**Chino Valley Unified School District**

# Scope of Work for
# District Wide Roofing Replacement Project

Contractors License: Class C39 License
Engineer's Estimate: $2,000,000.00
Allowance: $385,000.00 ($35,000.00 per school site)
Calendar Days: 365 Days

The successful contractor shall supply all labor, materials, services, insurance, and equipment necessary to complete the work. The Contractor shall thoroughly investigate the premises for a complete understanding of the scope of work required for this bid.

**Scope of Work Includes:**

Provide an installed thermoplastic single ply roofing system, flashing, and related work that is watertight and will not permit the passage of liquid water, able to withstand wind loads, thermally induced movement, and exposure to weather without failure.

Work will be done at the following school sites:

- **Woodcrest JHS -** 2725 S. Campus Dr., Ontario, CA 91761
- **Rhodes ES -** 6655 Schaefer Ave, Chino, CA 91710
- **Anna Borba ES -** 4980 Riverside Dr, Chino, CA 91710
- **Adult School -** 12970 Third Street, Chino, CA 91710
- **Dickson ES** – 3930 Pamela Drive, Chino, CA 91710
- **Rolling Ridge ES -** 13677 Calle San Marcos, Chino Hills, CA 91709
- **Canyon Hills JHS -** 2500 Madrugada, Chino Hills, CA 91709
- **Country Springs ES -** 14145 Village Center Dr., Chino Hills, CA 91709
- **Ayala HS -** 14255 Peyton Dr, Chino Hills, CA 91709
- **Hidden Trails ES -** 2250 Ridgeview Way, Chino Hills, CA 91709
- **Chaparral ES -** 4849 Bird Farm Rd., Chino Hills, CA 91709

Please see the attached scope of work for each school site.

# SECTION 07 54 21
# MECHANICALLY ATTACHED AND FULLY ADHERED PVC THERMOPLASTIC MEMBRANE ROOFING

## PART I 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 Chino Valley Unified School District detailed as follows:

1. Adult School:

   a. Portables (Rooms 21-25): G410, 60 Mil FB o/ ½" DDP o/ EPS Infill o/ metal deck/ pan. Loose lay EPS Insulation in the metal pan over the soffit area, nearest the entry to the building, and fasten the DDP board to the top of the crimped seam rather than in the pan. Fasteners are not permitted to penetrate the pan at the soffit to avoid them visible from below. Install entire roof system over metal cover on top of rain gutter. Install new rain gutter and attach to existing. Reconnect down spout to new rain gutter.

2. Anna Borba Elem.:

   a. Portables (Bldg. K, Rooms 7-8): G410, 60 Mil FB o/ ½" DDP o/ EPS Infill o/ metal deck/ pan. Loose lay EPS Insulation in the metal pan over the soffit area, nearest the entry to the building, and fasten the DDP board to the top of the crimped seam rather than in the pan. Fasteners are not permitted to penetrate the pan at the soffit to avoid them visible from below. Install entire roof system over metal cover on top of rain gutter. Install new rain gutter and attach to existing. Reconnect down spout to new rain gutter.
   b. Library (Bldg. L): S327, 60 Mil FB o/ coated BUR o/ sloped plywood decking. Lower deck is included. Flash existing curbs and penetrations per Sarnafil standards. Attach clad edge metal to the existing edge metal to act as a client for the new clad metal. Membrane and clad metal color shall be Tan. Remove and dispose of existing wood sleepers and replace them with new Pipe Guard supports by OMG. Provide tread from the eave edge at one end of the building and take it to the top of the ridge and lay it to the other end of the building.

3. Ayala High School:

   a. Portables (Bldg. D1, Rooms 136-140), (Bldg. F, Rooms 135-136), (Bldg. H1, Rooms 122-127), (Bldg. H2, Rooms 128-133): G410, 60 Mil FB o/ ½" DDP o/ EPS Infill o/ metal deck/ pan. Loose lay EPS Insulation in the metal pan over the soffit area, nearest the entry to the building, and fasten the DDP board to the top of the crimped seam rather than in the pan. Fasteners are not permitted to penetrate the pan at the soffit to avoid them visible from below. Install entire roof system over metal cover on top of rain gutter. Install new rain gutter and attach to existing. Reconnect down spout to new rain gutter.

4. Canyon Hills Jr. High School:

   a. Portables (Bldg. C, Rooms 503-505): G410, 60 Mil FB o/ ½" DDP o/ EPS Infill o/ metal deck/ pan. Loose lay EPS Insulation in the metal pan over the soffit area, nearest the entry to the building, and fasten the DDP board to the top of the crimped seam rather than in the pan. Fasteners are not permitted to penetrate the pan at the soffit to avoid them visible from below. Install entire roof system over metal cover on top of rain gutter. Install new rain gutter and attach to existing. Reconnect down spout to new rain gutter. (See as-built detail.)

5. Chapparal Elem.:

   a. Building A (MPR, including lower deck Kitchen): G410, 60 Mil FB o/ granular cap sheet BUR. Membrane to be adhered using low-rise foam adhesive. Remove and dispose of the existing coping metal and replace it with new clad metal in Lead Grey by Sarnafil. Remove and dispose of the existing fry reglets and apply feltbacked membrane over the stucco walls and terminate at the top of the wood nailer in keeping with Sarnafil standard wall application. Flash curbs and penetrations per Sarnafil standard detailing. Remove the ladder that accesses the lower deck and replace the coping metal below the ladder with new clad metal and flash vertical walls surrounding the ladder. Remove and replace rusted 'mushroom heads' with new of like type and function, thus matching existing. Remove and dispose of existing wood sleepers and replace them with new Pipe Guard supports by OMG. Owner to provide asbestos report. Flash penetrations and drains per Sarnafil standards; replace any missing or damaged drain domes. Lower deck is included, which includes flashing the walls and adding new clad coping metal. Follow existing tread layout with new Sarnatread.

6. Country Springs Elem.:

   a. Portables (Bldg. D): G410, 60 Mil FB o/ ½" DDP o/ EPS Infill o/ metal deck/ pan. Loose lay EPS Insulation in the metal pan over the soffit area, nearest the entry to the building, and fasten the DDP board to the top of the crimped seam rather than in the pan. Fasteners are not permitted to penetrate the pan at the soffit to avoid them visible from below. Install entire roof system over metal cover on top of rain gutter. Install new rain gutter and attach to existing. Reconnect down spout to new rain gutter.
   b. On the permanent buildings, remove and dispose of the existing rain gutters and replace them with new box gutters matching the existing size and shape configuration. The new gutters shall be painted with a Kynar finish matching the existing color. Ensure all downspout connects are made watertight, especially those routed through the building. (See as-built detail.)
   c. On the portable buildings, new rain gutters are needed to replace the existing gutters, thus matching their size and color. (See aerial map with gutter areas notated.)

7. Hidden Trails Elem.:

   a. Portables (Rooms 34-35): G410, 60 Mil FB o/ ½" DDP o/ EPS Infill o/ metal deck/ pan. Loose lay EPS Insulation in the metal pan over the soffit area, nearest the entry to the building, and fasten the DDP board to the top of the crimped seam rather than in the pan. Fasteners are not permitted to penetrate the pan at the soffit to avoid them visible from below. Install entire roof system over metal cover on top of rain gutter. Install new rain gutter and attach to existing. Reconnect down spout to new rain gutter.

8. Rhodes Elem.:

   a. Building A (MPR, including lower deck Kitchen): G410, 60 Mil FB o/ granular cap sheet BUR. Membrane adhered used low-rise foam adhesive. Remove and dispose of the existing coping metal and replace it with new Tan clad colored coping metal. Remove and dispose of the existing fry reglets and residential shingles at the walls and replace them with new feltbacked membrane and terminate at the top of the wood nailer in keeping with Sarnafil standard wall application. Flash curbs and penetrations per Sarnafil standard detailing. Remove the ladder that accesses the lower deck and replace the coping metal below the ladder with new clad metal and flash vertical walls surrounding the ladder. Remove and replace rusted 'mushroom heads' with new of like type and function, thus matching existing. Remove and dispose of existing wood sleepers and replace them with new Pipe Guard supports by OMG. Owner to provide asbestos report. Flash penetrations and drains per Sarnafil standards; replace any missing or damaged drain domes. Lower deck is included, which requires flashing the walls and adding new clad coping metal. Follow existing tread layout with new Sarnatread.

9. Rolling Ridge Elem.:

   a. Portables (Bldg. J): G410, 60 Mil FB o/ ½" DDP o/ EPS Infill o/ metal deck/ pan. Application Notes: Loose lay EPS Insulation in the metal pan over the soffit area, nearest the entry to the building, and fasten the DDP board to the top of the crimped seam rather than in the pan. Fasteners are not permitted to penetrate the pan at the soffit to avoid them visible from below. Install entire roof system over metal cover on top of rain gutter. Install new rain gutter and attach to existing. Reconnect down spout to new rain gutter.
   b. On the permanent buildings, remove and dispose of the existing rain gutters and replace them with new box gutters matching the existing size and shape configuration. The new gutters shall be painted with a Kynar finish matching the existing color. Ensure all downspout connects are made watertight, especially those routed through the building.
   c. On the portable buildings, new rain gutters are needed to replace the existing gutters, thus matching their size and color. (See aerial map with gutter areas notated.)

10. Woodcrest Jr. High School:

   a. Portables (Bldg. E, Rooms 4-8): G410, 60 Mil FB o/ ½" DDP o/ EPS Infill o/ metal deck/ pan. Loose lay EPS Insulation in the metal pan over the soffit area, nearest the entry to the building, and fasten the DDP board to the top of the crimped seam rather than in the pan. Fasteners are not permitted to penetrate the pan at the soffit to avoid them visible from below. Install entire roof system over metal cover on top of rain gutter. Install new rain gutter and attach to existing. Reconnect down spout to new rain gutter.
   b. Buildings A (MPR) & B (Gym): G410, 60 Mil FB o/ ½" DDP o/ EPS Infill o/ metal deck/ pan o/ Standing Seam metal roof. Membrane and clad color shall be Lead Grey by Sarnafil. Existing rain gutters to remain; use clad edge metal with a drip edge into the existing gutter. (See Sarnafil standard gutter detail.) Install Décor Profile battens using 6' oc spacing.

B. Related Work: The work includes but is not necessarily limited to the installation of:
   1. Adhesive for Flashings & Membrane
   2. Clad Metal
   3. Fasteners
   4. Metal Flashings
   5. Roof Membrane
   6. Roof Membrane Flashings
   7. Sealants
   8. Separation Board
   9. Substrate Preparation
   10. Walkways
   11. Wood Blocking

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 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 thirty (30) mils of waterproofing polymers above the reinforcement as documented in the Typical Physical Properties section of the Manufacturer's published Product Data Sheet for 60 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 Owner 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 Owner'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 ten (10) days 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 will be listed in an addendum three days 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. Safety Data Sheets (SDS).

## 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 Owner's Representative or the manufacturer are to be removed from the job site and replaced at no cost to the Owner.

## 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 Owner.

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/ Owner'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 Owner'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 Owner of such condition in writing for correction at the Owner'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 Owner's satisfaction.

S. All landscaped areas damaged by construction activities shall be repaired at no cost to the Owner.

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. Always keep lids on unused cans.

W. Protective wear shall be worn when using solvents or adhesives or as required by job conditions.

X. Applicator is required to notify the owner's project manager and inform him each time Sarnafil'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 Owner'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 (only products purchased from the membrane manufacturer are covered under System Warranty): Upon successful completion of the work to the Roofing Manufacturer's and Owner'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 accessories that comprise a roof system, and contractor labor. The Warranty shall be non-Prorated provide for No Dollar Limit (NDL) and shall not exclude 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 owner to a maintenance schedule or requirements as a condition of the warranty.

B. Applicator/Roofing Contractor Warranty: The Applicator shall supply the Owner 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 Owner. The Applicator's warranty obligation shall run directly to the Owner, and a copy shall be sent to the manufacturer.

C. Owner Responsibility: Owner shall notify both the manufacturer and the Applicator of any leaks as they occur during the time when both warranties are in effect.

**PART 2 - PRODUCTS**

**2.01 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 Owner's Representative for acceptability for the intended use with the manufacturer's products.

## 2.02 MEMBRANE

A. Sarnafil® S327-15 Polyester scrim reinforced membrane with a factory-applied integral lacquer coating to repel dirt and sustain reflectivity. Contact Keith Steiger, (760) 617-4404.

B. Sarnafil G410-15 Fiberglass reinforced membrane with a factory-applied integral lacquer coating to repel dirt and sustain reflectivity.

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

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 reinforcements and a 9 oz feltback fabricated as part of the membrane sheet.
3. Owner's product standard. Substitutions will not be considered. KEE and other like-type, non-conforming membrane products submitted will not be considered for use on this project. Polyester scrim reinforced membranes will not be used for adhered applications.

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

| Parameters | ASTM Test Method | Required Physical Properties |
|---|---|---|
| Reinforcing Material | - | Polyester, Fiberglass |
| Overall Thickness (1), min., inches (mm) | D751 | [0.060 inches] |
| Thickness Above Scrim | - | 0.030 (avg.) |
| 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 break 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.

## 2.03 FLASHING MATERIALS

A. Wall/Curb Flashing
1. Flashing Membrane: A fiberglass reinforced membrane adhered to approved substrate using adhesive. Consult Product Data Sheets for adhesive options and additional information.
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 Tan and Lead Grey as referenced in the scope.

B. Perimeter Edge Flashing
1. Sarnaclad: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Sarnaclad is a 24 gauge, G90 galvanized metal sheet with a 20 mil (0.5 mm) unsupported Sarnafil membrane laminated on one side. Use White clad metal as so specified and described in the Scope Section of this specification.

C. 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.

## 2.04 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 Sarnarail polymeric batten strip to clamp S327 roof membrane to roof decks. Fastener-MAXLoad may also be used to secure Disc-MAXLoad and Sarnafil 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.

## 2.05 INSULATION AND SEPARATION BOARD

A. Sarnatherm Insulation: Sarnatherm extruded polystyrene (EPS) insulation is a closed-cell foam panel with continuous skin surfaces and square edges. EPS to be 1.5 psi density.

B. Dens-Deck®: A siliconized gypsum, fire-tested hardboard with glass-mat facers. Dens-Deck is provided in a 4 ft x 8 ft (1.2 m x 2.4 m) board size and in thickness of ¼" and ½ inch.

## 2.06 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.

## 2.07 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.

## 2.08 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.

## 2.09 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.

# PART 3 EXECUTION

## 3.01 PRE-CONSTRUCTION CONFERENCE

A. The Applicator, Owner'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 Owner'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 weathertight 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 weathertight 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, 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 Sarnafil 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. Sarnafil S327 membrane shall be attached with Sarnafasteners and Sarndisc according to Sika Sarnafil'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. Sarnafil 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 Sika Sarnafil warranty**. Consult Sika Sarnafil's Technical Department for further information.

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 Sika Sarnafil Technical. Sarnafasteners and Sarnadiscs are installed along the edge of the membrane on the fastening line at a spacing determined by Sika Sarnafil and the Owner's Representative/Designer. Sarnadisc 2-3/8 inch is held back 5/8 inch (15.8 mm), Sarnadisc and Sarnadisc-XPN are held-back 1 inch (25 mm), and Sarnadisc 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 Sarnadisc and Sarnadisc-XPN, and 7 inches (177.8 mm) for Sarnadisc-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 Sarnadisc and Sarnadisc-XPN 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 Sarnadisc-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 Sarnafasteners and Sarnadiscs over the top the half-rolls and weld a (S327) coverstrip for watertightness. 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 Sika Sarnafil'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. Sarnafasteners and Sarnadiscs are installed along the edge of the membrane on the fastening line at a spacing determined by Sika Sarnafil and the Owner's Representative/Designer. Sarnadisc 2-3/8 inch is held back 5/8 inch (15.8 mm), Sarnadisc and Sarnadisc-XPN are held-back 1 inch (25 mm), and Sarnadisc-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 Sarnadisc and Sarnadisc-XPN, and 7 inches (177.8 mm) for Sarnadisc-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 Sarnadisc and Sarnadisc-XPN 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 Sarnadisc-MAXLoad for heat-welding. Fasteners shall clamp the S327 membrane tightly to the substrate. See Detail Drawings.

2. **Hot-air weld overlaps according to Sika Sarnafil's recommendations. Seam test cuts shall be taken at least 3 times per day.**

E. Securement Around Rooftop Penetrations:

1. Around all perimeters, at the base of walls, drains, curbs, vent pipes, or any other roof penetrations, Sarnafasteners and Sarnadiscs 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 Sarnafil membrane tightly to the substrate.
2. Sarnafil membrane flashings shall extend 2-1/2 inches (63 mm) past Sarnadisc and be hot-air welded to Sarnafil deck 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 using 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 Owner'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 Owner.

## 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 Owner's Representative and the manufacturer. Approval shall only be for specific locations on specific dates. If any water enters 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 Owner'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 Owner's Representative and the manufacturer. Acceptance shall only be for specific locations on specific dates. If any water enters 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 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 enters 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 Owner'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 Owner'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**

# SECTION 07 54 21
# MECHANICALLY ATTACHED & ADHERED FELTBACK
# PVC THERMOPLASTIC MEMBRANE ROOFING

## PART 1 - GENERAL CONDITIONS

### 1.01 DESCRIPTION

A. Scope: To install a mechanically fastened and adhered Single Ply Thermoplastic (PVC) Roofing Membrane with flashings and other system components to comprise a roofing system for the Chino Valley Unified School District at Doris Dickson Elementary School as follows:

1. **Sloped Deck Application:**

   a. Mechanically fasten ¼" Dens Deck Prime over the existing BUR system on all the sloped deck sections following FM 1-90 attachment criteria.
   b. Over the newly installed Dens Deck board, adhere Sarnafil G410, 60 Mil feltbacked membrane using a water-based adhesive. Membrane color shall be Tan by Sarnafil. (Contractor is responsible to take a core sample of the existing BUR materials.)
   c. Using the existing edge metal as a cleat to receive the new clad metal, install new clad edge metal in Copper Brown per Sarnafil standards.
   d. Install new expansion joint flashing membrane/ cover. (See attached detail.)
   e. Mechanically fasten new insulation and flashing membrane to the exterior of the parapet walls at the sloped decks. Install new clad metal over the existing coping stone. Clad metal shall be Copper Brown by Sarnafil. At the wall's edge, terminate the membrane using a surface-mounted reglet applied vertically.
   f. Install roof graphics in the center of the field with letters, numbers, and locations as shown on the campus map made a part of this bid package. Using any standard non-white 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.)
   g. Provide pricing for 300' lineal feet of walk tread; owner to determine amount and placement locations.

2. **Low Sloped Deck Application, Equipment Wells, & Covered Walk:**

   a. Mechanically fasten Sarnafil S327, 60 Mil Feltback membrane in compliance with FM 1-90 attachment criteria. Membrane color shall be EnergySmart White.
   b. Remove, abate, and dispose of the existing pitch pockets and flash each penetration using G459 flashing membrane. For those penetrations that are angle iron, flash per Sarnafil standards using wood treaded blocking to square off the penetration device.
   c. Flash each curb using skirt metal counter flashing. For those units with removable devices, flash the curb per Sarnafil Removable Curb Detail and reset the device back in place.
   h. Flash each existing drain per Sarnafil standards. Replace missing or damaged strainers/ drain covers.
   i. Remove and dispose of damaged vent domes/ covers and replace them with new covers of like type and compatibility.
   j. Flash the inside of the parapet walls using NWP Felt Separator, flashing membrane, and skirt metal counter flashing.
   k. For those curbs with removable devices or hoods, install the new membrane flashed over the top of the curb in compliance with Sarnafil's removable curb detail. Reset back in place the existing hoods or devices that were removed to flash the curb.
   d. Flash each scupper using Sarnafil clad metal per Sarnafil standards.
   e. Clad edge metal shall be installed to the sloping edge of the deck where it become vertical.
   f. Replace sleepers with new pipe supports by OMG, "PipeGuard."
   g. Contractor is responsible to take a core sample of the existing BUR materials to confirm the materials and fastener length.

h. Flash all interior parapet walls with NWP Felt Separator and flashing membrane.
i. At the covered walk between buildings, remove, abate, and dispose of the existing BUR materials down to the plywood deck. Install new tapered insulation and ¼" Dens Deck set-in low rise foam adhesive. Adhered Sarnafil G410,60 Mil FB in Tan over the Dens Deck boards. No fasteners shall penetrate the deck. Flash the membrane up the surrounding walls. Ensure new clad edge metal counter-flashes wall membrane termination. Install clad edge metal in Tan and attach a new rain gutter.
j. Remove and dispose of walk tread in the equipment wells and replace them with new tread applied in the same locations as the existing. In addition, provide owner with 300' lineal feet of walk tread; owner to determine placement locations.
k. Remove and dispose of coping metal applied on the parapet wall that separate the equipment well from the sloped deck application. Apply flashing membrane to the parapet wall and encapsulate the wood nailer. Complete the termination by install clad edge metal in Tan

3. **Multi-Purpose Room (MPR), Building:**

a. Over the existing coated BUR system, mechanically fastened Sarnafil S327, 60 Mil Feltbacked membrane into the sloped metal decking. Contractor shall take their own core sample to confirm fastener lengths for mechanical securement. Color shall be White by Sarnafil.
b. Remove and dispose of the existing coping metal and fry reglet at the base of the parapet walls. Adhere NWP felt separate against the stucco parapet walls using a solvent-based adhesive followed by adhering 60 mil flashing membrane to the felt separator. Mechanically fasten securement/ termination bar horizontally at the wall's midpoint and cover-striped; the wall substrate is plywood. Install new clad coping metal. Clad color shall be Reflective Grey by Sarnafil. Contractor shall ensure the flashing membrane encapsulates the wood nailer at the top of the wall before install the new clad metal.
c. Remove and dispose of the existing walk tread and replace it with new Sarnafil walk tread following the same path layout as the existing tread. Provide owner with unit price per lineal foot for additional walk tread.
d. Flash non-parapet walls to the fry reglet, which can be reused. Inside corners where building walls meet parapet walls shall be terminated using a surface-mounted reglet applied vertically.
e. Replace redwood sleepers/ blocking with new pipe supports by OMG, "PipeGuard;" dispose of the existing redwood sleepers.
f. Flash curbs and terminate using skirt metal counterflashing.
g. Flash pipe penetrations using asphaltic-resistant membrane, Sarnafil G459.

4. **Portable Buildings**:

a. For portable buildings located at the east side of the campus, install EPS insulation sized to fit within the standing seam pan opening, flush with the top of the metal standing seam. (Contractor shall confirm proper thickness and EPS sizing.) Install ½" Dens Deck Prime (DDP) by mechanical attachment following FM 1-90 attachment criteria. Mechanically fastened Sarnafil S327, 60 Mil Feltback membrane over the Dens Deck Prime separation board. Remove and dispose of all 'T-Top' vents and replace them with new 'T-Tops' with clad metal flange and new sheet metal cover. Weld the flange to the field membrane.
b. Portables with concealed gutters covered by a sheet metal cover, install the EPS insulation under the sheet metal cover and apply the DDP over the top of the cover. Complete the installation by mechanically fastened the membrane and installing a new rain gutter attached the existing gutter. Reconnect the downspout.
c. For those units with open gutters, install clad metal as an insert into the gutter opening, thus lining the gutter with clad metal. Use flashing membrane welded over each clad metal joint, ensuring a watertight seal throughout. Remove and dispose of the coping metal and replace it with White clad edge metal by Sarnafil.
d. Portables No. 34 & 35 have BUR cap sheet roof and a sheet metal gutter that runs through the center, between the buildings. Mechanically fastened S327, 60 Mil FB o/ the existing

BUR and flash the perimeter edge with White clad metal, including lining the gutter between the buildings with clad metal.

B. Related Work: The work includes but is not necessarily limited to the installation of:
   1. Adhesive for Flashings
   2. Clad Metal
   3. Fasteners
   4. Metal Flashings
   5. Roof Membrane
   6. Roof Membrane Flashings
   7. Sealants
   8. Separation Board
   9. Substrate Preparation
   10. Tapered/ Rigid Insulation
   11. Walkways
   12. Wood Blocking

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 mils 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 thirty (30) mils, respectively, of waterproofing polymers above the reinforcement as documented in the Typical Physical Properties section of the Manufacturer's published Product Data Sheet for 60 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 Owner 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. Additionally, the warranty shall not obligate the owner to any maintenance requirements or schedule as a condition of the warranty.

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.

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 Owner'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. 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. Outline of roof with roof size and elevations shown.
   b. Profile details of flashing methods for penetrations.
   c. Technical acceptance from Manufacturer.

d. 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-D and Quality Assurance, Section 1.02.
e. Certification from the membrane manufacturer that the membrane supplied contains at least 30 and 40 mils of waterproofing polymers and that the membrane thickness is a minimum of 60 and 80 mils, ASTM +/- tolerances do not apply.
f. Certification from the Applicator that the system specified meets all identified code and insurance requirements as required by the Specification.
g. 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.
h. 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 (Fastening/ 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 Owner's Representative or the manufacturer are to be removed from the job site and replaced at no cost to the Owner.

**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 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 Owner.

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/ Owner'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 Owner'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 Owner of such condition in writing for correction at the Owner'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 Owner's satisfaction.

S. All landscaped areas damaged by construction activities shall be repaired at no cost to the Owner.

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. Always keep lids on unused cans.

W. Protective wear shall be worn when using solvents or adhesives or as required by job conditions.

## 1.07 BIDDING REQUIREMENTS

A. Pre-Bid Meeting: A pre-bid meeting shall be held with the Owner'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 (only products purchased from the membrane manufacturer are covered under System Warranty): Upon successful completion of the work to the Roofing Manufacturer's and Owner'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 accessories that comprise a roof system, and contractor labor. The Warranty shall be Non-Prorated provide for No Dollar Limit (NDL) and shall not exclude 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 owner to a maintenance schedule as a condition of the warranty.

B. Applicator/Roofing Contractor Warranty: The Applicator shall supply the Owner 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 Owner. The Applicator's warranty obligation shall run directly to the Owner, and a copy shall be sent to the manufacturer.

C. Owner Responsibility: Owner shall notify both the manufacturer and the Applicator of any leaks as they occur during the time-period when both warranties are in effect.

## PART 2 - PRODUCTS

### 2.01 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 Owner's Representative for acceptability for the intended use with the manufacturer's products.

### 2.02 MEMBRANE

A. Sarnafil® S327-15 Polyester scrim reinforced membrane with a factory-applied integral lacquer coating to repel dirt and sustain reflectivity and Sarnafil G410-15 with fiberglass reinforcements. Owner standard, substitutions will not be considered. Contact Keith Steiger, (760) 617-4404.

B. Membrane shall conform to ASTM D4434-15 (or latest revision), "Standard for Polyvinyl Chloride Sheet Roofing". Classification: Type III and Type II, Grade I
   1. Sarnafil S327-15, 60 mil (1.5 mm), thermoplastic membrane with polyester scrim reinforcements and a factory applied 9 oz geotextile felt backing. (EnergyWhite)
   2. Sarnafil G410-15 Feltback, 60 mil (1.5 mm), thermoplastic membrane with fiberglass reinforcements and a factory applied 9 oz. geotextile felt backing. (Tan)

C. Color of Membrane:
   1. EnergySmart feltback (White), initial reflectivity of 0.83, initial emissivity 0.92, solar reflective index (SRI) of >104.
   2. EnergySmart (Tan), initial reflectivity of 0.73, initial emissivity 0.85, solar reflective index (SRI) of > 89.

D. Typical Physical Properties

| Parameters | ASTM Test Method | Typical Physical Properties |
|---|---|---|
| Reinforcing Material | - | Polyester & Fiberglass |
| Overall Thickness(1), min., inches (mm) | D751 | [0.060 inches)] |
| Thickness Above Scrim | - | 0.027 (avg.) |
| 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 breqking 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.

## 2.03 FLASHING MATERIALS

A. Wall/Curb Flashing
1. Flashing Membrane: A fiberglass reinforced membrane adhered to approved substrate using adhesive.

B. Perimeter Edge Metal or Coping Metal
1. Sarnaclad: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Sarnaclad is a 24 gauge, G90 galvanized metal sheet with a 20 mil (0.5 mm) unsupported Sarnafil membrane laminated on one side. Color shall be Copper Brown, White, and Reflective Grey.

C. 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 to flashing substrate.
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.

## 2.04 INSULATION, SEPARATION BOARD

A. Insulation: A rigid polyisocyanurate foam insulation with black mat facers. Insulation is available in 4 ft x 4 ft (1.2 m x 1.2 m) or 4 ft x 8 ft (1.2 m x 2.4 m) sizes and various thicknesses. Provide tapered insulation to achieve ¼" per foot slope to drain on covered walkway.

B. Insulation: Sarnatherm® EPS is a rigid expanded polystyrene insulation board. Sarnatherm® EPS is installed directly on the deck substrate (depending on local code or FM requirements), over an approved thermal barrier, or directly on the existing roof surface prior to the application of the Sarnafil® membrane.

C. Dens-Deck® A siliconized gypsum, fire-tested hardboard with glass-mat facers. Dens-Deck is provided in a 4 ft x 8 ft (1.2 m x 2.4 m) board size and in thicknesses of ¼" and ½".

## 2.05 ATTACHMENT COMPONENTS

A. Insulation and Separation Board Adhesive
1. Low Rise Foam Adhesive: A two component (Part A and B) polyurethane low-rise adhesive for bonding insulation to approved compatible substrates. Application rates are as follows:

| APPLICATION RATES FOR INSULATION | | |
|---|---|---|
| | Approximate Sq. Ft. *(Meter²)* per Drum Set | |
| | **50 Gal.** (189.27 liter) Set | **15 Gal.** (56.78 liter) Set |
| Wood | 8,500 - 9,000 *(789.68 - 836.13)* | 2,500 - 2,700 *(232.26 - 250.84)* |

Notes:

a) Adhesive must be applied as a continuous layer.
b) Use a water-filled, foam-covered lawn roller to consistently and evenly press insulation into adhesive layer.
c) Storage temperatures in excess of 90° F (32° C) may affect shelf life.
d) If exposed to temperatures below 40° F (5° C), restored to a minimum temperature of 60°F (15° C) before use.
e) Job site conditions may affect performance. LR-2001 adhesive shall not be used if surface and/or ambient temperatures below 40° F (5° C) are expected during application or subsequent curing time.
f) The addition of LR-2001 Catalyst to Part B may be required when temperatures are between 40° F (5° C) and 80° F (27° C).
g) Adhesive shall not be applied to wet or damp surfaces.

B. Membrane Adhesive:
1. 2121 Adhesive: A water-based adhesive used to attach the membrane to horizontal or near-horizontal substrates. Application rates are as follows:

| APPLICATION RATES FOR FELTBACK MEMBRANE | | | | | | |
|---|---|---|---|---|---|---|
| | Adhesive Rates – Gallons/100 Ft² *(Liters/Meter²)* | | | | | **Approximate Sq. Ft./Pail** *(meter²)* |
| | **Substrate** | | **Membrane** | | **Total** | |
| GP Dens-Deck Prime® | 1.50 *(0.61)* | + | 0 | = | 1.50 *(0.61)* | 333 *(30.94)* |

Notes:

a) There is a significant increase in drying time due to an increase in humidity and/or a decrease in temperature. Do not install when outdoor or substrate temperatures during drying period are expected to fall below 40° F (5° C).

b) Do not allow 2121 adhesive to skin-over or surface-dry prior to installation of membrane.

C. Use a water-filled, foam-covered lawn roller to press the membrane consistently and evenly into the adhesive layer.

D. 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.

E. 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.

F. Fastener-MAXLoad: A specially designed, heavy-duty, corrosion-resistant fastener used with the Sarnarail polymeric batten strip to clamp S327 roof membrane to roof decks. Fastener-MAXLoad may also be used to secure Disc-MAXLoad and Sarnafil 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.

G. 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.

H. 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).

I. 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.

J. 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.

K. 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.

L. 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.

M. 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.

N. 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.

## 2.06 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.

B. Crossgrip: Crossgrip XTRA is a rolled-out, open grid, walkway mat used to protect Sarnafil® roof membranes from regular foot traffic.

## 2.07 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.

## 2.08 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.

## 2.09 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.

# PART 3 - EXECUTION

## 3.01 PRE-CONSTRUCTION CONFERENCE

A. The Applicator, Owner'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

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 Owner'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.

A. 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 weathertight with new materials during a one-day period or before the onset of inclement weather.

B. Re-roofing Over Existing Bitumen Roofing
1. 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.

## 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, 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 INSULATION, SEPARATION BOARD INSTALLATION**

A. Insulation and separation board shall be installed according to insulation manufacturer's instructions.

B. Insulation and separation board shall be neatly cut to fit around penetrations and projections.

C. Install tapered insulation in accordance with insulation manufacturer's shop drawings.

D. Install tapered insulation around drains creating a drain sump.

E. Do not install more insulation board than can be covered with the membrane by the end of the day or the onset of inclement weather.

F. Use at least 2 layers of insulation when the total insulation thickness exceeds 2½ inches (64 mm). Stagger joints at least 12 inches (0.3 m) between layers.

G. Mechanical Attachment
1. Insulation and Separation Boards shall be mechanically fastened to the deck with approved fasteners and plates at a rate according to the insulation manufacturer's, FM's, and the manufacturer's recommendations for fastening rates and patterns. The quantity and locations of the fasteners and plates shall also cause the insulation boards to rest evenly on the roof deck/substrate so that there are no significant and avoidable air spaces between the boards and the substrate. Each insulation board shall be installed tightly against the adjacent boards on all sides.
2. Fasteners are to be installed consistently in accordance with fastener manufacturer's recommendations. Fasteners are to have minimum penetration into structural deck recommended by the fastener manufacturer and the membrane manufacturer.
3. Use fastener tools with a depth locator and torque-limiting attachment as recommended or supplied by fastener manufacturer to ensure proper installation.

## 3.07 INSTALLATION OF ROOF MEMBRANE

A. The surface of the insulation or substrate shall be inspected prior to installation of the Sarnafil 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. Sarnafil S327 membrane shall be attached with Sarnafasteners and Sarndisc according to Sika Sarnafil'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. Sarnafil full-width rolls shall be fastened perpendicular to the direction of the steel deck flutes, wood plank, precast 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 Sika Sarnafil warranty**. Consult Sika Sarnafil's Technical Department for further information.
5. **Membrane sheets widths for this project are 6.56'**.

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 Sika Sarnafil Technical. Sarnafasteners and Sarnadiscs are installed along the edge of the membrane on the fastening line at a spacing determined by Sika Sarnafil and the Owner's Representative/Designer. Sarnadisc 2-3/8 inch is held back 5/8 inch (15.8 mm), Sarnadisc and Sarnadisc-XPN are held-back 1 inch (25 mm), and Sarnadisc 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 Sarnadisc and Sarnadisc-XPN, and 7 inches (177.8 mm) for Sarnadisc-MAXLoad in accordance with the overlap lines marked on it's edge. The 5-1/2-inch (140 mm) overlap will allow the top membrane to extend 2-1/2 inches (63 mm) past the Sarnadisc and Sarnadisc-XPN 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 Sarnadisc-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 Sarnafasteners and Sarnadiscs over the top the half-rolls and weld a (S327) coverstrip for watertightness. 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's 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 Sika Sarnafil'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. Sarnafasteners and Sarnadiscs are installed along the edge of the membrane on the fastening line at a spacing determined by Sika Sarnafil and the Owner's Representative/Designer. Sarnadisc 2-3/8 inch is held back 5/8 inch (15.8 mm), Sarnadisc and Sarnadisc-XPN are held-back 1 inch (25 mm), and Sarnadisc-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 Sarnadisc and Sarnadisc-XPN, and 7 inches (177.8 mm) for Sarnadisc-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 Sarnadisc and Sarnadisc-XPN 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 Sarnadisc-MAXLoad for heat-welding. Fasteners shall clamp the S327 membrane tightly to the substrate. See Detail Drawings.
2. **Hot-air weld overlaps according to Sika Sarnafil's recommendations. Seam test cuts shall be taken at least 3 times per day.**

E. Securement Around Rooftop Penetrations
1. Around all perimeters, at the base of walls, drains, curbs, vent pipes, or any other roof penetrations, Sarnafasteners and Sarnadiscs 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 Sarnafil membrane tightly to the substrate.
2. Sarnafil membrane flashings shall extend 2-1/2 inches (63 mm) past Sarnadisc and be hot-air welded to Sarnafil deck membrane.

F. Adhered Membrane Installation
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.
4. Position and unroll successive sheets of feltback membrane and align to provide a minimum 3 inch (76 mm) wide overlap.
5. 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 excess adhesive 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 adhesive.
6. Fold remaining sheets lengthwise to expose additional substrate area adjacent to area previously adhered.
7. Membrane sheets widths for this application are 6.56'.
8. 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 using 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 Owner'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 Owner.

## 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 Owner's Representative and the manufacturer. Approval shall only be for specific locations on specific dates. If any water enters 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 Owner'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 Owner'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. A clad metal fascia plate shall be applied over each joint to cover the flashing membrane strip.

C. Flashing membrane shall 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.

B. Crossgrip: Unroll and position Crossgrip XTRA within the specified areas and cut to desired length. Do not install Crossgrip XTRA directly over Sarnabars. Crossgrip XTRA is installed loose laid on top of completed Sika Sarnafil® and roof assemblies

## 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 Owner'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 Owner'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**


Adult School
Legend
Chino Valley Hope Family Resource Center
Wellness center
Chino Valley Adult School
3rd St
3rd St
B St
B St
Google Earth
Image Landsat / Copernicus
200 ft
N


Anna Borba Elem.
Legend
Anna Borba Elementary School
Anna Borba Elementary School
3rd St
Google Earth
Image Landsat / Copernicus
200 ft
N


Ayala H.S.
Legend
Ruben S. Ayala High School
Ruben S. Ayala High School
Ayala Theatre Company
Practice Fields
Google Earth
Image Landsat / Copernicus
500 ft
N


Canyon Hills JHS
Legend
or High School
Canyon Hills Junior High School
Google Earth
Image Landsat / Copernicus
300 ft
N


Chaparral Elem.
Legend
Chaparral Elementary School
Chaparral Elementary School
Google Earth
Image Landsat / Copernicus
200 ft
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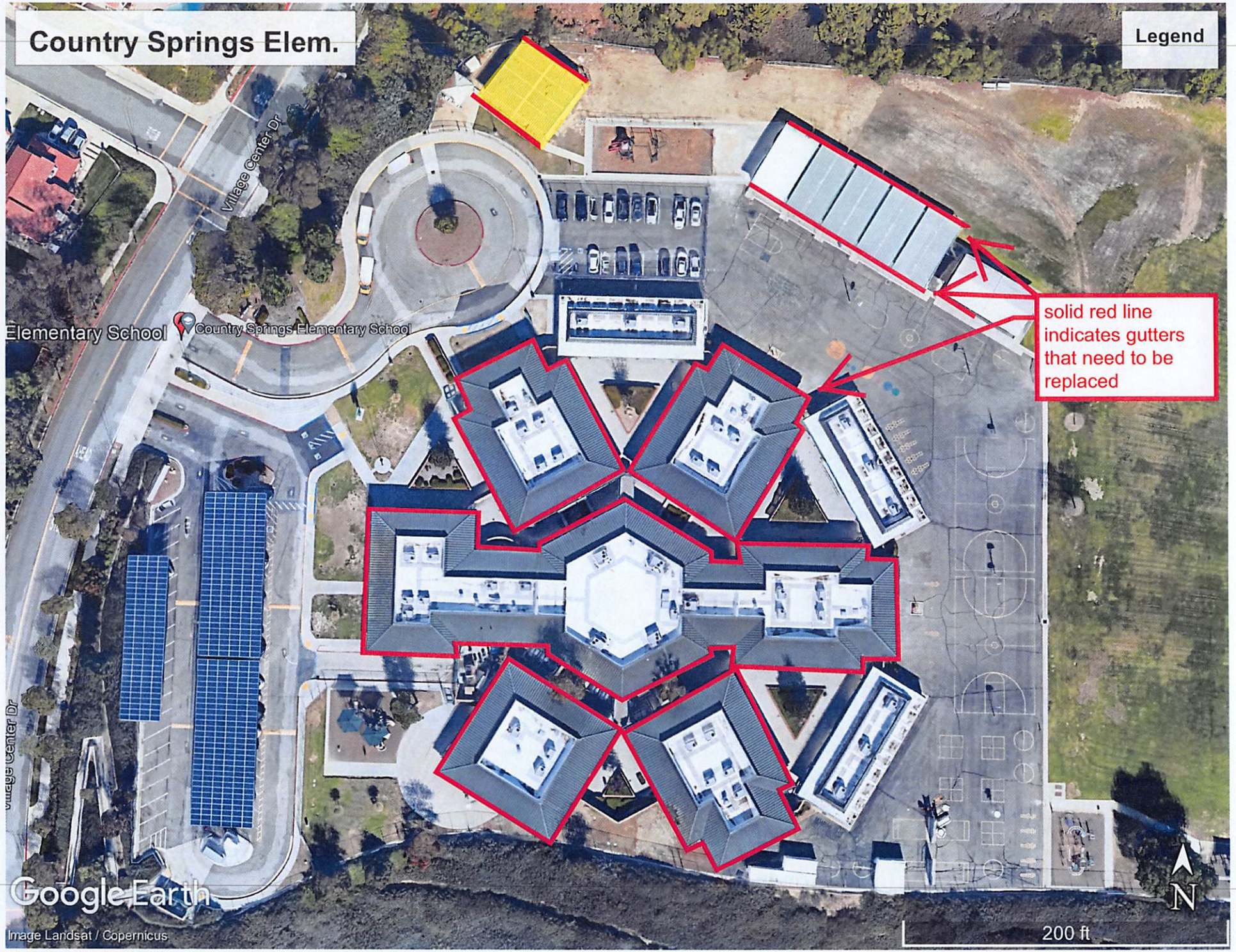
Country Springs Elem.
Legend
Village Center Dr
Elementary School
Country Springs Elementary School
solid red line indicates gutters that need to be replaced
Google Earth
Image Landsat / Copernicus
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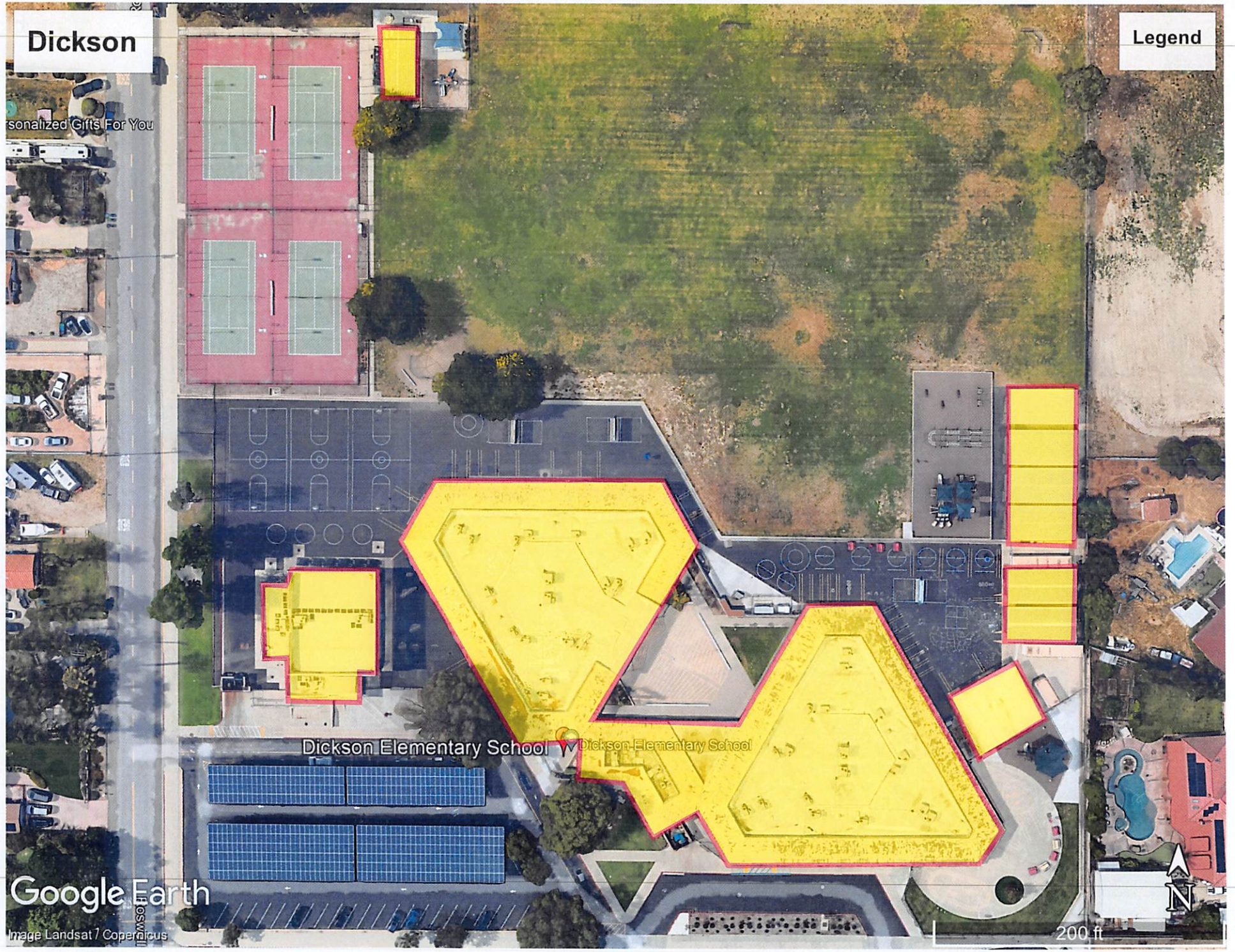
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Dickson Elementary School
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Google Earth
Image Landsat / Copernicus
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Hidden Trails Elem.
Legend
Home Based Realty
14760 Moon Crest
Windmill Creek Rd
Windmill Creek Rd
Windmill Creek Rd
Hidden Trails Elementary School
Hidden Trails Elementary School
Ridgeview Dr
Google Earth
Image Landsat / Copernicus
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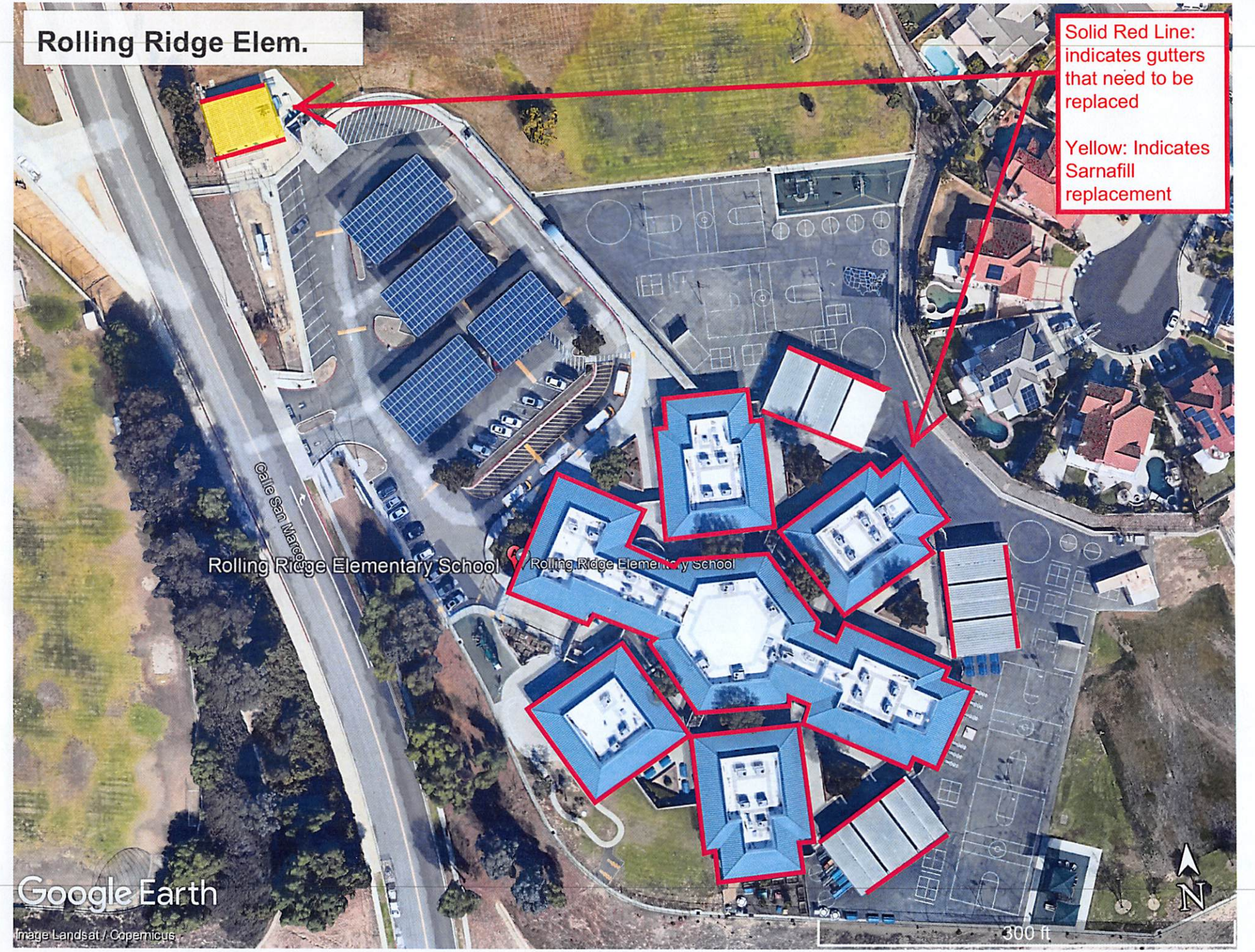
Rolling Ridge Elem.
Solid Red Line: indicates gutters that need to be replaced
Yellow: Indicates Sarnafill replacement
Calle San Marcos
Rolling Ridge Elementary School
Google Earth
Image Landsat / Copernicus
300 ft
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Woocrest JHS
Legend
Woodcrest Junior High School
Woodcrest Junior High School
Google Earth
Image Landsat / Copernicus
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