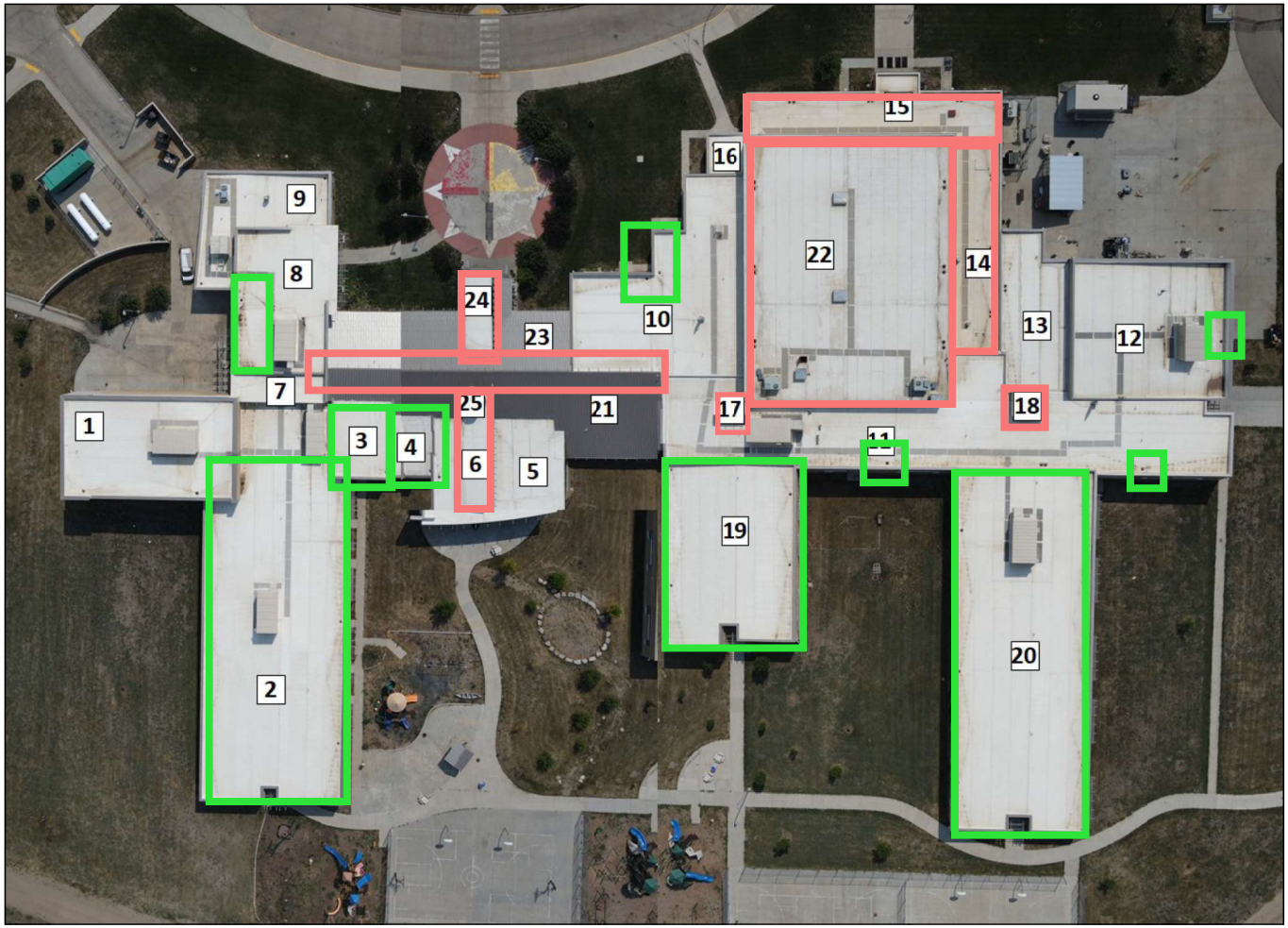
Denotes areas of scupper modifications

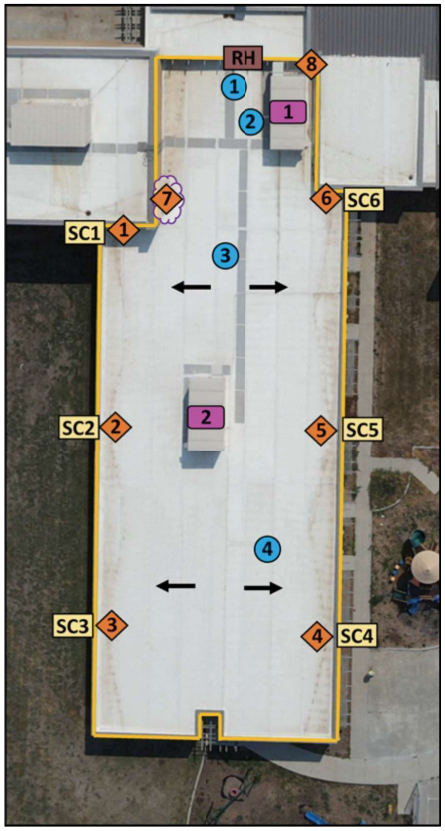
Denotes location of replacement / repair

AERIAL ROOF VIEW

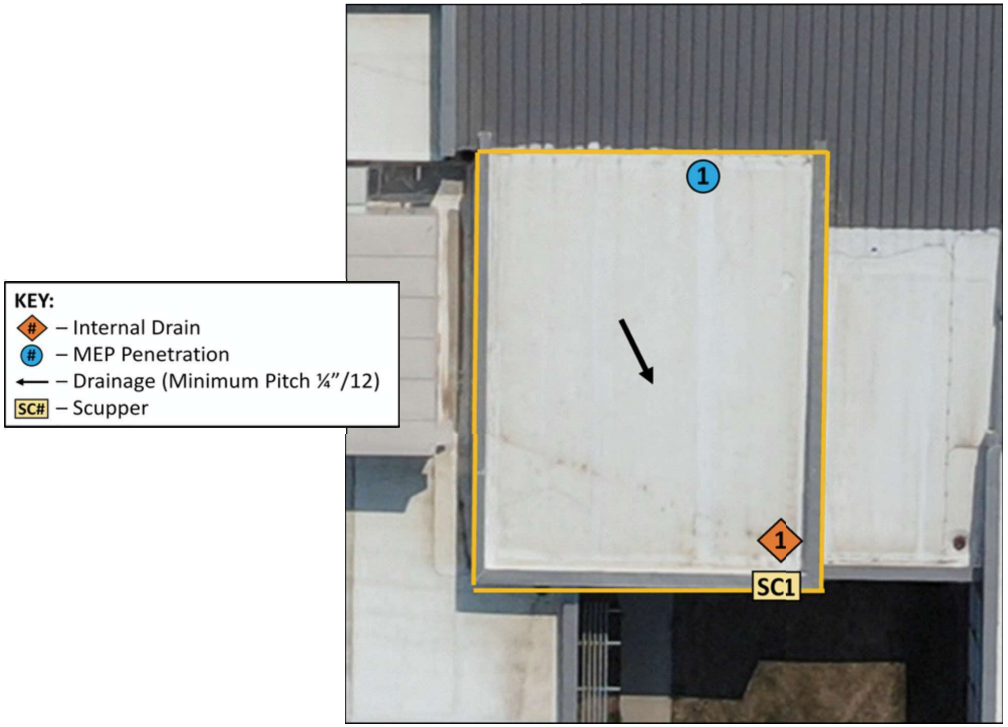


- 20,140 (+/-) square feet of TPO rip off and replace on 8 different planes (6, 14, 15, 17, 18, 22, 24, & 25) per specification.
- 250 (+/-) LF ridge vent remove, replace and provide proper Z channel as shown on plane 21.
- Modify all twenty-four (24+/-) scuppers as shown on 9 different planes (2, 3, 4, 8, 10, 11, 12, 19 & 20).

KEY:
- # – Internal Drain
- # – MEP Penetration
- # – MEP Equipment
- ← – Drainage (Minimum Pitch ¼"/12)
- SC# – Scupper
- RH – Roof Hatch
- – Ponding/ Evidence Of Ponding

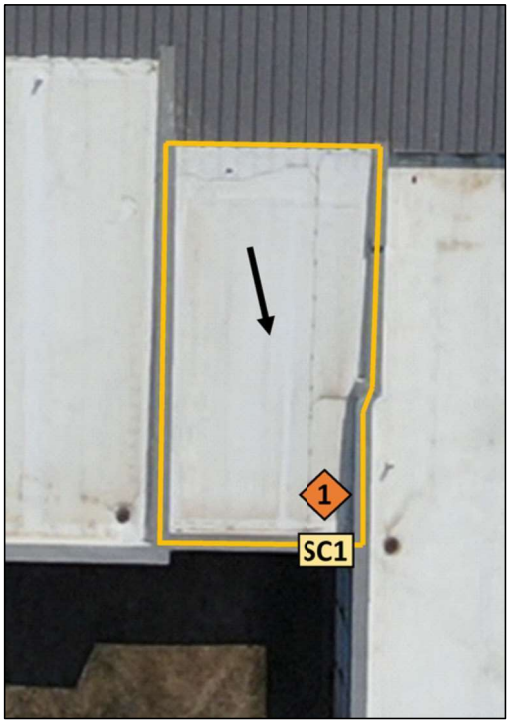


ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Amount (SF)	Condition	Notes
	Low Slope	≥ ¼ "	14850	TPO	Adhered	No	Yes	300	M-1	Debris and loose fasteners on plane



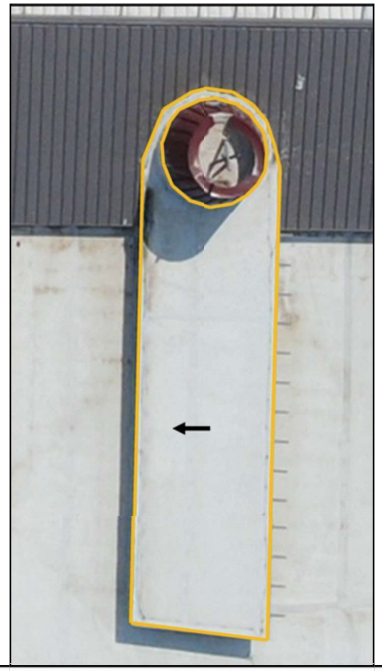
ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Condition	Notes
	Low Slope	≥ ¼ "	1,300	TPO	Adhered	No	No	M-2	

KEY:
- # – Internal Drain
- ← – Drainage (Minimum Pitch ¼"/12)
- SC# – Scupper

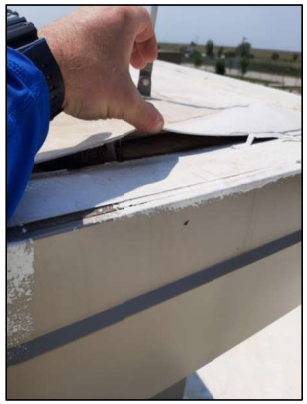


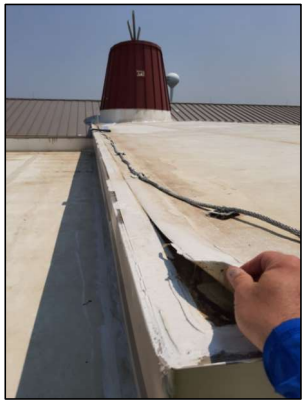
ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Condition	Notes
	Low Slope	≥ ¼ "	520	TPO	Adhered	No	No	M-2	

Plane 6

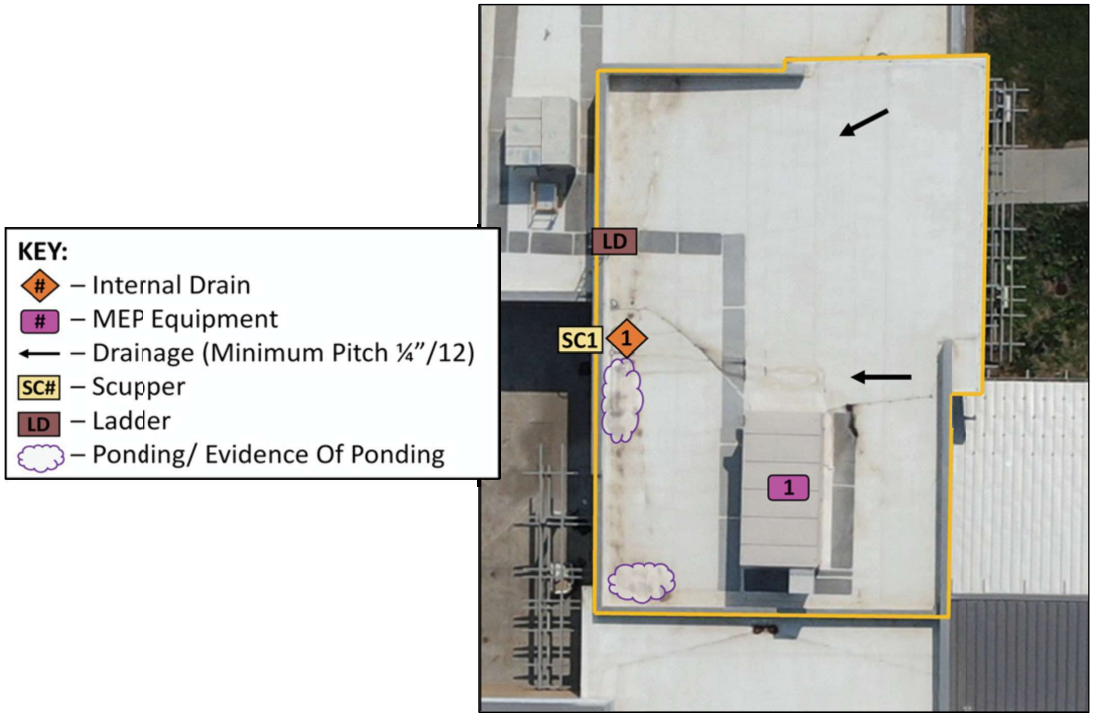


KEY:
⟵ – Drainage (Minimum Pitch ¼"/12)

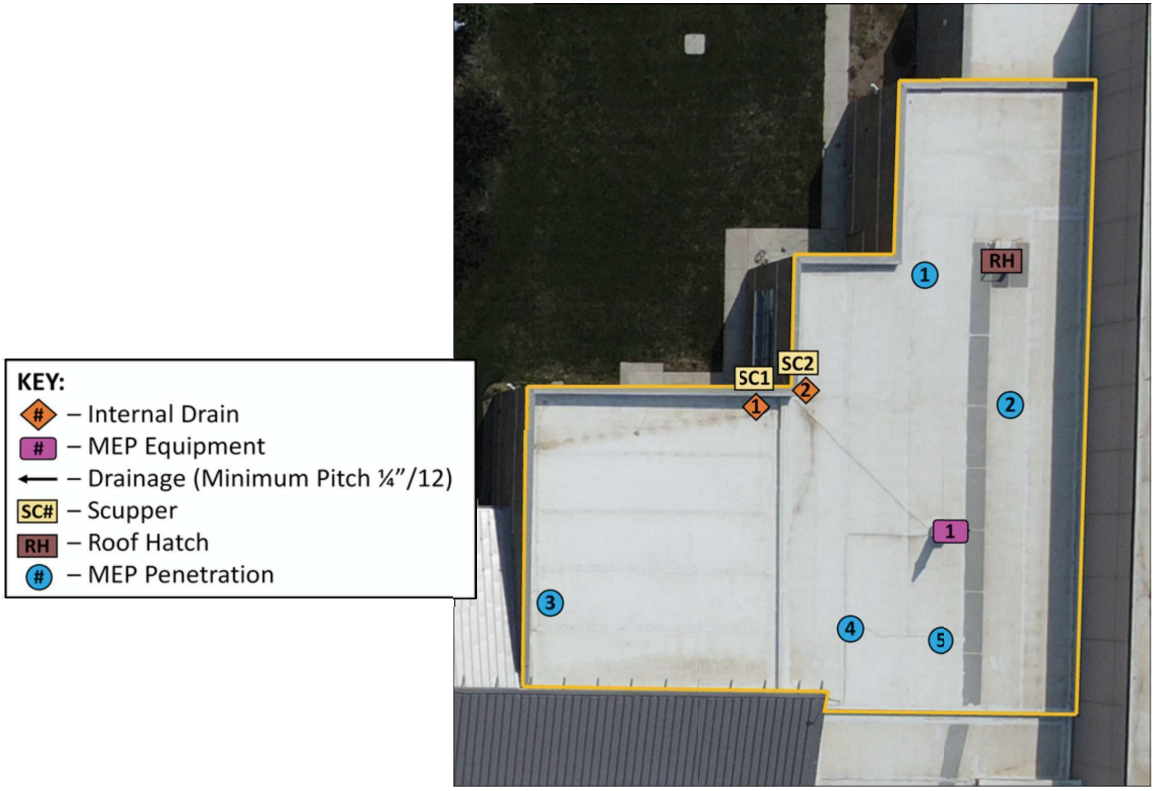




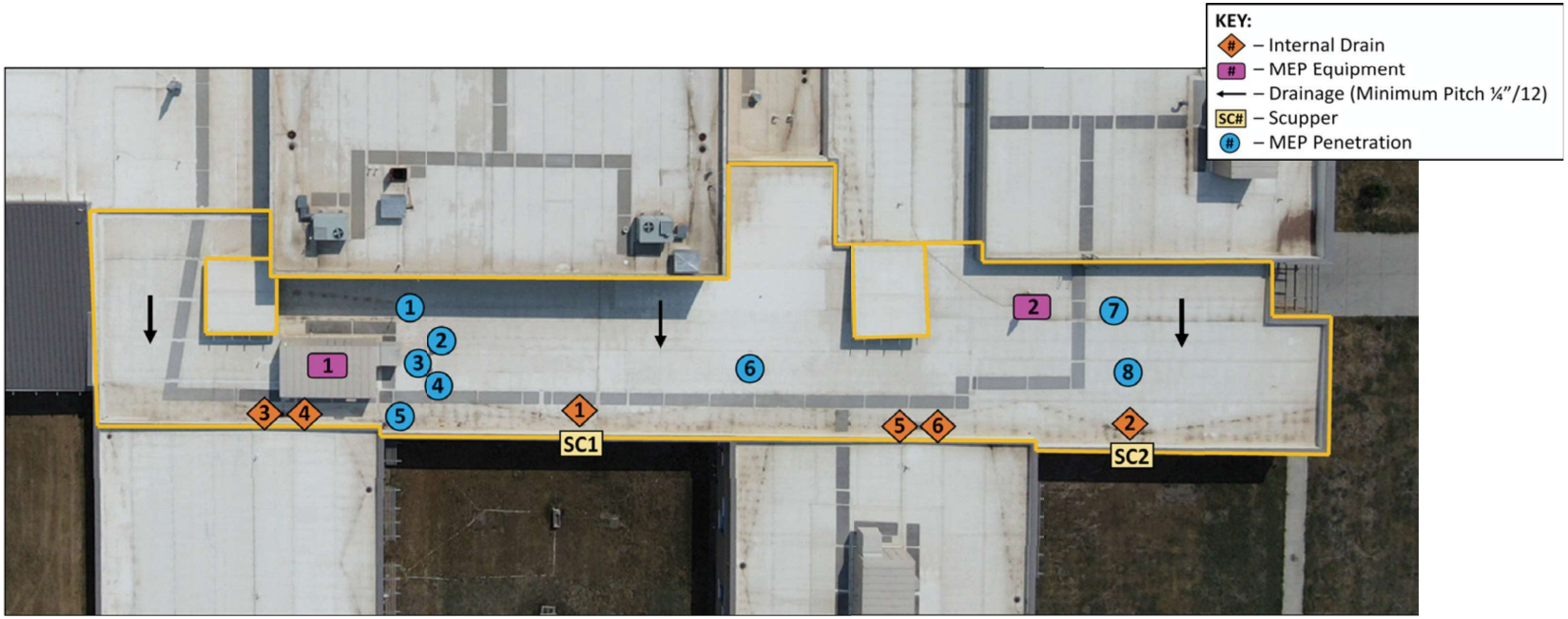
	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Amount (SF)	Ponding Evidence?	Condition	Notes
ASSEMBLY	Low Slope	≥ ¼ "	750	TPO	Adhered	Yes	100	No	U-1	FM reports leak from plane. JDA observes loose membrane on edges of plane. Area surrounding skylight are soft under foot, when stepping on soft area JDA team note water draining from under surrounding membrane



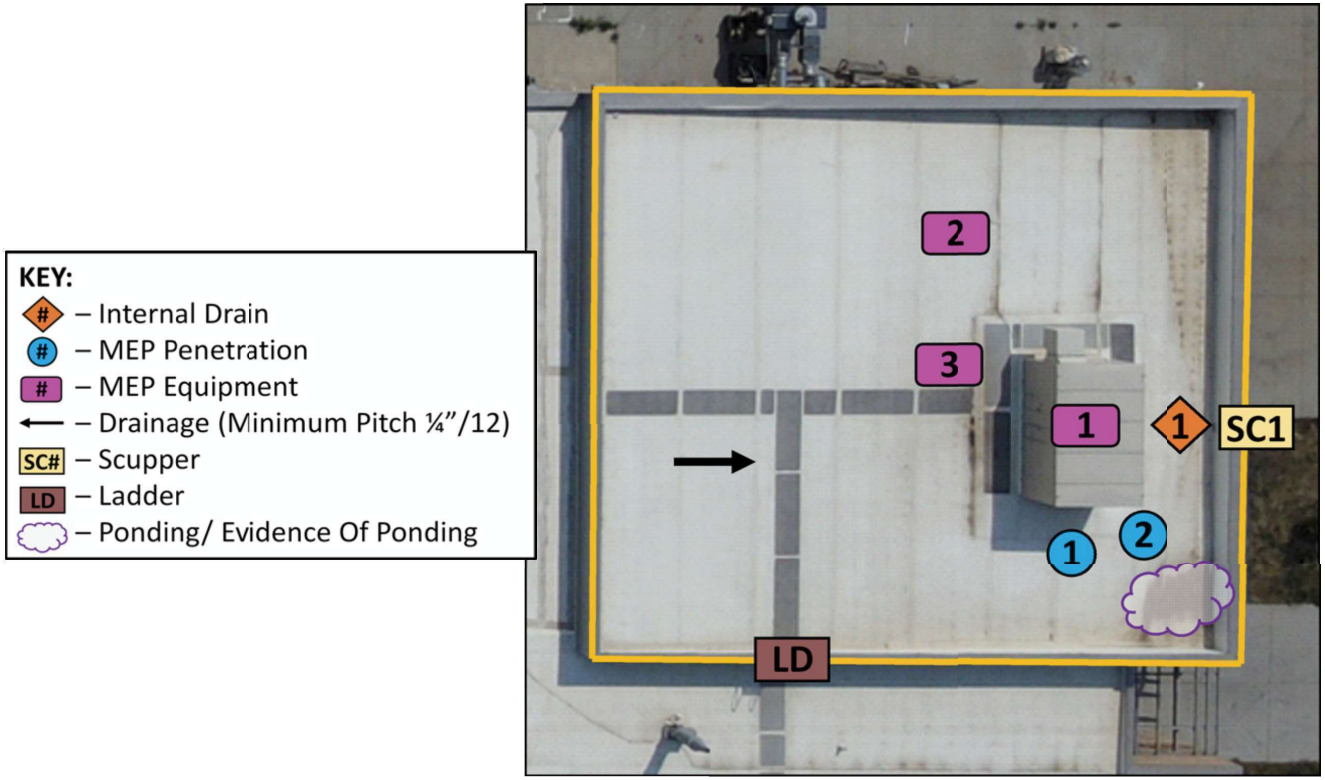
ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Amount (SF)	Condition	Notes
	Low Slope	≥ ¼ "	3,800	TPO	Adhered	No	Yes	400	M-2	



ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Condition	Notes
	Low Slope	≥ ¼ "	6,300	TPO	Adhered	No	No	M-2	

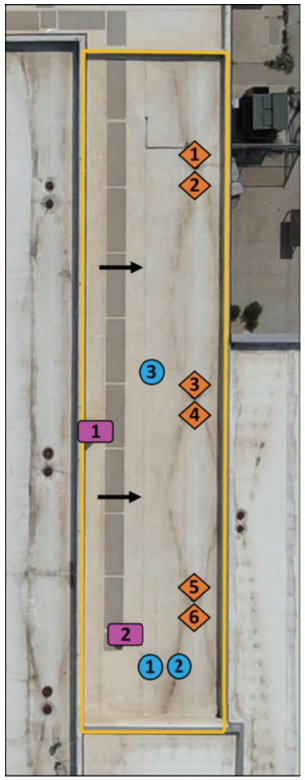


ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Condition	Notes
	Low Slope	≥ ¼ "	12,900	TPO	Adhered	No	No	M-2	



ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Amount (SF)	Condition	Notes
	Low Slope	≥ ¼ "	5,250	TPO	Adhered	No	Yes	500	M-2	

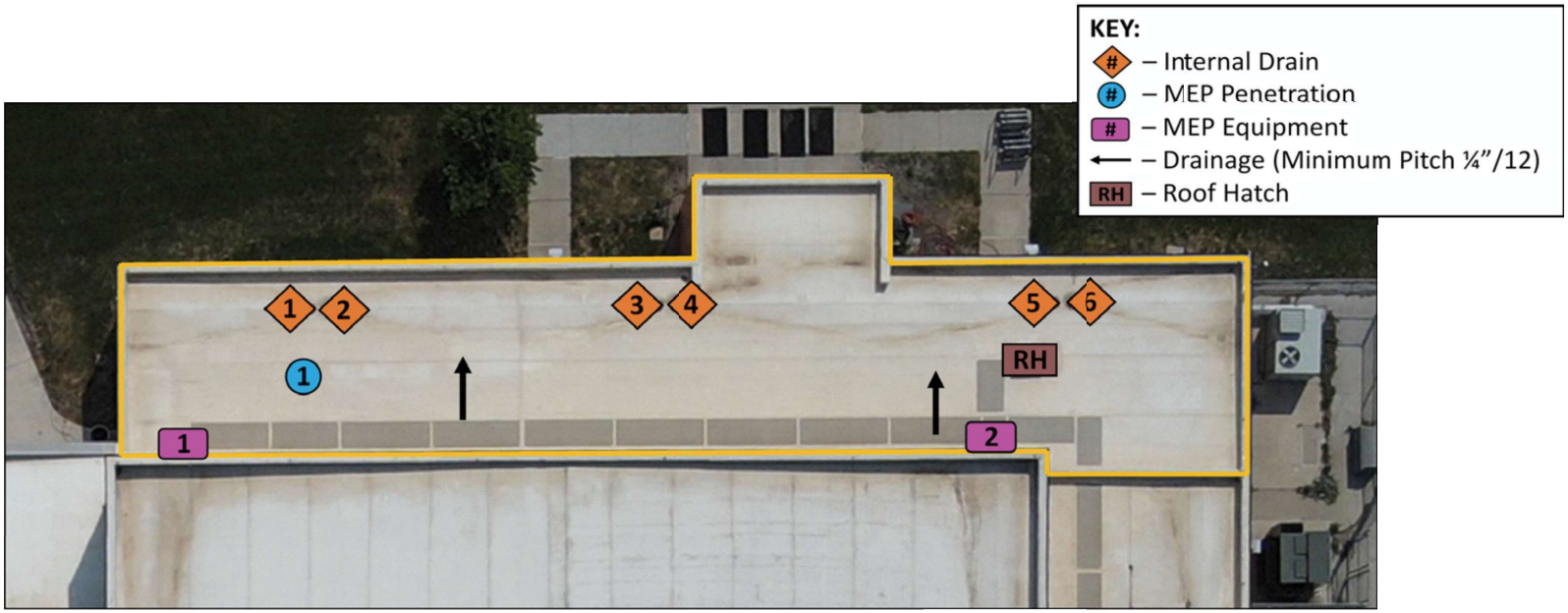
Plane 14



KEY:
- # – Internal Drain
- # – MEP Penetration
- # – MEP Equipment
- ← – Drainage (Minimum Pitch ¼"/12)

ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Condition	Notes
	Low Slope	≥¼ "	2,600	TPO	Adhered	No	No	M-1	Dirt build up on plane

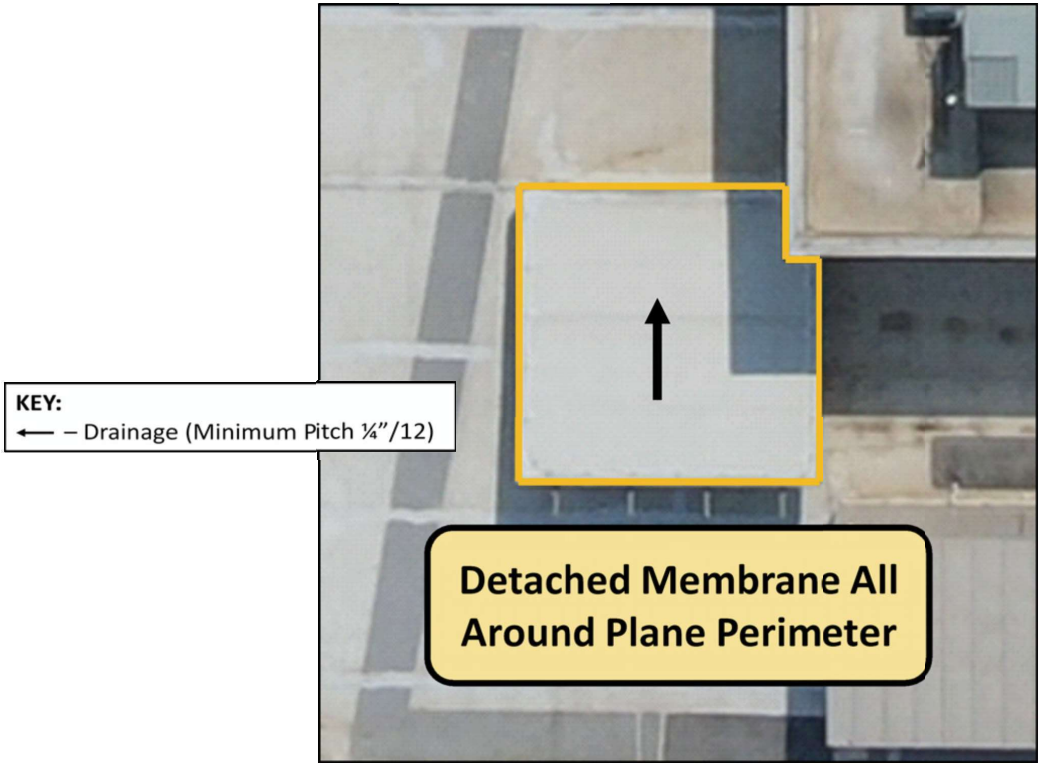
Plane 15



ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Condition	Notes
	Low Slope	≥ ¼ "	2,500	TPO	Adhered	No	No	M-1	Dirt build up on plane

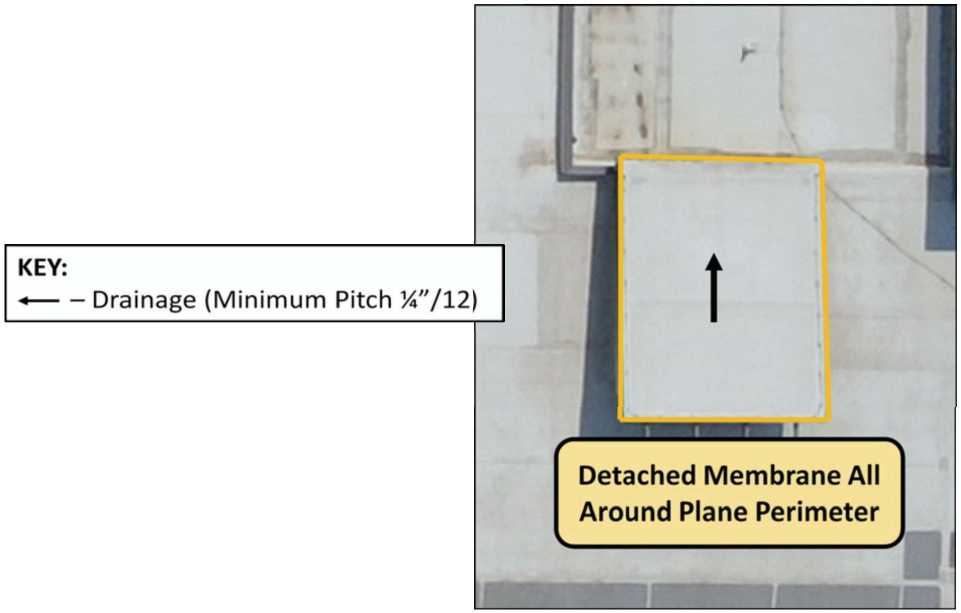
PLANE 15

Plane 17

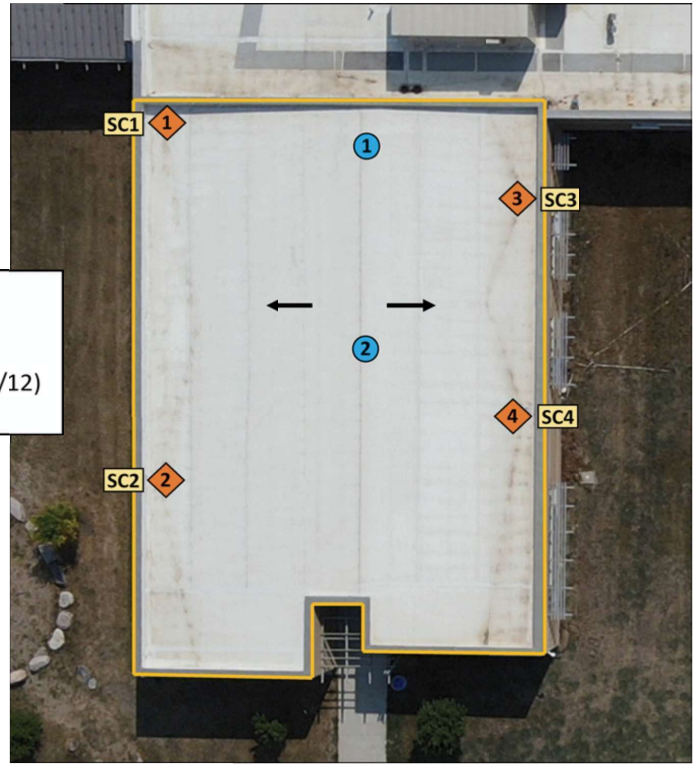


ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Amount (SF)	Ponding Evidence?	Condition	Notes
	Low Slope	≥ ¼ "	300	TPO	Adhered	Yes	68	No	U-I	FM reports leak from this plane, JDA team observes membrane detachment along eave

Plane 18



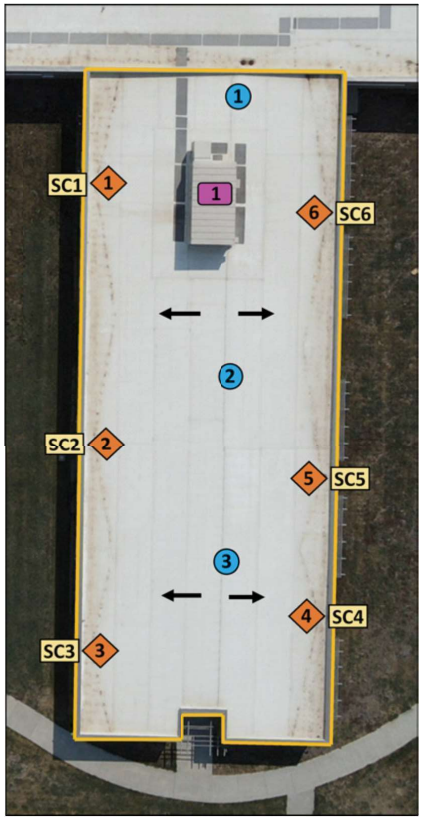
ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Amount (SF)	Ponding Evidence?	Condition	Notes
	Low Slope	≥ ¼ “	300	TPO	Adhered	Yes	68	No	U-I	FM reports leak from this plane, JDA team observes membrane detachment along eave



KEY:
- # – Internal Drain
- # – MEP Penetration
- ← – Drainage (Minimum Pitch ¼"/12)
- SC# – Scupper

ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Condition	Notes
	Low Slope	≥ ¼ "	6,000	TPO	Adhered	No	No	M-2	

KEY:
- # – Internal Drain
- # – MEP Equipment
- ← – Drainage (Minimum Pitch ¼"/12)
- SC# – Scupper
- # – MEP Penetration

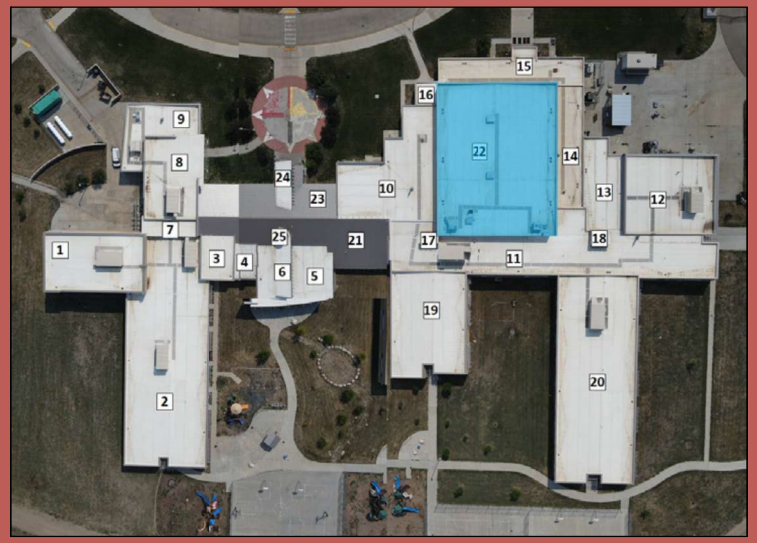


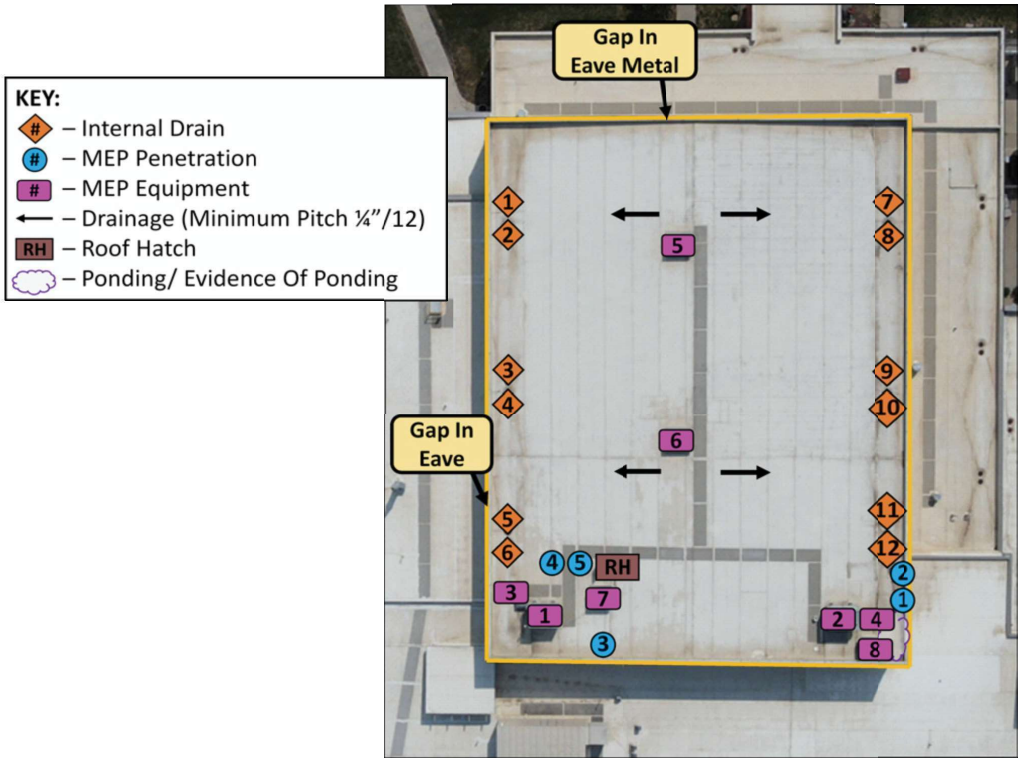
ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Condition	Notes
	Low Slope	≥ ¼ "	12,350	TPO	Adhered	No	No	M-2	

Plane 21

ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Detached / Damaged Membrane?	Ponding Evidence?	Condition	Notes
	Pitched	3/12	5,200	Standing Seam Metal	No	No	M-2	Hail damage to standing seam roof

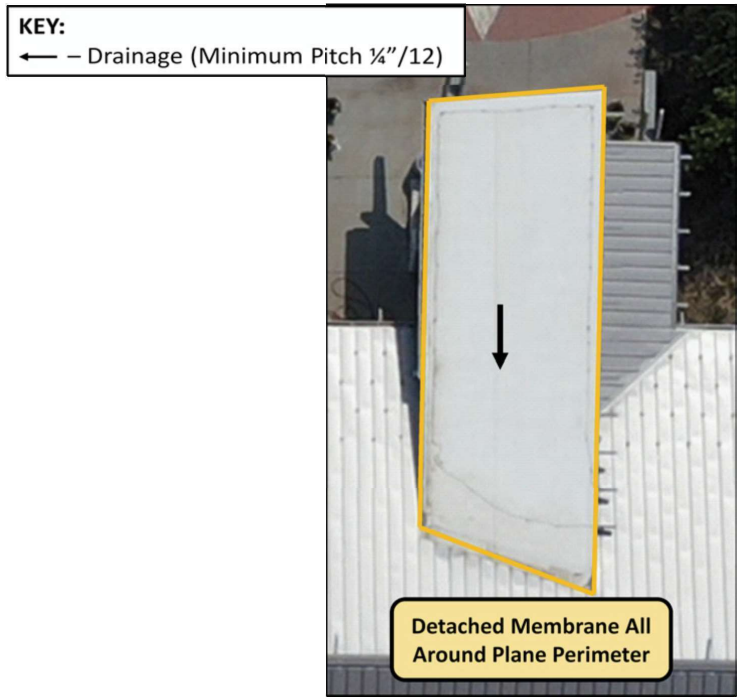
Plane 22





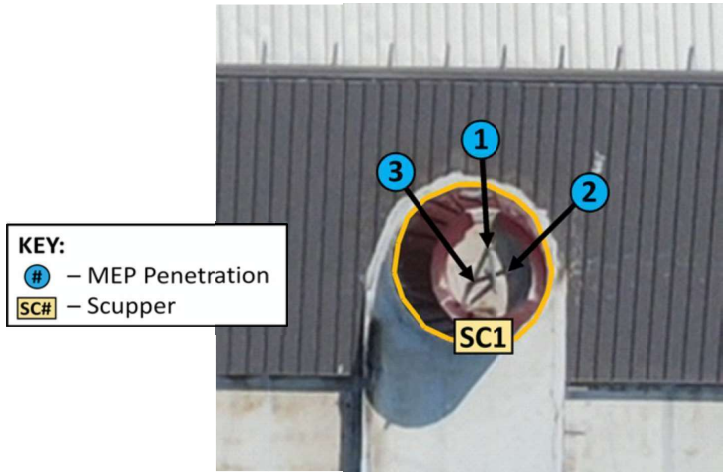
ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Amount (SF)	Condition	Notes
	Low Slope	≥ ¼ "	13,000	TPO	Adhered	No	Yes	300	M-1	Gym roof leaks per FM; JDA observes debris on plane and evidence of ponding water

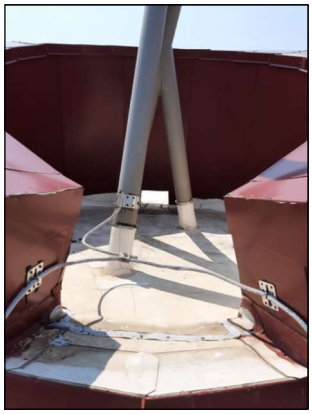
Plane 24



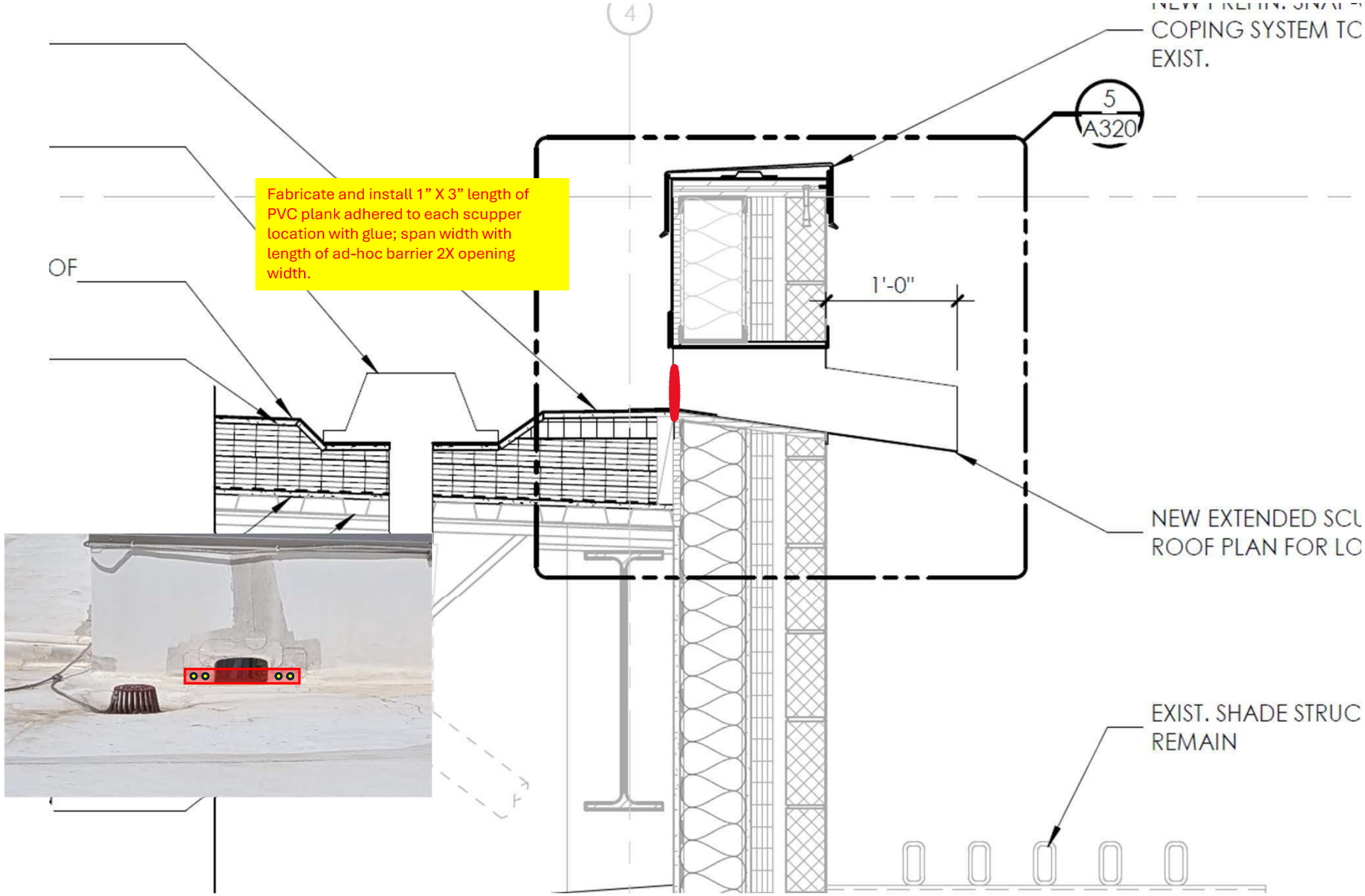
ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Amount (SF)	Ponding Evidence?	Condition	Notes
	Low Slope	≥ ¼ "	650	TPO	Adhered	Yes	110	No	U-1	Membrane loose at perimeter of plane

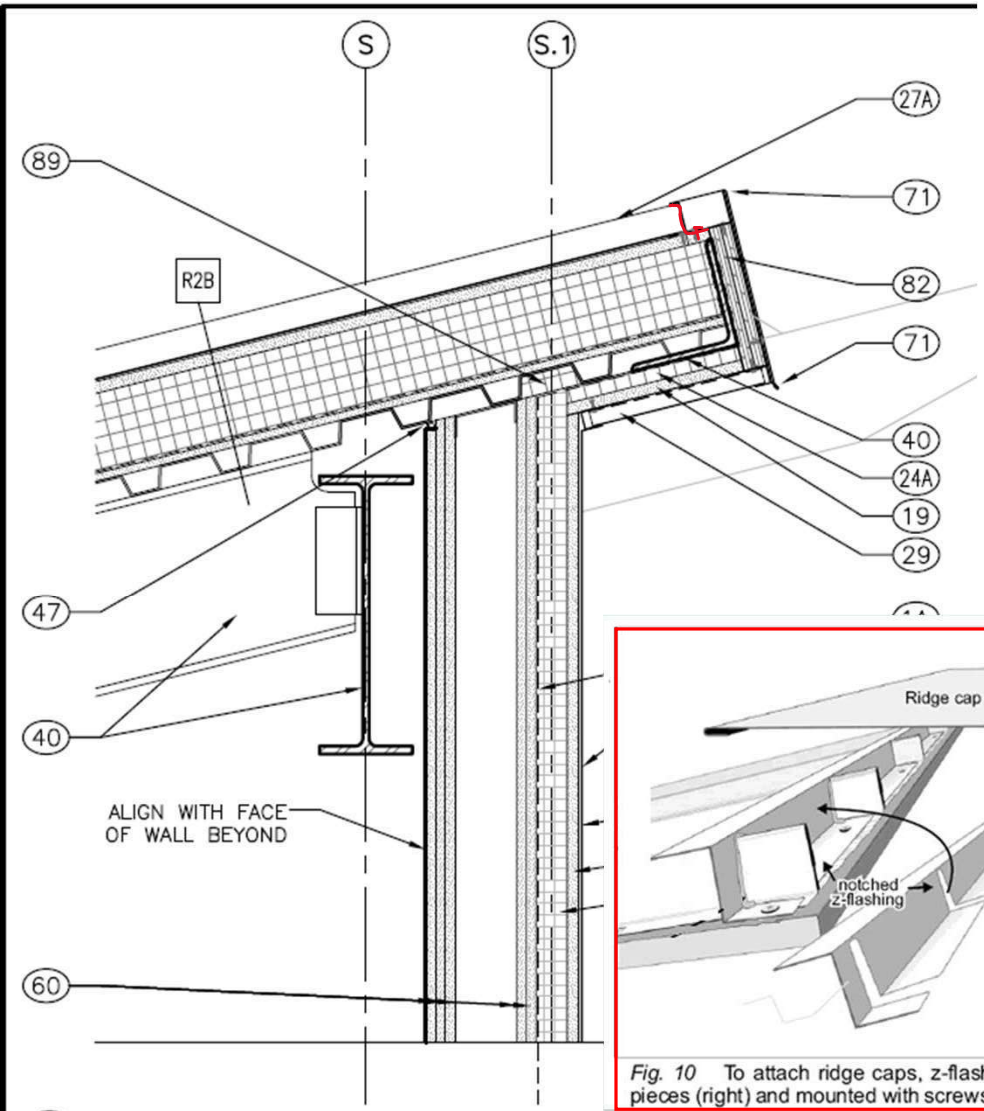
Plane 25





ASSEMBLY	Roof Type	Pitch (/12)	Area (SF)	Material	Attachment	Detached / Damaged Membrane?	Ponding Evidence?	Condition	Notes
	Low Slope	≥ ¼ "	40	TPO	Adhered	No	No	M-2	


Fabricate and install 1" X 3" length of PVC plank adhered to each scupper location with glue; span width with length of ad-hoc barrier 2X opening width.
COPING SYSTEM TO
EXIST.
5
A320
1'-0"
OF
NEW EXTENDED SCU
ROOF PLAN FOR LO
EXIST. SHADE STRUC
REMAIN



8 CLERESTORY HEAD DETAIL AT 2HR WALL

A6.13 A8.15 SCALE Ⓐ

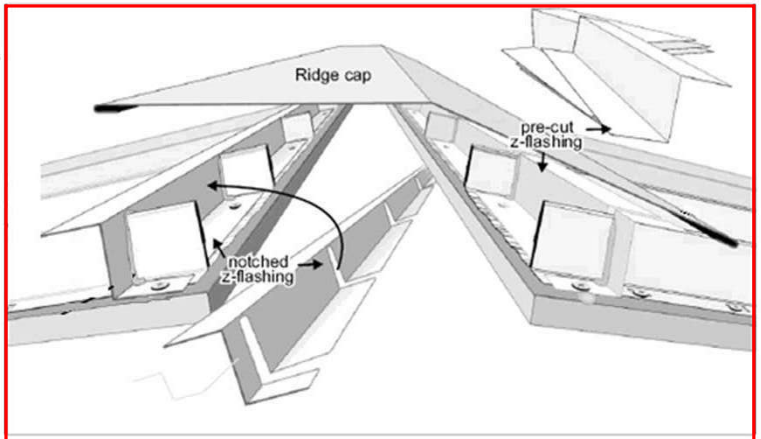
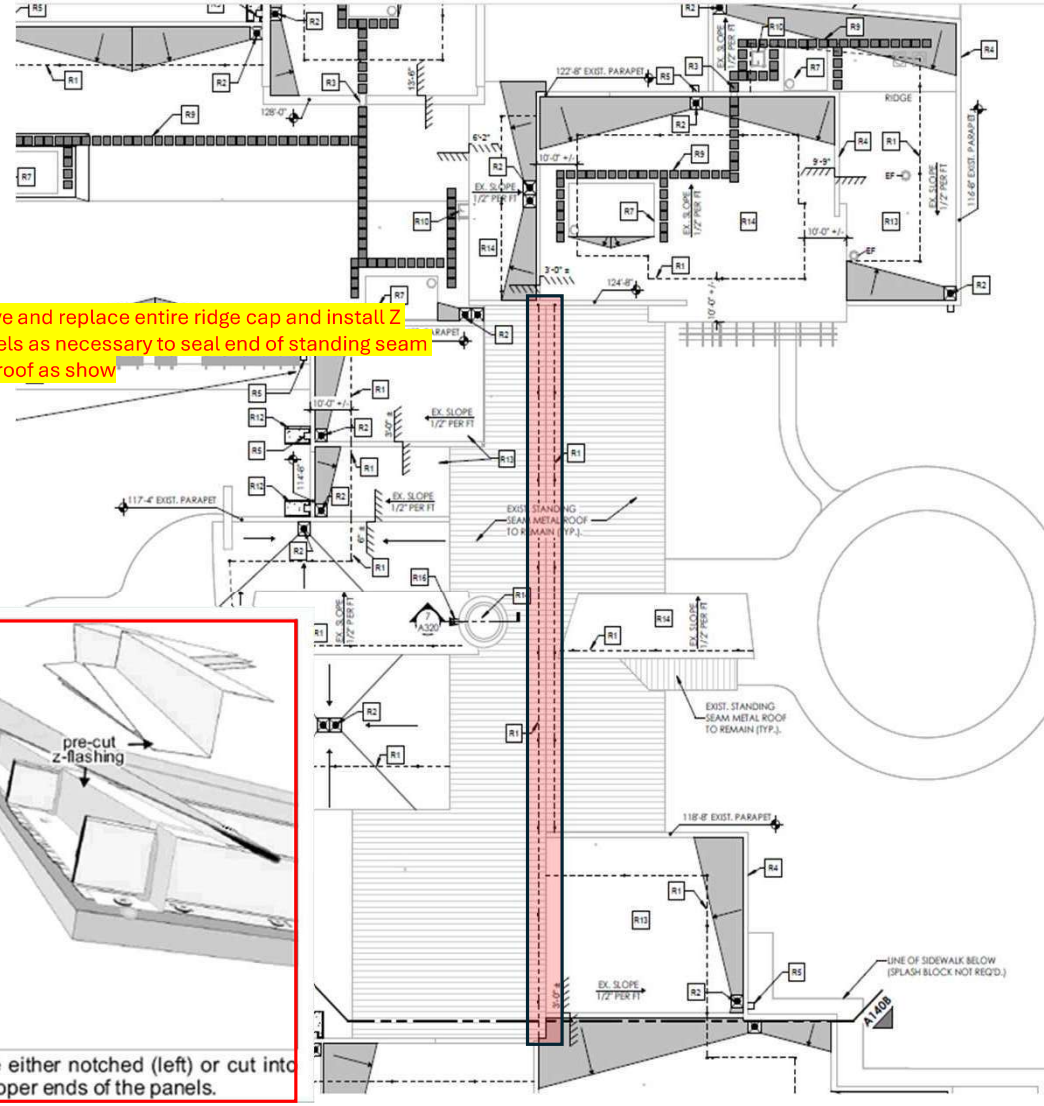


Fig. 10 To attach ridge caps, z-flashings are either notched (left) or cut into pieces (right) and mounted with screws at the upper ends of the panels.

Remove and replace entire ridge cap and install Z channels as necessary to seal end of standing seam metal roof as show



NORTH

ROOF PLAN - NORTH

SCALE: 1/16" = 1'-0"

SECTION 070150.19
PREPARATION FOR RE-ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Replacement of existing roofing system in preparation for entire new roofing system.

B. Removal of existing flashing and counterflashings.

C. Temporary roofing protection.

1.02 RELATED REQUIREMENTS

A. Section 075100 - Built-Up Bituminous Roofing.

B. Section 076200 - Sheet Metal Flashing and Trim: Replacement of flashing and counterflashings.

1.03 REFERENCE STANDARDS

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with affected mechanical and electrical work associated with roof penetrations.

B. Preinstallation Meeting: Convene one week before starting work of this section.
   1. Attendees:
      a. Contractor.
      b. Owner.
      c. Installer.
      d. Roofing system manufacturer's field representative.
   2. Meeting Agenda: Provide agenda to participants prior to meeting in preparation for discussions on the following:
      a. Removal and installation schedule.
      b. Necessary preparatory work.
      c. Protection before, during, and after roofing system installation.
      d. Removal of existing roofing system.
      e. Installation of new roofing system.
      f. Temporary roofing and daily terminations.
      g. Transitions and connection to and with other work.
      h. Inspections and testing of installed systems.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit for each type of material.

C. Shop Drawings: Indicate size, configuration, and installation details.

D. Preconstruction Test Reports.

E. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

A. Materials Removal Company Qualifications: Company specializing in performing work of type specified with at least three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
   1. When same installer as new roofing system, comply with related requirements of section indicated for new roofing system.

1.07 FIELD CONDITIONS

A. Existing Roofing System:
   1. Membrane system at school building, asphalt shingle at quarters buildings.

B. Do not remove existing roofing membrane when weather conditions threaten the integrity of building contents or intended continued occupancy.

C. Maintain continuous temporary protection prior to and during installation of new roofing system.

D. Provide notice at least three days before starting activities that will affect normal building operations.

E. Verify that occupants have been evacuated from building areas when work on structurally impaired roof decking is scheduled to begin.

F. Owner will occupy building areas directly below re-roofing area.
   1. Provide Owner with at least 48 hours written notice of roofing activities that may affect their operations and to allow them to prepare for upcoming activities as necessary.
   2. Do not disrupt Owner's operations or activities.
   3. Maintain access of Owner's personnel to corridors, existing walkways, and adjacent buildings.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.01 COMPONENTS

A. See the following sections for additional information on components relating to this work:
   1. Replacement and removal of existing roofing system in preparation for entire new roofing system, see Section 075100.
   2. Remove existing flashing and counterflashings in preparation for replacement of these materials as part of this work, see Section 076200 for material requirements.

2.02 MATERIALS

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing roof surface has been cleared of materials being removed from existing roofing system and ready for next phase of work as required.

3.02 PREPARATION

A. Sweep roof surface clean of loose matter.

B. Remove loose refuse and dispose of properly off-site.

3.03 MATERIAL REMOVAL

A. Remove only existing roofing materials that can be replaced with new materials the same day.

B. Fold up metal counter flashings to permit access to top edge of base flashings.

C. Remove roofing membrane, perimeter base flashings, flashings around roof protrusions, pitch pans and pockets and insulation vents.

D. At Shool: demolish existing cap sheet (to expose existing insulation board). Protect existing insulation for reuse.

E. At Quarters: repair existing wood deck surface to provide smooth working surface for new roof system.

3.04 INSTALLATION

A. Coordinate scope of this work with requirements for installation of new roofing system, see Section 075100 for additional requirements.

3.05 FIELD QUALITY CONTROL

A. Independent agency inspection and testing will be provided under provisions of Section 014000.

3.06 PROTECTION

A. Provide protection of existing roofing system that is not having work performed on it.

B. Do not permit traffic over unprotected or repaired deck surface.

3.07 SCHEDULES

A. Quarters: Tear-off to sheathing and completely replace system.

B. School/mechanical room addition: Tear-off membrane and cap sheet and install new system.

END OF SECTION

SECTION 075419
POLYVINYL-CHLORIDE ROOFING - MULE-HIDE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. PVC roofing membrane.

B. Overlay boards.

C. Insulation.

D. Flashings.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2022.

B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.

C. ASTM D4434/D4434M - Standard Specification for Poly(Vinyl Chloride) Sheet Roofing; 2021.

D. NRCA (RM) - The NRCA Roofing Manual; 2023.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, mechanical fastener layout, and insulation.

D. Manufacturer's Installation Instructions: Indicate membrane seaming precautions, special procedures, and perimeter conditions requiring special attention.

E. Manufacturer's qualification statement.

F. Installer's qualification statement.

G. Executed warranty.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.

C. Store materials in weather-protected environment, clear of ground and moisture.

D. Ensure storage and staging of materials do not exceed static and dynamic load-bearing capacities of roof decking.

E. Store adhesive and caulking at temperatures ranging from 60 to 80 degrees F (15 to 27 degrees C) until ready for use.

1.08 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane when ambient temperature is below manufacturer's recommendation.

C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

E. Schedule applications so that no partially completed sections of roof are left exposed at end of the workday.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 20-year manufacturer premium system warranty for labor and materials of membrane and accessories determined to be defective resulting in roof leaks. Complete forms in Owner's name and register with manufacturer.

C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 PVC ROOFING SYSTEM

A. Roofing Assembly Requirements, Unballasted.
   1. Insulation Thermal Resistance (R-Value): R- 6 per inch, minimum.

2.02 PVC ROOFING MEMBRANES

A. Reinforced PVC membrane with polyester reinforcing scrim 55 mil, 0.055 inch (1.4 mm) thick, polyester fleece backing, and ketone-ethylene-ester (KEE) copolymer, and comply with ASTM D4434/D4434M, Type IV.
   1. Product:
      a. Mule-Hide Products Co, Inc; PVC KEE HP (High Performance) Fleece Back Membrane.
   2. Application:
      a. Fully adhered roofing system.
   3. Installation: Over insulation.
      a. Provide overlay boards on top of upper insulation layer.
   4. Color: White.
   5. Overall Thickness: 105 mil, 0.105 inch (2.7 mm) with reinforcing scrim and fleece backing.
   6. Roll Size: 10 feet wide (3.1 m wide) by 100 feet (30.5 m) long.

2.03 OVERLAY BOARDS

A. High Density Wood Fiberboards: ASTM C208 Type II; natural finish.
   1. Board Size: 48 by 96 inches (1219 by 2438 mm).
   2. Board Thickness: 1/2 inch (12.7 mm).
      a. Comply with thickness rates as required for wind resistance and deck types following manufacturer's installation instructions.
   3. Board Edges: Square.

2.04 INSULATION

A. Provide insulation that is compatible with PVC membranes and flashings, adhesives, and other accessories.

B. Insulation Plates: Round, 26 gauge galvalume coated plates with reinforcing ribs providing wind uplift resistance, used with heavy-duty fasteners to attach insulation and cover boards.
   1. Diameter: 3 inches (76 mm).

C. Polyisocyanurate (ISO) Board Insulation: Rigid, closed-cell polyisocyanurate foam, and comply with ASTM C1289.
   1. Type II: Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
      a. Class 1 - Faced with glass fiber reinforced cellulosic facers on both major surfaces of the core foam.
      b. Compressive Strength: Classes 1-2-3, Grade 2 - 20 psi (138 kPa), minimum.
      c. Thermal Resistance, R-value (RSI-value): At 1-1/2 inches (38 mm) thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F (24 degrees C).
   2. Board Size: 48 by 96 inches (1220 by 2440 mm).
   3. Board Thickness: At least 3.0 inches (76 mm).

2.05 FLASHING

A. Coated Metal Flashing: 24 gauge, 0.024 inch (0.61 mm) galvanized steel sheet coated with layer of 35 mil, 0.035 inch (0.9 mm) non-reinforced PVC flashing, and used to fabricate metal drip edges or other roof perimeter edging profiles. PVC membrane may be heat-welded directly to coated metal edging, eliminating need to strip in metal with a separate piece of membrane.
   1. Color: White.
   2. Sheet Size: 4 by 10 feet (1.2 by 3 m).

B. Square Pipe Wrap Flashing: Square penetration flashings with 11-inch (279 mm) overall height, and with split and overlap tab incorporated into wrap to allow flashing to be opened and wrapped around square penetration.
   1. Color: White.
   2. Thickness: 60 mil, 0.060 inch (1.52 mm) thick reinforced PVC membrane.
   3. Size: 3-inch (76 mm) square.
   4. Maximum Temperature: Pipe temperature not to exceed 160 degrees F (71 degrees C).
   5. Applications: Used to seal assemblies where field fabrication is necessary, such as rectangular drains, pipe flashings, and pitch pocket flashings.

C. Preformed Pipe Flashing: Injection molded, preformed flashing for pipes consisting of non-reinforced PVC material, and used for single pipe penetrations on PVC membrane roof systems wherever pipe seals can be slipped over top of the pipe.
   1. Color: White.
   2. Pipe Size: 3/4-inch (19 mm) nominal diameter, with schedule 80 steep piping system.
   3. Maximum Temperature: Pipe temperature not to exceed 160 degrees F (71 degrees C).
   4. Applications: Used to seal assemblies where field fabrication is necessary, such as round drains, pipe flashings, and pitch pocket flashings.

2.06 ROOF WALKWAYS

A. Protection Mat: UV-resistant, polypropylene needle punched fabric, weighing 6 oz/sq yd (140 g/sq m).
   1. Color: Gray.
   2. Thickness: 65 mil, 0.065 inch (1.65 mm), nominal.
   3. Mat Size: 15 by 300 feet (4.6 by 92 m), nominal.
   4. Applications:

B. Walkway Rolls: Aggressive, non-slip, herringbone tread pattern of PVC material that offers excellent tear and puncture resistance.
   1. Color: Gray.
   2. Thickness: 110 mil, 0.11 inch (2.8 mm), nominal.
   3. Pad Size: 36 inches wide by 60 feet long (91.4 cm wide by 18.3 m long), nominal.

4. Applications: Required for traffic areas, such as roof hatches, access doors, and rooftop ladders regardless of traffic frequency, and also for regular maintenance locations, of once a month or more, to service rooftop equipment.

2.07 ACCESSORIES

A. Bonding Adhesive: As recommendaed by manufacturer.

B. Premolded Corners: Use manufacturer's recommended premolded corners and covers throughout.

C. Membrane Cleaner: Clear liquid solvent used to clean PVC membranes that have been exposed to weather before heat welding; helps to loosen and remove dirt and other contaminants from PVC membrane surface providing a suitable surface for heat welding.
   1. Coverage Rate: Approximately 400 sq ft/gal (37 sq m/3.8 L) of membrane depending on age and amount of debris on surface.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves or projections, properly sloped, and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through the roof are solidly set, and cant strips, nailing strips, and reglets are properly placed.

3.02 PREPARATION - WOOD AND OTHER DECKING TYPES

A. Fastener Pull-Out: Acceptable pull-out value of at least 360 lb (163 kg).

3.03 PREPARATION - METAL DECK

A. Install deck sheathing on metal deck.
   1. Lay with long side at right angle to flutes, stagger end joints, and provide support at ends.
   2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
   3. Tape joints.

B. Fastener Pull-Out: Acceptable pull-out value of at least 360 lb (163 kg).

3.04 INSTALLATION - OVERLAY BOARDS

A. Mechanically fasten overlay boards following roofing manufacturer's installation instructions.

B. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.

C. Mechanically attach boards to roof decking, with vapor retarder on top surface, to create substrate for placement of insulation.

D. Install boards over roof insulation to create substrate for placement of roofing membrane.

3.05 INSTALLATION - VAPOR RETARDER

A. Vapor Retarder, Self-Adhered: Verify climatic and job conditions that require use of vapor retarder, may be required by local building codes or energy codes, and type and location within roofing system.
   1. Install self-adhering vapor retarder to roof decking surface following manufacturer's installation instructions.
   2. Extend vapor retarder under cant strips and blocking to deck edge.
   3. Install flexible flashing from vapor retarder to air seal material of wall construction, lap, and seal to provide continuity of the air barrier plane.

4. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.

3.06 INSTALLATION - INSULATION

A. Attachment of Insulation:
   1. Mechanically fasten first layer of insulation to deck following roofing manufacturer's installation instruction.

B. Lay subsequent layers of insulation with joints staggered at least 6 inches (152 mm) from joints of preceding layer.

C. Lay boards with edges in moderate contact without forcing, and cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

D. At roof drains, use factory-tapered boards that slope down to roof drains over a distance of 18 inches (457 mm).

E. Do not apply more insulation than can be covered with membrane in same day.

3.07 INSTALLATION - MEMBRANE, GENERAL

A. Install PVC membrane roofing system following manufacturer's installation instructions and NRCA (RM) applicable requirements.

B. Roll out membrane, free from wrinkles or tears, and install sheet in place without stretching.

C. Shingle membrane joints on sloped substrate in direction of drainage.

3.08 INSTALLATION - FULLY ADHERED MEMBRANE

A. Allow membrane to relax at least 15 minutes when temperature is above 60 degrees F (15.6 degrees C), or 30 minutes when temperature is below 60 degrees F (15.6 degrees C), before installation.
   1. Inspect and remove damaged membrane.

B. Position membrane to run perpendicular to direction of steel deck flutes, and orientation of wood deck boards, where possible.

C. PVC KEE HP Fleece Back membrane has a 3-inch (76 mm) wide fleece-free selvage edge along one edge of membrane. Lap sheets at least 3 inches (76 mm) of fleece-free seam to provide space for a continuous weld at least 1-1/2 inches (38 mm) wide.

D. Ensure that welded field seams are at least 2 inches (51 mm) wide, and end laps are butted and stripped in with standard PVC reinforced membrane following manufacturer's installation instructions.

E. Verify welded seams for continuity and integrity using a cotter pin puller or other suitable blunt object.

F. Provide daily sample test seams before welding field seams.
   1. Use test seams to determine adequate seam strength and to ensure that equipment has warmed up, is operating properly, and proper settings have been established.
   2. Do this each time the equipment is turned on after a cool down period.

G. When installing PVC Fleece Back or PVC KEE HP Fleece Back roofing membrane system, it is not necessary to install half sheets parallel with perimeter.
   1. Install full-width membrane sheets, to greatest extent possible, to minimize quantity of field seams.
   2. Where partial width membranes are used, install additional fasteners following manufacturer's installation instructions and project wind speed and wind uplift requirements.
   3. Weld seams and end laps continuously with at least 2-inch (51 mm) weld width using an automatic welder.

H. Field Sheet Attachment: Position membrane over substrate with 3-inch (76 mm) selvage edge overlap at lap seams.

1. After membrane has relaxed, fold membrane in half lengthwise exposing underside of sheet.
2. For seams running through drains, cut out and install target patches at least 36 by 36 inches (0.914 by 0.914 m).

I. Welding of Lap Areas: Seaming membrane to membrane, and flashing or detail membrane to membrane is done using hot air welding.
   1. Verify that surfaces being welded are clean and dry.
   2. Side Laps: Contain selvage edge that allows them to be heat welded together.
   3. End Laps: Butted together, and covered with at least 6-inch (152 mm) wide strip of reinforced membrane that is heat welded along edges.
      a. Apply cut edge sealant to cut edges of reinforced membrane.
   4. Hot Air Welding: Follow hot air welding machine manufacturer's installation instructions, as well as local building codes regarding electric grounding, supply, and other related functions.
      a. Provide automatic welding machines for field sheet seaming; hand welding is only acceptable for flashings and those seams that automatic welder cannot be used.
      b. Hand-held welding equipment may also be used to weld membrane; after preheated nozzle tip is applied in overlap area and material starts to soften, immediately follow with a silicone hand roller to press the heated membrane surfaces together with slow, even movements.
         1) Keep roller within 1-inch (25.4 mm) of nozzle tip.
         2) Angle hot air tool so that flow of air faces roller.
         3) Test seam strength when cool; recommend testing seams 8 hours after hot air welding.
   5. T-Joint Covers: T-lap seams are formed where three layers of membrane overlap at a seam.
   6. Seam Patches at Roof/Wall Transitions: Provide hot air welded non-reinforced PVC flashing membrane patches over seams that transition from horizontal to vertical following manufacturer's installation instructions.

J. Base Attachment of Additional Membrane Securements: Provide additional PVC membrane mechanical attachment at perimeter of each roof level, base of walls, curbs, skylights, expansion joints, tie-ins, interior walls, bottom of valleys, angle changes that exceed inclines of 2 inches (51 mm) or greater per 12 inches (305 mm), and various penetrations. Provide securement either horizontally to roof deck or vertically to base of various penetrations.
   1. Methods for Mechanical Attachment of Fully Adhered Membrane at Locations Indicated:
      a. All Purpose Bar:
         1) Extruded aluminum bar with prepunched holes at 6 inches (152 mm) on center, placed either horizontally or vertically as required for project.
         2) Fastener Spacing: 12 inches (305 mm) on center, maximum, with adjoining bar ends spaced at 1/2 inch (12.7 mm) to 1 inch (25.4 mm) apart; attach ends of bars at maximum of 1-inch (25.4 mm) from end of each bar, and this may require pre-drilling additional holes with cut bars deburred.
         3) Strip-in bar with reinforced PVC membrane, 50 mil, 0.050 inch (1.27 mm) thick, 9 inches (229 mm) wide and 100 feet (30.5 m) maximum length, with a continuous 1-1/2 inch (38 mm) minimum width weld.
         4) Install bar at least 3 inches (76 mm) to a maximum of 6 inches (152 mm) from inside and outside corners.
      b. Drip Edge and Gravel Stop: Extend metal flange at least 3 inches (76 mm) onto wood nailer, and ensure wood nailer is wider than metal flange.
         1) Install screw fasteners at 6 inches (152 mm) on center, maximum, and 1/2 inch (12.7 mm) to 3/4 inch (19 mm) from inside edge of metal flange.

3.09 INSTALLATION - COATED METAL FLASHINGS

A. Install PVC coated metal flashing following manufacturer's roofing system installation instructions.

B. Install PVC coated metal at peaks, valleys, and slope intersections where the net change in slope exceeds 1-1/2 inches (38 mm) in 12 inches (305 mm). In some cases reinforced membrane may be sufficient for ridges, but should be fastened securely at transition areas.

C. Install PVC coated metal to provide adequate resistance to bending, and for normal thermal expansion and contraction.

D. Provide watertight metal joints, and stagger them over nailer joints to prevent joints in nailers and joints in metal from lining up.

E. Extend base flashings at least 8 inches (203 mm) up vertical surfaces, where possible.

F. Securely fasten metal flashings and terminations in plane of roof deck with fasteners following manufacturer's installation instructions.

G. Provide stainless steel, galvanized metal, or a corrosion-resistant fastener to secure flashings to wood nailers, having a head diameter of at least 3/8 inch (9.5 mm), and fastener penetration into wood nailer of at least 3/4 inches (19 mm).

H. Fabricate PVC coated metal to form hemmed edges, and to prevent sharp metal edges from cutting the membrane, except where used along with wood nailers.

3.10 INSTALLATION - WALKWAYS

A. Provide walkways at locations as indicated on drawings.

3.11 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Owner will provide testing and inspection services, and Contractor to provide temporary construction and materials for testing following requirements.

C. Provide daily on-site attendance of roofing and insulation manufacturer's representative during installation of this work.

3.12 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Remove bituminous or other inappropriate markings from finished surfaces.

C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.

D. Repair or replace defaced or damaged finishes caused by work of this section.

3.13 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION