



CORONA-NORCO UNIFIED SCHOOL DISTRICT
PURCHASING DEPARTMENT

SPECIFICATIONS & SCOPE OF WORK

BID No. 2018/19-040

ROOFING PROJECTS AT VARIOUS SITES (ROOFING REPLACEMENT, MAINTENANCE AND WARRANTY)

EXHIBIT A – SCOPE OF WORK

General Project Description:

The roofing project at the various sites will be phased project, consisting of two (2) phases. The District, in its sole discretion, reserves the right to include, remove or move roofing projects from either phases. The Contractor will be required to provide certifications from manufacturers for bidding on the different types of roofing projects.

Bidders shall provide all labor and additional materials to install new roofing including but not limited to:

1. All drains that are to remain must be water tested by roofing contractor before reroofing begins. If any drains are clogged, please notify the District immediately. Do not proceed until the drains are in working order. Roofing contractor will be responsible for all drains in place after project is completed to be in working condition once roof is complete.
2. Replace any rotted or damaged wood. The district must verify all replaced wood. Lack of proof lies on the responsibility of the contractor. Without proof, change orders will not be paid.
3. Replace any plastic or missing drain and overflow covers with new cast iron covers.
4. Absolutely no asbestos will be allowed in any product or form on this job.
5. Written certification from the roofing system manufacturer certifying the applicator is currently authorized for the installation of the specified roof system.
6. Manufacturer cannot be in or have been in bankruptcy (chapter 7 or chapter 11) in the last 10 years.
7. Secure all material and equipment on the job site. If any material or equipment is stored on the roof, assure that the integrity of the deck is not compromised at any time. Damage to the deck caused by the Contractor's actions will be the sole responsibility of the Contractor, and the deck will be repaired or replaced at his expense.

Specific Project Information:

Project Team & General Information: Refer to the Bid Set Drawings.

Liquidated damages: \$1,000.00 a day

Project Duration: For Phase 1, the completion period is Six (6) weeks commencing July 1, 2019 through August 9, 2019. The Phase 2 roofing projects, the completion time is estimated to start by middle December 2019 through early January 2020.

Engineer's Estimate: \$3,000,000 for the Repair, Maintenance and Warranty project
\$1,500,000 for the Roofing Replacement Project

Site access will be granted via appointments requested via email to the Project Manager – Tim Russell at TRussell@cnusd.k12.ca.us; or at (951) 736-3316.

Project Manual Contents:

1. Front End Documents
2. Divisions 1 and 7

SCHOOL LISTS

ROOFING BID (BID NO. 2018/19-040)

SITE LOCATIONS			
SCHOOL NAME	ADDRESS	TYPE OF ROOFING	PROPOSED PHASE
Barton Elementary	7437 Corona Valley Eastvale CA 92880	Monolithic Built Up Roofing	ONE
Foothill Elementary	2601 South Buena Vista Corona CA 92882	Monolithic Built Up Roofing	ONE
Centennial High	1820 Rimpau Avenue Corona CA 92881	Monolithic Built Up Roofing	ONE
Corona High	1150 West Tenth Corona CA 92882	Monolithic Built Up Roofing	ONE
Norco High	2065 Temescal Avenue Norco CA 92860	Single Ply Roofing	TWO
Roosevelt High	7447 Scholar Way Eastvale CA 92880	Monolithic Built Up Roofing	ONE
Parent Center	152 E 6th St, Corona, CA 92879	Single Ply Roofing	ONE
District Office	2820 Clark Avenue, Norco, CA 92860	Monolithic Built Up Roofing	ONE
District Office Portables		Single Ply Roofing	TWO
Warehouse & Maintenance	300 Buena Vista Ave., Corona, CA 92	Single Ply Roofing	TWO

COLD PROCESS
MONOLITHIC BUILT-UP
ROOFING REPLACEMENT
SPECIFICATIONS

SECTION 07520 – COLD PROCESS MONOLITHIC BUILT-UP ROOFING

PART 1 – GENERAL

SUMMARY

- A. Furnish necessary material and labor to install a Henry Roof System Specification or approved equal following the requirements of this Master Specification and site specific Scope of Work.
- B. Other work included: Furnish and install sheet metal, metal pan collar flashing, pipe flashings and counter-flashing.

1.02 REFERENCES

- A. National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual
- B. Western States Roofing Contractors Association (WSRCA)
- C. SMACNA
- D. Underwriters Laboratories (UL)
- E. American Society of Testing & Materials (ASTM)
- F. Uniform Building Code (UBC)

1.03 DEFINITIONS

- A. UNDERLAYMENT, BUFFER or BASE PLY– 80# Base sheet – first ply installed over wood deck or #604 25# Fiberglass Base Sheet or #607 33# Fiberglass Base Sheet installed over wood deck or insulation.
- B. INTERPLY – 2, 3 or 4 layers of #604 25# or #607 33# Fiberglass Base Sheet installed over Insulation or Underlayment.

1.04 SYSTEM DESCRIPTIONS

- A. Henry Specification #H3-NGC-MR - (See 3.05)
Over prepared deck surface mechanically fasten one layer #605 80# Inverted Cap and two ply #604 25# Fiberglass Base Sheet adhered in #902 Permanent Bond Adhesive. Surface with #197 Asphalt Emulsion reinforced with #189 Chopped Fiberglass. Finish with 294 Premium Elastomeric Base Coat and #280 White Elastomeric Roof Coating or other colors as specified.

Specification System & Weights per 100 Sq.ft.		Dry Weights
#606	SBS 80# Inverted Cap - Mechanically fastened	78lbs.
#197	Emulsion – 4 gallons per 100 sq. ft..	16lbs.
#196	Polyester Ply Sheet	3 lbs.
#197	Emulsion – 4 gallons per 100 sq. ft..	16lbs.
#196	Polyester Ply Sheet	3 lbs.
#197	Emulsion – 4 gallons per 100 sq. ft..	16lbs.
#196	Polyester Ply Sheet	3 lbs.
#197	Emulsion topcoat – 9 gallons per 100 sq.ft.	36 lbs.
#189	Chopped Fiberglass – 3 lbs. Per 100 sq.ft.	3 lbs.
#294	Premium Elastomeric Base Coat – 1 ¼ gallons per 100 sq. ft	5 lbs.
#280	White Elastomeric Finish Coat – 1 ¼ gallons per 100 sq. ft	5 lbs
"Option: #607 33# Fiberglass Base Sheet (add 16 lbs.)		
**Option: # 558 Emulsion Aluminum Reflective Coat- 1 ^{1/2} gallons per 100 sq.ft. (add 7 lbs.)		
Approximate Total Dry Weight		181bs.

1.05 SUBMITTALS

- A. Fire Hazard Classification - Provide letter certifying that roof membrane assembly qualifies for UL Class A fire hazard classification for the type of substrate(s), slope(s),

- insulation(s) (when applicable) and membrane(s) specified for this installation. Include copy of the UL listing.
- B. Applicator approval - Provide letter from manufacturer of roofing materials stating that applicator is acceptable to manufacturer.
- C. Complete materials list of all items to be furnished and installed under this Section.
- D. Copy of latest edition of the Roofing System Manufacturer's material specifications and installation instructions.
- E. Two (2) 3" x 5" samples of roof membrane mock-up and flashing membrane.
- F. Copy of Manufacturer's Warranty.

1.06 SUBMITTALS OF EQUALS

- A. Submittals shall be made no later than **May 30, 2019** and prior to bid date. Primary roof systems that have been reviewed and accepted as equals to the specified roof system will be listed in an addendum prior to bid date; only then will equals be accepted at bidding. All submittals which do not conform to the following requirements will be rejected.
- B. Furnish in triplicate:
 - 1. 8" x 10" mock up samples of the complete roof membrane and flashing membrane assemblies.
 - 2. Latest edition of the roofing system manufacturer's specifications and installation instructions.
 - 3. Detailed descriptive list of the materials proposed for use.
 - 4. Copy of UL approval of the proposed roofing system for the required assembly and slope. No other testing agency approvals will be accepted.
 - 5. Letter from the proposed primary roofing manufacturer confirming the number of years it has directly manufactured the proposed primary roofing system under the trade name and/or trademarks as proposed.
 - 6. List of ten (10) of the manufacturer's projects located within Southern California similar to the listed project sites of equal size and degree of difficulty which have been performing successfully for a period of at least ten (10) years. Include contact name and phone number.
 - 7. Complete list of material physical properties including solids. District reserves the right to request documentation from a nationally recognized independent lab certifying physical properties.
 - 8. Copy of manufacturer's inspection form.
 - 9. Qualifications of manufacturer's inspector(s)
 - 10. Proposal from manufacturer for site specific quality control program.
 - 11. Sample copy of the specified guarantee including terms and procedures for renewal.
 - 12. Documentation that manufacturer meets requirements of 1.06.

1.07 QUALIFICATIONS

- A. Manufacturer Qualifications
 - 1. Manufacturer shall be a member in good standing with the Southern California Roofing Contractors Association, Western States Roofing Contractors Association, National Roofing Contractors Association, and Construction Specifications Institute.
 - 2. Manufacturer must furnish as single source all primary roofing materials with manufacturer's labels and have current listing in Underwriters Laboratory Directory. Materials must bear UL Classification marking on bundle, package or container indicating that materials have been produced under UL's Classification and Follow-up Service.
 - 3. Manufacturer must provide list of 10 projects of equal size and difficulty within a 25 mile radius of the project site.

4. Manufacturer shall employ a full-time field inspector available for periodic inspections (not less than twice weekly) and final inspections. Inspection reports to be available to the District Representative on request.
 5. Manufacturer must employ a Registered Roof Consultant and Registered Roof Observer certified by the Roof Consultants Institute.
- B. Contractor Qualifications
1. Contractor to be approved and certified by the primary material manufacturer.
 2. Contractor must provide list of 3 projects of equal size and difficulty within a 50 mile radius using the specified roof system.
 3. Contractor must provide a supervisor that can communicate with Manufacturer's Inspector and District Representative.
 4. Contractor must provide knowledgeable foreman who understands all aspects of the specification.

1.08 QUALITY ASSURANCE

A. Pre-Job Conference

1. Prior to the beginning of work, a pre-job conference shall be held at the job site.
 2. Provide seven (7) calendar days advance written notice ensuring the attendance by competent authorized representatives of the Henry Certified Contractor (HCC), a Henry Company representative, the District, architect, consultant, and subcontractors including mechanical and electrical where such work penetrates the work of this Section.
 3. During the pre-job conference, attendees shall review the specifications to determine any potential problems, changes, etc. Scheduling, weather conditions, unique job site conditions, installation requirements and procedures and any other information pertinent to the roof system installation shall be discussed.
 4. The results of the conference shall be recorded with copies submitted to all participants
- B. Notify Henry Company Inspector 48 hours prior to job start, schedule changes and prior to application of surfacing and reflective coat.
- C. A copy of the specification is to be on the job site.

1.09 DELIVERY, STORAGE & HANDLING

A. Delivery Requirements

1. Deliver material in manufacturer's original sealed and labeled containers and in quantities required allowing continuity of application.

B. Storage Requirements

1. Store materials out of direct exposure to the elements. Store roll goods on a clean flat surface. Protect material against moisture. Store asphalt adhesives and cements in a heated area prior to use in cold weather.
2. When ambient temperatures are below 40°F (4°C), rolled materials must be stored in protected or heated areas and brought to the roof as needed for application.

C. Handling Requirements

1. Handle material in such a manner as to preclude damage and contamination with moisture or foreign matters
2. Materials that are found to be damaged or stored in any manner other than as stated above shall be automatically rejected and shall be removed and replaced at contractor's expense.

1.10 JOB CONDITIONS

A. Protection Requirements.

1. Protect building and grounds from overspray, staining and mechanical damage. Plank lawns, walks, etc. in traffic areas.
 2. Applicator will be held responsible for any damage caused to roof top equipment, roof penetrations, clogged drains (if not identified prior to starting the work) and damage to building and grounds resulting from the execution of his work.
 3. Lock valves on tankers when not attended.
 4. Cover or arrange air intakes to be turned off during application of solvent based materials.
- B. Environmental Requirements.
1. Do not apply material during precipitation or when rain is a probability during or after application before material can set.
 2. Never apply solvent-based adhesives or coatings to a wet surface.
 3. Never apply water-based emulsions when the ambient temperature is below 60°F (16°C) or will fall below 40°F (4°C) before the emulsion has cured to a tack-free black surface. High humidity, fog and dew will greatly extend the time for emulsions to cure.
 4. Protect adjacent surfaces from staining and mechanical damage during application of roofing.

1.11 WARRANTY

A. CONTRACTOR WARRANTY

1. Prior to acceptance of the roofing work, furnish certified written warranty signed by Roofing Contractor agreeing to make repairs and replacements required to maintain roof, including flashing, in watertight condition for two years from date of substantial completion.
2. Make repairs or replacements at no additional cost to District.
3. Warranty shall include temporary repair work under emergency condition as required to maintain water tightness of the building pending permanent repairs.

B. MANUFACTURER'S WARRANTY

1. Furnish Manufacturer's 10 + 10 -year Warranty for material and workmanship. No exceptions to ponding water. There is to be no additional warranty or inspection fees for the 10-year extension.
2. Manufacturer to make inspection in the 2nd and 10th year of the warranty period.

1.12 MAINTENANCE

- A. Furnish District with annual maintenance requirements to maintain contractor and manufacturer's warranties.

PART 2 – PRODUCTS

ACCEPTABLE MANUFACTURERS

- A. Materials manufactured or supplied by Henry Company, Huntington Park, CA 90255. (323) 583-5000.
- B. Products by other manufacturers must be submitted by May 30, 2019 prior for approval in accordance with Section 1.06 of these specifications..

PRODUCT DELIVERY

- A. Bulk delivery material shall be accompanied by a Henry Company bill of lading or equivalent.

MATERIALS

- A. GENERAL: Refer to Project Scope of Work for applicable product references.

- B. Sheathing paper (wood decks only) -1 ply
- C. UNDERLAYMENT OR BUFFER PLY
 - 1. #606 80# SBS Underlayment, reverse rolled – ASTM D 3909-91
- D. INSULATION
 - 1. Polyisocyanurate insulation ASTM C-1289-95
 - 2. Density - ASTM D1622 – nominal 2 pcf
 - 3. Compressive strength - ASTM D1621 – nominal 20 psi
 - 4. Polyisocyanurate insulation overlay of minimum ½ inch perlite, fiberboard or 1/8” Henry Recover Board. Combined R-value of 19.
 - 5. Mechanical fasteners – corrosion resistant – listed with Factory Mutual
 - 6. Insulation adhesive: #111 InsulBond applied at rate of 2 to 2 ½ gallons per 100 sq.ft.
- E. INTERPLY (Select specified ply sheet)
 - 1. #604 Fiberglass Ply Sheet
 - a. nominal 25# asphalt coated base sheet
 - b. Tensile Strength: 65 lbs. MD – 55 lbs. XD
- F. INTERPLY ADHESIVE – 2 Gallons/Sq/Ply:
 - 1. #902 Permanent Bond Adhesive – low odor, modified and rubberized cold adhesive
- G. BASE FLASHING
 - 1. modifiedPlus NP180 s/s – SBS modified membrane, polyester reinforced.
- H. SURFACING (9 Gallons with 3 lbs. Glass/Square):
 - 1. #197 Asphalt Emulsion – ASTM D 1227-95 Type III, Class I
 - 2. and #189 Chopped Fiberglass
- I. REFLECTIVE SURFACING (as specified in Project Scope of Work)
 - 1. #558 Aluminum Emulsion- 1½ gal/Square
 - 2. Premium Elastomeric Coating: #280 White, #294 Base Coat at 1 ¼ Gallons per square each
- J. MISCELLANEOUS PRODUCTS
 - 1. Primer #113 VOC Compliant Primer
 - 2. #600 Ruftac – 75 mil - SBS modified self-adhesive membrane
 - 3. #209 Modified Mastic
 - 4. #183 Reinforcing Glass – Yellow
 - 5. #196 Polyester Fabric
 - 6. #197 Asphalt Emulsion
 - 7. Walk pads
 - 8. Approved mechanical fasteners
 - 9. Wolmanized wood nailers
 - 10. Replacement metal to be 24 gauge galvanized sheet metal
 - a. Metal edging to have maximum ¼” rise.
 - b. All flanges to be 4 inches with full corners
 - 11. Lead Flashings to be minimum 4 oz. – factory or field soldered
 - 12. Josam or Smith drains and overflows
 - 13. Four inch cant strips ASTM C-208

PART 3 – APPLICATION

GENERAL

- A. Henry Company’s General Requirements and Product Data are a part of this specification.
- B. Do not tear-off or remove any more roofing than can be replaced the same day.
- C. Unless sheet metal components are specified for replacement carefully remove, clean, prime and set aside for reinstallation. Carefully turn up counter-flashing.

EXAMINATION

- A. Inspect deck and advise District's Representative of any corrections required before proceeding with roofing. Report in writing any unsatisfactory conditions that cannot be guaranteed. Absence of such report constitutes acceptance of the surfaces and conditions.

PREPARATION

- A. Sweep or vacuum all surfaces prior to commencement of roofing. Allow surface to dry before proceeding.
- B. Cut ply sheets into 18 foot lengths. Allow plies to flatten before application.
- C. All surfaces shall be well-secured, firm, smooth and free from rough spots and sharp projections before roof application begins.
- D. Wood decks. Repair and/or renaill roof sheathing where necessary. Cover gaps of ½" or more between sheathing board with flat sheet metal stock nailed. Contractor to replace deteriorated sheathing with new to match existing unless specified otherwise under Scope of Work.
- E. Test interior drains to confirm that they flow freely. Immediately notify District's Representative if correction is required. Protect drains from plugs of gravel and debris.
- F. If not scheduled for new metal, carefully lift or remove metal counter-flashing, coping, and gravel stop. Clean metal and set aside for reinstallation.

GENERAL REQUIREMENTS

- A. Install roofing in accordance with roofing system manufacturer's instruction, scope of work for the site and these requirements.
- B. Valleys and waterways. Install extra layer of the specified glass base set in full width application of #902 Permanent Bond Adhesive in valleys, drains and waterways.
- C. Prime metal flanges (all jacks, edge metal, etc.), concrete and masonry surfaces with a uniform coating of asphalt primer.
- D. Thinning or alterations of adhesives, primer, emulsion, reflective coat and sealants is not permitted.
- E. Clean all drains and remove clamp rings, dried mastic and any other loose material. Prime with asphalt primer and allow to dry. Install minimum 30" square leads in drains set in #209 Modified Mastic. When lead is not permitted by District install Ruftac. Replace broken or missing clamp rings, bolts or fasteners and drain bonnets with new. Complete drains the same day.
- F. Scuppers/Outlets. Set scuppers in 1/8" troweling of plastic cement. Three course flange with modified mastic and glass fabric.
- G. Lift all supports for conduits and other pipes. Install new wood blocks under conduit or pipes. Reinforce under block with one layer of 80# Cap Sheet cut 6 inches larger in all directions of block, granules side up, set in generous application of specified modified mastic prior to Monolithic surfacing. Seal top of bolts, screws, etc., with #209 Modified Mastic. Loosen brackets so pipes can expand and contract freely.
- H. EQUIPMENT PADS. Install one layer of Ruftac over equipment pads before installing metal pans.
- I. PIPE PENETRATIONS, ELECTRICAL JACKS, VENT PIPES EQUIPMENT STANDS
 1. Set flange over base plies set in plastic cement.
 2. Seal with 6" strip of reinforcing fabric sealed solidly with modified mastic. Cut a collar of base sheet to fit around vents and overlap the flanges 6" on sides. Set in application of modified mastic.
 3. Form a plastic cement cant around base of vents prior to the application of the Monolithic surfacing.
 4. Ruftac is an acceptable alternative to I.2.

5. When specified in the Site's Scope of Work attached herein, install storm collars on all pipe penetrations and jacks.
- J. 3-COURSING
1. Prime wall surface at least 3" above termination edge of the base flashing.
 2. Over completed base flashing trowel a 5 inch wide layer of modified mastic 1/8" thick to completely cover nails and top edge of base flashing.
 3. Embed a 4" wide strip of Yellow Glass Fabric and apply another 1/8" troweling of modified mastic covering fabric completely. Bring to a feather edge and finish in a straight line.
 4. If not covered by metal counter-flashing cover with Monolithic Emulsion system.
- K. CANT STRIPS. Install cant strip at all horizontal to vertical transitions. Nail or set in specified modified mastic. Set to provide smooth transition without gaps. Miter corners. At scuppers bevel cant strip starting 8" back from outlet.
- L. COPING JOINTS: Clean coping joints. Prime 3 inches on both sides of joint and seal joint with 6 inch minimum layer of Ruftac.
- M. WATER CUT-OFF. At end of day's work, or when precipitation is imminent, install a water cut-off at all open edges. Install alternating layers of plastic cement and roof felts. Construction is to withstand protracted periods of service. Remove cut-offs completely prior to the resumption of roofing.
- N. Roll the membrane with a 75 lb. (34kg) (minimum) weighted roller within 30 minutes to 4 hours of application. Provide waterstops and seal all terminations at the end of each day.
- O. On slopes over 3" in 12" (250mm/m), install interplies parallel to slope blindnailing 4" (102mm) at end laps only, 6" (152mm) on center.
- P. WALKWAYS. Install walkways in 4' sections allowing 2" spacing between sheets. Cut and trim pieces as required to fit conditions. Set walkway in spot applications of #209 Modified Mastic.

Specification H3-NGC-MR (NAILABLE DECK – NO INSULATION)

- A. Over diagonal sheathing install one layer of rosin sheathing paper. Lap each sheet 2" (51mm) and nail sufficiently to hold in place.
- B. UNDERLAYMENT OR BUFFER: Apply #606 inverted 80# SBS Buffer granule side down with 2" (51mm) side laps and 4" (102mm) end laps. Apply the first sheet of underlayment with a 12" (305mm) width and the remaining sheets full width.
- C. Nail underlayment through one inch tin disks at side laps 9" (229mm) on center and 18" (457mm) on center, staggered in two rows 12" (305mm) from each edge. Fasteners to be sufficient length to penetrate deck 1/2 inch.
- D. Specification H3-NGC-MR
 1. Over the underlayment, apply two (2) layers of #604 25# interply sheets set in a uniform application of #902 Permanent Bond Adhesive at a rate of 2 gallons per 100 sq.ft.
 2. Apply the first sheet with an 18" (457mm) width then over that a full width piece. Install the remaining sheets full width overlapping preceding sheet 19". Stagger laps with the layer below. Run plies to top of cant.

METAL EDGING

- A. Extend top layer of base sheet over edge of roof approximately 1".
- B. Install metal flange over completed membrane but before application of surfacing. Set metal flange in trowel application of plastic cement. Nail 3" (76mm) o.c. staggered.
- C. Over prepared surface install 12-inch wide Ruftac over metal flange and extending onto the field of the roof.

FLASHINGS

- A. General Requirements

1. Prime concrete surfaces with specified primer and allow to dry.
 2. Complete first ply of flashing daily to assure watertight installation.
 3. Install Base Flashing to a maximum 24-inch height.
 4. Ruftac may be used in lieu of #605 Mineral Surfaced Cap Sheet, but requires that surface be primed and allowed to dry.
 5. Install flashings in two pieces when height exceeds 24 inches. Overlap bottom layer 3 inches.
 6. Reinforce and make watertight all angles with one layer of mineral surfaced cap to extend two (2) inches above cant and two (2) inches onto field. Coat substrate and back of sheet with 902 Permanent Bond Adhesive at rate of 1 gallon per 100 sq.ft. per side. Allow to tack. May require approximately 30 minutes air time to be tacky. Press in place. Lap sides 3 inches.
 7. Unless otherwise specified 3-course top edge with #209 Modified Mastic and #183 Yellow Glass
- B. Install Flashing Specification Number #180
1. Cut layer of mineral surfaced cap to extend not less than 4" (51mm) above cant strip. Coat back of cap ply and wall with #902 Permanent Bond Adhesive at rate of $\frac{3}{4}$ gallon/100 sq.ft. (.3 l/m²) each side. Allow sheets to set until tacky. Press sheet in place. Lap ends 4" (102mm).
 2. Nail top of completed base flashings 8" (204mm) o.c.
 3. Provide counterflashing with minimum 4" (102mm) face installed in reglet or surface mount.
 4. Apply compatible sealant.
- C. Wall Flashings
1. Wood Walls. Nail #605 granule side out. Nail 12 inches on center in all directions and 6" on end laps. Extend wall flashing over base flashing three inches.
 2. Concrete Walls. Unless otherwise specified, cover the inside and tops of concrete parapet walls with one layer of Ruftac. Extend membrane over base flashing three (3) inches and to within 3 inches of outside wall. Rub in firmly by using a wallpaper roller bonding Ruftac without wrinkles or loose areas. Nail top edge through one inch tin disks eight (8) inches o.c.
 3. Masonry Block Walls. Unless otherwise specified cover the inside and tops of masonry block walls with one layer of polyester embedded in 4 gallons of 107 Asphalt Emulsion. Side laps to be three (3) inches. Extend over base flashing three (3) inches and to within 3 inches of outside wall. Polyester to be fully embedded and without wrinkles.

SURFACING; Monolithic System

- A. After the adhesive has thoroughly cured (no solvent odor is evident and laps cannot be pulled apart), but not less than five days, sweep or pressure blow dust and debris from the roof surface to provide a clean surface. Hose and/or scrub off with water any residue accumulation.
- B. Protect adjacent walls not scheduled for emulsion and reflective coating. Protect equipment, roof top units, valves, switches, coils or moveable parts etc. not scheduled to receive Monolithic application from overspray. Mask off identification plates on equipment.
- C. Clean gutters prior to surfacing.
- D. Cover prepared surfaces with not less than 9 gallons (34l) per 100 sq.ft of undiluted #197 Asphalt Emulsion. Evenly blend emulsion with 3 lbs. (1.4kg) of $\frac{3}{4}$ " (19mm) long chopped glass reinforcing sprayed with equipment approved by Henry Company. Tufting of the glass fibers is not acceptable. Spray emulsion in a pattern into laps of base sheet so that when system is dry, there are no voids or bridging of glass over any seam of the membrane.

- E. Unless otherwise specified, spray vents, ducts, and parapet walls. Spray parapet walls to within one inch of outside edge; above reglets and/or 5-course counter-flashing.
- F. Spray base flashings and other designated surfaces with the Monolithic System.

REFLECTIVE COATING:

- A. As soon as emulsion surfacing has cured (tack-free and black), clean the surface of dust and debris. After five (5) days hose roof surface and scrub out any pockets of residue.
- B. Apply #294 Elastomeric Base Coating at the rate of 1 ¹/₄ gallons per 100 square feet (.6l/m²) in one coat.
- C. Apply #280 White Elastomeric Finish Coating at the rate of 1 ¹/₄ gallons per 100 square feet in one (.6l/m²) coat.
NOTE: Both coats to be applied same day. Base coat must be thoroughly dry before application of finish coat.
- D. Apply #588 Aluminum Emulsion Coating at the rate 1 ¹/₄ gallons per 100 square feet in one (.6l/m²) coat.
- E. Any areas that peel must be redone before the project will be considered complete.
- F. In arid climates when rain is unlikely within 30 days of application of the aluminum coat, hose roof surface 30 days after application.

CLEAN-UP

- A. Test all drains to confirm they are free flowing and clear of debris.
- B. Clean gutters and downspouts as needed of all debris.
- C. Any deficiencies found during final inspection will be corrected within 5 working days and will be re-inspected by a Manufacturer's Representative and District's Representative.
- D. Leave premises clean to complete satisfaction of the District.

END THIS SECTION

ROOF MAINTENANCE SPECIFICATIONS

ROOF MAINTENANCE SPECIFICATIONS

PART 1 – GENERAL

SUMMARY

1. Furnish necessary material and labor to install a Henry Roof Maintenance System. Site Work Description is part of this specification. In event of conflict between Site Work Description and these standard requirements follow the Site Work Description. Work includes, but is not limited to:
2. Repair of existing system (See Site Work Description for additional requirements)
 - Repair of defects in the roof membrane including blisters, splits, fishmouths, and loose laps.
 - Repair or replacement of defects in the flashings at walls, roof penetrations, metal flanges, etc. including replacement of deteriorated cant strips, curbs, wood nailers, etc.
 - Refill Pitch pans
 - Replacement of deteriorated sheet metal to match existing as designated on job walk. (See Site Work Description)
 - Cleaning and resetting roof drains/scuppers as applicable.
 - Repair or replacement of defects in expansion joints with compatible material as applicable.
 - Removal of all debris from the roof.
3. Resurface roof membrane and base and wall flashings (See Site Work Description for selected Spec #)
 - a. Henry Specification #HMS-197/588
 - b. Henry Specification #HMS-197/294-280
 - c. Henry Specification #H-MR
 - d. Henry Specification #H1-PE-MR
4. Miscellaneous requirements including:
 - Wood blocking under pipe supports where missing or deteriorated
 - Install protective layer of Ruftac under unsecured wood blocking where missing or deteriorated.
5. Unit Pricing (See Site Work Description if applicable)

REFERENCES

National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual
Western States Roofing Contractors Association (WSRCA)
SMACNA
Underwriters Laboratories (UL)
American Society of Testing & Materials (ASTM)

SYSTEM DESCRIPTIONS

Henry Specification #HMS-197/588

Over prepared existing roof surface with #107 Asphalt Emulsion. Finish with #558 Aluminum Emulsion.

Specification System & Weights per 100 Sq.ft.

Existing roof	TBD
#197 Asphalt Emulsion – 3 gallons/100 sq.ft.	12 lbs.
#588 Aluminum Coat – 1-1/2 Gallons per 100 sq.ft.	5 lbs.

Approximate Total Dry Weight

Existing roof + 17 lbs.

Henry Specification #HMS-197/294-280

Over prepared existing roof surface with #197 Asphalt Emulsion. Finish with Base Coat of #294 (grey) and Top Coat of #280 (white).

Specification System & Weights per 100 Sq.ft.	Dry Weights
Existing roof	TBD
#197 Asphalt Emulsion – 3 gallons/100 sq.ft.	12 lbs.
#294 Base Coat – 1-1/4 Gallons per 100 sq.ft.	8 lbs.
#280 Top Coat – 1-1/4 Gallons per 100 sq.ft.	7 lb.s
Approximate Total Dry Weight	Existing roof + 27 lbs.

Henry Specification #H-MR

Over prepared existing roof surface with #107 Asphalt Emulsion reinforced with #189 Chopped Fiberglass. Finish with #588 Aluminum Emulsion.

Specification System & Weights per 100 Sq.ft.	Dry Weights
Existing roof	TBD
#197 Emulsion topcoat – 9 gallons per 100 sq.ft.	36 lbs.
#189 Chopped Fiberglass – 3 lbs. Per 100 sq.ft.	3 lbs.
#294 Base Coat – 1-1/4 Gallons per 100 sq.ft.	8 lbs.
#280 Top Coat – 1-1/4 Gallons per 100 sq.ft.	7 lbs.
Approximate Total Dry Weight	Existing roof + 44 lbs.

Henry Specification #H1-PE-MR

Over prepared existing roof install one ply #196 Polyester Sheet adhered in #197 Asphalt Emulsion. Surface with #197 Asphalt Emulsion reinforced with #189 Chopped Fiberglass. Finish with #558 Aluminum Emulsion.

Specification System & Weights per 100 Sq.ft.	Dry Weights
Existing roof	TBD
#197 Asphalt Emulsion – 4 gallons/100 sq.ft.	16 lbs.
#196 Polyester	3 lbs.
#109 Emulsion topcoat – 9 gallons per 100 sq.ft.	36 lbs.
#189 Chopped Fiberglass – 3 lbs. Per 100 sq.ft.	3 lbs.
#294 Base Coat – 1-1/4 Gallons per 100 sq.ft.	8 lbs.
#280 Top Coat – 1-1/4 Gallons per 100 sq.ft.	7 lbs.
Approximate Total Dry Weight	Existing roof + 63 lbs.

SUBMITTALS

Applicator approval - Provide letter from manufacturer of roofing materials stating that applicator is acceptable to manufacturer.

Complete materials list of all items to be furnished and installed under this Section.

QUALIFICATIONS

Manufacturer Qualifications

1. Manufacturer must furnish as single source all primary roofing materials with manufacturer's labels and have current listing in Underwriters Laboratory Directory. Materials must bear UL Classification marking on bundle, package or container indicating that materials have been produced under UL's Classification and Follow-up Service.
2. Manufacturer must hold the original warranty.

Contractor Qualifications

1. Contractor must provide a supervisor that can communicate with Manufacturer's Inspector and District Representative.

2. Contractor must provide knowledgeable foreman who understands all aspects of the specification.

1.07 QUALITY ASSURANCE

Pre-Job Conference

1. Prior to the beginning of work, a pre-job conference shall be held at the job site.
2. During the pre-job conference, attendees shall review the specifications to determine any potential problems, changes, etc. Scheduling, weather conditions, unique job site conditions, installation requirements and procedures and any other information pertinent to the roof system installation shall be discussed.

Notify Henry Company Inspector 48 hours prior to job start, schedule changes and prior to application of surfacing and reflective coat. A copy of the specification is to be on the job site.

1.08 DELIVERY, STORAGE & HANDLING

Delivery Requirements

1. Deliver material in manufacturer's original sealed and labeled containers and in quantities required allowing continuity of application.

Storage Requirements

1. Store materials out of direct exposure to the elements. Store roll goods on a clean flat surface. Protect material against moisture. Store asphalt adhesives and cements in a heated area prior to use in cold weather.
2. When ambient temperatures are below 40°F (4°C), materials must be stored in protected or heated areas and brought to the roof as needed for application.

Handling Requirements

1. Handle material in such a manner as to preclude damage and contamination with moisture or foreign matters
2. Materials that are found to be damaged or stored in any manner other than as stated above shall be automatically rejected and shall be removed and replaced at contractor's expense.

1.09 JOB CONDITIONS

Protection Requirements.

1. Protect building and grounds from overspray, staining and mechanical damage. Plank lawns, walks, etc. in traffic areas.
2. Applicator will be held responsible for any damage caused to roof top equipment, roof penetrations, clogged drains (if not identified prior to starting the work) and damage to building and grounds resulting from the execution of his work.
3. Lock valves on tankers when not attended.
4. Cover or arrange air intakes to be turned off during application of solvent-based materials.

Environmental Requirements.

1. Do not apply material during precipitation or when rain is a probability during or after application before material can set.
2. Never apply solvent-based adhesives or coatings to a wet surface.
3. Never apply water-based emulsions when the ambient temperature is below 50°F or will fall below 40°F before the emulsion has cured to a tack-free black surface. High humidity, fog and dew will greatly extend the time for emulsions to cure.
4. Protect adjacent surfaces from staining and mechanical damage during application of roofing.

1.10 WARRANTY

CONTRACTOR WARRANTY

1. Prior to acceptance of the roofing work, furnish certified written warranty signed by Roofing Contractor agreeing to make repairs and replacements required to maintain roof, including flashing, in watertight condition for one year from date of substantial completion.
2. Make repairs or replacements at no additional cost to Owner.
3. Warranty shall include temporary repair work under emergency condition as required to maintain water tightness of the building pending permanent repairs.

MANUFACTURER'S WARRANTY

1. Furnish Manufacturer's 10 -year Warranty for material and workmanship.

1.11 MAINTENANCE

Furnish District with annual maintenance requirements to maintain contractor and manufacturer's warranties.

PART 2 – PRODUCTS

ACCEPTABLE MANUFACTURERS

Materials manufactured or supplied by Henry Company, Huntington Park, CA 90255. (323) 583-5000. Local Representative:

PRODUCT DELIVERY

Bulk delivery material shall be accompanied by a Henry Company bill of lading.

MATERIALS

#197 Asphalt Emulsion – meeting following requirements:

ASTM D-1227 Type III, Class I

Color. Black

Viscosity @ 77°F 8000-15000 cps (ASTM D2196)

Density @ 77°F 8.7 lbs./gal

Non-volatile Matter by Weight 47-53% (ASTM D2939)

Pliability @ 32°F No cracking or separating (ASTM D2939)

#196 Polyester meeting following requirements:

Weight. 2.9 oz./sq. yd.

Elongation 25.8%(ASTM D-1682)

Trapezoidal Tear Strength 14.2 lbs.(ASTM D-1117)

Tensile 41 lbs.(ASTM D-1682)

Mullen Burst 127 lbs.(ASTM D-3786)

REFLECTIVE SURFACING

Premium Elastomeric Top Coating: #280 White – ASTM D6083

2. Premium Elastomeric Base Coat: #294

3. #558 Aluminum Emulsion-

MISCELLANEOUS PRODUCTS

1. #113 VOC Compliant Primer

2. #189 Glass Roving

3. #209 Modified Mastic

4. #600 Ruftac – 75 mil - SBS modified self-adhesive membrane

5. #289 ElastoCaulk

6. #183 Reinforcing Glass – Yellow

7. Walk pads approved by manufacturer

8. Approved mechanical fasteners

9. Termination bar
10. Wolmanized wood nailers
11. Replacement metal to be 24 gauge galvanized sheet metal
 - a. Metal edging to have maximum ¼" rise.
 - b. All flanges to be 4 inches with full corners
 - c. Pitch pans to have soldered joints.
12. Lead Flashings to be minimum 4 oz. – factory or field soldered
13. Four inch cant strips ASTM C-208

PART 3 – APPLICATION

3.01 GENERAL

General Requirements and Roof Repair Requirements are part of these Specifications. Unless sheet metal components are specified for replacement carefully remove, clean, prime and set aside for reinstallation. Carefully turn up counterflashing.

Clean the existing roof thoroughly. Power wash or vacuum low spots and valleys. Prime valleys and ponded areas where dirt has collected including areas around all pipes, skylights, vents and other projections. Prime with #197 asphalt emulsion diluted 5 parts emulsion to one part water.

Reinforce all valleys with an extra layer of #196 polyester embedded in #197 asphalt emulsion at rate of 4 gallons per 100 sq.ft.. Extend ply at least 12" up inclines. Apply in the direction of the slope of the valley, lapping 4" on ends. Inspect and mark flashings for deterioration, splits, punctures, separation from wall, etc. and repair or replace in accordance with specified procedures.

Replace deteriorated, severely buckled, brittle or badly cracked base flashings determined to be non-repairable with Henry Specification #196. Clean thoroughly and prime all existing flashings and scuppers which are in good condition and seal with 6" yellow glass or polyester fabric and modified mastic.

Re-secure any loose membrane flashing nailing top edge 8" o.c.

Replace damaged or rusted metal flashings with new 24-gauge galvanized flashings.

Inspect and mark roof membrane for defects including blisters, splits, holes in membrane and deterioration of roofing felts. Repair in accordance with specified procedures.

Clean all drains and remove clamping rings, dried mastic and any other loose material. Prime with asphalt primer. Install a layer of #600 Ruftac 3 feet square at all drains set in a layer of #209 Modified Mastic.

Lift all supports for conduits and other pipes. Replace all rotted wood pipe supports. Prime under such supports and install a layer of Ruftac embedded into a generous application of #209 Modified Mastic.

Extend Ruftac 6" (152mm) beyond the support on all sides. Reset supports and re-secure same as original.

Seal top of bolts, screws, etc., with #209 Modified Mastic. Loosen brackets so pipes can expand and contract freely. Three-Course all pipes and corners with yellow glass or polyester fabric and #209 Modified Mastic.

SHEET METAL

1. Sheet metal is to be a minimum of 24 gauge galvanized steel.
2. Prime all surfaces of sheet metal that will come in contact with roofing mastics, adhesives and coatings.
3. Solder all joints. Corner flanges must be full corners.
4. Provide metal clips one gauge heavier than coping, gravel stop or edge metal.

5. Face of counter flashing and gravel stop or edge metal should be sufficient dimension to cover top of flashing or wood blocking. If necessary add sheet metal "skirt".

PIPE PENETRATIONS, ELECTRICAL JACKS, EQUIPMENT STANDS

1. Install storm collars on all pipe penetrations and jacks.
2. Replace deteriorated caulking. Remove old sealant. Wire brush and prime. Replace with compatible caulking.

WALK PADS

1. Install walk pads over finished roof. Space pads 2" apart to allow drainage.
2. Set walk pads in not less than 5 generous spot applications of #209 Modified Mastic.

3.02 GENERAL REPAIR REQUIREMENTS

Thoroughly clean roof surface of dirt, debris, loose granules and contaminants at and around repair area extending 18" beyond perimeter of defect. Prime area and allow to dry. Extend repair a minimum of 6" beyond damage. Minimum repair is to be Ruftac set in #209 Modified Mastic.

Apply #600 Ruftac Self-Adhering SBS Modified Asphalt Membrane by peeling off the backing and pressing it onto the area to remove any entrapped air. A brush coat of emulsion or aluminum coating is required over the Ruftac if it is to remain exposed.

Alternate to 3.02D: 5-course application of 2 layers of polyester, sandwiched between alternating layers of #289 ElastoCaulk. Increase number of layers of polyester and ElastoCaulk to match the number of damaged original roofing plies.

On insulated systems inspect for water infiltration. Remove wet or damaged insulation and replace with insulation of same type and thickness. Mechanically attach insulation or adhere with #111 InsulBond adhesive. Install new roof membrane in accordance with not less than Henry Specification H3-IG4C-MR.

Alternate repair methods require approval of Henry Company Technical Services or equivalent.

3.03 MEMBRANE REPAIRS

SMALL HOLES AND CRACKS

1. See General Repair Requirements 3.02
2. Apply plastic roof cement or flashing compound 1/8" to 1/4" thick into the hole or crack using a roofer's trowel or gloved hand, working the modified mastic into the opening and 2-4" beyond.
3. For damaged areas larger than 1/4" repair with Ruftac or 5-course with #289 ElastoCaulk and Polyester

BLISTERS

1. See General Repair Requirements 3.02.
2. Cut and remove blistered material until good adhesion of the membrane is found.
3. Install the same number of plies as are removed, but not less than two plies. Fill depression with sufficient number of plies of #604 set in #902 Permanent Bond Adhesive to make surface flush.
4. Cover with Ruftac set in #209 Modified Mastic extending 6 inches onto existing roof. Alternate to 3.03B2 and 3. Make an X cut at blister, cutting only the layer(s) that is raised. Fold back plies and allow to dry. Apply #209 Modified Mastic between plies and press in place. Trim any overlap.

FISHMOUTHS, BUCKLES, WRINKLES, RIDGES

1. See General Repair Requirements 3.02.
2. Cut out defective material to an adhered area.

3. Cover with Ruftac set in #209 Modified Mastic extending 6 inches onto existing roof.

SPLITS

1. See General Repair Requirements 3.02.
2. Prepare surface area 24 inches on each side of split and 36 inches beyond end of the split.
3. Cut out loose felt from the split area.
4. Extend split 12 inches further in length by cutting through the membrane.
5. Make a 6-8 inch T-cut at both ends of the split.
6. Cut #606 80# granulated sheet 9 inches wide and sufficient length to cover the split. Install granule side down centered over the split.
7. Cover with Ruftac set in #209 Modified Mastic extending 6 inches onto existing roof.

3.04 FLASHING REPAIR PROCEDURES

GENERAL REPAIR REQUIREMENTS

1. Thoroughly clean base flashing and adjacent roof surface of dirt, debris, loose granules or gravel, contaminants at and around repair area extending 18" beyond perimeter of defect.
2. Prime area and allow to dry completely.
3. Extend repair a minimum of 6" beyond damage.
4. Repairs that extend to top of base flashings are to be mechanically fastened and three-coursed.

LOOSE, WRINKLED, BUCKLED, CRACKED BASE FLASHINGS

1. See General Repair Requirements 3.04A
2. Install the same number of plies as are removed, but not less than two plies.
3. Set one ply of Ruftac in #209 Modified Mastic extending 6" beyond damage.
4. Repeat procedure extending second ply 3" beyond previous layer.
5. Fasten through tin discs top of the base flashing to the wall or curb 6" on center maximum.
6. Three-course fasteners and termination edge of base flashing with specified mastic and #183 reinforcement fabric.

OPEN LAPS

1. See General Repair Requirements 3.04A
2. Carefully cut out open lap or void at side lap or field membrane.
3. Remove debris, clean and prime.
4. Set one ply of Ruftac in #209 Modified Mastic extending 6" beyond damage.
5. Repeat procedure extending second ply 3" beyond previous layer.
6. Three-course fasteners and termination edge of base flashing with specified mastic and #183 reinforcement fabric.

GAPS AT TOP OF BASE FLASHING

1. See General Repair Requirements 3.04A
2. Make a vertical slit in the base flashing until a bonded area is found.
3. Carefully pull back membrane and apply #209 Modified Mastic to wall or curb and press membrane back in place.
4. Over repair, set one ply of Ruftac in #209 Modified Mastic extending 6" on either side of repair.
5. Repeat procedure extending second ply 3" beyond previous layer.
6. Three-course fasteners and termination edge of base flashing with specified mastic and #183 reinforcement fabric.

LOOSE MECHANICAL ATTACHMENT

1. Remove loose fasteners
2. Re-secure base flashings through tin discs of a larger diameter or fastened to an adjacent location (new hole).
3. Three-course fasteners and termination edge of base flashing with modified mastic and #183 reinforcement fabric.

DETERIORATED BASE FLASHINGS

1. Remove and replace deteriorated base flashings.
2. Install Henry Specification #196.

3.05 BASE FLASHINGS – SPECIFICATION #196

Prime concrete surface with specified primer and allow to dry.

Install #600 Ruftac in three foot lengths (cut cross machine or from end of roll) using salvage edge for laps. Prime where membrane will overlap.

Cut #600 Ruftac to required dimensions. Align sheet before removing release paper. Press in place. Lap ends 4". Set termination edges in #209 Modified Mastic. Extend onto field 4". Lightly prime exposed Ruftac surface and allow to dry.

On plywood walls nail #600 Ruftac 9 inches o.c. in both directions.

Flashing Cap. Cut #196 Polyester to extend not less than 2" above the Ruftac ply and 6" onto the field of the roof. Coat the surface to receive the polyester with #107 Asphalt Emulsion and embed the polyester. Lap ends 4". Stagger laps with layer below. Extend onto field 6". Nail top of completed base flashings 8" o.c. 3-course top edge with #209 Modified Mastic #183 Yellow Glass.

1. Prime wall surface at least 3" above termination edge of the base flashing.
2. Over completed base flashing trowel a 5 inch wide layer of #209 Modified Mastic
3. 1/8" thick to completely cover nails and top edge of base flashing.
4. Embed a 4" wide strip of Yellow Glass Fabric and apply another 1/8" troweling of modified mastic covering fabric completely. Bring to a feather edge and finish in a straight line. Install counter-flashing. Apply specified surfacing and reflective coat.
5. Maximum allowable flashing height is 24 inches. For higher requirements install base flashings and complete wall with wall flashing.

3.06 WALL FLASHINGS

Cover wall with one layer of polyester fabric embedded into 4 gallons per 100 sq. ft. of #197 asphalt emulsion. Extend wall flashing over base flashing 4 inches.

Extend wall flashing over wall and down outside face 2 inches or 3-course top edge with modified mastic and #183 Yellow Glass.

3.07 MEMBRANE APPLICATION –Valleys, Waterways & Specification #H1-PE-MR

All surfaces shall be well secured, firm, smooth and free from rough spots and sharp projections before roof application shall begin. Complete all repairs prior to application of membrane. Surface may be damp, but must be free of free standing water. Over the prepared roof, apply a uniform layer of #197 Emulsion using a brush or roofing spray equipment at the rate of 4 gallons per 100 sq.ft. Immediately embed the fabric into the wet emulsion without wrinkles. Press fabric into the emulsion by a soft push broom or paint roller. Overlap preceding sheet and end laps 4 inches. Along perimeter install a half width of polyester followed by a full layer. At vertical transitions run material to the toe of the cant.

3.08 SURFACING –

After the emulsion or repairs have cured, sweep or pressure blow dust and debris from the roof surface to provide a clean surface. Hose and/or scrub off with water any residue accumulation. Protect adjacent walls not scheduled for emulsion and reflective coating. Protect equipment, roof top units, valves, switches, coils or moveable parts etc. not scheduled to receive Monolithic application from overspray. Mask off identification plates on equipment.

Specification #H1-PE-MR or H-MR

1. Cover prepared roof and flashing surfaces with not less than 9 gallons per 100 sq.ft of undiluted #197 Asphalt Emulsion. Evenly blend emulsion with 3 lbs. of ¾" long chopped glass reinforcing sprayed with equipment approved by Henry Company. Tufting of the glass fibers is not acceptable.
2. Spray emulsion in a pattern so that when system is dry, there are no voids or bridging of glass over any seam of the membrane. Finish to be 72 dry mils.

Specification #HMS-197/588or #HMS-197/294-280

1. Over the roof surface, apply a uniform layer of #197 asphalt emulsion using a brush or spray equipment at the rate of 3 gallons per 100 ft.²
2. Spray base flashings and other designated surfaces. Unless otherwise specified, spray vents, ducts, and parapet walls. Spray parapet walls to within one inch of outside edge; above reglets and/or 5-course counter-flashing. Spray base flashings and other designated surfaces.

3.09 REFLECTIVE COATING:

1. Allow emulsion surfacing to cure. Clean the surface of dust and debris. Scrub out any pockets of residue.
2. See Site Work Description for specified reflective coating:
3. White Elastomeric Coating -Apply #280 White Elastomeric Roof Coating over a base coat of #294.
 - a. Apply #294 Premium Elastomeric Base Coat at a rate of 1-1/4 gallon/100 ft.² .
 - b. Apply #280 White Elastomeric Roof Coating at a rate of 1-1/4 gallon/100 ft.².
 - c. Apply base and top coat the same day. Allow to dry thoroughly between coats. Schedule work so second coat can dry before nightfall. Apply second coat at right angles to first coat
4. or - Apply #588 Aluminum Emulsion at a rate not less than 1½ gallons /100 ft.² in one coat.

Any areas that peel must be redone before the project will be considered complete. In arid climates when rain is unlikely within 30 days of application of the aluminum coat, hose roof surface 30 days after application. Repeat if necessary.

3.10 CLEAN-UP

Test all drains to confirm they are free flowing and clear of debris.

Clean gutters and downspouts as needed of all debris.

Any deficiencies found during final inspection will be corrected within 5 working days and will be re-inspected by a Manufacturer's Representative and District's Representative. Leave premises clean to complete satisfaction of the District.

END THIS SECTION

SINGLE PLY ROOF REPLACEMENT SPECIFICATIONS

MECHANICALLY ATTACHED AND FULLY ADHERED PVC THERMOPLASTIC MEMBRANE ROOFING

1. GENERAL CONDITIONS

1.01 DESCRIPTION

- A. Scope: To install a mechanically fastened and adhered Single Ply Thermoplastic (PVC) Roofing Membrane system with flashings and other system components to comprise a roof system at various District sites for the Corona-Norco Unified School District as follows:

Parent Center:

1. The existing roof system consists of 1 base sheet, 1 BUR ply, and a cap sheet over a sloped plywood deck. Contractor is responsible for taking their own core sample to confirm fastener length required for proper attachment.
2. Over the existing BUR roof system, install S327, 60 Mil Feltback Membrane by mechanical attachment conforming to FM 1-90 attachment criteria.
3. Install a treated wood nailer on the parapet walls and apply flashing membrane over the walls, encapsulating the nailer. Complete the termination by installing white clad edge metal per Sarnafil standards.
4. Install new scuppers using clad metal inserts per manufacturer standards.
5. Flash membrane to the existing curbs and add skirt metal counter-flashing.
6. Flash pipe penetrations using G459 flashing membrane.
7. Flash membrane to the existing drains and replace any missing strainers with new of like-type and size.
8. Remove and dispose of the existing sleepers and replace them with Pipe Guard by OMG.
9. Provide District unit price per lineal feet of walk tread. Placement locations will be determined by District.
10. Replace all roof top devices/ penetrations with new devices of like type, size and function.
11. Install new roof graphics in the center of the field. Using any standard contrasting colored G410 membrane, apply the graphic to the field membrane with a solvent-based adhesive and weld the perimeter edge of the graphic to the field membrane. Logo/ graphic dimensions shall be 16' x 8'. (Installation method is the same as walk tread.) District to identify the alphanumeric (i.e., letter or number) to be used for the building.
12. Provide District with manufacturer's 20 Full System Warranty.

District Office (Portable Buildings):

1. Install S327, 60 Mil FB over the existing TPO roof membrane as well as those portable buildings with conventional BUR roof systems. Follow FM 1-90 attachment criteria.
2. Install Tan clad edge metal after first removing the straps that support the rain gutter. Terminate the clad metal by fastening it to the plywood deck and weld a cover strip in place per manufacturer requirements.
3. Replace all roof top devices/ penetrations with new devices of like type, size and function.
4. The screen wall supports anchored to the deck have exposed fasteners covered in caulk. Install clad metal over the opening with a flange on both sides. Fasten the clad metal flange to the deck and install pipe flashing membrane over the entire

- penetration. Close the opening of the clad metal on the third side with flashing membrane. Complete the termination with a hose clamp.
5. Install new roof graphics in the center of the field. Using any standard contrasting colored G410 membrane, apply the graphic to the field membrane with a solvent-based adhesive and weld the perimeter edge of the graphic to the field membrane. Logo/ graphic dimensions shall be 16' x 8'. (Installation method is the same as walk tread.) District to identify the alphanumeric (i.e., letter or number) to be used for the building. One letter shall apply to each building.
 6. Provide District with manufacturer's 20-Year Full System warranty.

Maintenance & Warehouse (North & South Buildings):

1. Over the existing polyurethane foam roof system, mechanically fasten ½" Dens Deck following FM 1-90 attachment requirements. The deck is sloped plywood.
2. Over the Dens Deck Board, mechanically fasten G410, 60 Mil Feltbacked membrane. Contractor is required to take their own core sample to confirm foam thickness and fastener length required for proper attachment.
3. Remove and dispose of pitch pockets and re-flash each penetration individually. District will provide asbestos abatement report.
4. Flash all pipe penetrations per Sarnafil standards, using G459 flashing membrane or standard flashing membrane with a felt separator between the substrate and new flashing membrane.
5. Flash membrane to existing clamping ring drains per Sarnafil standards.
6. At the parapet walls on the south building, install new treaded wood nailer and apply wall flashing membrane over the new nailer, securing the membrane on the exterior side of the nailer. Install new white clad edge metal and weld flashing membrane over each joint, applying Sarnafil standards. District to remove all conduits and uni-struts mounted to the top or inside of the parapet walls. Parapet walls at the north building are to be treated with flashing membrane, but terminated with a surface-mounted reglet 8 – 10" above the membrane surface.
7. At the north building, install new white clad edge metal to be applied over the existing edge metal used at the upper level deck.
8. At the north building, remove the ladder used to access the upper deck level, flash the wall with flashing membrane and reinstall the ladder. Walk tread shall be adhered to the wall flashing membrane at the point where the ladder is to be reattached.
9. Flash each curb and add skirt metal to provide for proper counter-flashing. For those curbs that are too low, install clad metal behind the vertical leg of the metal pan and secure the clad to the deck per Sarnafil standard. Weld in a flashing cover strip membrane to complete the termination. Remove units resting on wood sleepers, flash the sleepers with flashing membrane and cover with clad metal coping cover. Re-set the unit and properly secure.
10. Install new clad metal as an insert into the scupper or other similar openings. Install per Sarnafil standards.
11. Remove existing hatch and flash membrane over the top of the curb per Sarnafil removable curb detail. Re-set hatch and properly secure. District will determine re-replacement of the cables running through the curb of the hatch.
12. For those units resting on multiple wood sleepers at the north bldg., raise the unit(s), remove the sleepers, and apply the field membrane. Before resetting/ resting the sleepers on the new membrane surface, install walk tread on the membrane where the sleepers will be placed.

13. At all rooftop electrical conduits, condensation piping, gas lines, etc., install Pipe Guard by OMG at a maximum spacing of 60 inches apart. Use minimum 60 mil PVC membrane as a protection layer between the PVC roof membrane and pipe supports.
14. Replace all roof top devices/ penetrations with new devices of like type, size and function.
15. Install new roof graphics in the center of the field. Using any standard contrasting colored G410 membrane, apply the graphic to the field membrane with a solvent-based adhesive and weld the perimeter edge of the graphic to the field membrane. Logo/ graphic dimensions shall be 16' x 8'. (Installation method is the same as walk tread.) District to identify the alphanumeric (i.e., letter or number) to be used for the building.
16. Provide District with manufacturer's 20-Year Sika Sarnafil Full System Warranty.
17. Provide District unit price per lineal feet of walk tread. Placement locations will be determined by District.

Norco High School, Gym:

1. Remove and dispose of the existing BUR & Foam systems along with all reglets and all other associated metals down to the sloped metal deck. Contractor is responsible to take their own core sample to confirm the type and thickness of the existing materials. District to provide asbestos abatement report.
2. Install R-30 rigid polyiso insulation by mechanical attachment to the sloped metal deck. Subsequent layers can be adhered using low-rise foam adhesive.
3. Install ¼" Dens Deck Prime over the insulation using low-rise foam adhesive.
4. Install Sarnafil G410, 60 Mil Feltbacked membrane using water-based adhesive to the Dens Deck board.
5. Install new treated wood nailer on the top of the parapet walls; apply flashing membrane over the walls and encapsulate the nailer. Complete the detail using White clad metal and install as a complete coping metal, not as an edge metal. Weld each joint using flashing membrane.
6. Install new clad metal in the scupper opening; remove and dispose of the existing galvanized sheet metal.
7. Remove and dispose of the existing wood sleepers and replace them with new OMG Pipe Guard Support and place per manufacturer's instructions. Place a separator membrane between the bottom of the support and the field sheet membrane.
8. Flash all pipe penetrations using G459 aphaltic-resistant membrane.
9. Install new flashing membrane up the HVAC curbs and terminate using skirt metal counter-flashing.
10. Provide and install new walk tread following the same layout path as the existing walk tread.
11. Install new expansion joint cover in PVC membrane after removing and disposing of the existing EPDM joint cover.
12. Replace all roof top devices/ penetrations with new devices of like type, size and function.
13. Install new roof graphics in the center of the field. Using any standard contrasting colored G410 membrane, apply the graphic to the field membrane with a solvent-based adhesive and weld the perimeter edge of the graphic to the field membrane. Logo/ graphic dimensions shall be 16' x 8'. (Installation method is the same as walk tread.) District to identify the alphanumeric (i.e., letter or number) to be used for the building.
14. Provide District with manufacturer's 20-Year Full System warranty.

Norco High School, Buildings B, C & D:

1. Remove and dispose of the existing BUR roof system down to the level concrete deck. Removal to include all associated edge metal, reglets, lead jack, walk tread, EPDM expansion joints, pitch pockets, T-Top and all other devices, etc. Replace all roof top devices/ penetrations with new devices of like type, size and function.
2. District to provide asbestos abatement report. Abate as required.
3. Install new tapered insulation for slope only application at 1/4" per foot and adhere it to the structural concrete deck using low-rise foam adhesive. Subsequent layers, crickets shall be adhered using low-rise foam adhesive, applied in ribs and in keeping with manufacturer's application requirements.
4. Adhere 1/4" Dens Deck Prime to the insulation using low rise foam adhesive, applied at a rate according to manufacturer's requirements.
5. Adhered Sarnafil G410, 80 Mil Feltback membrane to the Dens Deck Board using VOC-compliant water based adhesive at a rate consistent with manufacturer's requirements.
6. On the upper deck section, the library, install new treaded wood nailer at the 'outside' edge, flashing and encapsulate it with flashing membrane, and install new clad edge metal.
7. Install new treated wood nailers and white clad edge metal throughout all edge conditions.
8. Lift sheet metal conduit boxes, install new roof system, and reset the boxes on new walk tread.
9. Remove and dispose of the existing wood sleepers and replace them with new OMG Pipe Guard Support and place per manufacturer's instructions. Place a separator membrane between the bottom of the support and the field sheet membrane.
10. Flash curbs and terminate using skirt metal counter-flashing.
11. Flash pipe penetrations using G459 asphaltic-resistant membrane.
12. Install new roof graphics in the center of the field. Using any standard contrasting colored G410 membrane, apply the graphic to the field membrane with a solvent-based adhesive and weld the perimeter edge of the graphic to the field membrane. Logo/ graphic dimensions shall be 16' x 8'. (Installation method is the same as walk tread.) District to identify the alphanumeric (i.e., letter or number) to be used for the building.
13. Flash existing clamping ring drains per manufacturer's warrantable flashing methods.
14. Provide District with unit price for walk tread; District to identify locations for placement.
15. Provide District with manufacturer's 20-Year Full System warranty.

B. Related Work: The work includes but is not necessarily limited to the installation of:

1. Wood Blocking
2. Roof Membrane
3. Fasteners
4. Clad Metal
5. Rigid and Tapered Insulation
6. Separation Board
7. Adhesive for Flashings & Membrane
8. Roof Membrane Flashings
9. Walkways
10. Metal Flashings

- 11. Sealants
- 12. Substrate Preparation

C. Upon successful completion of work the following warranties may be obtained:

- 1. Manufacturer Warranty
- 2. Roofing Contractor Warranty

1.02 QUALITY ASSURANCE

- A. Membrane Manufacturer must certify that the proposed equal has a membrane thickness equal to the membrane thickness specified, 60 and 80 mil thick, without ASTM (+/-) mil tolerances, as such tolerances are not acceptable. The felt backing shall not be included when measuring membrane thickness.
- B. Membrane must have at least forty (40) and twenty-seven (27) mils, respectively, of waterproofing polymers above the reinforcement for 80 Mil and 60 Mil membranes as documented in the Typical Physical Properties section of the Manufacturer's published Product Data Sheet for 60 and 80 mil membranes.
- C. Roofing Membrane Manufacturer must have a demonstrated performance history of producing thermoplastic membranes no less, in duration of years, than the warranty duration specified.
- D. Membrane Manufacturer must provide a list of at least 10 (ten) projects in which the submitted roofing material has been performing for the specified warranty duration. Membranes with modified formulation changes and undocumented proven performance will not be accepted.
- E. Membrane Manufacturer must not require the use of membrane cut edge sealant at any location. This is a maintenance item that the District does not accept.
- F. Manufacturer's warranty must have "No Dollar Limit" for the replacement of defective materials and labor with no exclusions for ponding water.
- G. Membrane Manufacturer to confirm in writing that they directly manufacture the roofing membrane; private labeled membranes are not acceptable.
- H. Membrane Manufacturer must have an established program for recycling membrane at the end of its useful life. Must provide 3 (three) instances in which they have done so.
- I. Membrane Manufacturer must have recycled content certification from UL (Underwriters Laboratories) Environment.
- J. Membrane Manufacturer must have ISO 14001 Certification and a Responsible Care program in place.
- K. Upon completion of the installation and the delivery to the Manufacturer, by the Applicator of certification, that all work has been done in strict accordance with the contract specifications and Membrane Manufacturer's requirements, a Technical Service Representative will review the installed roof system.
- L. There is no deviation made from the project specification or the approved shop drawings without prior written approval by the Architect, the District's Representative and Roofing Manufacturer.

- M. The installer must have a minimum of 5 years' experience in installing roofing system of this type and nature. Contractor must be certified and approved by the roofing materials Manufacturer.
- N. All work pertaining to the installation of PVC membrane and flashings must only be completed by Applicator personnel trained and authorized by roofing Manufacturer in those procedures.

1.03 SUBMITTALS

- A. Submit proposed equals to be considered for use on this project no less than **May 30, 2019** prior to bid date. KEE and other like-type, non-conforming membrane products submitted will not be considered as equal to the product requirements defined and outlined in this specification. Proposed roof systems which have been reviewed and accepted prior to the bid will be listed in an addendum to be issued prior to bid date; only then will roof systems be accepted at bidding. All submittals which do not conform to the following requirements will be rejected. Submittals shall include the following:
 - 1. Copies of Specification including physical properties.
 - 2. Samples of each primary component to be used in the roof system and the manufacturer's current literature for each component.
 - 3. Written approval by the insulation manufacturer (as applicable) for use and performance of the product in the proposed system.
 - 4. Sample copy of Manufacturer's warranty including no exclusion for ponding water and no time limit shall be assigned to any such ponding water.
 - 5. Sample copy of Applicator's warranty.
 - 6. Dimensioned shop drawings which shall include:
 - a. Profile details of flashing methods for penetrations.
 - b. Technical acceptance from Manufacturer.
 - 7. Certifications by manufacturers of roofing and insulating materials that all materials supplied comply with all requirements of the identified ASTM and industry standards or practices and requirements of this specification as stated in Section 2.02, A-F and all requirements listed in Quality Assurance.
 - 8. Certification from the Applicator that the system specified meets all identified code and insurance requirements as required by the Specification.
 - 9. Letter from the proposed manufacturer confirming the number of years it has DIRECTLY manufactured the proposed roof system under the trade names and/or trademarks as proposed.
 - 10. Material Safety Data Sheets (MSDS).

1.04 CODE REQUIREMENTS

The applicator shall submit evidence that the proposed roof system meets the requirements of the local building code and has been tested and approved or listed by the following test organizations. These requirements are minimum standards and no roofing work shall commence without written documentation of the system's compliance, as required in the "Submittals" section of this specification.

- A. Factory Mutual Research Corporation (FM) - Norwood, MA
 - 1. **Class 1-90 (Attachment Criteria)**

- B. Underwriters Laboratories, Inc. - Northbrook, IL
1. **Class A assembly**

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.
- B. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.
- C. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.
- D. All adhesives shall be stored at temperatures between 40° F (5° C) and 80° F (27° C).
- E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.
- F. All materials which are determined to be damaged by the District's Representative or the manufacturer are to be removed from the job site and replaced at no cost to the District.

1.06 JOB CONDITIONS

- A. Membrane materials may be installed under certain adverse weather conditions but only after consultation with the Manufacturer, as installation time and system integrity may be affected.
- B. Only as much of the new roofing as can be made weathertight each day, including all flashing and detail work, shall be installed. All seams shall be cleaned and heat welded before leaving the job site that day.
- C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.
- D. All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to the application.
- E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.
- F. Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the District.

- G. The Applicator is cautioned that certain membranes are incompatible with asphalt, coal tar, heavy oils, roofing cements, creosote and some preservative materials. Such materials shall not remain in contact with the membranes. The Applicator shall consult the manufacturer regarding compatibility, precautions and recommendations.
- H. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the General Contractor/ Construction Manager/ District's Representative shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over Felt or plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.
- I. Prior to and during application, all dirt, debris and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air and/or similar methods.
- J. The Applicator shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.
- K. All roofing, insulation, flashings and metal work removed during construction shall be immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable City, State and Federal requirements.
- L. All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) shall be immediately removed from the site by the Applicator and properly transported to a legal dumping area authorized to receive such material.
- M. The Applicator shall take precautions that storage and/or application of materials and/or equipment does not overload the roof deck or building structure.
- N. Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.
- O. All rooftop contamination that is anticipated or that is occurring shall be reported to the manufacturer to determine the corrective steps to be taken.
- P. The Applicator shall verify that all roof drain lines are functioning correctly (not clogged or blocked) before starting work. Applicator shall report any such blockages in writing (letter copy to the manufacturer) to the District's Representative for corrective action prior to installation of the roof system.
- Q. Applicator shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify District of such condition in writing for correction at the District's expense (letter copy to the manufacturer).
- R. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the District's satisfaction.
- S. All landscaped areas damaged by construction activities shall be repaired at no cost to the District.

- T. The Applicator shall conduct fastener pullout tests in accordance with the latest revision of the SPRI/ANSI Fastener Pullout Standard to help verify condition of deck/substrate and to confirm expected pullout values.
- U. The adhered membrane shall not be installed under the following conditions without consulting the manufacturer's technical department for precautionary steps:
 - 1. The roof assembly permits interior air to pressurize the membrane underside.
 - 2. Any exterior wall has 10% or more of the surface area comprised of opening doors or windows.
 - 3. The wall/deck intersection permits air entry into the wall flashing area.
- V. Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Keep lids on unused cans at all times.
- W. Protective wear shall be worn when using solvents or adhesives or as required by job conditions.
- X. Applicator is required to notify the District's project manager and inform him each time a manufacturer's technical representative is scheduled to visit the site(s) to inspect the progress or completion of the installation work performed.

1.07 BIDDING REQUIREMENTS

- A. Pre-Bid Meeting/ Job Walk. A pre-bid meeting and job walk shall be held with the District's Representative and involved trades to discuss all aspects of the project. The Applicator's field representative or roofing foreman for the work shall be in attendance. Procedures to avoid rooftop damage by other trades shall be determined.

1.08 WARRANTIES

- A. Manufacturer's System Warranty: Upon successful completion of the work to the Roofing Manufacturer's and District's satisfaction, and receipt of final payment, the twenty (20) Year System Warranty shall be issued. The System Warranty shall provide for the roof membrane, all supplied accessories and system components that comprise a roof system, and the contractor's labor. The Warranty shall be Non-Prorated provide for No Dollar Limit (NDL), and shall not exclude the condition of ponding water and no time limited shall be assigned for any such ponding water during the warranty period. Warranty shall not exclude foot traffic or storage of any kind upon the membrane surface. Warranty shall further not obligate the District to a maintenance schedule or requirements of any kind as a condition of the warranty.
- B. Applicator/Roofing Contractor Warranty: The Applicator shall supply the District with a separate two-year workmanship warranty. In the event any work related to roofing, flashing, or metal is found to be within the Applicator warranty term, defective or otherwise not in accordance with the Contract Documents, the Applicator shall repair that defect at no cost to the District. The Applicator's warranty obligation shall run directly to the District, and a copy shall be sent to the manufacturer.
- C. District Responsibility: District shall notify both the manufacturer and the Applicator of any leaks as they occur during the time period when both warranties are in effect.

2. PRODUCTS

GENERAL

- A. The components of the Adhered roof system are to be products of the membrane manufacturer as indicated on the Detail Drawings and specified in the Contract Documents.
- B. Components to be used that are other than those supplied or manufactured by the membrane manufacturer may be submitted for review and acceptance by the manufacturer. The manufacturer's acceptance of any other product is only for a determination of compatibility with membrane products and not for inclusion in the manufacturer's warranty. The specifications, installation instructions, limitations, and/or restrictions of the respective manufacturers must be reviewed by the District's Representative for acceptability for the intended use with the manufacturer's products.

MEMBRANE

- A. Sarnafil® S327-15 Polyester scrim reinforced membrane with a factory-applied integral lacquer coating to repel dirt and sustain reflectivity or pre-approved equal subject to compliance with all specification requirements herein so stated. Contact Keith Steiger (760) 617-4404.
- B. Sarnafil G410-15 & G410-18 Fiberglass reinforced membrane with a factory-applied integral lacquer coating to repel dirt and sustain reflectivity or pre-approved equal subject to compliance with all specification requirements herein so stated. Contact Keith Steiger (760) 617-4404.
- C. Membrane shall conform to ASTM D4434-15 (or latest revision), "Standard for Polyvinyl Chloride Sheet Roofing". Classification: Type III and Type II, Grade I, respectively.
 - 1. Sarnafil S327-15, 60 mil (1.5 mm), thermoplastic membrane with polyester scrim reinforcements and a 9 oz. feltback fabricated as part of the membrane sheet. A separate felt is unacceptable.
 - 2. Sarnafil G410-15, 60 Mil (1.5 mm), thermoplastic membrane with fiberglass this project.
 - 3. Type III polyester scrim reinforced membranes are not permitted for use for adhered applications as set forth herein; only fiberglass reinforced membranes are permitted for adhered applications.
 - 4. reinforcements and a 9 oz. feltback fabricated as part of the membrane sheet. A separate felt is unacceptable.
 - 5. Sarnafil G410-18, 80 Mil (1.8 mm), thermoplastic membrane with fiberglass
 - 6. reinforcements and a 9 oz. feltback fabricated as part of the membrane sheet. A separate felt is unacceptable.
 - 7. District's roof product standard. PVC membrane substitutions will be considered prior to the bid date only. KEE and other like-type, non-conforming membrane products submitted are not considered as equal products for use on
- D. Color of Membrane
 - 1. EnergySmart feltback (white), initial reflectivity of 0.83, initial emissivity 0.92, solar reflective index (SRI) of >104.

E. Typical Physical Properties

<u>Parameters</u>	<u>ASTM Test Method</u>	<u>Required Physical Properties</u>
Reinforcing Material	-	Polyester, Fiberglass
Overall Thickness(1), min., inches (mm)	D751	[0.080, 0.060 inches]
Thickness Above Scrim	-	[0.040, 0.027]
Breaking Strength, min., lbf/in. (KN/m)	D751	230 (40.0)
Elongation at Break, min. (machine / transverse)	D751	25% / 25%
Seam strength(2), min. (% of breaking strength)	D751	85
Retention of Properties After Heat Aging	D3045	-
Tensile Strength, min., (% of original)	D751	95
Elongation, min., (% of original)	D751	90
Tearing Resistance, min., lbf (N)	D1004	45.0 (200)
Low Temperature Bend, -40° F (-40° C)	D2136	Pass
Accelerated Weathering Test (florescent light, uv exposure)	G154	10,000 Hours
Cracking (7x magnification)	-	None
Discoloration (by observation)	-	Negligible
Crazing (7x magnification)	-	None
Linear Dimensional Change	D1204	0.1%
Weight Change After Immersion in Water	D570	2.5%
Static Puncture Resistance, 33 lbf (15 kg)	D5602	Pass
Dynamic Puncture Resistance, 14.7 ft-lbf (20 J)	D5635	Pass
Initial Solar Reflectance	E903	0.83
Emissivity	E408, C1371, Other	0.90
Solar Reflective Index (SRI)	E1980	104
Recycled Content (5 & 10 ft. sheets only)	8 to 12% Pre-Consumer / Up to 1% Post Consumer.	

Notes

(1) Typical Physical Properties data is applicable for 0.048 in (1.2 mm) membrane thickness and greater.

(2) Failure occurs through membrane rupture not seam failure.

Physical Properties shown are prior to applying felt backing, if specified.

FLASHING MATERIALS

A. Wall/Curb Flashing

1. Flashing Membrane: A fiberglass reinforced membrane adhered to approved substrate using solvent based adhesive.
2. PVC Clad Metal: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Clad is a 25 gauge, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported membrane laminated on one side. Use White clad metal for scuppers, edge and coping metal applications.

B. Miscellaneous Flashing

1. Flash: A prefabricated expansion joint cover made from membrane. Flash is designed for securement to wall or horizontal surfaces to span and accommodate the movement of new and existing expansion gaps from 1 inch to 4½ inches (25 mm to 114 mm) across.
2. Reglet: A heavy-duty, extruded aluminum flashing termination reglet used at walls and large curbs. Reglet is produced from 6063-T5, 0.10 inch - 0.12 inch (2.5 mm - 3.0 mm) thick extruded aluminum. Reglet has a 2¼ inch (57 mm) deep profile, and is provided in 10 foot (3 m) lengths. Use prefabricated Reglet mitered inside and outside corners where walls intersect.
3. Stack: A prefabricated vent pipe flashing made from 0.048 inch (48 mil/1.2 mm) thick G410 membrane.
4. Circle-"G": Circular 0.048 inch (48 mil/1.2 mm) thick G410 membrane patch welded over T-joints formed by overlapping thick membranes.
5. Corner: Prefabricated outside and inside flashing corners made of 0.060 inch (60 mil/1.5 mm) thick membrane that are heat-welded to membrane or Clad base flashings.
6. Multi-Purpose Sealant: A sealant used at flashing terminations.
7. StaBond Adhesive: A solvent-based reactivating-type adhesive used to attach membrane to flashing substrate.
8. Low-Rise Foam Adhesive: A two-component polyurethane, low rise expanding foam adhesive used to attach membrane or insulation/ separation board to acceptable substrates.
9. Felt: A non-woven polyester or polypropylene mat cushion layer that is necessary behind G410 or G459 Flashing Membrane when the flashing substrates are rough-surfaced or incompatible with the flashing membrane.

ATTACHMENT COMPONENTS

- A. Plate: Used with various Fasteners to attach insulation boards to roof deck. Plate is a 3 inch (75 mm) square or round, 26 gauge stamping of SAE 1010 steel with an AZ 55 Galvalume coating.
- B. Plate-HD/CD: Used with Fastener-HD or Fastener-CD10 to attach insulation boards to wood or concrete roof decks. Plate-HD/CD is a 3 inch (75 mm) round stamping of SAE 1010 steel with an AZ 55 Galvalume coating.
- C. Fastener-MAXLoad: A specially designed, heavy-duty, corrosion-resistant fastener used with the polymeric batten strip to clamp S327 roof membrane to roof decks. Fastener-MAXLoad may also be used to secure Disc-MAXLoad and the S327 roof membrane to roof decks. Acceptable substrates include 22-24 gauge steel and 1/2 to 5/8 (12.7 to 15.9 mm) wood roof decks. Fastener-MAXLoad has a shank diameter of approximately 0.26 inch (6.6 mm) and a thread diameter of approximately 0.33 inch (8.4 mm). The driving

head has a diameter of approximately 0.66 inch (16.8 mm) with a #3 Phillips recess for positive engagement and simplicity of application.

- D. Fastener No. 12: Number 12 corrosion-resistant fastener used with Plates to attach insulation boards to steel or wood roof decks. Fastener No. 12 has a modified buttress thread, a shank diameter of approximately 0.168 inch (4 mm) and a thread diameter of approximately 0.214 inch (5 mm). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement.
- E. Fastener-HD: A #14 corrosion-resistant fastener used with Plate-HD/CD to attach insulation boards or with Disc and Bar to attach membrane to structural concrete or wood roof decks. Fastener-HD has a shank diameter of 0.190 inch (4.8 mm), a thread diameter of 0.245 inch (6.2 mm) and a #3 Phillips drive head with a diameter of 0.435 inch (11 mm).
- F. Fastener-XP: A #15, heavy-duty, corrosion-resistant fastener used with Plate to attach insulation or Stop and Bar to attach G410 roof membrane to steel or wood roof decks. Fastener-XP has a shank diameter of approximately 0.21 inch (5.3 mm) and the thread diameter is approximately 0.26 inch (6.6 mm). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement.
- G. Fastener-XPS: A specially designed, heavy-duty, corrosion-resistant fastener used with Stop or Bar to attach G410 roof membrane to steel roof decks. Fastener-XPS has a shank diameter of approximately 0.21 inch (5.3mm) and a thread diameter of approximately 0.26 inch (6.6). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement and simplicity of application.
- H. Fastener-CD10: A nail-in, corrosion-resistant fastener used with Plate-HD/CD, Stop or Bar to attach insulation or membrane to normal weight concrete roof deck. Fastener-CD10 has a shank diameter of 0.215 inch (5.5 mm), a split diameter of 0.265/0.275 inch (6.7/7.0 mm) and a flat head with a 0.435 inch (11 mm) diameter.
- I. Stop: An extruded aluminum, low profile bar used with certain Fasteners to attach to the roof deck or to walls/curbs at terminations, penetrations and at incline changes of the substrate. Stop is a 1 inch (25 mm) wide, flat aluminum bar 1/8 inch (3 mm) thick that has predrilled holes every 6 inches (152 mm) on center.
- J. Termination Bar: An FM-approved, heavy-duty, 14 gauge, galvanized or stainless, roll-formed steel bar used to attach membrane to roof decks. The formed steel is pre-punched with holes every 1 inch (25 mm) on center to allow various Fastener spacing options.
- K. Cord: A 5/32 inch (4 mm) diameter, red-colored, flexible thermoplastic extrusion that is welded to the top surface of the membrane and against the side of the Bar, used to hold the membrane in position.
- L. OM Feltback Membrane Adhesive: A two-component foamable urethane-based adhesive used to attach the Feltback membrane to approved horizontal or near-horizontal substrate.

WALKWAY PROTECTION

- A. Tread: A polyester reinforced, 0.096 inch (96 mil/2.4 mm), weldable membrane with surface embossment. Used as a protection layer from rooftop traffic. Tread is supplied in rolls of 39.3 inches (1.0 m) wide and 32.8 feet (10 m) long.

MISCELLANEOUS ACCESSORIES

- A. Aluminum Tape: A 2 inch (50 mm) wide pressure-sensitive aluminum tape used as a separation layer between small areas of asphalt contamination and the membrane and as a bond-breaker under the coverstrip at Clad joints.
- B. Sealing Tape Strip: Compressible foam with pressure-sensitive adhesive on one side. Used with metal flashings as a preventive measure against air and wind blown moisture entry.
- C. Multi-Purpose Tape: A high performance sealant tape with used with metal flashings as a preventive measure against air and wind blown moisture entry.
- D. Seam Welder 641mc: 220 volt, self-propelled, hot-air welding machine used to seal long lengths of membrane seams.
- E. Perimat Welder: 120 volt, self-propelled, hot-air welding machine used to seal long-lengths of membrane seams along perimeter details.
- F. Solvent: A high quality solvent cleaner used for the general cleaning of residual asphalt, scuff marks, etc., from the membrane surface. Solvent is also used daily to clean seam areas prior to hot-air welding in tear off or dirty conditions or if the membrane is not welded the same day it is unrolled.

MISCELLANEOUS FASTENERS AND ANCHORS

- A. All fasteners, anchors, nails, straps, bars, etc. shall be post-galvanized steel, aluminum or stainless steel. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1¼ inch (32 mm) and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch (25 mm) and shall be approved for such use by the fastener manufacturer.

RELATED MATERIALS

- A. Wood Nailer: Treated wood nailers shall be installed at the perimeter of the entire roof and around such other roof projections and penetrations as specified on Project Drawings. Thickness of nailers must match the insulation thickness to achieve a smooth transition. Wood nailers shall be treated for fire and rot resistance (wolmanized or osmose treated) and be #2 quality or better lumber. Creosote or asphalt-treated wood is not acceptable. Wood nailers shall conform to Factory Mutual Loss Prevention Data Sheet 1-49. All wood shall have a maximum moisture content of 19% by weight on a dry-weight basis.

3. EXECUTION

3.01 PRE-CONSTRUCTION CONFERENCE

- A. The Applicator, District's Representative/Designer and Manufacturer(s) shall attend a pre-construction conference.
- B. The meeting shall discuss all aspects of the project including but not limited to:
 - 1. Safety
 - 2. Set up
 - 3. Construction schedule
 - 4. Contract conditions
 - 5. Coordination of the work

3.02 SUBSTRATE CONDITION

- A. Applicator shall be responsible for acceptance or provision of proper substrate to receive new roofing materials.
- B. Applicator shall verify that the work done under related sections meets the following conditions:
 - 1. Roof drains and/or scuppers have been reconditioned and/or replaced and installed properly.
 - 2. Roof curbs, nailers, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.
 - 3. All surfaces are smooth and free of dirt, debris and incompatible materials.
 - 4. All roof surfaces shall be free of water, ice and snow.

3.03 SUBSTRATE PREPARATION

- A. The roof deck and existing roof construction must be structurally sound to provide support for the new roof system. The Applicator shall load materials on the rooftop in such a manner to eliminate risk of deck overload due to concentrated weight. The District's Representative shall ensure that the roof deck is secured to the structural framing according to local building code and in such a manner as to resist all anticipated wind loads in that location.
- B. Re-roofing over Existing Bitumen Roofing: All existing roofing, base flashing, deteriorated wood blocking or deteriorated metal flashings shall be removed. Remove only that amount of roofing and flashing which can be made weather-tight with new materials during a one-day period or before the onset of inclement weather. On smooth surfaced roofs, the surface must be clean and dry. All blisters shall be removed and sealed or cut, fastened down and sealed. For Type III hot asphalt attachment of new insulation board, priming of the old roof surface after preparation is necessary.
- C. Re-roofing with Removal of Existing Bitumen Roofing: All existing roofing, base flashing, deteriorated wood blocking or deteriorated metal flashings shall be removed. Remove only that amount of roofing and flashing which can be made weather-tight with new materials during a one-day period or before the onset of inclement weather.

3.04 SUBSTRATE INSPECTION

- A. A dry, clean and smooth substrate shall be prepared to receive the Adhered roof system.
- B. The Applicator shall inspect the substrate for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect the quality of work.
- C. The substrate shall be clean, smooth, dry, and free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until all defects have been corrected.
- D. All roof surfaces shall be free of water, ice and snow.
- E. The membrane shall be applied over compatible and accepted substrates only.

3.05 WOOD NAILER INSTALLATION

- A. Install continuous wood nailers at the perimeter of the entire roof and around roof projections and penetrations as shown on the Detail Drawings.
- B. Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction. Individual nailer lengths shall not be less than 3 feet (0.9 meter) long. Nailer fastener spacing shall be at 12 inches (0.3 m) on center or 16 inches (0.4 m) on center if necessary to match the structural framing. Fasteners shall be staggered 1/3 the nailer width and installed within 6 inches (0.15 m) of each end. Two fasteners shall be installed at ends of nailer lengths. Nailer attachment shall meet this requirement and that of the current Factory Mutual Loss Prevention Data Sheet 1-49.
- C. Thickness shall be as required to match substrate or insulation height to allow a smooth transition.
- D. Any existing nailer woodwork which is to remain shall be firmly anchored in place to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction and shall be free of rot, excess moisture or deterioration. Only woodwork shown to be reused in Detail Drawings shall be left in place. All other nailer woodwork shall be removed.

3.06 INSTALLATION OF ROOF MEMBRANE, MECHANICALLY ATTACHED

- A. The surface of the insulation or substrate shall be inspected prior to installation of the roof membrane. The substrate shall be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged insulation boards shall be removed and replaced.
- B. General:
 - 1. S327 membrane shall be attached with fasteners and Disc according to manufacturer's and wind uplift requirements per ASCE 7 or Factory Mutual.
 - 2. Membrane overlaps shall be shingled with the flow of water where possible.
 - 3. Membrane full-width rolls shall be fastened perpendicular to the direction of the steel deck flutes, wood plank, pre-cast or cementitious wood fiber panel where possible.
 - 4. **Tack welding of S327 full or half-width rolls for purposes of temporary restraint during installation is not permitted and may result in voiding of the warranty.**

C. Perimeter and Corner Areas:

1. Over the properly installed and prepared substrate surface, S327 half-width rolls are to be installed either parallel or perpendicular to the entire perimeter edge according to FM guidelines. The number of adjacent half-rolls will be determined by building height and width and other conditions according to FM guidelines and Manufacturer's Technical Department. Fasteners and Discs are installed along the edge of the membrane on the fastening line at a spacing determined by Sika Sarnafil and the District's Representative/Designer. Disc 2-3/8 inch is held back 5/8 inch (15.8 mm), Disc and Disc-XPEN are held-back 1 inch (25 mm), and Disc-MAXLoad are held-back 1-1/4 inch (31.8 mm) from the outer edge of the membrane. The adjacent half-roll is positioned to overlap the fastened edge of the first half-roll by 5-1/2 inches (140 mm) for Disc and Disc-XPEN, and 7 inches (177.8 mm) for Disc-MAXLoad in accordance with the overlap lines marked on its edge. The 5-1/2 inch (140 mm) overlap will allow the top membrane to extend 2-1/2 inches (63 mm) past the Disc and Disc-XPEN for heat-welding. The 7 inch (177.8 mm) overlap will allow the top membrane to extend 2-1/4 inches (57.2 mm) past the Disc-MAXLoad for heat-welding. Fasteners shall clamp the S327 membrane tightly to the substrate. In corner areas where perimeter half-rolls intersect, add rows of Fasteners and Discs over the top the half-rolls and weld a (S327) coverstrip for water tightness. See Detail Drawings.

Notes:

- a) Perimeter area is defined as the outer boundary of the roof. If the roof is broken into different levels, each roof area shall be treated as an individual roof with its outer boundary being treated as a perimeter. Typically, internal expansion joints and firewalls are not considered to be full perimeters. Refer to Factory Mutual Data Sheet 1-28 for more information.
 - b) The ridge area is defined as the high point in the roof area formed by two intersecting planes. When the sum of the slopes is a minimum of 4 inches in 12 inches (30 degrees), each side of the ridge shall be treated as a perimeter area.
2. **Hot-air weld overlaps according to manufacturer's requirements. Seam test cuts shall be taken at least 3 times per day.**

D. Interior Area:

1. Over the properly installed and prepared substrate surface, S327 full-width rolls are to be installed perpendicular to the steel deck flutes, wood plank or wood or concrete panels. Fasteners and Discs are installed along the edge of the membrane on the fastening line at a spacing determined by the membrane manufacturer and the District's Representative/Designer. Disc 2-3/8 inch is held back 5/8 inch (15.8 mm), Disc and Disc-XPEN are held-back 1 inch (25 mm), and Disc-MAXLoad is held back 1-1/4 inch (31.8 mm) from the outer edge of the membrane. The adjacent full-roll is positioned to overlap the fastened edge of the first full-roll by 5-1/2 inches (140 mm) for Disc and Disc-XPEN, and 7 inches (177.8 mm) for Disc-MAXLoad in accordance with the overlap lines marked on its edge. The 5-1/2 inch (140 mm) overlap will allow the top membrane to extend 2-1/2 inches (63 mm) past the Fasteners and Discs shall be installed according to perimeter rate of attachment. Fasteners shall be installed according to the manufacturer's instructions. Fasteners shall be installed using the fastener manufacturer's recommended torque-sensitive fastening tools with depth locators. Fasteners shall clamp the membrane tightly to the substrate.
2. Membrane flashings shall extend 2-1/2 inches (63 mm) past Disc and be hot-air welded to deck/ field membrane.

3.07 INSTALLATION OF ROOF MEMBRANE, ADHERED

A. 2121 Adhesive:

1. Over the properly installed and prepared substrate, 2121 adhesive shall be poured out of the pail and spread using notched ¼ inch x ¼ inch x ¼ inch (6 mm x 6 mm x 6 mm) rubber squeegees. The 2121 adhesive shall be applied at a rate according to the manufacturer's requirements. No adhesive is applied to the back of the G410 feltback membrane. Do not allow adhesive to skin-over or surface-dry prior to installation of G410 feltback membrane.
2. The G410 feltback roof membrane is unrolled immediately into the wet 2121 adhesive. Adjacent rolls overlap previous rolls by 3 inches (75 mm). This process is repeated throughout the roof area. Immediately after application into adhesive, each roll shall be pressed firmly into place with a water-filled, foam-covered lawn roller by frequent rolling in two directions. Do not allow adhesive to skin-over or surface-dry prior to installation of G410 feltback membrane.
3. Weld G410 coverstrips at all G410 feltback seams that do not have a factory selvage edge.
Notes:
 - a) 2121 adhesive shall not be used if temperatures below 40° F (5° C) are expected during application or subsequent drying time.
 - b) No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.

B. Membrane Installation, Low-Rise Foam:

1. Position and unroll successive sheets of feltback membrane and align to provide a minimum 3 inch (76 mm) wide overlap.
2. Fold adjacent sheet in half lengthwise to expose substrate area. Fold selvage Sheet edges (along the length of the sheets) under the membrane to prevent overspray onto weld area. Adhere membrane that will be bottom side of the weld first. This will protect the selvage edge from being contaminated by setting into Low Rise Foam adhesive.
3. Spray Low Rise Foam adhesive onto the substrate and allow to rise approximately 1/8 inch (45.7 cm).
4. Place membrane into Low Rise Foam adhesive and roll with water filled, foam covered lawn roller to set into adhesive.
5. Fold remaining sheets lengthwise to expose additional substrate area adjacent to area previously adhered.
6. Apply Low Rise Foam adhesive to substrate and continue process described above until all sheets are adhered.
7. Hot-air weld all seams.

3.08 HOT-AIR WELDING OF SEAM OVERLAPS

A. General:

1. All seams shall be hot-air welded. Seam overlaps should be 3 inches (75 mm) wide when automatic machine-welding and 4 inches (100 mm) wide when hand-welding, except for certain details.
2. Welding equipment shall be provided by or approved by the manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by a Technical Representative prior to welding.

3. All membrane to be welded shall be clean and dry.
- B. Hand-Welding: Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
1. The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.
 2. The nozzle shall be inserted into the seam at a 45 degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow," the hand roller is positioned perpendicular to the nozzle and pressed lightly. For straight seams, the 1½ inch (40 mm) wide nozzle is recommended for use. For corners and compound connections, the ¾ inch (20 mm) wide nozzle shall be used.
- C. Machine Welding:
1. Machine welded seams are achieved by the use of automatic welding equipment. When using this equipment, the manufacturer's instructions shall be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator is recommended. No other equipment shall be operated off the generator.
 2. Metal tracks may be used over the deck membrane and under the machine welder to minimize or eliminate wrinkles.
- D. Quality Control of Welded Seams:
1. The Applicator shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark grey material from the underside of the top membrane. On-site evaluation of welded seams shall be made daily by the Applicator to locations as directed by the District's Representative or a manufacturer's representative. One inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Applicator at no extra cost to the District.

3.09 MEMBRANE FLASHINGS

All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the District's Representative and the manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Applicator's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.

- A. Adhesive for Membrane Flashings:
 - 1. Over the properly installed and prepared flashing substrate, adhesive shall be applied according to instructions found on the Product Data Sheet. The adhesive shall be applied in smooth, even coats with no gaps, globs or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.
 - 2. No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels as required by welding techniques.
- B. Install Stop/Bar/Cord according to the Detail Drawings with approved fasteners into the structural deck at the base of parapets, walls and curbs. Stop is required by the manufacturer at the base of all tapered edge strips and at transitions, peaks, and valleys according to the manufacturer's details.
- C. The manufacturer's requirements and recommendations and the specifications shall be followed. All material submittals shall have been accepted by the manufacturer prior to installation.
- D. All flashings shall extend a minimum of 8 inches (0.2 m) above roofing level unless otherwise accepted in writing by the District's Representative and the Technical Department.
- E. All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place. No bitumen shall be in contact with the membrane.
- F. All flashing membranes shall be mechanically fastened along the counter-flashed top edge with Stop at 6-8 inches (0.15-0.20 m) on center.
- G. Flashings shall be terminated according to the manufacturer's recommended details.
- H. All flashings that exceed 30 inches (0.75 m) in height shall receive additional securement.

3.10 METAL FLASHINGS

- A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:
 - 1. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).
 - 2. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - latest issue.
- B. Metal, other than that provided by the manufacturer, is not covered under the warranty.
- C. Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily.
- D. Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction.
- E. Metal joints shall be watertight.

- F. Metal flashings shall be securely fastened into solid wood blocking. Fasteners shall penetrate the wood nailer a minimum of 1 inch (25 mm).
- G. Airtight and continuous metal hook strips are required behind metal fascias. Hook strips are to be fastened 12 inches (0.3 m) on center into the wood nailer or masonry wall.
- H. Counter flashings shall overlap base flashings at least 4 inches (100 mm).
- I. Hook strips shall extend past wood nailers over wall surfaces by 1½ inch (38 mm) minimum and shall be securely sealed from air entry.

3.11 CLAD METAL BASE FLASHINGS/EDGE METAL

All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the District's Representative and the manufacturer. Acceptance shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Applicator's expense.

- A. Clad metal flashings shall be formed and installed per the Detail Drawings.
 - 1. All metal flashings shall be fastened into solid wood nailers with two rows of post galvanized flat head annular ring nails, 4 inches (100 mm) on center staggered. Fasteners shall penetrate the nailer a minimum of 1 inch (25 mm).
 - 2. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and contraction.
- B. Adjacent sheets of Clad shall be spaced ¼ inch (6 mm) apart. The joint shall be covered with 2 inch (50 mm) wide aluminum tape. A 4 inch minimum (100 mm) wide strip of flashing membrane shall be hot-air welded over the joint. Cover each joint with clad metal to conceal the membrane cover strip.
- C. Flashing membrane shall be applied over the top of the wood nailer before installing the edge/ coping clad metal.

3.12 WALKWAY INSTALLATION

- A. Tread Walkway: Roofing membrane to receive the Tread Walkway shall be clean and dry. Place chalk lines on deck sheet to indicate location of Walkway. Apply a continuous coat of 2170 adhesive to the deck sheet and the back of Walkway in accordance with manufacturer's technical requirements and press Walkway into place with a water-filled, foam-covered lawn roller. Clean the deck membrane in areas to be welded. Hot-air weld the entire perimeter of the Walkway to the membrane deck sheet. Check all welds with a rounded screwdriver. Re-weld any inconsistencies.
Important: Check all existing deck membrane seams that are to be covered by Walkway with rounded screwdriver and reweld any inconsistencies before Walkway installation. Do not run Walkway over Bars.

3.13 TEMPORARY CUT-OFF

- A. All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. All temporary waterstops shall be constructed to provide a 100% watertight seal. The stagger of the insulation joints shall be made even by installing partial panels of insulation. The new membrane shall be carried into the waterstop. The waterstop shall be sealed to the deck and/or substrate so that water will not be allowed to travel under the new or existing roofing. The edge of the membrane shall be sealed in a continuous heavy application of sealant as described in Section 2.10. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and properly disposed of off-site. None of these materials shall be used in the new work.
- B. If inclement weather occurs while a temporary waterstop is in place, the Applicator shall provide the labor necessary to monitor the situation to maintain a watertight condition.
- C. If any water is allowed to enter under the newly-completed roofing, the affected area shall be removed and replaced at the Applicator's expense.

3.14 COMPLETION

- A. Prior to demobilization from the site, the work shall be reviewed by the District's Representative and the Applicator. All defects noted and non-compliances with the Specifications or the recommendations of the manufacturer shall be itemized in a punch list. These items must be corrected immediately by the Applicator to the satisfaction of the District's Representative and the manufacturer prior to demobilization.
- B. All Warranties referenced in this Specification shall have been submitted and have been accepted at time of contract award.

END OF SECTION

SCOPE OF WORK FOR VARIOUS SITES (Monolithic Built-Up Roofing)

SCOPE OF WORK (ROOFING REPLACEMENT)

Roosevelt High School

7447 Scholar Way
Eastvale, CA 92880

AREA TO BE REROOFED: Weight Room (from north parapet wall base flashing to south ridge line) as per drawing and/or jobwalk.

ROOF PREPARATION

Complete tear-off and removal of existing roof down to existing insulation and to the bottom base flashings of parapet walls.

Contractor shall give a per square foot price for replacing water damaged insulation with perlite same thickness.

Jobs may be stopped if the Contractor does not provide a knowledgeable Foreman who understands all aspects of the specification for which the company has contracted to install and supervise the workmanship of his crews. A copy of the specification is to be on the jobsite at all times.

ROOF SYSTEM H4-PE-MR: 80# Buffer (#606), three layers of #196 Polyester each layer set in 4-gals of #197 asphalt emulsion. Apply monolithic surfacing. All Roof substrates other than covered walkways, lunch shelters and open areas to receive #280 White Elastomeric Reflective Coating over #294 Elastomeric Base Coat. On all other Roof substrates to receive Aluminum Reflective Coating, as specified in Master Specification.

Note: Apply buffer and base flashing a minimum of 6" under all existing parapet wall coverings. Nail 6" O/C at the top of tie-in with standard EG roofing nails and 3-course as specified.

Base Flashing: Install Base Flashing Specification #180 (Modified Plus NP180 S/S Polyester Reinforced Membrane over buffer, apply polyester over modified base flashing as specified.

Note: Non-Nailable Deck – Apply a spot application (9" spots) of #902 Permanent Bond Adhesive 18" on center staggered in two rows 12 inches from each edge to secure buffer in place.

Extra layer of base sheet in all base flashings and waterways.

For Ten Year Manufacturer's Roof Membrane Warranty. The Contractor MUST notify the District and the manufacturer at least 24 hours prior to commencing work to arrange for inspection of the roofing application. Also, if the Contractor pulls off job for any reason, the District personnel and manufacturer's representative must be notified.

NOTE: Failure to inform the manufacturer prior to commencing work, project may be stopped and Contractor may be held responsible to make any corrections to fulfill contract obligations, without any extra cost being placed on the District or the manufacturer.

Manufacturer shall provide a qualified inspector with reroofing experience and knowledge (5 years plus). Manufacturer's inspector to make periodic inspections, as well as inspection reports. These reports can be provided to owner's representative at any time during progress of work.

SPECIAL CONDITIONS

All Electrical junction boxes & all valves of any type to be protected prior to monolithic & reflective coating applications.

Furnish & install new 18"x 24" 24 sheet metal louvered attic vents with 4" flange minimum, two (2) per South & North Parapet Walls. Four (4) per East & West Parapet Walls evenly spaced. Vent flanges to be primed & set in #209 modified mastic, nailed 3" O/C and apply web. Apply 1 layer of 12" Ruftac and coat with monolithic surfacing & reflective coating as specified.

Install all new 4# lead flashings.

Contractor must water test internal drains, especially on coal tar recovers, and notify owner's representative before tear-off crew starts work or Contractor will be held responsible for plugged drains at completion of new roof.

Note: 1. Contractor shall clean up any Josam type drain for reuse. Apply 3'x3' layer of Ruftac reinforcement on top of buffer down into drain. Any broken rings, missing bolts or clamps shall be replaced or new drains may be installed.

2. When work is started at drains, the Contractor must complete the drain area with plies of base sheet and Ruftac or lead and install clamp rings the same day.

HVAC Unit Equipment & Roof Hatch: Install decktop walkpads on top of completed roof system after aluminum is completely dry. Secure the 3'x4' units by applying five generous spots of #209 Modified Mastic on the back surface of each walkpad, turn over, in place, on top of Reflective Coating. Allow approximately 6" between each unit to allow for drainage. **(Around 2 – Sides Only).**

- END OF SECTION -

SCOPE OF WORK (MAINTENANCE & WARRANTY)

Roosevelt High School

7447 Scholar Way
Eastvale, CA

AREA TO BE MAINTAINED: A Bldg. (Weight Room from North Parapet Wall to Center Ridge Line and Boys & Girls Lockers), B Bldg., C Bldg., G Bldg. (Kitchen, Food, Choir & Band) Excluding all Concrete Tile Sections & Portables (see map) as per drawing and/or jobwalk.

ROOF PREPARATION

Power wash existing roof surface to remove dirt, debris, and any loose reflective coating to provide a clean and smooth roof deck.

Jobs may be stopped if the Contractor doesn't provide a knowledgeable Foreman who understands all aspects of the specification for which his company has contracted to install and supervise the workmanship of his crews. A copy of the specification is to be on the jobsite at all times.

Remove all existing walk pads, if existing roof is damaged apply 2 layers of polyester each set in emulsion as specified.

RECOAT SYSTEM

Apply one layer of polyester over existing roof set in 4 gallons of #197 Asphalt Emulsion.

Apply Monolithic System (9 gallons of #197 Emulsion and 3# chopped fiberglass) as specified in master specifications.

Apply White Acrylic Reflective Coating to meet Title 24 requirements as specified in master specifications. (#280 White Elastomeric Reflective Coating over # 294 Base Coat as specified in Master Specification.)

Broadcast 20 lbs granules per 100 sq. ft., Broadcast 20 lbs granules per 100 sq. ft., into wet #294 base coating in all waterways.

For Ten Year Manufacturer's Roof Membrane Warranty. The Contractor MUST notify the School District and the manufacturer at least 24 hours prior to commencing work to arrange for inspection of the roofing application. Also, if the Contractor pulls off job for any reason, School District personnel and manufacturer's representative must be notified.

NOTE: Failure to inform the manufacturer prior to commencing work, project may be stopped and Contractor may be held responsible to make any corrections to fulfill contract obligations, without any extra cost being placed on the District or the manufacturer.

Manufacturer shall provide a qualified inspector with reroofing experience and knowledge (5 years plus). Manufacturer's inspector to make periodic inspections, as well as inspection reports. These reports can be provided to owner's representative at any time during progress of work.

SPECIAL CONDITIONS

All Electrical junction boxes & all valves of any type to be protected prior to monolithic & reflective coating applications.

Furnish & install new 18"x 24"x 24 sheet metal louvered attic vents with 4" flange minimum every 30 feet to all Parapet Walls (evenly spaced). Vent flanges to be primed & set in #209 modified mastic, nailed 3" O/C and apply web. Apply 1 layer of 12" Ruftac and coat with monolithic surfacing & reflective coating as specified.

Prime and apply 1 layer of 12" Ruftac over all buckles over 1/4" high and all splits

Clean, Prime and apply 1 layer of Ruftac 6" larger in all directions and 1 layer of polyester set in 4 gallons of # 197 Asphalt Emulsion over all exposed added Pipe and Vent Flashings.

Contractor must water test internal drains, and notify owner's representative before roofing crew starts work or Contractor will be held responsible for plugged drains at completion of repairs and maintenance of existing roof eligible for a ten-year warranty extension.

Note: Contractor replace any broken rings, missing bolts or clamps install new metal screens where any are missing.

Clean, Prime and 3-course all scupper type drains with #209 Elastomastic.

Clean, prime and reseal all pipe and vent flashing with asphalt primer and #209 Elastomastic.

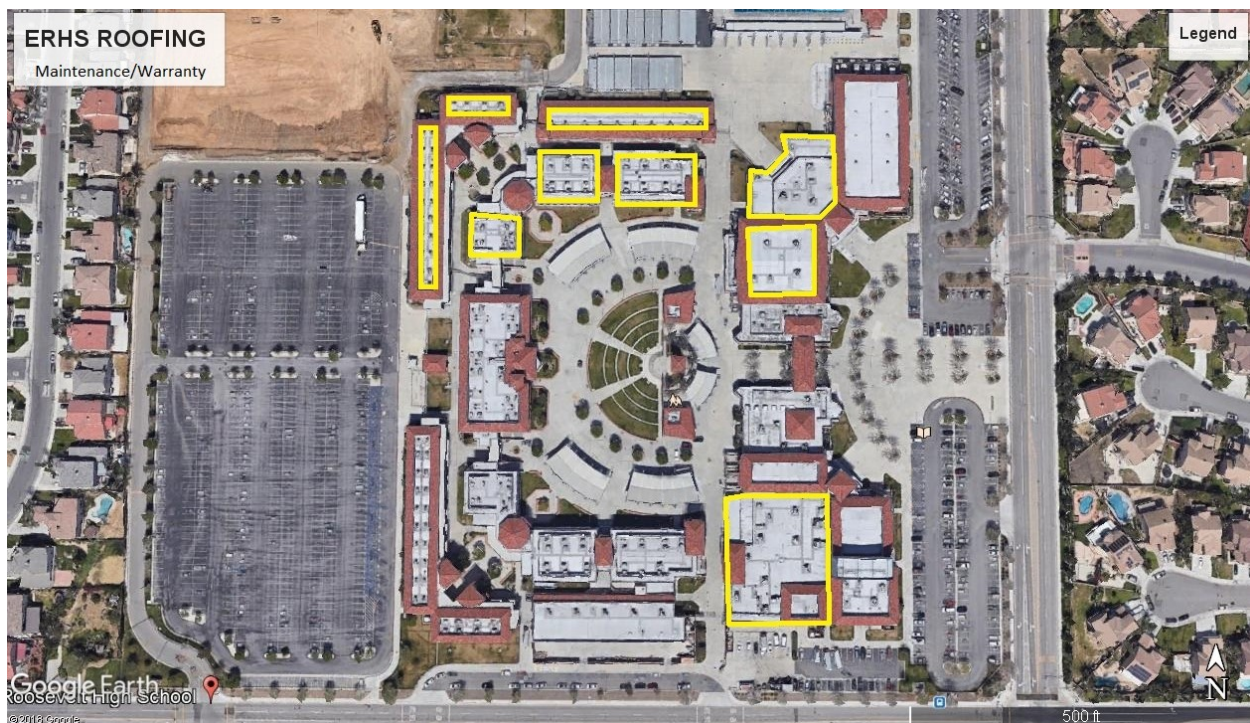
Clean, prime and reseal all corners at curbs, base flashings, etc., with asphalt primer and #209 Elastomastic.

Contractor to install one layer of #80 Buffer (6" larger in all directions) under all wood blocks, sleepers, etc., where needed or missing..

Walk Pad: At A.C. units and roof hatches, install units of decktop where specified. Install decktop walkpads on top of completed roof system after aluminum is completely dry. Secure the 3"x4" units by applying five generous spots of #209 ElastoMastic on the back surface of each walkpad. Then, turn over pad and set in place on top of reflective coating. Allow approximately 1" between each unit to allow for drainage. (Around 2 – Sides Only)

Coping Joints: Clean, prime, and seal with 6" Ruftac. Spray entire parapet and coping with Monolithic System and Aluminum to within 1" of outside edge.

ROOSEVELT HIGH SCHOOL – MAINTENANCE & WARRANTY & REPLACEMENT (AERIAL MAP)



SCOPE OF WORK (MAINTENANCE & WARRANTY)

Barton Elementary School

7437 Corona Valley Avenue
Eastvale, CA

AREA TO BE MAINTAINED: Complete School (minus Standing Seam & Portables) as per drawing and/or jobwalk.

ROOF PREPARATION

Power wash existing roof surface to remove dirt, debris, and any loose reflective coating to provide a clean and smooth roof deck.

Jobs may be stopped if the Contractor doesn't provide a knowledgeable Foreman who understands all aspects of the specification for which his company has contracted to install and supervise the workmanship of his crews. A copy of the specification is to be on the jobsite at all times.

Remove and replace all existing 3'x 3' & 4'x 6' Skylight domes with dual pane type skylights. Re-use existing skylight frames if at all possible. If existing frames cannot be re-used install new dual pane curb mounted skylights.

Remove all existing walk pads, if existing roof is damaged apply 2 layers of polyester each set in emulsion as specified.

RECOAT SYSTEM

Apply one layer of polyester over existing roof set in 4 gallons of #197 Asphalt Emulsion.

Apply Monolithic System (9 gallons of #197 Emulsion and 3# chopped fiberglass) as specified in master specifications.

Apply White Acrylic Reflective Coating to meet Title 24 requirements as specified in master specifications. (#280 White Elastomeric Reflective Coating over # 294 Base Coat as specified in Master Specification.) Apply #558 Aluminum Coating in all Drains.

Broadcast 20 lbs granules per 100 sq. ft., Broadcast 20 lbs granules per 100 sq. ft., into wet #294 base coating in all waterways.

For Ten Year Manufacturer's Roof Membrane Warranty. The Contractor MUST notify the District and the manufacturer at least 24 hours prior to commencing work to arrange for inspection of the roofing application. Also, if the Contractor pulls off job for any reason, School District personnel and manufacturer's representative must be notified.

NOTE: Failure to inform the manufacturer prior to commencing work, project may be stopped and Contractor may be held responsible to make any corrections to fulfill contract obligations, without any extra cost being placed on the District or the manufacturer.

Manufacturer shall provide a qualified inspector with reroofing experience and knowledge (5 years plus). Manufacturer's inspector to make periodic inspections, as well as inspection reports. These reports can be provided to owner's representative at any time during progress of work.

SPECIAL CONDITIONS

All Electrical junction boxes & all valves of any type to be protected prior to monolithic & reflective coating applications.

Prime and apply 1 layer of 12" Ruftac over all buckles over 1/4" high and all splits.

Clean, Prime and apply 1 layer of Ruftac 6" larger in all directions and 1 layer of polyester set in 4 gallons of # 197 Asphalt Emulsion over all exposed added Pipe and Vent Flashings.

Contractor must water test internal drains, and notify owner's representative before roofing crew starts work or Contractor will be held responsible for plugged drains at completion of repairs and maintenance of existing roof eligible for a ten-year warranty extension.

Note: Contractor replace any broken rings, missing bolts or clamps install new metal screens where any are missing.

Clean, Prime and 3-course all scupper type drains with #209 Elastomastic.

Clean, prime and reseal all pipe and vent flashing with asphalt primer and #209 Elastomastic.

Clean, prime and reseal all corners at curbs, base flashings, etc., with asphalt primer and #209 Elastomastic.

Contractor to install one layer of #80 Buffer (6" larger in all directions) under all wood blocks, sleepers, etc., where needed or missing.

Walk Pad: At A.C. units and roof hatches, install units of decktop where specified. Install decktop walkpads on top of completed roof system after aluminum is completely dry. Secure the 3"x4" units by applying five generous spots of #209 ElastoMastic on the back surface of each walkpad. Then, turn over pad and set in place on top of reflective coating. Allow approximately 1" between each unit to allow for drainage. **(Around 2 – Sides Only).**

Coping Joints: Clean, prime, and seal with 6" Ruftac. Spray entire parapet and coping with Monolithic System and Aluminum to within 1" of outside edge.

BARTON ELEMENTARY SCHOOL - MAINTENANCE & WARRANTY (AERIAL MAP)



SCOPE OF WORK (ROOFING REPLACEMENT)

Corona High School
1150 West 10th Street
Corona, CA

AREA TO BE REROOFED: Portables 5, 011 & 012 as per drawing and/or jobwalk.

ROOF PREPARATION

Complete tear-off and removal of existing roofs.

Remove any abandoned pipes, flashings, etc.

Contractor shall give a per square foot price for replacing broken or water damaged sheathing, matching existing type and thickness.

Furnish and Install a 24" wide strip of ½" CDX Plywood over center sections on all Portable Classroom Buildings. Nail per local building requirements.

Jobs may be stopped if the Contractor doesn't provide a knowledgeable Foreman who understands all aspects of the specification for which his company has contracted to install and supervise the workmanship of his crews. A copy of the specification is to be on the jobsite at all times.

ROOF SYSTEM

H3-NGC-MR: 80# Buffer (#606), two layers of 25# Base Sheet (#604), Monolithic System. All Roof Substrates other than covered walkways, lunch shelters and open areas to receive #280 White Elastomeric Reflective Coating over #294 Elastomeric Base Coat. On all other Roof Substrates to receive Aluminum Reflective Coating, as specified in Master Specification.

Note: 1. Assemble interply sheets shingle fashion, the top finish Sheet MUST be installed full width single ply.

Base Flashing: Install Base Flashing Specification #180 (Modified Plus NP180 S/S Polyester Reinforced Membrane

"Ten & Ten" Manufacturer's Roof Membrane Warranty. The Contractor MUST notify the School District and the manufacturer at least 24 hours prior to commencing work to arrange for inspection of the roofing application. Also, if the Contractor pulls off job for any reason, District personnel and manufacturer's representative must be notified.

NOTE: Failure to inform the manufacturer prior to commencing work, project may be stopped and Contractor may be held responsible to make any corrections to fulfill contract obligations, without any extra cost being placed on the District or the manufacturer.

Manufacturer shall provide a qualified inspector with reroofing experience and knowledge (5 years plus). Manufacturer's inspector to make periodic inspections, as well as inspection reports. These reports can be provided to owner's representative at any time during progress of work.

SPECIAL CONDITIONS

All Electrical junction boxes & all valves of any type to be protected prior to monolithic & reflective coating applications.

Install new 24-gauge (low rise type) metal edging (1/4" maximum) set in 1/8" bed of #209 ElastoMastic. Install gravel stop on top of completed base sheet assembly as specified in master specifications. Prime roof flange and allow to dry. Install metal with 4" minimum end laps with #209 ElastoMastic between laps and up rise of metal joint. Nail 6" on center with suitable length galvanized nail which will penetrate wood nailer or sheathing in a minimum of ½". Then, over thoroughly dried primer, seal metal to base sheets with a 12 wide layer of Ruftac prior to Monolithic System.
Install all new 24-gauge galvanized metal flashings.

Clean gutters prior to Monolithic Spray System.

Install new 2x4 blocks under conduit or pipes every 10 foot; also reinforce under block with extra layer of 80# Underlayment, 6" wider than blocks, mineral side down, set in generous application of #209 Elastomastic.

If necessary to get a smooth job, base sheets shall be cut and allowed to flatten in piles. Sheets should be broomed and cold process sheets shall be rolled with a weighted roller approximately 30 minutes or up to 4 hours after sheets are in place.

SCOPE OF WORK (MAINTENANCE & WARRANTY)

Corona High School
1150 West 10th Street
Corona, CA

AREA TO BE MAINTAINED: Buildings E, I, J, K, L, N, O, Star Bldg., Lunch Shelter all Canopies, Portables L10, L11, L12, L7, L8, K7 & K8 (Excluding Admin, Science, Theater Bldgs.) as per drawing and/or jobwalk.

ROOF PREPARATION

Power wash existing roof surface to remove dirt, debris, and any loose reflective coating to provide a clean and smooth roof deck.

Remove all existing walk pads, if existing roof is damaged apply 2 layers of polyester each set in emulsion as specified.

Jobs may be stopped if the Contractor doesn't provide a knowledgeable Foreman who understands all aspects of the specification for which his company has contracted to install and supervise the workmanship of his crews. A copy of the specification is to be on the jobsite at all times.

RECOAT SYSTEM

Apply one layer of polyester over existing roof set in 4 gallons of #197 Asphalt Emulsion.

Apply Monolithic System (9 gallons of #197 Emulsion and 3# chopped fiberglass) as specified in master specifications.

On all covered walkways, lunch shelters, open areas & water ways, apply #588 Aluminum Reflective Coating. All other Roof Substrates to receive #280 White Elastomeric Reflective Coating over #294 Elastomeric Base Coat, as specified in Master Specification. Apply #588 Aluminum Coating in all Drains.

Broadcast 20 lbs granules per 100 sq. ft., Broadcast 20 lbs granules per 100 sq. ft., into wet #294 base coating in all waterways.

For Ten Year Manufacturer's Roof Membrane Warranty. The Contractor MUST notify the School District and the manufacturer at least 24 hours prior to commencing work to arrange for inspection of the roofing application. Also, if the Contractor pulls off job for any reason, School District personnel and manufacturer's representative must be notified.

NOTE: Failure to inform the manufacturer prior to commencing work, project may be stopped and Contractor may be held responsible to make any corrections to fulfill contract obligations, without any extra cost being placed on the District or the manufacturer.

Manufacturer shall provide a qualified inspector with reroofing experience and knowledge (5 years plus). Manufacturer's inspector to make periodic inspections, as well as inspection reports. These reports can be provided to owner's representative at any time during progress of work.

SPECIAL CONDITIONS

All Electrical junction boxes & all valves of any type to be protected prior to monolithic & reflective coating applications.

Clean, Prime and apply 1 layer of Ruftac 6" larger in all directions and 1 layer of polyester set in 4 gallons of # 197 Asphalt Emulsion over all exposed added Pipe and Vent Flashings.

Contractor must water test internal drains, and notify owner's representative before roofing crew starts work or Contractor will be held responsible for plugged drains at completion of repairs and maintenance of existing roof eligible for a ten-year warranty extension.

Note: Contractor replace any broken rings, missing bolts or clamps install new metal screens where any are missing.

Clean, Prime and 3-course all scupper type drains with #209 Elastomastic.

Clean, prime and reseal all pipe and vent flashing with asphalt primer and #209 Elastomastic.

Remove all existing pitch pans and install split lead jacks as specified in master specifications to fit field conditions. Install clamp rings and seal with #209 Elastomastic.

Clean, prime and reseal all corners at curbs, base flashings, etc., with asphalt primer and #209 Elastomastic.

Remove blocking under conduits and other pipes running across roof and replace with a minimum of 2"x4" block (must be redwood or pressure treated). Set blocks on top of extra layer of #80 Buffer. Buffer must extend 6" beyond edge of blocks on all sides. Ruftac shall be set in a generous application of #209 Elastomastic (not cold applied cement) prior to Monolithic System application. Do not nail through roof membrane.

Where there are large pipes or several pipes running across roof, in lieu of blocks, contractor shall install pipe hanger brackets every 12' and hang all pipes to bracket (will explain on job walk). Base of brackets shall be reinforced under with 18"x18" Deck-Top and base shall be set in a generous application of #209 Elastomastic. Set steel base of hangers in a generous application of #209 ElastoMastic on top of completed base sheets. Secure brackets to roof using four proper sized wood screws per bracket. Seal base with a 9" wide layer of polyester and a 12" wide layer of polyester. Both layers shall be embedded in four (4) gallons of emulsion per ply and top coated with four (4) gallons of emulsion.

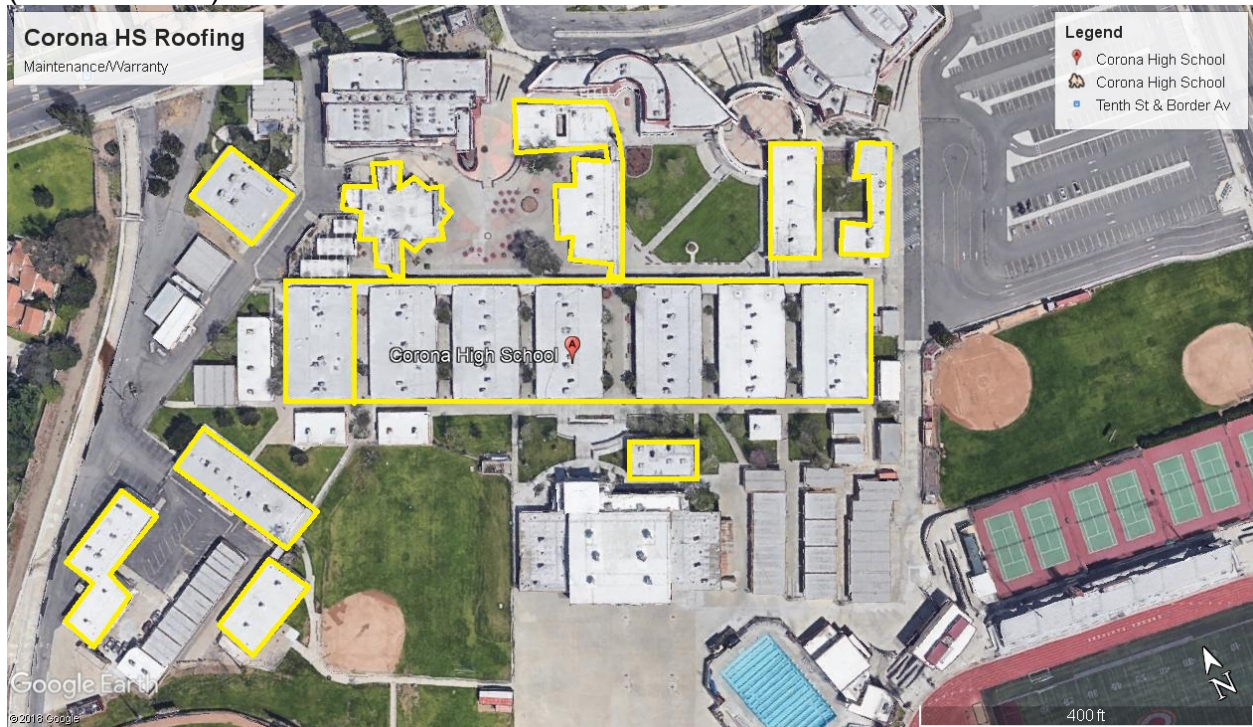
Clean gutters prior to respray application.

MC-21 Install new 24-gauge (low rise type) metal edging (1/4" maximum) set in 1/8" bed of #209 ElastoMastic. Install gravel stop on top of completed base sheet assembly as specified in master specifications. Prime roof flange and allow to dry. Install metal with 4" minimum end laps with #209 ElastoMastic between laps and up rise of metal joint. Nail 6" on center with suitable length galvanized nail which will penetrate wood nailer or sheathing in a minimum of 1/2". Then, over thoroughly dried primer, seal metal to base sheets with a 12 wide layer of Ruftac prior to Monolithic System.

Gravel Stop Joints (various locations) – Contractor to renail or screw all gravel stop joints (three fasteners per joint) as necessary. Contractor to clean, prime and 3-course gravel stop joints with yellow jacket fiberglass webbing and #209 Elastomastic.

Walk Pad: At A.C. units and roof hatches, install units of decktop where specified. Install decktop walkpads on top of completed roof system after aluminum is completely dry. Secure the 3"x4" units by applying five generous spots of #209 ElastoMastic on the back surface of each walkpad. Then, turn over pad and set in place on top of reflective coating. Allow approximately 1" between each unit to allow for drainage. (Around 2 – Sides Only)

CORONA HIGH SCHOOL – MAINTENANCE & WARRANTY & REPLACEMENT (AERIAL MAP)



SCOPE OF WORK (ROOFING REPLACEMENT)

Foothill Elementary School
2601 S. Buena Vista Avenue
Corona, CA

AREA TO BE REROOFED: All Composition Shingle Buildings as per drawing and/or jobwalk.

ROOF PREPARATION

Complete tear-off and removal of existing composition shingle roofs.

Remove any abandoned pipes, flashings, etc.

Contractor shall give a per square foot price for replacing broken or water damaged sheathing, matching existing type and thickness.

Jobs may be stopped if the Contractor doesn't provide a knowledgeable Foreman who understands all aspects of the specification for which his company has contracted to install and supervise the workmanship of his crews. A copy of the specification is to be on the jobsite at all times.

ROOF SYSTEM

30 year CertainTeed Landmark type composition shingle type roofing system (color to be approved in writing by owner) and 1 layer of Eaveguard Self-adhered shingle underlayment.

"30 Year" Manufacturer's Roof Membrane Only Warranty. The Contractor MUST notify the School District and the manufacturer at least 24 hours prior to commencing work to arrange for inspection of the roofing application. Also, if the Contractor pulls off job for any reason, School District personnel and manufacturer's representative must be notified.

NOTE: Failure to inform the manufacturer prior to commencing work, project may be stopped and Contractor may be held responsible to make any corrections to fulfill contract obligations, without any extra cost being placed on the District or the manufacturer.

Standard 2 Year Contractor Labor Warranty.

Manufacturer shall provide a qualified inspector with reroofing experience and knowledge (5 years plus). Manufacturer's inspector to make periodic inspections, as well as inspection reports. These reports can be provided to owner's representative at any time during progress of work.

SPECIAL CONDITIONS

Install new painted metal edging with drip edge (color to be approved in writing by District).

Install all new 24-gauge galvanized metal pipe and vent flashings, including 18" metal valleys.

Composition shingles to be installed per shingle manufactures written recommendations for high winds.

Clean all gutters.

Inspection fee of \$5.00 per square for daily inspection. Contractor is responsible for notifying Henry Company in advance when men will be working. Cleaning, priming, patching must be inspected prior to any spraying.

- END OF SECTION -

SCOPE OF WORK (ROOFING REPLACEMENT)

Foothill Elementary School
2601 S. Buena Vista Avenue
Corona, CA

AREA TO BE REROOFED: All Low Sloped Sections on Composition Shingle Roofs as per drawing and/or jobwalk.

ROOF PREPARATION

Complete tear-off and removal of existing roofs.

Remove any abandoned pipes, flashings, etc.

Contractor shall give a per square foot price for replacing broken or water damaged sheathing, matching existing type and thickness.

Jobs may be stopped if the Contractor doesn't provide a knowledgeable Foreman who understands all aspects of the specification for which his company has contracted to install and supervise the workmanship of his crews. A copy of the specification is to be on the jobsite at all times.

ROOF SYSTEM

H3-NGC-MR: 80# Buffer (#606), two layers of 25# Base Sheet (#604), Monolithic System. All Roof Substrates other than covered walkways, lunch shelters and open areas to receive #280 White Elastomeric Reflective Coating over #294 Elastomeric Base Coat. On all other Roof Substrates to receive Aluminum Reflective Coating, as specified in Master Specification.

Note: 1. Assemble interply sheets shingle fashion, the top finish sheet MUST be installed full width single ply.
2. Broadcast 20 lbs granules per 100 sq. ft., into wet #294 Base Coat in all waterways

Base Flashing: Install Base Flashing Specification #180 (Modified Plus NP180 S/S Polyester Reinforced Membrane

Extra layer of base sheet in all base flashings and waterways.

“Ten & Ten” Manufacturer’s Roof Membrane Warranty. The Contractor MUST notify the School District and the manufacturer at least 24 hours prior to commencing work to arrange for inspection of the roofing application. Also, if the Contractor pulls off job for any reason, District personnel and manufacturer’s representative must be notified.

NOTE: Failure to inform the manufacturer prior to commencing work, project may be stopped and Contractor may be held responsible to make any corrections to fulfill contract obligations, without any extra cost being placed on the District or the manufacturer.

Manufacturer shall provide a qualified inspector with reroofing experience and knowledge (5 years plus). Manufacturer’s inspector to make periodic inspections, as well as inspection reports. These reports can be provided to owner’s representative at any time during progress of work.

SPECIAL CONDITIONS

All Electrical junction boxes & all valves of any type to be protected prior to monolithic & reflective coating applications.

Install new 24-gauge (low rise type) metal edging (1/4” maximum) set in 1/8” bed of #209 ElastoMastic. Install gravel stop on top of completed base sheet assembly as specified in master specifications. Prime roof flange and allow to dry. Install metal with 4” minimum end laps with #209 ElastoMastic between laps and up rise of metal joint. Nail 6” on center with suitable length galvanized nail which will penetrate wood nailer or sheathing in a minimum of 1/2”. Then, over thoroughly dried primer, seal metal to base sheets with a 12 wide layer of Ruftac prior to Monolithic System.

Install all new 4# lead flashings.

Clean gutters prior to Monolithic Spray System.

Furnish and Install new 24 Ga Sheet Metal Shim Stock with a 3" face and ¼" drip edge. Fasten with 1 1/4" screws with rubber washers 2' on center.

Remove existing Pitch Pans and install new split lead jacks as specified in master specifications to fit field conditions. Install clamp rings and seal with #209 Elastomastic.

If necessary to get a smooth job, base sheets shall be cut and allowed to flatten in piles. Sheets should be broomed and cold process sheets shall be rolled with a weighted roller approximately 30 minutes or up to 4 hours after sheets are in place.

FOOTHILL ELEMENTARY – MAINTENANCE & WARRANTY & REPLACEMENT (AERIAL MAP)



SCOPE OF WORK (ROOFING REPLACEMENT)

Centennial High School
1820 Rimpau Avenue
Corona, CA

AREA TO BE REROOFED: All Composition Shingle Buildings as per drawing and/or jobwalk.

ROOF PREPARATION

Complete tear-off and removal of existing composition shingle roofs.

Remove any abandoned pipes, flashings, etc.

Contractor shall give a per square foot price for replacing broken or water damaged sheathing, matching existing type and thickness.

Jobs may be stopped if the Contractor doesn't provide a knowledgeable Foreman who understands all aspects of the specification for which his company has contracted to install and supervise the workmanship of his crews. A copy of the specification is to be on the jobsite at all times.

ROOF SYSTEM

30 year CertainTeed Landmark type composition shingle type roofing system (color to be approved in writing by owner) and 1 layer of Eaveguard Self-adhered shingle underlayment.

"30 Year" Manufacturer's Roof Membrane Only Warranty. The Contractor MUST notify the School District and the manufacturer at least 24 hours prior to commencing work to arrange for inspection of the roofing application. Also, if the Contractor pulls off job for any reason, School District personnel and manufacturer's representative must be notified.

NOTE: Failure to inform the manufacturer prior to commencing work, project may be stopped and Contractor may be held responsible to make any corrections to fulfill contract obligations, without any extra cost being placed on the District or the manufacturer.

Standard 2 Year Contractor Labor Warranty.

Manufacturer shall provide a qualified inspector with reroofing experience and knowledge (5 years plus). Manufacturer's inspector to make periodic inspections, as well as inspection reports. These reports can be provided to owner's representative at any time during progress of work.

SPECIAL CONDITIONS

All existing HVAC Unit Curbs to be skirted with ½ plywood, install Henry Spec. H3-NGC-MR Curb Detail as specified. Building 100 at Culinary Arts Exhaust Fans: Furnish and Install new 24 GA Sheet Metal HVAC Unit Pan with a 3" face and 1'4" drip edge. Apply 1 layer of 36" Ruftac under new pan.

Remove all existing pitch pans and install split lead jacks as specified in master specifications to fit field conditions. Install clamp rings and seal with #209 Elastomastic. Furnish and Install new 24 Ga Sheet Metal Shim Stock with a 3" face and ¼" drip edge. Fasten with 1'1/4" screws with rubber washers 2' on center to HVAC Unit Curbs.

Install new painted metal edging with drip edge (color to be approved in writing by District). Install all new 24-gauge galvanized metal pipe and vent flashings, saddles including 18" metal valleys.

Composition shingles to be installed per shingle manufactures written recommendations for high winds.

Clean all gutters.

Inspection fee of \$5.00 per square for daily inspection. Contractor is responsible for notifying Henry Company in advance when men will be working. Cleaning, priming, patching must be inspected prior to any spraying.

SCOPE OF WORK (ROOFING REPLACEMENT)

Centennial High School
1820 Rimpau Avenue
Corona, CA

AREA TO BE REROOFED: All Gravel Canopies as per drawing and/or jobwalk.

ROOF PREPARATION

Complete tear-off and removal of existing roofs.

Contractor shall give a per square foot price for replacing broken or water damaged sheathing, matching existing type and thickness.

Jobs may be stopped if the Contractor doesn't provide a knowledgeable Foreman who understands all aspects of the specification for which his company has contracted to install and supervise the workmanship of his crews. A copy of the specification is to be on the jobsite at all times.

ROOF SYSTEM

H3-NGC-MR: 80# Buffer (#606), two layers of 25# Base Sheet (#604), Monolithic System. All Roof Substrates other than covered walkways, lunch shelters and open areas to receive #280 White Elastomeric Reflective Coating over #294 Elastomeric Base Coat. On all other Roof Substrates to receive Aluminum Reflective Coating, as specified in Master Specification.

Note: 1. Assemble interply sheets shingle fashion, the top finish sheet **MUST** be installed full width single ply.

Base Flashing: Install Base Flashing Specification #180 (Modified Plus NP180 S/S Polyester Reinforced Membrane

"Ten & Ten" Manufacturer's Roof Membrane Warranty. The Contractor **MUST** notify the District and the manufacturer at least 24 hours prior to commencing work to arrange for inspection of the roofing application. Also, if the Contractor pulls off job for any reason, School District personnel and manufacturer's representative must be notified.

NOTE: Failure to inform the manufacturer prior to commencing work, project may be stopped and Contractor may be held responsible to make any corrections to fulfill contract obligations, without any extra cost being placed on the District or the manufacturer.

Manufacturer shall provide a qualified inspector with reroofing experience and knowledge (5 years plus). Manufacturer's inspector to make periodic inspections, as well as inspection reports. These reports can be provided to owner's representative at any time during progress of work.

SPECIAL CONDITIONS

Install new 24-gauge (low rise type) metal edging (1/4" maximum) set in 1/8" bed of #209 ElastoMastic. Install gravel stop on top of completed base sheet assembly as specified in master specifications. Prime roof flange and allow to dry. Install metal with 4" minimum end laps with #209 ElastoMastic between laps and up rise of metal joint. Nail 6" on center with suitable length galvanized nail which will penetrate wood nailer or sheathing in a minimum of 1/2". Then, over thoroughly dried primer, seal metal to base sheets with a 12 wide layer of Ruftac prior to Monolithic System.

Install all new 24-gauge galvanized metal flashings.

Clean gutters prior to Monolithic Spray System.

Tubular Expansion Joints: Install new tubular expansion joints over existing as specified in Master Specifications. Cover with yellow jacket prior to Monolithic Spray System.

Lift and roof under existing counterflashing with roofing and base flashing. Then, resecure flashing prior to Monolithic Spray System.

Remove existing Pitch Pans and install new split lead jacks as specified in master specifications to fit field conditions. Install clamp rings and seal with #209 Elastomastic.

If necessary to get a smooth job, base sheets shall be cut and allowed to flatten in piles. Sheets should be broomed and cold process sheets shall be rolled with a weighted roller approximately 30 minutes or up to 4 hours after sheets are in place.

SCOPE OF WORK (MAINTENANCE & WARRANTY)

Centennial High School

1820 Rimpau Avenue
Corona, CA

AREA TO BE MAINTAINED: 500 Gym, Boys & Girls Lockers, Weight & Wrestling Rooms, as per drawing and/or jobwalk.

ROOF PREPARATION

Power wash existing roof surface to remove dirt, debris, and any loose reflective coating to provide a clean and smooth roof deck.

Jobs may be stopped if the Contractor doesn't provide a knowledgeable Foreman who understands all aspects of the specification for which his company has contracted to install and supervise the workmanship of his crews. A copy of the specification is to be on the jobsite at all times.

Remove all existing walk pads, if existing roof is damaged apply 2 layers of polyester each set in emulsion as specified.

RECOAT SYSTEM

Apply one layer of polyester over existing roof set in 4 gallons of #197 Asphalt Emulsion.

Apply one layer of #606 buffer and two layers of polyester over existing roof, each layer set in 4 gallons of #197 Asphalt Emulsion over all added HVAC Unit Curbs & all added penetrations during modernization.

Apply Monolithic System (9 gallons of #197 Emulsion and 3# chopped fiberglass) as specified in master specifications.

On all covered walkways, lunch shelters, open areas & water ways, apply #588 Aluminum Reflective Coating. All other Roof substrates to receive #280 White Elastomeric Reflective Coating over #294 Elastomeric Base Coat, as specified in Master Specification. Apply #588 Aluminum Coating in all Drains.

For Ten Year Manufacturer's Roof Membrane Warranty. The Contractor MUST notify the School District and the manufacturer at least 24 hours prior to commencing work to arrange for inspection of the roofing application. Also, if the Contractor pulls off job for any reason, School District personnel and manufacturer's representative must be notified.

NOTE: Failure to inform the manufacturer prior to commencing work, project may be stopped and Contractor may be held responsible to make any corrections to fulfill contract obligations, without any extra cost being placed on the District or the manufacturer.

Manufacturer shall provide a qualified inspector with reroofing experience and knowledge (5 years plus). Manufacturer's inspector to make periodic inspections, as well as inspection reports. These reports can be provided to owner's representative at any time during progress of work.

SPECIAL CONDITIONS

All Electrical junction boxes & all valves of any type to be protected prior to monolithic & reflective coating applications.

Clean, Prime and apply 1 layer of Ruftac 6" larger in all directions and 1 layer of polyester set in 4 gallons of # 197 Asphalt Emulsion over all exposed added Pipe and Vent Flashings.

Clean, Prime and 3-course all scupper type drains with #209 Elastomastic.

Clean, prime and reseal all pipe and vent flashing with asphalt primer and #209 Elastomastic.

Remove all existing pitch pans and install split lead jacks as specified in master specifications to fit field conditions. Install clamp rings and seal with #209 Elastomastic.

Furnish and Install new 24 Ga Sheet Metal Shim Stock with a 3" face and 1/4" drip edge. Fasten with 1 1/4" screws with rubber washers 2' on center to HVAC Unit Curbs.

Contractor to install one layer of #80 Buffer (6" larger in all directions) under all wood blocks, sleepers, etc., where needed or missing.

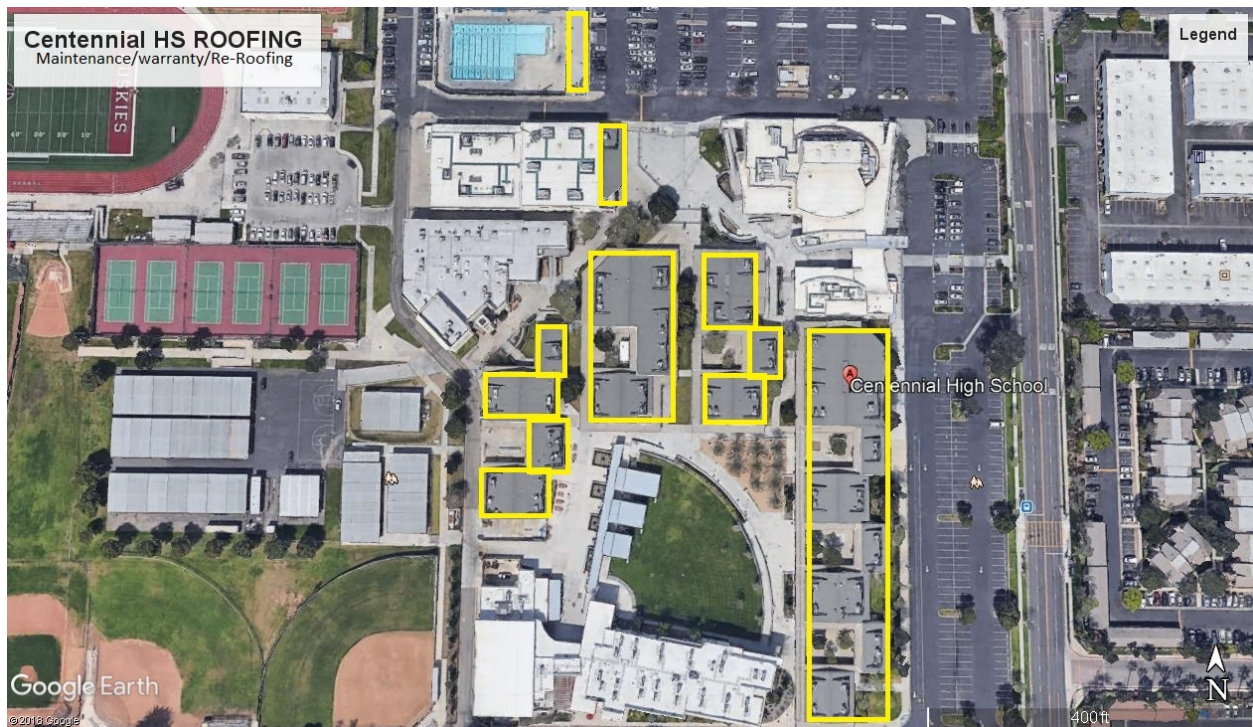
Clean gutters prior to respray application.

Gravel Stop Joints (various locations) – Contractor to renail or screw all gravel stop joints (three fasteners per joint) as necessary. Contractor to clean, prime and 3-course gravel stop joints with yellow jacket fiberglass webbing and #209 Elastomastic.

Walk Pad: At A.C. units and roof hatches, install units of decktop where specified. Install decktop walkpads on top of completed roof system after aluminum is completely dry. Secure the 3"x4" units by applying five generous spots of #209 ElastoMastic on the back surface of each walkpad. Then, turn over pad and set in place on top of reflective coating. Allow approximately 1" between each unit to allow for drainage. (Around 2 – Sides Only)

Coping Joints: Clean, prime, and seal with 6" Ruftac. Spray entire parapet and coping with Monolithic System and Aluminum to within 1" of outside edge.

CENTENNIAL HIGH SCHOOL – MAINTENANCE & WARRANTY & REPLACEMENT (AERIAL MAP)



SCOPE OF WORK (MAINTENANCE & WARRANTY)

District Office Building

2820 Clark Avenue
Norco, CA

AREA TO BE MAINTAINED: District Office – 2 (Two) Buildings as per drawing and/or jobwalk.

ROOF PREPARATION

Power wash existing roof surface to remove dirt, debris, and any loose reflective coating to provide a clean and smooth roof deck.

Jobs may be stopped if the Contractor doesn't provide a knowledgeable Foreman who understands all aspects of the specification for which his company has contracted to install and supervise the workmanship of his crews. A copy of the specification is to be on the jobsite at all times.

Remove all existing walk pads, if existing roof is damaged apply 2 layers of polyester each set in emulsion as specified.

Remove all existing Skylights and sheet in with ½" CDX Plywood including necessary bracing.

RECOAT SYSTEM

Apply two layers of polyester over existing roof, each layer set in 4 gallons of #197 Asphalt Emulsion.

Apply 1 layer of buffer mechanically fastened and 3 layers of polyester set in asphalt emulsion over all sheeted in Skylight sections as specified.

Apply Monolithic System (9 gallons of #197 Emulsion and 3# chopped fiberglass) as specified in master specifications.

Apply White Acrylic Reflective Coating to meet Title 24 requirements as specified in master specifications. (#280 White Elastomeric Reflective Coating over # 294 Base Coat as specified in Master Specification.) Apply #558 Aluminum Coating in all Drains.

Broadcast 20 lbs granules per 100 sq. ft., Broadcast 20 lbs granules per 100 sq. ft., into wet #294 base coating in all waterways.

For Ten Year Manufacturer's Roof Membrane Warranty. The Contractor MUST notify the School District and the manufacturer at least 24 hours prior to commencing work to arrange for inspection of the roofing application. Also, if the Contractor pulls off job for any reason, School District personnel and manufacturer's representative must be notified.

NOTE: Failure to inform the manufacturer prior to commencing work, project may be stopped and Contractor may be held responsible to make any corrections to fulfill contract obligations, without any extra cost being placed on the District or the manufacturer.

Manufacturer shall provide a qualified inspector with reroofing experience and knowledge (5 years plus). Manufacturer's inspector to make periodic inspections, as well as inspection reports. These reports can be provided to owner's representative at any time during progress of work.

SPECIAL CONDITIONS

All Electrical junction boxes & all valves of any type to be protected prior to monolithic & reflective coating applications.

Re 5-course all base flashings as needed and apply one layer of 12" polyester set in 4 gallons of #197 Asphalt Emulsion over all existing 5-course details

Contractor to sump all existing drains and apply 1 layer of buffer, 2 layers of polyester and 1 layer of 36" Ruftac

as specified.

Clean, prime and reseal all pipe and vent flashing with asphalt primer and #209 Elastomastic.

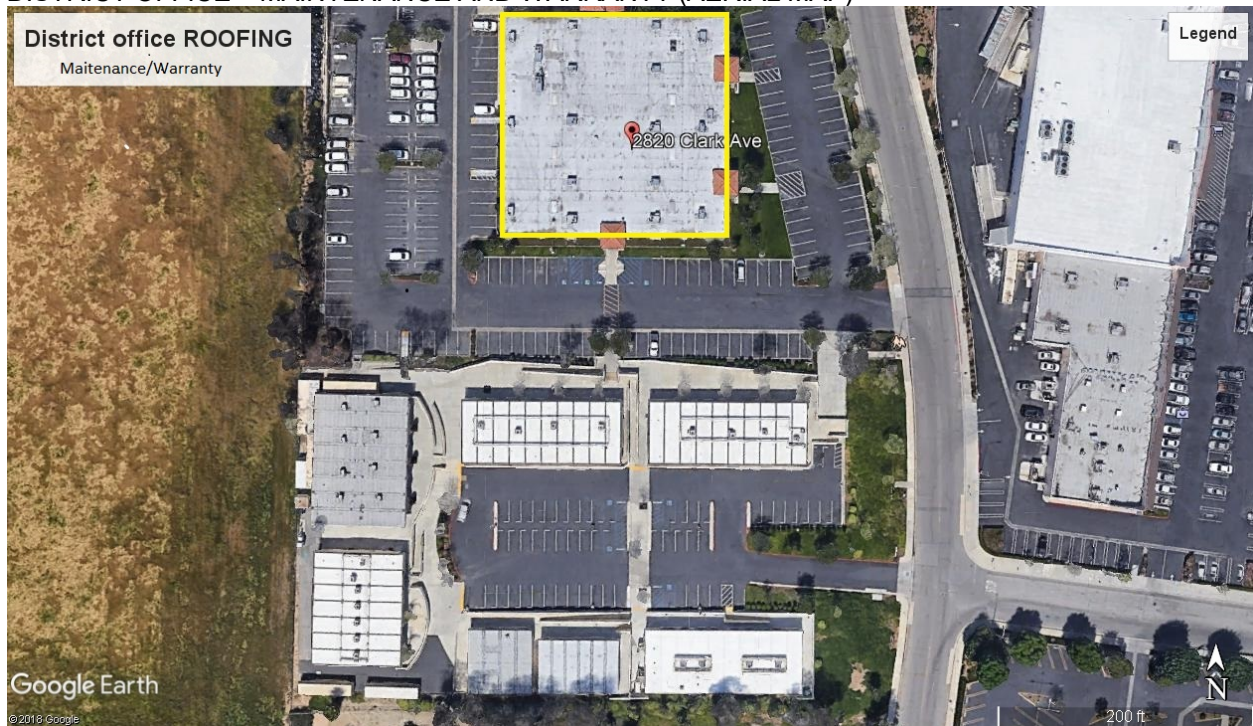
Remove all existing pitch pans and install split lead jacks as specified in master specifications to fit field conditions. Install clamp rings and seal with #209 Elastomastic.

Clean, prime and reseal all corners at curbs, base flashings, etc., with asphalt primer and #209 Elastomastic.

Contractor to install one layer of #80 Buffer (6" larger in all directions) under all wood blocks, sleepers, etc., where needed or missing..

Walk Pad: At A.C. units and roof hatches, install units of decktop where specified. Install decktop walkpads on top of completed roof system after aluminum is completely dry. Secure the 3"x4" units by applying five generous spots of #209 ElastoMastic on the back surface of each walkpad. Then, turn over pad and set in place on top of reflective coating. Allow approximately 1" between each unit to allow for drainage. (Around 2 – Sides Only)

DISTRICT OFFICE – MAINTENANCE AND WARRANTY (AERIAL MAP)



SCOPE OF WORK (ROOFING REPLACEMENT)

District Office PORTABLE BUILDINGS
2780 Clark Avenue
Norco, CA

AREA TO BE REROOFED: Portables H, I & Learning Center (Cap Sheet) as per drawing and/or jobwalk.

ROOF PREPARATION

Complete tear-off and removal of existing roofs.

Remove any abandoned pipes, flashings, etc.

Contractor shall give a per square foot price for replacing broken or water damaged sheathing, matching existing type and thickness.

Furnish and Install a 24" wide strip of ½" CDX Plywood over center sections on all Portable Classroom Buildings. Nail per local building requirements.

Jobs may be stopped if the Contractor doesn't provide a knowledgeable Foreman who understands all aspects of the specification for which his company has contracted to install and supervise the workmanship of his crews. A copy of the specification is to be on the jobsite at all times.

ROOF SYSTEM

H3-NGC-MR: 80# Buffer (#606), two layers of 25# Base Sheet (#604), Monolithic System. All Roof Substrates other than covered walkways, lunch shelters and open areas to receive #280 White Elastomeric Reflective Coating over #294 Elastomeric Base Coat. On all other Roof Substrates to receive Aluminum Reflective Coating, as specified in Master Specification.

- Note:** 1. Assemble interply sheets shingle fashion, the top finish sheet MUST be installed full width single ply.
2. Broadcast 20 lbs granules per 100 sq. ft., into wet #294 Base Coat in all waterways

Base Flashing: Install Base Flashing Specification #180 (Modified Plus NP180 S/S Polyester Reinforced Membrane

"Ten & Ten" Manufacturer's Roof Membrane Warranty. The Contractor MUST notify the School District and the manufacturer at least 24 hours prior to commencing work to arrange for inspection of the roofing application. Also, if the Contractor pulls off job for any reason, School District personnel and manufacturer's representative must be notified.

NOTE: Failure to inform the manufacturer prior to commencing work, project may be stopped and Contractor may be held responsible to make any corrections to fulfill contract obligations, without any extra cost being placed on the District or the manufacturer.

Manufacturer shall provide a qualified inspector with reroofing experience and knowledge (5 years plus). Manufacturer's inspector to make periodic inspections, as well as inspection reports. These reports can be provided to owner's representative at any time during progress of work.

SPECIAL CONDITIONS

All Electrical junction boxes & all valves of any type to be protected prior to monolithic & reflective coating applications.

Install new 24-gauge (low rise type) metal edging (1/4" maximum) set in 1/8" bed of #209 ElastoMastic. Install gravel stop on top of completed base sheet assembly as specified in master specifications. Prime roof flange and allow to dry. Install metal with 4" minimum end laps with #209 ElastoMastic between laps and up rise of metal joint. Nail 6" on center with suitable length galvanized nail which will penetrate wood nailer or sheathing in a minimum of ½". Then, over thoroughly dried primer, seal metal to base sheets with a 12 wide layer of Ruftac prior to Monolithic System.

Install all new 24-gauge galvanized metal flashings.

Raise all existing HVAC Unit Curbs to 6" to 8".

Furnish and Install new 24 Ga Sheet Metal Shim Stock with a 3" face and ¼" drip edge. Fasten with 1"1/4" screws with rubber washers 2' on center.

Install new 2x4 blocks under conduit or pipes every 10 foot; also reinforce under block with extra layer of 80# Underlayment, 6" wider than blocks, mineral side down, set in generous application of #209 Elastomastic.

HVAC Unit Equipment & Roof Hatch: Install decktop walkpads on top of completed roof system after aluminum is completely dry. Secure the 3'x4' units by applying five generous spots of #209 Elastomastic on the back surface of each walkpad, turn over, in place, on top of Reflective Coating. Allow approximately 6" between each unit to allow for drainage. **(Around 2 – Sides Only)**

Remove existing Pitch Pans and install new split lead jacks as specified in master specifications to fit field conditions. Install clamp rings and seal with #209 Elastomastic.

If necessary to get a smooth job, base sheets shall be cut and allowed to flatten in piles. Sheets should be broomed and cold process sheets shall be rolled with a weighted roller approximately 30 minutes or up to 4 hours after sheets are in place.

DISTRICT OFFICE PORTABLES - ROOFING REPLACEMENT (AERIAL MAP)

