PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.02 SUMMARY

A. Section includes:

1. Adhered membrane roofing system.
2. Roof insulation, tapered insulation and crickets.
3. Vapor retarder.
4. Cover board and substrate board.
5. Walkway pads.
6. Membrane base flashing.
7. Flashing for vent piping, and all roof penetrations.
8. Furnish and install all wood nailers, blocking, curbs and plywood sheathing.
9. Curb mounted mechanical equipment to receive base flashing.
10. All hoisting and scaffolding necessary for the completion of the roofing work.
11. Waste disposal.

B. Related Sections:

1. Division 01 Section "Sustainable Design Requirements."
2. Division 01 Section “Building Commissioning Requirements.”
3. Division 05 Section “Metal Fabrications” for aluminum ladders.
4. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, curbs, blocking, and plywood.
5. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
6. Division 07 Section “Roof Specialties” for roof edge fascia and copings.
7. Division 07 Section “Roof Accessories” for roof hatches.
8. Division 07 Section "Joint Sealants."
9. Division 22 Sections for installation of roof drains and related piping.
10. Division 23 Sections for installation of mechanical equipment.
11. Division 26 Sections for electrical.

1.03 DEFINITIONS

A. TPO: Thermoplastic polyolefin.

B. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. CTHPB Documentation Submittals: Comply with Division 01 Section “Sustainable Design Requirements” and provide the following in addition to other action submittals:

1. Product Data for Credit 5d: For adhesives and sealants used inside the weatherproofing system, documentation including printed statement of VOC content.
2. Product Data for Credit e11: For roof materials, indicating that roof materials comply with Solar Reflectance Index requirement.

C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.

1. Base flashings and membrane terminations.
2. Roof plan showing orientation of steel roof deck and orientation of membrane roofing and fastening spacings and patterns for mechanically fastened membrane roofing.
3. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

D. Samples for Verification: For the following products:

1. 6-by-6-inch square of sheet roofing, of color specified, including T-shaped side and end lap seam.
2. 6-by-6-inch square of roof insulation.
3. 6-by-6-inch square of walkway pads or rolls.
4. 6-inch length of metal termination bars.
5. Six insulation fasteners of each type, length, and finish.
6. Six roof cover fasteners of each type, length, and finish.

E. Qualification Data: For qualified Installer and manufacturer.

F. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of compliance with performance requirements.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.

H. Research/Evaluation Reports: For components of membrane roofing system, from the ICC-ES.

I. Field quality-control reports.

J. Maintenance Data: For roofing system to include in maintenance manuals.

K. Warranties: Sample of special warranties.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for membrane roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

1. The Installer shall be doing business under the same name for a minimum of 5 years prior to January 1, 2023 and have applied similar roofing systems on 10 or more projects which have been completed for more than two years.

    a. Furnish names and addresses of each project within 100 miles of Project.

2. The Contractor that receives the award of this Project shall be the Installer of the roofing system. Installation of the roofing system shall not be subcontracted.

C. Source Limitations: Obtain components including roof insulation and fasteners for membrane roofing system from same manufacturer as membrane roofing.

D. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

E. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.

1. Meet with Owner, Architect, Construction Manager, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

F. Preinstallation Roofing Conference: Conduct conference at Project Site.

1. Meet with Owner, Architect, Construction Manager, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.07 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.08 WARRANTY

A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation and not prorated, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, cover boards, vapor retarder, and other components of membrane roofing system.
2. Wind Speed Warranty: Special warranty includes peak gust wind speed up to 100 mph.
3. Manufacturer shall certify the application methods and performance of the roofing system as part of the warranty.
4. Warranty Period (Base Bid): 20 years from date of Substantial Completion.
5. Warranty Period (Alternate): 30 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, vapor retarder, and cover boards, for the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion.

1.09 GUARANTEE

A. Special Project Guarantee: Pursuant to Connecticut General Statute, Chapter 173, Section 10-291 provide an unlimited manufacturer's guarantee for watertightness covering material and workmanship on the entire roofing system including vapor retarders, insulation, bitumen, felts, membranes, flashings, metals, and other feature required by the roof design. All manufacturer's materials used in the roofing system must meet the latest ASTM standards for individual components of the roofing system. Provide a minimum roof pitch in all locations of 1/4-inch per foot.

1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7 and the Connecticut State Building Code.

1. Basic Design Wind Speed: 135 mph.
2. Risk Category: III.
3. Exposure Category: B.

D. Energy Performance: Roofing system shall have an initial solar reflectance index of 78.

2.02 TPO MEMBRANE ROOFING

A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible TPO sheet.

1. Basis of Design Product: Subject to compliance with requirements, provide **Elevate; UltraPly TPO** or comparable product by one of the following:

a. Carlisle SynTec; Sure-Weld.
b. Johns Manville.

2. Thickness:

a. Base Bid: 60 mils.
b. Alternate: 80 mils.

3. Exposed Face Color: White.

2.03 AUXILIARY MEMBRANE ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall comply with VOC limitations included in the State of Connecticut DEP Regulations, Chapter 446c Abatement of Air Pollution, Section 22a-174-44.

B. Sheet Flashing: Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 0.060-inch thick, minimum, of same color as sheet membrane.

C. Bonding Adhesive: Manufacturer's standard, water based.

D. Slip Sheet: Manufacturer's standard, of thickness required for application.

E. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

F. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.04 VAPOR RETARDER

A. Vapor Retarder: Self-adhesive vapor barrier composed of SBS modified bitumen with a top surface of high-density polyethylene grid laminated between two layers of polyethylene film, and a silicone release plastic film that covers the self-adhesive back side.

1. Product: Subject to compliance with requirements, provide one of the following~~, or equal~~:

   a. Carlisle; VapAir Seal 725TR.
   b. Elevate; V-Force SA Vapor Barrier Membrane.
   c. GAF; SA Vapor Retarder.

2. Thickness: 30 mils minimum.
3. Moisture Vapor Permeance: ASTM E 96, 0.015 perms.

2.05 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by TPO membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

1. To maintain system warranty, manufacturer’s approved insulation must be installed.
2. R-Value: 5.7 per inch.
3. Compressive Strength: 20 psi.

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4- inch per 12 inches unless otherwise indicated.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.06 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

C. Bead-Applied Insulation Adhesive: Insulation manufacturer's recommended bead-applied, low-rise, one- or multicomponent urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

D. Full-Spread Applied Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

~~E. Substrate Board: Provide one of the following:~~

~~1. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, factory primed, 1/2-inch thick.~~

~~a. Product: Subject to compliance with requirements, provide the following:~~

~~1) Georgia-Pacific Corporation; Dens Deck Prime.~~

~~2. Substrate Board: ASTM C 1177, siliconized moisture and mold-resistant gypsum substrate, with high performance fiberglass facer, 1/2-inch thick.~~

~~a. Product: Subject to compliance with requirements, provide the following:~~

~~1) USG Corporation; Securock Ultralight Coated Glass Mat Roof Board.~~

F. High Density Cover Board: ASTM C 1289, Type II, Class 4, high density, fiberglass coated, closed-cell polyisocyanurate foam insulation.

1. Compression Strength: ASTM D 1621, not less than 100 psi.
2. Thickness: 1/2-inch.
3. Products: Subject to compliance with requirements, provide one of the following:

a. Carlisle SynTec Incorporated; SecurShield HD Plus.
b. Elevate; IsoGuard HD.
c. GAF; EnergyGuard NH HD Plus.

G. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and resistant to UV degradation, type and weight as recommended by roofing system manufacturer for application.

2.07 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads, approximately 3/16- inch thick, and acceptable to membrane roofing system manufacturer.

2.08 NAILERS, BLOCKING AND PLYWOOD

A. Comply with requirements for lumber and plywood specified in Division 06 Section “Miscellaneous Rough Carpentry.”

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.03 SUBSTRATE BOARD INSTALLATION

A. Install substrate board on metal deck.

B. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to plywood deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions. Fastener must penetrate wood substrate a minimum of 1 inch.
2. Seal all roofing penetrations in substrate board prior to installation of vapor retarder.

3.04 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 percent 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. Waterstop shall be sealed to the deck 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 specified. 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 offsite. None of these materials shall be used in the new work.

B. If inclement weather occurs while a temporary waterstop is in place, the Contractor 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 Contractor's expense.

3.05 VAPOR-RETARDER INSTALLATION

A. Coordinate installation and transition of roofing system component serving as a vapor barrier with air and vapor barrier specified under Division 07 Section "Fluid-Applied Membrane Air Barriers" and "Water-Resistive Air-Barrier Membranes."

B. Substrate must be clean, dry and free of dust, grease or other contaminants; smooth and free of voids. Apply primer to clean and dry surfaces with a brush, roller or sprayer at application rate recommended by manufacturer and as required for substrate. Allow primer to dry completely prior to installation of vapor barrier. Install vapor barrier on the same day as primer.

C. Laminate Sheet: Install laminate-sheet vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 3 inches and 6 inches, respectively. Stagger end laps a minimum of 12 inches. Bond vapor retarder to substrate as follows:

1. Unroll sheet onto substrate without adhering for alignment. Do not immediately remove the silicone release sheet.
2. Once aligned, peel back a portion of the silicone release sheet and press membrane onto the substrate for initial adherence. Hold sheet tight and peel back release sheet by pulling diagonally.
3. Use a 75 lb. roller to press sheet down onto the subtracted including the laps. Finish by aligning the edge of the roller with the lower end of the side laps and rolling up the membrane. Do not cut membrane to remove air bubbles trapped under laps. Squeeze air bubbles by pushing the roller to the edge of the laps.

D. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system. Avoid tenting or wrinkles in the vapor retarder. If tenting or wrinkles occur, cut out imperfection and apply patch over area in accordance with manufacturer's instructions.

3.06 WOOD NAILER AND BLOCKING INSTALLATION

A. Install continuous wood nailers at perimeter of the entire roof, around roof projections, penetrations, and locations indicated.

1. Do not use nailers less than three feet in length.
2. Build up nailer height to match thickness of substrate or insulation, with smooth transitions.

    a. Wood blocking and nailers are indicated in nominal lumber sizes. Where required, as indicated or not, provide ripped, continuous shims to create nailer height to match thickness of substrate or insulation.

B. Anchor nailers to resist a minimum force of 300 lbf in any direction. Provide a 1-1/2" space between lengths of nailers.

1. Anchor nailers with fasteners spaced at 12 inches on center, staggered 1/3 the nailer width and installed within 6 inches of each end.

2. Comply with fastening requirements of FM Loss Prevention Data Sheet 1-49.

3.07 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

G. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck.

1. Adhere cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.08 ADHERED MEMBRANE ROOFING INSTALLATION

A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.

B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.

C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.

E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.

F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.

G. Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

H. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

I. Install membrane roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing membrane roofing system.

3.09 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.10 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.11 FIELD QUALITY CONTROL

A. Engage a qualified testing agency to perform the following test, to be witnessed by the Roofing Manufacturer's Representative:

1. Infrared thermal scan of completed membrane roofing system.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect and Construction Manager.

1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

1. Comply with Division 01 Section "Temporary Facilities and Controls."

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.13 WASTE DISPOSAL

A. Unless otherwise indicated, excess materials are Contractor's property. At completion of roofing work, remove from Project site. Comply with Division 01 Section "Construction Waste Management and Disposal."

3.14 PROJECT 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 Section shall have been submitted and have been accepted at time of contract award.

END OF SECTION