

ROOF REPLACEMENT AND PHOTOVOLTAIC PROJECT

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1854 Route CT-12
Ledyard, Connecticut 06335
STATE PROJECT NO. 072-0096 RR/PV

S/P+A PROJECT NO. 22.331

DATE: April 8, 2024

The following changes to the Drawings and Project Specifications shall become a part of the Drawings and Project Specifications; superseding previously issued Drawings and Project Specifications to the extent modified by Addendum #1.

New Specifications:

- BACKGROUND CHECKS has been added and is attached as part of this addendum. (2 pages) *(Per Owner)*
- SECTION 075500, MODIFIED BITUMINOUS MEMBRANE ROOFING has been added and is attached as part of this addendum. (16 pages) *(Per Owner)*

Changes to the Specifications:

- TABLE OF CONTENTS:
 - Page 1, Division 00 – Procurement and Contract Requirements, add the following:
“Background Checks 2 pages”
 - Page 2, Division 07 – Thermal and Moisture Protection, revise “Section 075216 Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing 9 pages” to read “Section 075500 Modified Bituminous Membrane Roofing 16 pages”. *(Per Owner)*
- LEGAL NOTICE/INVITATION TO BID, delete in its entirety. A new LEGAL NOTICE/INVITATION TO BID has been added and is attached as part of this addendum (2 pages) *(Per Owner)*
- AIA A701 INSTRUCTIONS TO BIDDERS, Page 6, Section 5.3.1, insert after the word ‘Bidder’ the following:
“and per CGS 10-287(b)(1) to the lowest responsible qualified bidder.” *(Per Owner)*
- SUPPLEMENTARY INSTRUCTIONS TO BIDDERS, Page 6, Section 9.10, revise “\$500,000” to read “\$1,000,000”. *(Per Owner)*
- BID FORM, delete its entirety. A REVISED BID FORM has been added and is attached as part of this addendum. (3 pages). *(Per Owner)*

- SUPPLEMENTARY GENERAL CONDITIONS:
 - Page 6, add the following:

“11.3 **Revise** in its entirety to read as follows: **Waiver of Rights of Recovery**. Refer to Indemnification and Insurance Exhibit.

11.4 **Delete** in its entirety.

11.5 **Delete** in its entirety.”
 - Page 7, add the following:

“15.1.7 **Delete** in its entirety.” *(Per Owner)*
- SECTION 011000 SUMMARY, Page 1, Article 1.4.A.2, add the following to the end of the sentence:

“The PV system will be owned and operated by the Owner and it is not a leased/PPA system.” *(Per Owner)*
- SECTION 014333, ROOFING MANUFACTURER’S FIELD SERVICES, delete in its entirety. A new SECTION 014333 has been added and is attached to this addendum. (6 pages) *(Per Owner)*
- SECTION 075216, STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING, delete in its entirety. *(Per Owner)*

Changes to the Drawings:

- DRAWING A1, OVERALL ROOF PLAN, delete the drawing dated 2/2/24 and insert the revised DRAWING A1 dated 4/8/24 which is attached to this addendum.*
- DRAWING E1, PV ROOF PLAN AND NOTES, delete the drawing dated 2/2/24 and insert the revised DRAWING E1 dated 4/8/24 which is attached to this addendum.*

The bid date remains unchanged by this addendum.

The addendum consists of thirty-one (31) pages of 8½” x 11” text and two (2) 30” x 42” drawings*.
End of Addendum #1

BACKGROUND CHECKS

The successful Bidder (referred to as Contractor in this Exhibit) shall be required to comply with the following requirements:

Prohibited Activities and Background Check Requirements

Contractor shall comply with all applicable law including, without limitation, Connecticut General Statutes Section 10-222c, as applicable, and with the requirements set forth in this Exhibit.

Interaction with School Community. The scope of the Work does not, and will not under any circumstances, require any contact with students or any other minors physically present in the facilities of, or the grounds surrounding, the school where the Project is located (the “School Grounds”). None of the Contractor, Subcontractors, Sub-subcontractor, or any of their respective employees, agents or representatives shall, under any circumstances, converse or interact in any manner, with students or any minors physically present on the School Grounds. None of the Contractor, Subcontractors, Sub-subcontractor, or any of their respective employees, agents or representatives shall interact with any adult members of the school community (including, without limitation, employees, officials, or visitors, including parents of students enrolled in the District’s schools) with respect to the Project with the exception of the District’s Designated Representative as provided in the Contract. All of the Contractor, Subcontractors, Sub- subcontractors, and their respective employees, agents or representatives shall, while on the School Grounds, refrain from use of vulgar language, obscene gestures, or any other behavior inappropriate for a school environment and/or property on which minor children are or may be present.

Background and Employment History Checks.

To the extent permitted by law, the Contractor shall perform (or cause to be performed) as regards all of its employees, agents, and representatives (each, a “Contractor Employee”), and all of the employees, agents, and representatives of Subcontractors and Sub-subcontractors (each, a “Subcontractor Employee”), who will be physically present on the School Grounds in connection with the Project, appropriate background checks on all such Contractor Employees and Subcontractor Employees. Such background checks shall include, at a minimum and without limitation, a search of both the Connecticut Department of Emergency Services and Public Protection’s sexual offender registry and the Abuse and Neglect Registry of the Connecticut Department of Children and Families. For those Contractor Employees and Subcontractor Employees who are to be physically present on the School Grounds in connection with the Project and whose current or most recent employment occurred out of state, the out-of-state equivalent of the Connecticut Department of Emergency Services and Public Protection’s sexual offender registry and the Abuse and Neglect Registry of the Connecticut Department of Children and Families registry shall be checked. The Contractor shall complete (or cause to be completed) background checks as to each Contractor Employee and Subcontractor Employee prior to such Contractor Employee or Subcontractor Employee being permitted to be physically present on the

School Grounds. If the Contractor receives any information indicating that any Contractor Employee or Subcontractor Employee may be registered as a sexual offender, may have a record of abuse or neglect, or is, in any other manner, unfit to perform services which could involve direct contact with minor children, or which may involve working in or near property on which minor children may be present, the Contractor shall immediately forward such information to the District, to the extent permitted by law, and shall immediately remove the individual from the School Grounds and from participation in the Project.

Contractor represents and warrants that, in its best professional judgment, each Contractor Employee and each Subcontractor Employee maintains the appropriate qualifications and is fit to perform services which could involve direct contact with minor children, or which may involve working in or near property on which minor children may be present. The Contractor shall immediately remove any Contractor Employee or Subcontractor Employee from the School Grounds and from the Project if requested to do so by the District (which request shall be made

in the District's sole discretion) or if it becomes known to the Contractor that such Contractor Employee or Subcontractor Employee may be a danger to the health, safety or well-being of the school community, its students, or any minor children. A request by the District to remove any Contractor Employee or Subcontractor Employee from the School Grounds and from the Project shall not constitute a breach of the Contract.

The Contractor shall include, and shall require all Subcontractors to include the foregoing requirements in all subcontracts for the Project.

By execution of the Contract, the Contractor shall represent and warrant that it has fully complied with the requirements of this Exhibit. To the extent permitted by law, the Contractor agrees that upon the District's request, Contractor shall promptly provide the District with any documentation related to such compliance, including, without limitation, the results of the background and employment history checks required by this Exhibit. Failure by the Contractor to comply with its obligations under this Exhibit shall constitute a material breach of the Contract.

SECTION 075500 – MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. 2-Ply modified bituminous roofing system over low slope roof areas
- B. Accessories
- C. Edge Treatment and Roof Penetration Flashings

1.2 RELATED SECTIONS

- A. Section(s):
 - 1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking, and for wood based, structural-use roof deck panels.
 - 2. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counter flashings
 - 3. Section 077129 "Manufactured Roof Expansion Joints" for proprietary manufactured roof expansion-joint assemblies.
 - 4. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
 - 5. Section 221423 "Storm Drainage Piping Specialties" for roof drains.

1.3 REFERENCES

- A. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- B. ASTM D 312 - Standard Specification for Asphalt used in Roofing.
- C. ASTM D 451 - Standard Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.
- D. ASTM D 1970 - Specification for Sheet Materials, Self-Adhering Polymer Modified Bituminous, Used as Steep Roofing Underlayment for Ice Dam Protection.
- E. ASTM D 1079 Standard Terminology Relating to Roofing, Waterproofing and Bituminous Materials.
- F. ASTM D 1227 Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.
- G. ASTM D 4586 Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- H. ASTM D 4601 Standard Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.

- I. ASTM D 5147 Standard Test Method for Sampling and Testing Modified Bituminous Sheet Materials.
- J. ASTM D 6162 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
- K. ASTM D 6163 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
- L. ASTM D 6164 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- M. ASTM D 6757 - Standard Specification for Underlayment Felt Containing Inorganic Fibers Used in Steep-Slope Roofing.
- N. ASTM E 108 - Standard Test Methods for Fire Test of Roof Coverings
- O. Factory Mutual Research (FM): Roof Assembly Classifications.
- P. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
- Q. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- R. Underwriters Laboratories, Inc. (UL): Fire Hazard Classifications.
- S. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.
- T. ASCE 7, Minimum Design Loads for Buildings and Other Structures
- U. UL - Fire Resistance Directory.
- V. FM Approvals - Roof Coverings and/or RoofNav assembly database.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Perform work in accordance with all federal, state and local codes.
- B. Design Requirements:
 - 1. Uniform Wind Uplift Load Capacity
 - a. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria.
 - 1) Design Code: ASCE 7-16 ASD
 - 2. Wind Design Standard: Manufacture and install copings and roof-edge specialties tested according to Chapter 16 of the International Building Code and capable of resisting the following design pressures:
 - a. Design Pressure: As indicated on Drawings.
 - 3. Installation of new roofing materials shall not exceed the dead load capacity of the existing roof structure.
- C. Energy Star: Roof System shall comply with the initial and aged reflectivity required by the U.S. Federal Government's Energy Star program.
- D. LEED: Roof system shall meet the reflectivity and emissivity criteria to qualify for one point

under the LEED credit category, Credit 7.2, Landscape & Exterior Design to Reduce Heat Island - Roof.

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

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions.
- C. Shop Drawings: Submit shop drawings including installation details of roofing, flashing, fastening, insulation and vapor barrier, including notation of roof slopes and fastening patterns of insulation and base modified bitumen membrane, prior to job start.
- D. Design Pressure Calculations: Submit design pressure calculations for the roof area in accordance with ASCE 7 and local Building Code requirements. Include a roof system attachment analysis report, certifying the system's compliance with applicable wind load requirements before Work begins.
- E. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
 - 1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
 - 2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
 - 3. Product reflectivity and emissivity criteria to qualify for one point under the LEED credit category, Credit 7.2, Landscape & Exterior Design to Reduce Heat Island - Roof.
- F. Manufacturer's Site Supervision Letter: Certify that site supervision shall be provided by roofing manufacturer representative on a basis 3 (Three) times per week minimum during the duration of the project. Weekly progress reports, complete with pictures and descriptions of that week's work, shall be submitted to the Owner and Architect at the end of each week during the duration of the project. Failure to submit letter will result in an immediate rejection of the submittal.
- G. Recycled or Bio-Based Materials: Provide third party certification through UL Environment of roof System membranes containing recycled or bio-based materials.
- H. Verification Samples: For each modified bituminous membrane ply product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- I. Manufacturer's Certificates: Provide to certify products meet or exceed specified requirements.
- J. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147. Testing must be performed at 77 deg. F. Tests at 0 deg. F will not be considered.
- K. Yearly Roof Inspections: Provide a letter stating yearly roof inspections be made at no additional cost to the Owner shall be provided for the life of the warranty.
 - 1. Inspection reports shall be provided for Owner's records. Any deficiencies in the roof

caused by material failure or workmanship shall be corrected at no additional cost to the Owner (labor and material).

2. A manufacturer's failure to submit a letter will result in an immediate rejection of the submittal.

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

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified with documented ISO 9001 certification and minimum of twelve years of documented experience and must not have been in Chapter 11 bankruptcy during the last fifteen years.
- C. Installer Qualifications: Company specializing in performing Work on this project shall have minimum ten years documented experience and a be certified and approved by the Manufacturer who is listed as the basis of design.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Source Limitations: Obtain all components for each roofing system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.
- G. Country of Origin: All rolled good, mastics, sealants and prefabricated metal components shall be 100% sourced and manufactured in USA. Raw materials sourced outside of the stated country of origin shall not be accepted. Upon request of the Architect or Owner, submit a Manufacturer's written letter as proof that all components in list form, signed by an authorized agent of the Manufacturer have been sourced and manufactured in the listed country of origin above.

1.7 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to commencing Work of this section.
- B. Review installation procedures and coordination required with related Work.
- C. Inspect and make notes of job conditions prior to installation:
 1. Record minutes of the conference and provide copies to all parties present.
 2. Identify all outstanding issues in writing designating the responsible party for follow-up action and the timetable for completion.
 3. Installation of roofing system shall not begin until all outstanding issues are resolved to the satisfaction of the Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface. No wet or damaged materials will be used in the application.
- D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.
- F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

1.9 COORDINATION

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

1.10 PROJECT CONDITIONS

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

1.11 WARRANTY

- A. Upon completion of the work, provide the Manufacturer's written and signed Edge-To-Edge NDL System Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installer, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition including all metal components, roofing systems and wall panels. The Manufacturer of this warranty shall be the owner of all roof section warranties as to make one manufacturer responsible for all.
 - 1. Warranty Period:
 - a. Thirty (30) years or twenty (20) years, non-prorated, no-dollar-limit, from date of Substantial Completion.
- B. Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work.
 - 1. Warranty Period:
 - a. 3 years from date of acceptance.
- C. Single source warranty: The warranty issued to the Owner per choice that each roofing system, and metal wall panel or component separate or all-encompassing shall be warranted and owned by a single Manufacture.
 - a. Metal roofing system warranty must come from the same Manufacturer that issues a warranty on any low slope roofing to Owner as to have one Manufacturer warranty entire roof area.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. The basis of design and minimal performance criteria are based upon roofing systems engineered, tested and manufactured by The Garland Company or approved equal.
- B. Acceptable Manufacturers: Subject to compliance with CT State requirements, available manufacturers offering products and services that either meet or exceed the performance criteria listed within this specification but are not limited to, the following:
 - 1. Tremco
 - 2. Ecology
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.
- D. The Products specified are intended and the Standard of Quality for the products required for this project. If other products are proposed the bidder must disclose in the bid the manufacturer and the products that they intend to use on the Project. If no manufacturer and products are listed, the bid may be accepted only with the use of products specified.
 - 1. Bidder will not be allowed to change materials after the bid opening date.
 - 2. If alternate products are included in the bid, the products must be equal to or exceed the products specified. Supporting technical data shall be submitted to the Architect/ Owner for approval prior to acceptance.
 - 3. In making a request for substitution, the Bidder/Roofing Contractor represents that it has:
 - a. Personally investigated the proposed product or method, and determined that it is equal or superior in all respects to that specified.
 - b. Will provide the same guarantee for substitution as for the product and method specified.
 - c. Will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
 - d. Will waive all claims for additional cost related to substitution, which consequently become apparent.
 - e. Cost data is complete and includes all related cost under his/her contract or other contracts, which may be affected by the substitution.
 - f. Will reimburse the Owner for all redesign cost by the Architect for accommodation of the substitution.
 - 4. Architect/ Owner reserves the right to be the final authority on the acceptance or rejection of any or all bids, proposed alternate roofing systems or materials that has met ALL specified requirement criteria.
 - 5. Failure to submit substitution package, or any portion thereof requested, will result in immediate disqualification and consideration for that particular contractors request for manufacturer substitution.

2.2 HOT APPLIED 2-PLY MODIFIED BITUMEN ROOF SYSTEM (Deduct Alt. Bid)

- A. Base (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
- B. Mineral Surfaced Cap (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive
- C. Interply Adhesive: Generic Type III Asphalt
- D. Flashing Base Ply: One ply bonded to the prepared substrate Flashing Ply Adhesive
- E. Flashing Cap (Ply) Sheet: One ply bonded to the prepared substrate with Flashing Ply

Adhesive

- F. Flashing Ply Adhesive: Generic Type III Asphalt

2.3 ACCESSORIES:

- A. Walkway System: A one-component, 100% solids, moisture curing silicone rubber coating system designed to enhance the impact resistance of the roof surface and also provide a non-skid walking surface when used with WG walkway granules.
 - 1. Color: Safety Yellow
- B. Above Deck Thermal Board: Provide ½", non-faced gypsum-based fiber board, USG Securock or pre-approved equal.
- C. Urethane Sealant Hybrid: One-part, non-sag sealant as approved and furnished by the membrane manufacturer for moving joints.
 - 1. Tensile Strength, ASTM D 412: 250 psi
 - 2. Elongation, ASTM D 412: 450%
 - 3. Hardness, Shore A ASTM C 920: 35
 - 4. Adhesion-in-Peel, ASTM C 92: 30
- D. Sealant - Structural Adhesive: Single component, 100% solids structural adhesive as furnished and recommended by the membrane manufacturer.
 - 1. Elongation, ASTM D 412: 300%
 - 2. Hardness, Shore A, ASTM C 920: 50
 - 3. Shear Strength, ASTM D 1002: 300 psi
- E. Pitch Pocket Sealer -100% solids, self-leveling, polyurethane sealant for filling pitch pans as recommended and furnished by the membrane manufacturer.
 - 1. Durometer, ASTM D 2240: 40-50 Shore
 - 2. Elongation, ASTM D 412: 250%
 - 3. Tensile Strength, ASTM D 412: 200 @ 100 mil
- F. Liquid Flashing - An asphaltic-polyurethane, low odor, liquid flashing material designed for specialized details unable to be waterproofed with typical modified membrane flashings.
 - 1. Tensile Strength, ASTM D 412: 400 psi
 - 2. Elongation, ASTM D 412: 300%
 - 3. Density @77 deg. F 8.5 lb/gal typical
- G. Glass Fiber Cant - Glass Cant: Continuous triangular cross Section made of inorganic fibrous glass used as a cant strip as recommended by the membrane manufacturer.

2.4 EDGE TREATMENT AND ROOF PENETRATION FLASHINGS

- A. Pre-Manufactured Edge Metal: Flash-less Snap-On Fascia Cover and Splice Plate.
 - 1. Basis of Design: R-Mer Force Flashless Edge Metal
 - 2. Aluminum, ASTM B209, alloy 3105-H14, in thickness of .040" nom or .050" nom
- B. Pre-Manufactured Coping Cap: Formed Drip Edge, Gutter, Leaders and Splice Plates.
 - 1. Aluminum, ASTM B209, alloy 3105-H14, in thickness of .040" nom.
- C. Pre-Manufactured Edge Metal: Flash-less Snap-On Fascia Extruded Base Anchor and Components.
 - 1. Base Anchor: 6005A-T61 extruded aluminum.
 - 2. Compression Seal for top of anchor: TPE thermoplastic elastomer.
 - 3. Sealant for Flange: Single-component high performance 100% solids, interior and exterior polyether joint sealant.

- D. Pre-Manufactured Coping Cap: Coping Chairs
 - 1. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 0.0635 nom./ 16 gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.

- E. Pre-Manufactured Edge Metal Finishes:
 - 1. Exposed and unexposed surfaces for mill finish flashing, fascia, and coping cap, as shipped from the mill
 - 2. Exposed surfaces for coated panels:
 - a. Finishes: fluorocarbon finish. Epoxy primer baked both sides, .2-.25 mils thickness as approved by finish coat manufacturer. Weathering finish as referred by National Coil Coaters Association (NCCA). Provided with the following properties.
 - 1) Pencil Hardness: ASTM D3363, HB-H / NCCA II-2.
 - 2) Bend: ASTM D-4145, O-T / NCCA II-19
 - 3) Cross-Hatch Adhesion: ASTM D3359, no loss of adhesion
 - 4) Gloss (60 deg. angle): ASTM D523, 25+/-5%
 - 5) Reverse Bend: ASTM D2794, no cracking or loss of adhesion
 - 6) Nominal Thickness: ASTM D1005
 - a) Primer: 0.2 mils
 - b) Topcoat, 0.7 mils min
 - c) Clear Coat 0.3 mils
 - 7) Color: Standard, TBD by Owner

- F. Flashing Boot: Neoprene pipe boot for sealing single or multiple pipe penetrations adhered in approved adhesives as recommended and furnished by the membrane manufacturer.

- G. Pitch pans, Rain Collar 24 gauge stainless or 20oz (567gram) copper. All joints should be welded/soldered watertight.

- H. Drain Flashings should be rolled polyvinyl butyral (PVB) foil formed, cut and rolled.

- I. Plumbing stacks should be pre-manufactured polyvinyl butyral (PVB) foil boots formed and rolled.

- J. Liquid Flashing - Tuff-Flash: An asphaltic-polyurethane, low odor, liquid flashing material designed for specialized details unable to be waterproofed with typical modified membrane flashings.
 - 1. Tensile Strength, ASTM D 412: 400 psi
 - 2. Elongation, ASTM D 412: 300%
 - 3. Density @77 deg. F 8.5 lb/gal typical

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

- L. Manufactured Roof Specialties: Shop fabricated copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim.
 - 1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the NRCA "Roofing and Waterproofing Manual" as applicable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Inspect and approve the deck condition, slopes and fastener backing if applicable, parapet walls, expansion joints, roof drains, stack vents, vent outlets, nailers and surfaces and elements.
- C. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.
- D. If substrate preparation and other conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. General: Clean surfaces thoroughly prior to installation.
 - 1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 - 2. Fill substrate surface voids that are greater than 1/4 inch wide with an acceptable fill material.
 - 3. Roof surface to receive roofing system shall be smooth, clean, free from loose gravel, dirt and debris, dry and structurally sound.
 - 4. Wherever necessary, all surfaces to receive roofing materials shall be power broom and vacuumed to remove debris and loose matter prior to starting work.
 - 5. Do not apply roofing during inclement weather. Do not apply roofing membrane to damp, frozen, dirty, or dusty surfaces.
 - 6. Fasteners and plates for fastening components mechanically to the substrate shall provide a minimum pull-out capacity of 300 lbs. per fastener.
 - 7. Prime decks where required, in accordance with requirements and recommendations of the primer and deck manufacturer.

3.3 INSTALLATION - GENERAL

- A. Install modified bitumen membranes and flashings in accordance with manufacturer's instructions and with the recommendations provided by the National Roofing Contractors Association's Roofing & Waterproofing Manual, the Asphalt Roofing Manufacturers Association, and applicable codes.
- B. General: Avoid installation of modified bitumen membranes at temperatures lower than 40-45 degrees F. When work at such temperatures unavoidable use the following precautions:
 - 1. Take extra care during cold weather installation and when ambient temperatures are affected by wind or humidity, to ensure adequate bonding is achieved between the surfaces to be joined. Use extra care at material seam welds and where adhesion of the applied product to the appropriately prepared substrate as the substrate can be affected by such temperature constraints as well.
 - 2. Unrolling of cold materials, under low ambient conditions must be avoided to prevent the likelihood of unnecessary stress cracking. Rolls must be at least 40 degrees F at the time of application. If the membrane roll becomes stiff or difficult to install, it must be replaced with roll from a heated storage area.
- C. Commence installation of the roofing system at the lowest point of the roof (or roof area), working up the slope toward the highest point. Lap sheets shingle fashion so as to constantly shed water
- D. All slopes greater than 2:12 require back-nailing to prevent slippage of the ply sheets. Use ring or spiral-shank 1 inch cap nails, or screws and plates at a rate of 1 fastener per ply (including the membrane) at each insulation stop. Place insulation stops at 16 ft o.c. for slopes less than 3:12 and 4 feet o.c. for slopes greater than 3:12. On non-insulated systems,

nail each ply directly into the deck at the rate specified above. When slope exceeds 2:12, install all plies parallel to the slope (strapping) to facilitate backnailing. Install 4 additional fasteners at the upper edge of the membrane when strapping the plies.

3.4 INSTALLATION HOT APPLIED ROOF SYSTEM

- A. Base Ply(s): Install vapor barrier or base sheet in twenty-five (25) lbs per square of bitumen shingled uniformly to achieve one or more plies over the entire prepared substrate. Shingle in direction of slope of roof to shed water on each area of roof. Do not step on base rolls until asphalt has cooled, fish mouths should be cut and patched.
1. Lap ply sheet ends 8 inches (203 mm). Stagger end laps 6 inches minimum.
 2. Install base flashing ply to all perimeter and projection details after membrane application.
 3. Extend plies 2 inches beyond top edges of cants at wall and projection bases.
 4. Install base flashing ply to all perimeter and projection details.
 5. Allow the one ply of base sheet to cure at least 30 minutes before installing the modified membrane or subsequent system layers. However, the cap membrane must be installed the same day as the base plies.
- B. Modified Cap Ply: Allow plies to relax before installing. Install in twenty-five (25) lbs per square of bitumen. Shingle sheets uniformly over the prepared substrate to achieve the number of plies specified. Shingle in proper direction to shed water on each large area of roofing.
1. Solidly bond the modified membrane to the base layers with specified asphalt at the rate of twenty five (25) to thirty (30) lbs (11-13kg) per 100 square feet.
 2. The modified membrane roll must push a puddle of adhesive in front of it with adhesive slightly visible at all side laps. Exercise care during application to eliminate air entrapment under the membrane.
 3. Apply pressure to all seams with a heavy roller to ensure that the laps are solidly bonded to substrate.
 4. Install subsequent rolls of modified membrane across the roof as above with a minimum of four (4) inch (101mm) side laps and eight (8) inch (203mm) end laps. Stagger the end laps. Apply the modified membrane in the same direction as the previous layers but stagger the laps so they do not coincide with the laps of the base layers.
 5. Apply asphalt no more than five (5) feet (1.5m) ahead of each roll being embedded.
 6. Extend membrane two (2) inches (50mm) beyond top edge of all cants in full moppings of the specified asphalt
 7. All field seams shall be welded with an approved automatic welder.
 8. All field seams must be clean and dry prior to initiating any field welding. Remove foreign materials from the seams (dirt, oils, etc.) with acetone or authorized alternative.
 9. Contaminated areas within a membrane seam will inhibit proper welding and will require a membrane patch or strip.
 10. All welding shall be performed only by qualified personnel to ensure the quality and continuity of the weld. The lap or seam area of the membrane may be intermittently tack welded to hold the membrane in place.
 11. The back interior edge of the membrane shall be welded first, with a thin, continuous weld to concentrate heat along the exterior edge of the lap during the final welding pass.
 12. Follow local code requirements for electric supply, grounding and surge protection. The use of a dedicated, portable generator is highly recommended to ensure a consistent electrical supply, without fluctuations that can interfere with weld consistency.
 13. Properly welded seams shall utilize a 1.5 inch wide nozzle, to create a homogeneous weld, a minimum of 1.5 inches in width

14. Apply membrane in the same direction as the previous layers but stagger the laps so they do not coincide with the laps of the base layers.
- C. Fibrous Cant Strips: Provide non-combustible perlite or glass fiber cant strips at all wall/curb detail treatments where angle changes are greater than 45 degrees. Cant may be set in approved cold adhesives, hot asphalt or mechanically attached with approved plates and fasteners.
- D. Wood Blocking, Nailers and Cant Strips: Provide wood blocking, nailers and cant strips as specified in previous Section(s).
 1. Provide nailers at all roof perimeters and penetrations for fastening membrane flashings and sheet metal components.
 2. Wood nailers should match the height of any insulation, providing a smooth and even transition between flashing and insulation areas.
 3. Nailer lengths should be spaced with a minimum 1/8 inch gap for expansion and contraction between each length or change of direction.
 4. Nailers and flashings should be fastened in accordance with Factory Mutual "Loss Prevention Data Sheet 1- 49, Perimeter Flashing" and be designed to be capable of resisting a minimum force of 200 lbs/lineal foot in any direction.
- E. Metal Work: Provide metal flashings, counter flashings, parapet coping caps and thru-wall flashings as specified in Section 07620 or Section 07710. Install in accordance with the SMACNA "Architectural Sheet Metal Manual" or the NRCA Roofing Waterproofing manual.
- F. Termination Bar: Provide a metal termination bar or approved top edge securement at the terminus of all flashing sheets at walls and curbs. Fasten the bar a minimum of 8 inches (203 mm) o/c to achieve constant compression. Provide suitable, sealant at the top edge if required.
- G. Flashing Base Ply: Install flashing sheets by the same application method used for the base ply.
 1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
 2. Prepare all walls, penetrations, expansion joints and surfaces to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
 3. Adhere to the underlying base flashing ply with specified hot material unless otherwise noted in these specifications. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
 4. Solidly adhere the entire sheet of flashing membrane to the substrate.
 5. Seal all vertical laps of flashing membrane with a three-course application of trowel-grade mastic and mesh.
 6. Coordinate counter flashing, cap flashings, expansion joints, and similar work with modified bitumen roofing work as specified.
 7. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work.
- H. Flashing Cap Ply: Install flashing cap sheets by the same application method used for the cap ply.
 1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
 2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
 3. Adhere to the underlying base flashing ply with specified flashing ply adhesive unless

- otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
4. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
 5. Coordinate roof accessories, miscellaneous sheet metal accessory items with the roofing system work.
 6. All stripping shall be installed prior to flashing cap sheet installation.
 7. Heat and scrape granules when welding or adhering at cut areas and seams to granular surfaces at all flashings.
 8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.
- I. Roof Walkways: Provide fluid applied walkways in areas indicated on the Drawings.
1. Walkway- Fluid applied, safety yellow in color with slip-resisting mineral-granule surface, manufactured and installed as a traffic walkway for foot traffic and acceptable to roofing system manufacturer, 30 inches wide minimum.
 2. If there are any areas of the walkway system that will come in direct contact with any asphaltic based material, prime such areas as per the datasheet.
 3. These include: Bleed out from field adhesives, uncoated mastics, liquid flashing, etc.
 4. Mineral cap sheet (Minus bleed-out) is an acceptable direct substrate.
- J. Installation of the Walkway System:
1. Install at heavy traffic areas and at high impact areas as directed by the Owner.
 2. Mixing: Store buckets upside down 24hrs prior to application to assist in mixing. If bucket is opened and clear, non-mixed liquid is present, mix with a jiffy mixer on a low setting until uniform color is evident throughout.
 3. Coverage Rates: Walkway & Impact resistance areas: (Specific to 30" Mineral substrate install)
 4. Walkway Areas – (3 gal/sq.) of walkway coating with 25-35 lbs./sq. of walkway granules.
 5. Impact Resistant Areas (Around RTU's, ladders & hatches) – (5 gal/sq.) of walkway coating with 40-50 lbs./sq. of walkway granules.
 6. Walkway Areas Scope:
 - a. Walkways should be a minimum of 30" wide.
 - b. Blow, lightly sweep and clean area to receive coating.
 - c. Any areas of exposed asphalt shall be primed with coating Bleed-Blocking Primer prior to application of coating.
 - d. Tape off area with 4" wide painters' tape and roll with weighted roller to ensure clean straight edges and tapes adhesion.
 - e. Install 100% solids, silicone yellow walkway coating at a rate of 3Gal/sq. minimum with a roller.
 - f. Immediately after the application of the walkway coating, broadcast Walkway Granules into the coating at a rate of 25-35 lbs. per 100 square feet. The granules will settle into the coating. Apply the granules generously, inspect the surface within a few minutes and reapply as needed to obtain a continuous film of granules.
 - g. Remove painters' tape while still wet and before skinning over.
 - h. After the coating has completely cured, remove all loose granules with a small hand blower and a soft bristle broom.
 7. High Impact Areas (around mechanical equipment, hatches, etc) Scope:
 - a. Walkways should be a minimum of 48" wide.
 - b. Blow, lightly sweep and clean area to receive coating.
 - c. Any areas of exposed asphalt shall be primed with coating Bleed-Blocking Primer prior to application of coating.
 - d. Tape off area with 4" wide painters' tape and roll with weighted roller to ensure

- clean, straight edges and tapes adhesion.
- e. Install coating Walkway Coating at a rate of 5Gal/sq. minimum with a roller.
- f. Immediately after the application of the walkway coating, broadcast Walkway Granules into the coating at a rate of 40-50 lbs. per 100 square feet. The granules will settle into the coating. Apply the granules generously, inspect the surface within a few minutes and reapply as needed to obtain a continuous film of granules.
- g. Remove painters' tape while still wet and before skinning over.
- h. After the coating has completely cured, remove all loose granules with a small hand blower and a soft bristle broom.

3.5 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

- A. Pre-Manufactured Flash-less Snap-On Metal Edge System:
 - 1. Position base ply of the Built-Up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations. Cap sheet shall stop at the edge of the roof and shall not turn over the edge of the nailer.
 - 2. Prior to installing the base anchor, assure a level plane is present. If not, shim the roof edge surface as required.
 - 3. Extruded base anchor: Apply two 1/4" beads of Green-Lock Sealant XL or equal on the bottom surface of the top flange of the extruded anchor.
 - 4. Set the extruded anchor on the edge and face fasten through pre-punched slots every 18 inches o.c. for 5.75 inch face fascia, and 18 inches o.c. staggered for any fascia size greater than 5.75 inches. Begin fastening 6 inches from ends.
 - 5. Install GL Sealant XL at the ends of the base frame to prevent water from running between base anchor joints.
 - 6. Install compression seals every 40 inches on center in the slots located at the top of the extruded anchor.
 - 7. Install fascia cover setting the top flange over the top flange and compression seals of the base anchor. Assure compression seals are in place during this process. Beginning on one end and working towards the opposite end, press downward firmly (do not rotate) until "snap" occurs and cover is engaged along entire length of miter.
 - 8. Install splice plate at each end of the base anchor and fascia cover prior to the installation of the next adjacent ten foot piece.

3.6 CLEANING

- A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.
- B. Remove asphalt markings from finished surfaces using mineral spirits or approved solvent and WHITE COTTON CLOTH rags.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.7 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch (16 mm) thick.

- D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.
- E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

3.8 FIELD QUALITY CONTROL

- A. Provide manufacturer's field observations at start-up and at intervals of approximately 30 percent, 60 percent and 90 percent completion. Provide a final inspection upon completion of the Work.
- B. Site inspection: When the project is in progress, the roofing system manufacturer will provide the following:
 - 1. Report progress and quality of the work as observed.
 - 2. Provide job site inspections a minimum of three-times per week, at no additional cost to the building Owner or Contractor.
 - 3. Field observations shall be performed by a Manufacturer's Representative employed full-time by the manufacturer and whose primary job description is to assist, inspect and approve membrane installations for the manufacturer.
 - 4. The field observer must possess roofing field and technical experience with the roof system manufacturer. Roof system manufacturer must provide a written letter, signed by a corporate officer, that the required inspector meets the above referenced criteria.
 - 5. Provide weekly inspection and progress reports to the Owner and Architect. Progress reports must include digital photographic documentation and a summary of the daily work progress. Progress reports must be made available to the Owner via a password secure on-line database
 - 6. Warranty shall be issued upon manufacturer's acceptance of the installation.
 - 7. Provide observation reports from the Manufacturer's Representative indicating procedures followed, weather conditions and any discrepancies found during inspection.
 - 8. Provide a final report from the Manufacturer's Representative, certifying that the roofing system has been satisfactorily installed according to the project specifications, approved details and good general roofing practice.
- C. Perform field inspection and testing as required by the specifications and Architect.
- D. Contractor to correct defects or irregularities discovered during field inspection.

3.9 SCHEDULES

- A. All waterproofing, membrane components and raw materials within such components shall be made, sourced and warrantied by an employee owned and operated company based out of the USA.
 - 1. Material manufacturer shall provide letter of compliance and show earnest proof of such compliance at the Owners request.
- B. Base (Ply) Sheet:
 - 1. 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a dual fiberglass scrim, performance requirements according to ASTM D 5147.
 - a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 0 +/- 3.6 deg. F MD 225lbf/in XD 225lbf/in
 - 2) 50mm/min. @ -17.78 +/- 2 deg. C MD 39 kN/m XD 39 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 300 lbf XD 300 lbf
 - 2) 50mm/min. @ 23 +/- 2 deg. C MD 1335 N XD 1335 N

- c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in/min. @ 0 +/- 3.6 deg. F MD 4 % XD 4 %
 - 2) 50mm/min@ -17.78 +/- 2 deg. C MD 4 % XD 4 %
 - d. Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-34.4 deg. C)
- C. Rubberized Modified Cap (Ply) Sheet:
- 1. 160 mil SBS (Styrene-Butadiene-Styrene) mineral surfaced, rubber modified roofing membrane with dual fiberglass reinforced scrim. ASTM D6162, Type III Grade S
 - a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf/in XD 550 lbf/in
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 87.5 kN/m XD 96.25 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf XD 950 lbf
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 4003 N XD 4226 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 6% XD 6%
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 8% XD 8%
 - d. Low Temperature Flexibility, ASTM D 5147, Passes -40 deg. F (-40 deg. C)
 - e. Recycled Content:
 - 1) Pre-Consumer: 1%
 - 2) Post-Consumer: 6%
 - 3) Bio-Based: 2.5%
 - f. Fire Retardant:
 - 1) Fire Rating: Class A
- D. Interply Adhesive: Generic Type III Asphalt: Hot Bitumen, ASTM D 312, Type III steep asphalt having the following characteristics:
- 1. Softening Point 185 deg. F - 205 deg. F
 - 2. Flash Point 500 deg. F
 - 3. Penetration @ 77 deg. F 15-35 units
 - 4. Ductility @ 77 deg. F 2.5 cm
- E. Flashing Base Ply: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a dual fiberglass scrim, performance requirements according to ASTM D 5147.
- a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 0 +/- 3.6 deg. F MD 225lbf/in XD 225lbf/in
 - 2) 50mm/min. @ -17.78 +/- 2 deg. C MD 39 kN/m XD 39 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 300 lbf XD 300 lbf
 - 2) 50mm/min. @ 23 +/- 2 deg. C MD 1335 N XD 1335 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in/min. @ 0 +/- 3.6 deg. F MD 4 % XD 4 %
 - 2) 50mm/min@ -17.78 +/- 2 deg. C MD 4 % XD 4 %
 - d. Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-34.4 deg. C)
- F. Flashing Cap (Ply) Sheet: Modified Cap (Ply) Sheet:
- 1. 160 mil SBS (Styrene-Butadiene-Styrene) mineral surfaced, rubber modified roofing membrane with dual fiberglass reinforced scrim. ASTM D6163, Type III Grade S
 - a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf/in XD 550 lbf/in
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 87.5 kN/m XD 96.25 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf XD 950 lbf
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 4003 N XD 4226 N
 - c. Elongation at Maximum Tensile, ASTM D 5147

MODIFIED BITUMINOUS MEMBRANE ROOFING

- 1) 2 in./min. @ 73.4 +/- 3.6 deg. F MD 6% XD 6%
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 8% XD 8%
 - d. Low Temperature Flexibility, ASTM D 5147, Passes -40 deg. F (-40 deg. C)
 - e. Recycled Content:
 - 1) Pre-Consumer: 1%
 - 2) Post-Consumer: 6%
 - 3) Bio-Based: 2.5%
 - f. Fire Retardant:
 - 1) Fire Rating: Class A
- G. Flashing Ply Adhesive: Generic Type III Asphalt: Hot Bitumen, ASTM D 312, Type III steep asphalt having the following characteristics:
- 1. Softening Point 185 deg. F - 205 deg. F
 - 2. Flash Point 500 deg. F
 - 3. Penetration @ 77 deg. F 15-35 units
 - 4. Ductility @ 77 deg. F 2.5 cm
- H. Surfacing: A light-grey/white in color Mineral Surfaced Membrane

END OF SECTION 075500

Revised Legal Notice

Town of Ledyard
Permanent Building Committee
Ledyard Public Schools
4 Blonder Boulevard
Ledyard, CT 06339

INVITATION TO BID

Notice is hereby given that sealed bids by which the Town of Ledyard will contract for the

**ROOF REPLACEMENT AND PHOTOVOLTAIC PROJECT
JULIET LONG SCHOOL
STATE PROJECT NO. 072-0096 RR/PV**

will be received at the Office of the Facilities Director until

3:00 PM on, May 3, 2024

Bids will be publicly opened and read aloud at 3:00 in the first floor conference room of the Central Office located at 4 Blonders Boulevard, Ledyard, CT.

There will be a **MANDATORY** pre-bid meeting on April 12, **2024 @ 10:00 AM**
at the

**Juliet Long School, 1854 Route Ct-12
Ledyard, Connecticut 06335**

The Bid of any Bidder who has not attended the mandatory pre-bid meeting shall be rejected.

This Invitation to Bid, Instruction to Bidders conditions, Drawings, Specifications and other Bidding Documents may be obtained at no charge at the Town of Ledyard website https://www.ledyard.net/district/bids_rfp_s and the Connecticut State Contracting portal at <http://das.ct.gov>

Each bid shall be signed by the bidder and accompanied by a certified check or a bid bond in an amount equal to ten percent (10%) of the bid, payable to the Town of Ledyard.

For this bid, we require eight (8) hard copy submissions and one USB drive containing the bid form and other required documents.

This contract is subject to state set-aside and contract compliance requirements.

In accordance with Connecticut General Statute Sections 4a-100 and 4b-91, a responsible bid must contain two (2) documents: The Contractor Prequalification Certificate and the Update (Bid) Statement. The classifications ROOFING and SOLAR ELECTRIC are required as a minimum.

Bidders are advised that a good faith effort is required for participation in this contract by Small Business Enterprises (SBE) and Minority Business Enterprises (MBE). The SBE goal is twenty-five (25) percent of the contract value, with twenty-five (25) percent of that amount (6.25 percent of the overall project) as the MBE goal.

Bidders are further advised that this project is subject to the prevailing wage requirements of Connecticut General Statutes Section 31-53.

To receive consideration bids must be received at the address above no later than the deadline noted.

Emailed bids will not be accepted. The Town of Ledyard reserves the right to amend or withdraw this Invitation to Bid for any reason, to accept or reject any or all Bids, to waive any informalities or non-material deficiencies in any Bid, and to make such award (or make no award) for a contract in connection with this Invitation to Bid all as determined by the Town of Ledyard, in its discretion, to be in the best interest of the Town of Ledyard. A Bid may be rejected for irregularities of any kind, including without limitation, alteration of form, additions not called for, conditional proposals and incomplete Bids. A Bid may also be rejected if, in the opinion of the Town of Ledyard, the Bid does not meet the standard of quality established by the Bidding Documents. Any or all Bids may be rejected if there is any reason to believe that collusion exists among two or more Bidders. The foregoing provisions are for illustrative purposes and shall in no way limit the right of the Town of Ledyard to reject any and all Bids, in whole or in part.

RFP Timeline:

Posting: **April 3, 2024**

Mandatory Pre-Bid Meeting: **April 12, 2024**

Requests for Information: **April 18, 2024** (See SIB 1.2 A)

Responses to RFI/Addendum: **April 23, 2024** (See SIB 1.4.A). Response will be posted on the Town of Ledyard' website <https://www.ledyard.net/district/bidsrfps> and the Connecticut State Contracting portal at <http://das.ct.gov>

Bid Opening: **May 3, 2024** at the location identified above.

By the order of the Ledyard Public Schools Facilities Director
Wayne Donaldson

BIDDER: _____
Name

Address

To: **Permanent Building Committee
Ledyard Public Schools
4 Blonder Boulevard
Ledyard, CT 06339**

Project: **ROOF REPLACEMENT AND PHOTOVOLTAIC PROJECT
JULIET LONG SCHOOL
1854 ROUTE CT-12
LEDYARD, CONNECTICUT 06335
STATE PROJECT NO. 072-0096 RR/PV**

In preparing this bid, we have carefully examined the Bidding Documents for this Project. We have visited the site and noted the conditions affecting the Work.

The Bidding Documents referred to include Drawings and Project Manual dated February 2, 2024 for the above referenced project, prepared by Silver/Petrucci + Associates, Inc., New London, Connecticut, and any Addenda issued thereafter.

We propose to perform the work described in the Bidding Documents, in keeping with definitions of Article 1 of the Instructions to Bidders, for the Base Bid Sum as follows:

Base Bid Total Cost for Modified Thermoplastic Hybrid Membrane Roofing 30-Year Roof Replacement for a Total Cost of:

\$ _____ Dollars (\$) .00).
written figure

We will commence work on the project _____ calendar days after receipt of "Notice to Proceed" or signing of Contract (whichever is earlier). We will be able to substantially complete the project within _____ calendar days thereafter (see SIB-1, 1.1.A) but no later than _____, 2024.

Alternate No. 1 Total Cost for SBS Modified Bitumen 30-Year Roof Replacement for a Total Cost of:

\$ _____ Dollars (\$) .00).
written figure

We will commence work on the project _____ calendar days after receipt of "Notice to Proceed" or signing of Contract (whichever is earlier). We will be able to substantially complete the project within _____ calendar days thereafter (see SIB-1, 1.1.A) but no later than _____, 2024.

Alternate No. 2: Total Cost for Modified Thermoplastic Hybrid Membrane Roofing 20-Year Roof Replacement for a Total Cost of:

\$ _____ Dollars (\$) .00).
written figure

We will commence work on the project _____ calendar days after receipt of "Notice to Proceed" or signing of Contract (whichever is earlier). We will be able to substantially complete the project within _____ calendar days thereafter (see SIB-1, 1.1.A) but no later than _____, 2024.

Alternate No. 3 Total Cost for SBS Modified Bitumen 20-Year Roof Replacement for a Total Cost of:

\$ _____ Dollars (\$) .00).
written figure

We will commence work on the project _____ calendar days after receipt of "Notice to Proceed" or signing of Contract (whichever is earlier). We will be able to substantially complete the project within _____ calendar days thereafter (see SIB-1, 1.1.A) but no later than _____, 2024.

Alternate No. 4 Total Cost for Photovoltaic System for a Total Cost of:

\$ _____ Dollars (\$) .00).
written figure

We will commence work on the project _____ calendar days after receipt of "Notice to Proceed" or signing of Contract (whichever is earlier). We will be able to substantially complete the project within _____ calendar days thereafter (see SIB-1, 1.1.A) but no later than _____, 2024.

Allowances: (See Section 012100)

Allowance No. 1: Metal Deck Repair/Replacement (part of Base Bid) \$ _____
Allowance No. 2: Chimney Brick Repair/Replacement (part of Base Bid) \$ 5,000.00

Unit Prices:

As required by the Base Bid, should deteriorated or damaged materials be required to be removed as determined by the Architect or Owner, the cost to remove and replace the referenced material, (or credit for specified material not provided or installed) including all labor, material, equipment, and related furnishings is as follows:

- 1. Add Metal Deck Repair/Replacement, as specified, cut to fit around roof structure and systems and installed \$ _____/sf
- 2. Deduct Metal Deck Repair/Replacement, as specified, cut to fit around roof structure and systems and installed \$ _____/sf
- 3. Chimney Brick Repair/Replacement, including added scope, as specified, installed \$ _____/sf
- 4. Deduct Chimney Brick Repair/Replacement, as specified, installed \$ _____/sf

If written notice of the acceptance of this Bid is mailed, telegraphed, or delivered to the undersigned at the Address designated below, within ninety (90) days after the date of Bid Opening, or any time thereafter before this Bid is withdrawn, the undersigned will, within ten (10) days after the date of mailing, telegraphing, or delivering of the notice, execute and deliver a contract in the Standard Form of Agreement Between the Owner and Contractor, AIA Document A101, or similar contract modified as may be mutually agreed upon.

The undersigned acknowledges that he has examined the documents, visited and examined the site as required under "Instructions to Bidders", examined the availability of labor and materials and further agrees to comply with all the requirements as to the conditions of employment and wage rates set forth by the Department of Labor.

Addenda:

The undersigned acknowledges receipt of the following addenda to the Contract Documents, listed by number and date:

Number , Dated: _____
Number , Dated: _____

Number , Dated: _____
Number , Dated: _____

Exceptions: _____

ATTACHMENTS – Attached hereto (by Contractor) is:

- 1. Bid Bond
- 2. Contractor Prequalification Statement
- 3. Update Bid Statement
- 4. CHRO Bidder Contract Compliance Monitoring Report
- 5. Include three (3) references for similar projects (CT School roof & PV projects)

NON-COLLUSIVE BID STATEMENT

The undersigned bidder certifies that his bid is made independently and without collusion, agreement, understanding or planned course of action with any other bidder and that the contents of his bid shall not be disclosed to anyone other than his employees, agents, or sureties prior to the official bid opening.

Date: _____

Signature: _____

Printed Name and Title
of Agent submitting bid: _____

Name of Company: _____

Address: _____

Telephone Number: _____ Fax Number: _____

E-mail: _____

This Bid may be withdrawn prior to the scheduled Bid Opening or any postponement thereof.

SECTION 014333 – ROOFING MANUFACTURER'S FIELD SERVICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 07 Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section includes Manufacturer's field services for roofing assemblies.
- B. Related Sections:
 - 1. Section 07 05 00 – Common Work Results for Thermal and Moisture Protection.
- C. Related Work Specified Elsewhere:
 - 1. Roofing Material: Section 07 52 00- Modified Bituminous Membrane Roofing.
 - 2. Roofing Material: Section 07 51 13 – Built-Up Asphalt Roofing – Cold-Applied.
 - 3. Roofing Material: Section 07 51 16 – Mineral Embedded Cap Sheet.

1.3 REFERENCES

- A. International building Code (current edition) or local authority building code.
- B. American Society of Civil Engineers (ASCE): ASCE 7, Minimum Design Loads for Buildings and Other Structures.
- C. Factory Mutual Global (FMG):
 - 1. Roof Assembly Classifications.
- D. National Roofing Contractors Association (NRCA):
 - 1. Roofing and Waterproofing Manual.
- E. American National Standards Institute and Single Ply Roofing Institute (ANSI/SPRI):
 - 1. ANSI/SPRI ES-1 Testing and Certification Listing of Shop Fabricated Edge Metal.

1.4 SUBMITTALS FOR REVIEW

- A. Product Data:
 - 1. Provide manufacturer's technical product data for each type of roofing product specified. Include data substantiating that materials comply with specified requirements.
- B. Specimen Warranty:
 - 1. Provide an unexecuted copy of the warranty specified for this project, identifying the terms and conditions required of the Manufacturer and the Owner.
- C. Roofing System Manufacture's Evaluation:
 - 1. Provide a comprehensive written assessment comparing available roofing solutions with validation of why the roofing system selection for the specific project is suitable and appropriate.

- D. Roofing System Manufacturer's Report Form:
 - 1. Provide a copy of the report form utilized by the Job Site Inspector for progress inspections to monitor installation and quality.

1.5 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions:
 - 1. Submit installation instructions and recommendations indicating special precautions required for installing the membrane.
- B. Manufacturer's Certificate:
 - 1. Certify that roof system furnished is approved by Underwriters Laboratories, Warnock Hersey or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.
 - 2. Certify that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
 - 3. Submit a certified copy of the roofing manufacturer's ISO 9001 compliance certificate.
 - 4. Written certification verifying the applicator is currently authorized for the installation of the specified roof system.
- C. Design Loads:
 - 1. Submit copy of manufacturer's minimum design load calculations according to ASCE 7, Method 2 for Components and Cladding. In no case shall the design loads be taken to be less than those detailed in Design and Performance Criteria article of this specification.
- D. Qualification data for firms and individuals identified in Quality Assurance Article 1.7 below.
- E. Test Reports:
 - 1. Submit ANSI/SPRI ES-1 Testing and Certification Listing of Shop Fabricated Edge Metal Products.
- F. Substitutions:
 - 1. Products proposed as equal to the products specified for this project shall meet all of the requirements in the appropriate Division 7 specifications and shall be submitted for consideration at least seven (7) days prior to the date that bids must be submitted.
 - 2. Proposals shall be accompanied by a copy of the manufacturer's standard specification Section.
 - a. That specification Section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take place.
 - b. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.
 - 3. Manufacturer's checklist will be accompanied with any substitution to verify equal performance characteristics to those specified in Division 7 specification.
 - 4. The Owner's decision regarding substitutions will be considered final.

1.6 CONTRACT CLOSEOUT SUBMITTALS

- A. Project Warranty: Manufacturer shall execute all applicable warranties for all system(s) criteria. Multiple manufacturers warranties are not acceptable.
 - 1. Manufacturer's long-term system warranty.
 - 2. Installer's three (3) year warranty covering system installation.
 - 3. Warranties shall commence on date of Substantial Completion.

4. Single system warranty: The final warranty issued to the Owner shall include each roofing, wall cladding and soffit system, separate or all-encompassing shall be warranted and owned by a single Manufacture.
- B. Roofing Maintenance Instructions:
 1. Provide a roof care and maintenance manual of manufacturer's recommendations for maintenance of installed roofing systems.
- C. Insurance Certification:
 1. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.
- D. Inspection Logs:
 1. Copy of inspection reports as performed by the Job Site Inspector or manufacturer shall be submitted at project closeout and include photographic documentation of installation progress, weather conditions, and personnel on the project at the time of every inspection.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 1. Company specializing in manufacturing the products specified in this Section with not less than Fifty (50) years of documented experience and have ISO 9001 certification.
- B. Installer Qualifications:
 1. Company specializing in specified roofing installation with not less than 5 years' experience and authorized by roofing system manufacturer as qualified to install manufacturer's roofing materials.
- C. Installer's Field Supervision:
 1. Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
 2. Maintain proper supervision of workmen.
- D. Maintain a copy of the roof plans, details, and specifications in the possession of the Supervisor/Foreman and on the roof at all times.
- E. Source Limitations:
 1. Obtain all primary components of roofing systems from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer.
 2. The manufacturer providing the roofing system warranty must verify that they manufacture a minimum of 75% of the products utilized in the roofing system of this project. Products that are private labeled shall not be considered as manufactured by the roofing system supplier.
 3. Upon request of the Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.
- F. Source Quality Control:
 1. Manufacturer shall have in place a documented, standardized quality control program such as ISO-9001.

1.8 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Roofing Conference:

1. Convene a pre-roofing conference approximately two (2) weeks before scheduled commencement of roofing system installation and associated work.
- B. Require attendance of:
 1. All project design team members: Architect, structural, etc.
 2. Contractors of construction to receive any work associated with the project
 3. Installers of rooftop units or any roof hatch related work
 4. Contractors or subcontractors of any other work in and around roofing that must precede or follow roofing work (including mechanical and electrical work if any)
 5. Owner or representative of roofing system and building
 6. Manufacturer's full-time employee(s)
 7. Other representatives directly concerned with performance of the Work, including (where applicable) Owner's insurers, testing agencies and governing authorities.
- C. Objectives of conference include:
 1. Review foreseeable methods and procedures related to roofing work, including set up and mobilization areas for stored material and work area.
 2. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by others.
 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
 4. Review roofing system requirements (drawings, specifications and other contract documents).
 5. Review required submittals both completed and yet to be completed.
 6. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
 7. Review required inspection, testing, certifying and material usage accounting procedures.
 8. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).
 9. Record discussion of conference including decisions and agreements (or disagreements) reached and furnish a copy of record to each party attending.
 - a. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
 - b. Do not proceed with roofing work until such issues are resolved to the satisfaction of the Owner. This shall not be construed as interference with the progress of Work on the part of the Owner.
 10. The Owner will designate one of the conference participants to record the proceedings and promptly distribute them to the participants for record.
- D. The intent of the conference is to resolve any issues affecting the installation and performance of roofing work.

1.9 MANUFACTURER'S INSPECTIONS

- A. When the Project is in progress, a full-time employee of the roofing system manufacturer must provide the following:
 1. Weekly reports, showing progress and quality of the work as observed. Progress reports shall be published to an online system as referenced in Section 1.4.
 2. Provide periodic roofing installation inspections: Not less than three days per week, Inspections reports must include; photographic documentation of work in progress and written statements of compliance with details/shop drawings.

3. Report to the Architect and Owner in writing any failure or refusal of the contractor to correct unacceptable practices called to the contractor's attention.
4. Confirm after project completion that the manufacturer has observed no application procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.10 WARRANTY

- A. Upon completion of installation on all roof sections and systems, one manufacturer will supply to the Owner all specified, long-term warranties.
- B. Installer will submit a three-year workmanship warranty to the membrane manufacturer with a copy directly to the Owner.
- C. The roofing system manufacturer must have been in continuous business operation for a period of time at least as long as the length of the roof system warranty provided for this project.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXECUTION, GENERAL

- A. Comply with requirements of related Division 07 Section.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.
- B. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.

3.3 FIELD QUALITY CONTROL

- A. Representative shall perform field inspection as specified in Article titled: MANUFACTURER'S INSPECTIONS above. Inspections must include photographic documentation of installation progress, weather conditions, and personnel on the project at the time of inspection.
- B. Correct defects or irregularities discovered during field inspection. Issues deemed defective must be re-inspected and determined suitable by the roofing manufacturer.
- C. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system. A copy of the specification shall also be on site at all times.
- D. Frequent progress meetings shall be conducted during the performance of roof system installation and must be attended by the Owner, roofing system manufacturer's full-time employee, and other representatives directly concerned with performance of the work.

3.4 FINAL INSPECTION

ROOFING MANUFACTURER'S FIELD SERVICES

- A. At the completion of the roofing installation and associated work, meet with contractor and installer of associated work, Owner, roofing system client's representative, and other representatives directly concerned with performance of roofing system.
- B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.
- C. Notify the Architect and Owner upon completion of corrections.
- D. The roofing system manufacturer reserves the right to request a thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermographic scan shall be provided by the roofing contractor.
- E. If core cuts verify the presence of damp or wet materials, the roofing contractor shall be required to replace the damaged areas at his own expense.
- F. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.
- G. Immediately correct roof leakage during construction. If the contractor does not respond within twenty-four (24) hours, the Owner may exercise right to correct the Work under the terms of the Conditions of the Contract.

END OF SECTION 014333

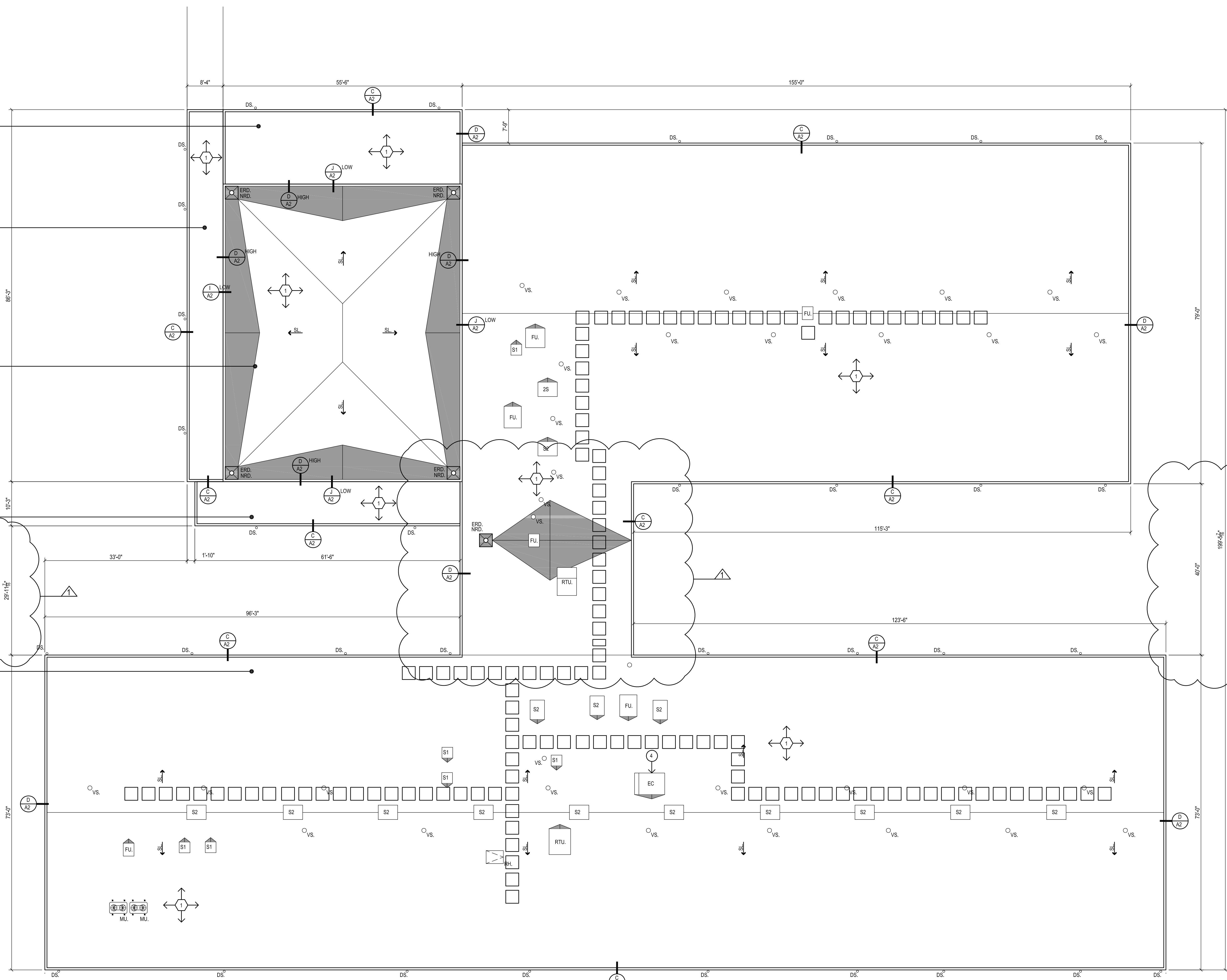
ROOF "C"
 ROOF SYSTEM: KEE
 EXIST. DECK: METAL DECK
 INSULATION: 5" BASE LAYER
 † TAPERED INSULATION
 VAPOR BARRIER
 ELEVATION: 29'-0" ±

ROOF "E"
 ROOF SYSTEM: KEE
 EXIST. DECK: METAL DECK
 INSULATION: 5" BASE LAYER
 † TAPERED INSULATION
 VAPOR BARRIER
 ELEVATION: 29'-0" ±

ROOF "B"
 ROOF SYSTEM: KEE
 EXIST. DECK: METAL DECK
 INSULATION: 5" BASE LAYER
 † TAPERED INSULATION
 VAPOR BARRIER
 ELEVATION: 42'-0" ±

ROOF "D"
 ROOF SYSTEM: KEE
 EXIST. DECK: METAL DECK
 INSULATION: 5" BASE LAYER
 † TAPERED INSULATION
 VAPOR BARRIER
 ELEVATION: 29'-0" ±

ROOF "A"
 ROOF SYSTEM: KEE
 EXIST. DECK: METAL DECK
 INSULATION: 5" BASE LAYER
 † TAPERED INSULATION
 VAPOR BARRIER
 ELEVATION: 29'-0" ±



SYMBOL LEGEND	
	PLAN SECTION DETAIL OR ELEVATION-SHEET NUMBER
	INDICATES SLOPE DIRECTION OF SLOPED STRUCTURAL DECK.
	TAPERED INSULATION CRICKET SLOPED @ 1/2" PER FOOT
	INDICATES SLOPE DIRECTION & INDICATES EXISTING ROOF PITCH.
	NOT IN CONTRACT SCOPE
	WALKWAY PADS. SEE CONSTRUCTION NOTE #2
	EXISTING ROOF DRAIN TO BE REMOVED. SEE DEMOLITION NOTES.
	NEW ROOF DRAIN TO BE INSTALLED. SEE DETAIL A/A2
	EMERGENCY OVERFLOW SCUPPER. SEE DETAIL B/A2
	EXISTING CHIMNEY SEE GENERAL NOTE #4
	METAL DOWNSPOUT. SEE CONSTRUCTION NOTE #3
	EXISTING VENT STACK. SEE DETAIL E/A2
	EXISTING ROOF TOP FAN UNIT. SEE DETAIL F/A2
	EXISTING ROOF TOP MECHANICAL UNIT. SEE DETAIL G/A2
	EXISTING 3'-0" SKYLIGHT SEE DETAIL H/A2
	EXISTING 4'-0" SKYLIGHT SEE DETAIL H/A2
	ROOF HATCH. SEE DETAIL K & O/A2
	MECHANICAL UNIT SEE DETAIL M/A2
	PITCH POCKET. SEE DETAIL L/A2

- GENERAL NOTES**
- ALL FLAT ROOFS TO RECEIVE 5" PER FOOT TAPERED RIGID INSULATION MINIMUM UNLESS OTHERWISE NOTED.
 - FIELD VERIFY ALL DIMENSIONS & PERFORM TEST CUTS AT EACH ROOF PRIOR TO THE BID.
 - ALL MATERIALS ARE NEW UNLESS OTHERWISE NOTED "EXISTING".
 - ALL WOOD BLOCKING, PLYWOOD & NAILERS TO BE PRESSURE TREATED. (P.T.)
 - ALL WOOD BLOCKING INDICATED IN DETAILS ARE TO BE ANCHORED TO THE EXISTING STRUCTURE.
 - ALL MEMBRANE FLASHING INDICATED IS TO EXTEND A MINIMUM OF 8". (VERTICAL OR HORIZONTAL)
 - CONTRACTOR IS TO SURVEY THE EXISTING ROOF DECKS W/A LEVEL (AFTER DEMOLITION) TO VERIFY THE SLOPES INDICATED ON PLAN ARE ACCURATE. NOTIFY ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO PERFORMING ANY ADDITIONAL ROOFING OPERATIONS.
 - CONTRACTOR IS TO INSPECT THE UNDERSIDE OF ALL ROOF DECKS PRIOR TO ROOFING OPERATIONS TO ENSURE THAT NO INTERIOR MATERIALS, EQUIPMENT, FINISHES OR OBJECTS WILL BE PERICLED OR DAMAGED.
 - CONTRACTOR ASSUMES ALL RESPONSIBILITY DURING PROJECT & WILL REPLACE ANY & ALL DAMAGED EQUIPMENT W/NO ADDITIONAL COST TO OWNER.
 - SITE AREAS DISTURBED SHALL BE CLEANED & RE-LEVELLED. W/LAWN AREAS MAGNETICALLY RAKED TO REMOVE ANY METAL DEBRIS & RE-SEED AS REQUIRED TO MATCH ADJACENT CONDITIONS.
 - CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR CLEAN UP OF ROOFING MATERIALS & DEBRIS THAT PENETRATES THE INTERIOR ENVELOPE OF THE BUILDING W/NO ADDITIONAL COST TO THE OWNER.
 - SNAKE/CLEAN OUT ALL EXISTING VERTICAL & HORIZONTAL LEADERS OUT TO NEAREST MANHOLE OUTSIDE OF BUILDING.
 - ALL CRICKETS ARE TO BE SLOPED @ A MINIMUM OF 1/2" PER FOOT & COORDINATE CRICKETS AROUND EXIST. HVAC UNITS AS REQUIRED TO AVOID PONDING.
 - CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL & RE-INSTALLATION OF ALL HVAC UNITS INCLUDING ANY ELECTRICAL OR MECHANICAL CONNECTIONS. THIS MAY INCLUDE THE EXTENSION OF EXISTING ELECTRICAL & DUCTWORK SYSTEMS TO ACCOMMODATE NEW MECHANICAL UNIT CURBING & NEW ROOFING SYSTEM.
 - SNAKE/CLEAN OUT ALL EXISTING VENT STACKS BEFORE THE INSTALLATION OF METAL SLEEVE.
 - ALL DRAIN PIPING IS INSULATED ABOVE THE CEILINGS. THE EXACT ROUTE WILL BE DETERMINED IN THE FIELD. MAKE MINOR ADJUSTMENT IN THE ROUTE AT NO ADDITIONAL COST TO OWNER.
 - NEW ROOF INSULATION TO BE A MINIMUM OF R-30 AT ALL NEW ROOF DRAINS AND/OR THE LOW POINTS OF THE ROOF AREAS.
 - ALL ANTENNAE, CONDUITS & ANY OTHER OBJECTS TO REMAIN AFFECTED BY SCOPE OF WORK, TO BE REMOVED & REINSTALLED.

- DEMOLITION NOTES**
- REMOVE ALL EXISTING ROOFING SYSTEM, DOWN TO EXISTING METAL DECK.
 - REMOVE ALL PERIMETER METAL FLASHING WITHIN SCOPE OF WORK.
 - REMOVE EXISTING ROOF DRAINS & SUMP.
 - TEMPORARILY REMOVE EXISTING CAP. REMOVE EXISTING CAST IN PLACE CONC. CAP. RAKE EXISTING MORTAR JOINTS. REMOVE ANY CRACKED OR CHIPPED EXISTING BRICK AND MORTAR.

- CONSTRUCTION NOTES**
- CONTRACTOR TO PROVIDE A SPECIFIED QUANTITY OF EXISTING DECK REPAIR & REPLACEMENT. SEE PROJECT MANUAL.
 - WALKWAY PADS TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATION. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION. COORDINATE & FINALIZE EXACT ROUTE W/ OWNER & ARCHITECT.
 - EXISTING DOWNSPOUT LOCATION. PROVIDE NEW METAL DOWNSPOUT & CONNECT TO EXISTING STUP-UP. SEE PROJECT MANUAL.
 - CHIMNEY TO RECEIVE NEW CAST IN PLACE CONCRETE CAP TO MATCH EXISTING. RE-POINT ALL EXISTING MORTAR JOINTS TO MATCH EXISTING. REPLACE ANY DAMAGED OR CRACKED BRICKS TO MATCH EXISTING. SEE DETAIL N/A2 AND SPECIFICATION.

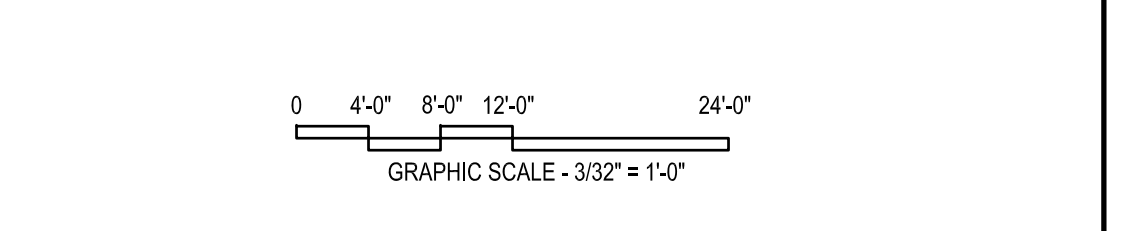
ROOF AREAS	ROOF ASSEMBLY
ROOF "A" 32,295 SF.	OUTSIDE AIR 0.17
ROOF "B" 3,830 SF.	ROOF MEMBRANE 0.33
ROOF "C" 998 SF.	COVERBOARD 2.20
ROOF "D" 631 SF.	5" POLYSTY INSUL 23.7
ROOF "E" 719 SF.	EXISTING DECK 1.23
	INSIDE AIR 0.61
TOTAL ROOF AREAS: 38,433 SF.	R-VALUE TOTAL 34.24

THIS AREA IS APPROXIMATE - V.L.F.
 IECC CODE REQUIREMENT R-VALUE MIN. R-30
 CONNECTICUT ZONE 2B
 CBSC REQUIREMENT : R-30 - UJ.0333

CODE INFORMATION

USE GROUP : B
 CONSTRUCTION CLASS: 2B
 RISK CATEGORY #3
 ULTIMATE DESIGN WIND SPEED: 135 MPH
 NOMINAL DESIGN WIND SPEED: 105 MPH

FACTORY MUTUAL ENGINEERING & RESEARCH CORPORATION (FM), ROOF ASSEMBLY CLASSIFICATION OF NON-COMBUSTIBLE CONSTRUCTION, WIND UPLIFT REQUIREMENT OF 140 FOR FIELD, 175 FOR PERIMETER AND I-110 FOR CORNERS, IN ACCORDANCE WITH FM PROPERTY LOSS PREVENTION DATA SHEETS 1-28.



A1 OVERALL ROOF PLAN
 3/32"=1'-0"

Project Title:
**PARTIAL ROOF REPLACEMENT AT:
 JULIET LONG SCHOOL**
 1854 CT-12
 GALES FERRY, CONNECTICUT 06335

SILVER PETRUCELLI + ASSOCIATES

3190 WHITNEY AVENUE HAMDEN CT 06518
 311 STATE STREET NEW LONDON CT 06320
 203 230 9007 silverpetrucci.com

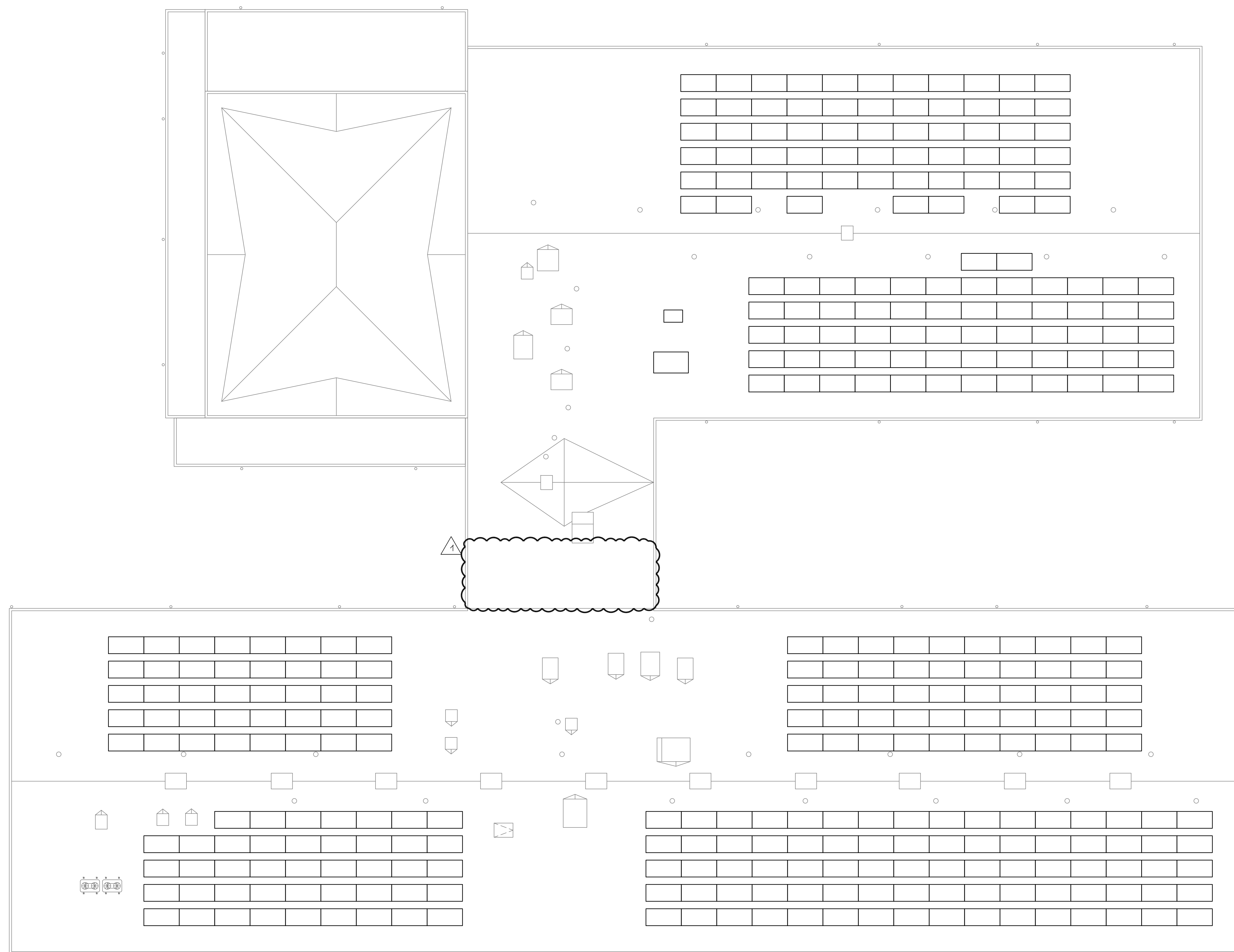
Revision	Description	Date	Revised By
#1	ADDENDUM #1	04/08/2024	K.JINSLEY

Drawing Title:
OVERALL ROOF PLAN

Date: 02/02/2024
 Scale: 3/32"=1'-0"
 Drawn By: MAG
 Project Number: 22.331

A1

STATE PROJECT 072-0096 RR/PV



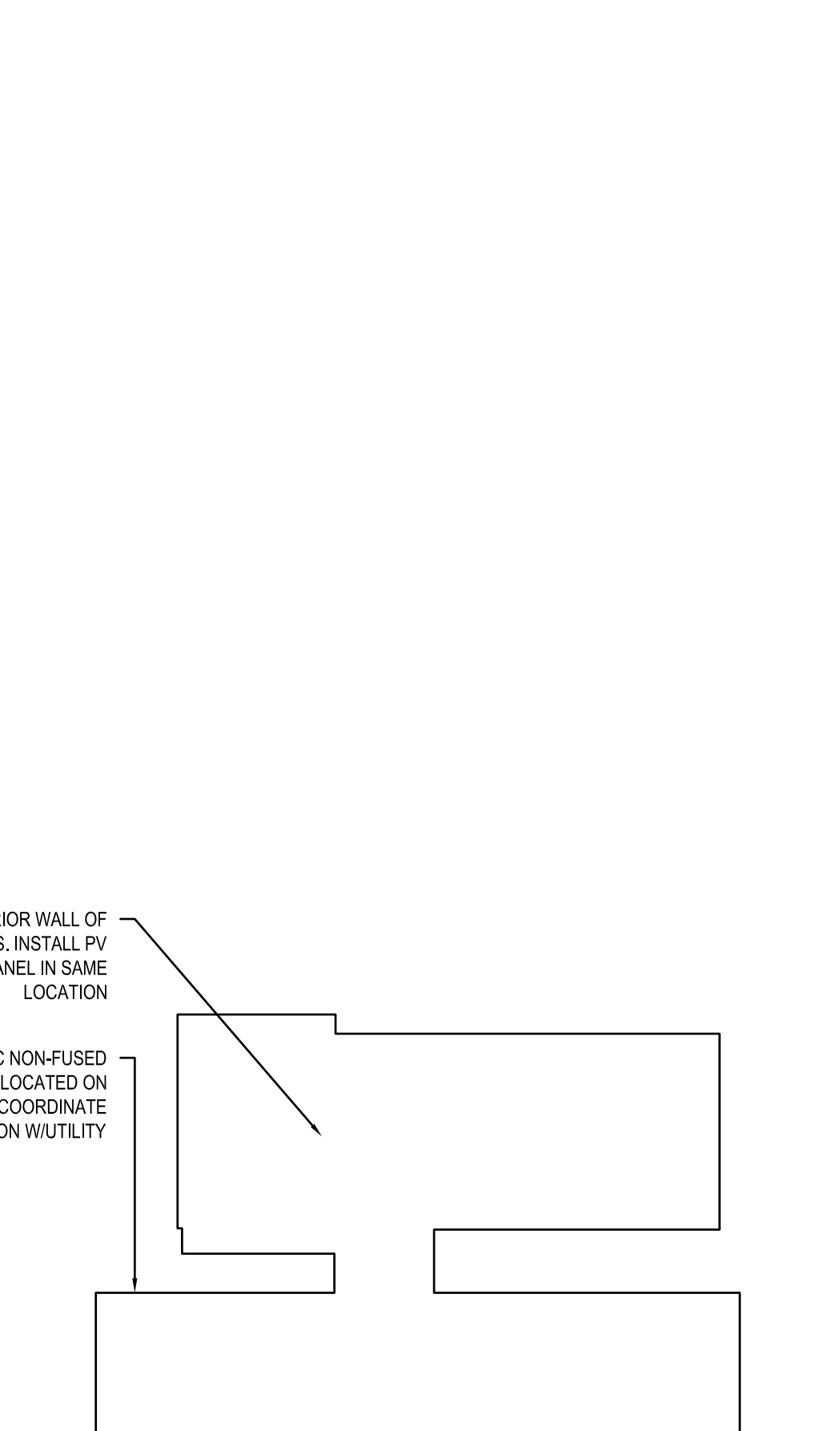
1 PV ROOF PLAN
SCALE: 1" = 10'-0"

- PV SYSTEM GENERAL NOTES**
- ALL INVERTERS SHALL BE IEEE 1547 & UL 1741 COMPLIANT. IT SHALL BE INSPECTED BY LOCAL UTILITY BEFORE COMMISSIONING, TESTING AND OPERATION OF THE SYSTEM.
 - ALL OUTDOOR EQUIPMENT SHALL BE PROPERLY GROUNDED PER THE REQUIREMENTS OF NEC ARTICLE 250 & 690.
 - NEC ARTICLE 690.9(A) PV SYSTEM DC CIRCUIT & INVERTER OUTPUT CONDUCTORS & EQUIPMENT SHALL BE PROTECTED AGAINST OVERCURRENT. CIRCUITS CONNECTED TO CURRENT LIMITED SUPPLIES & ALSO CONNECTED TO SOURCES HAVING HIGHER CURRENT AVAILABILITY SHALL BE PROTECTED AT THE HIGHER CURRENT SOURCE CONNECTION.
 - DUE TO THE FACT THAT PV MODULES ARE ENERGIZED WHENEVER THEY ARE EXPOSED TO LIGHT, PV CONTRACTOR SHALL DISABLE THE ARRAY DURING INSTALLATION AND SERVICE BY SHORT CIRCUITING, OPEN CIRCUITING, OR COVERING THE ARRAY WITH AN OPAQUE COVERING.
 - PROVIDE ALL MATERIALS NECESSARY FOR RAPID SHUTDOWN. TIGRO RAPID SHUTDOWN PRODUCTS WILL NEED TO BE USED TO COMPLY WITH NEC ARTICLE 690.12. PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS IN ACCORDANCE WITH 690.12 (A) THROUGH (D).
 - NEC ARTICLE 690.56 (C)(1)(ii) FOR PV SYSTEMS THAT SHUT DOWN THE ARRAY & CONDUCTORS LEAVING THE ARRAY: SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN. TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM & REDUCE SHOCK HAZARD IN ARRAY. THE TITLE "SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN" SHALL UTILIZE CAPITALIZED CHARACTERS WITH A MINIMUM HEIGHT OF 3/4" IN BLACK ON YELLOW BACKGROUND & THE REMAINING CHARACTERS SHALL BE CAPITALIZED WITH A MINIMUM HEIGHT OF 3/8" IN BLACK ON WHITE BACKGROUND.
 - NEC ARTICLE 690.13 (B). EACH PV SYSTEM DISCONNECTING MEANS SHALL PLAINLY INDICATE WHETHER IN THE OPEN (OFF) OR CLOSED (ON) POSITION & BE PERMANENTLY MARKED "PHOTOVOLTAIC DISCONNECT" OR EQUIVALENT. ADDITIONAL MARKINGS SHALL BE PERMITTED BASED UPON THE SPECIFIC SYSTEM CONFIGURATION. FOR PV SYSTEM DISCONNECTING MEANS WHERE THE LINE & LOAD TERMINALS MAY BE ENERGIZED IN THE OPEN POSITION, THE DEVICE SHALL BE MARKED WITH THE FOLLOWING WORDS OR EQUIVALENT "WARNING ELECTRIC SHOCK HAZARD TERMINALS ON THE LINE & LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION". THE WARNING SIGNS OR LABELS SHALL COMPLY WITH 110.21 (B).
 - NEC ARTICLE 690.13 (A) THE PV SYSTEM DISCONNECTING MEANS SHALL BE INSTALLED AT A READILY ACCESSIBLE LOCATION.
 - CONTRACTOR TO PROVIDE GROUND FAULT PROTECTION FOR ROOF MOUNTED PHOTOVOLTAIC ARRAYS IN ACCORDANCE WITH NEC ARTICLE 690.41 (B).
 - PHOTOVOLTAIC SOURCE CURRENTS MUST BE RATED AT BOTH 125% OF THE PARALLEL MODULE AND AT A CONTINUOUS LOAD OF ANOTHER 125% FOR A TOTAL OF 156% OF THE LOAD.
 - PROVIDE PERMANENT PLACARD OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECT MEANS IF THEY ARE NOT IN THE SAME LOCATION. A LABEL SHALL BE PERMANENTLY AFFIXED TO THE MAIN SERVICE DISCONNECT PANEL SERVING ALTERNATING CURRENT (AC) & DIRECT CURRENT (DC) PHOTOVOLTAIC SYSTEMS. THE LABEL SHALL BE RED WITH WHITE CAPITAL LETTERS AT LEAST 3/4" IN HEIGHT & IN A NONSERIF FONT. TO READ: "WARNING: PHOTOVOLTAIC POWER SOURCE". THE MATERIALS USED FOR THE LABEL SHALL BE REFLECTIVE, WEATHER RESISTANT, & SUITABLE FOR THE ENVIRONMENT. 2018 FIRE CODE 11.12.2.1 MAIN SERVICE DISCONNECT MARKING.
 - INSTALLATION OF PV PANEL ARRAYS SHOULD RESIST SLIDING AND POPUP RESULTING FROM SEISMIC EVENTS AND SHOULD COMPLY WITH CBC SECTION 1613 AND ASCE STANDARD 7-05 CHAPTER 13.
 - PV SYSTEM INSTALLER WILL BE RESPONSIBLE FOR FURNISHING AND INSTALLING ALL RELATED EQUIPMENT, CABLES, ADDITIONAL CONDUITS, BOXES, WIREWAYS, AND ALL OTHER ACCESSORIES NECESSARY FOR A COMPLETE AND OPERATIONAL PHOTOVOLTAIC SYSTEM.
 - PV SYSTEM CONTRACTOR SHALL COORDINATE ALL WORK WITH THE ENGINEER, CONSTRUCTION MANAGER, AND OTHER CONTRACTORS TO INSURE THAT PV SYSTEM IS INSTALLED AS SPECIFIED IN THESE DOCUMENTS.
 - NEC ARTICLE 690.11 PHOTOVOLTAIC SYSTEMS OPERATING AT 60 VOLTS DC OR GREATER BETWEEN ANY TWO (2) CONDUCTORS SHALL BE PROTECTED BY A LISTED PV ARC-FAULT CIRCUIT INTERRUPTER OR OTHER SYSTEM COMPONENTS LISTED TO PROVIDE EQUIVALENT PROTECTION. THE SYSTEM SHALL DETECT & INTERRUPT ARCING FAULTS RESULTING FROM A FAILURE IN THE INTENDED CONTINUITY OF A CONDUCTOR, CONNECTION, MODULE, OR OTHER SYSTEM COMPONENT IN THE PV SYSTEM DC CIRCUITS.
 - NEC ARTICLE 690.31 (B) PV SOURCE CIRCUIT & PV OUTPUT CIRCUITS SHALL NOT BE CONTAINED IN THE SAME RACEWAY, CABLE TRAY, CABLE, OUTLET BOX, JUNCTION BOX, OR SIMILAR FITTING AS CONDUCTORS, FEEDERS, BRANCH CIRCUITS OF OTHER NONPV SYSTEMS, OR INVERTER OUTPUT CIRCUITS, UNLESS THE CONDUCTORS OF THE DIFFERENT SYSTEMS ARE SEPARATED BY A PARTITION. PV SYSTEM CIRCUIT CONDUCTORS SHALL BE IDENTIFIED & GROUPED AS REQUIRED BY 690.31 (B)(1) THROUGH (2). THE MEANS OF IDENTIFICATION SHALL BE PERMITTED BY SEPARATE COLOR CODING, MARKING TAPE, TAGGING, OR OTHER APPROVED MEANS.
 - NEC ARTICLE 690.31 (G)(3) THE FOLLOWING WIRING METHODS & ENCLOSURES THAT CONTAIN PV SYSTEM DC CIRCUIT CONDUCTORS SHALL BE MARKED WITH THE WORDING "WARNING: PHOTOVOLTAIC POWER SOURCE" BY MEANS OF PERMANENTLY AFFIXED LABELS OR OTHER APPROVED PERMANENT MARKING: (1) EXPOSED RACEWAYS, CABLE TRAYS, & OTHER WIRING METHODS, (2) COVERS OR ENCLOSURES OF PULL BOXES & JUNCTION BOXES, (3) CONDUIT BODIES IN WHICH ANY OF THE AVAILABLE CONDUIT OPENINGS ARE UNUSED.
 - NEC ARTICLE 690.31 (G)(4) THE LABELS OR MARKINGS SHALL BE VISIBLE AFTER INSTALLATION. THE LABELS SHALL BE REFLECTIVE & ALL LETTERS SHALL BE CAPITALIZED & SHALL BE A MINIMUM HEIGHT OF 3/8" IN WHITE ON A RED BACKGROUND. PV SYSTEM DC CIRCUIT LABELS SHALL APPEAR ON EVERY SECTION OF THE WIRING SYSTEM THAT IS SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILING, FLOORS, SPACING BETWEEN LABELS OR MARKINGS, OR BETWEEN A LABEL & A MARKING. SHALL NOT BE MORE THAN 10' LABELS REQUIRED BY THIS SECTION SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE THEY ARE INSTALLED.
 - ALL CABLES, CONDUCTORS, RACEWAY & FITTINGS INSTALLED OUTDOORS & EXPOSED TO DIRECT SUNLIGHT & WET CONDITIONS MUST BE SUITABLE FOR THESE CONDITIONS. CONDUCTORS INSTALLED INSIDE RACEWAYS INSTALLED IN WET LOCATIONS ARE REQUIRED TO BE IDENTIFIED OR LISTED AS SUITABLE FOR WET LOCATIONS.
 - EVERSOURCE REQUIRES A UTILITY ACCESSIBLE DISCONNECT SWITCH WHICH IS ACCESSIBLE TO COMPANY PERSONNEL AT ALL HOURS OF ALL DAYS & CAN BE OPENED FOR ISOLATION IF REQUIRED. THE DEVICE SHALL HAVE PROPER PLACARDS FOLLOWING NEC SIGNAGE. SIGNAGE MUST BE OF A PERMANENT NATURE. USE UV STABLE MATERIALS & ADHESIVE SUITABLE FOR OUTDOOR ENVIRONMENTAL LIFE CYCLE. THE DISCONNECT SHALL BE GANG OPERATED, HAVE A VISIBLE BREAK WHEN OPEN, BE RATED TO INTERRUPT MAXIMUM DISTRIBUTED ENERGY RESOURCES FACILITY OUTPUT & BE CAPABLE OF BEING LOCKED OPEN.
 - PROVIDE ROOF SAFETY FLAGS FOR ALL LOCATIONS WHERE CONDUIT OR PIPING CROSSES WALKING PATHS. REFER TO SPEC SECTION 290533 FOR MORE INFORMATION REGARDING PRODUCTS. QUANTITY OF MARKERS WILL NEED TO BE VERIFIED IN FIELD DEPENDING ON ROUTING OF CONDUIT.

PV MODULE RATINGS @ STC	
OPEN-CIRCUIT VOLTAGE (Voc):	59.68
OPERATING VOLTAGE (Vmp):	43.30
OPERATING CURRENT (Imp):	13.48
SHORT-CIRCUIT CURRENT (Isc):	14.18
MAXIMUM POWER (Wp):	565
Voc TEMP COEFF (%/°C):	-0.25
INVERTER #1 RATINGS	
MAX DC VOLT RATING (V):	600
MAX POWER @ 40°C (W):	5000
NORMAL AC VOLTAGE (V):	208
MAX AC CURRENT (A):	139.5
MAX OCPD RATING (A):	175
INVERTER #2 RATINGS	
MAX DC VOLT RATING (V):	600
MAX POWER @ 40°C (W):	17300
NORMAL AC VOLTAGE (V):	208
MAX AC CURRENT (A):	48.25
MAX OCPD RATING (A):	70
TOTAL SYSTEM DESIGN	
TOTAL QUANTITY OF PANELS:	337
TOTAL SYSTEM KW (DC):	192.145
TOTAL SYSTEM KW (AC):	167.3
SYSTEM RATIO (DC/AC):	1.18

GENERAL NOTES - ELECTRICAL

- SPECIFICATION SECTIONS, GENERAL CONDITIONS, SUPPLEMENTAL GENERAL CONDITIONS AND DRAWINGS ARE INTEGRAL PARTS OF CONTRACT DOCUMENTS.
- SYSTEM COMPONENTS ARE LOCATED APPROXIMATELY ON DRAWINGS. BASE ACTUAL LOCATIONS ON FIELD VERIFICATION OF EXISTING BUILDING CHARACTERISTICS INCLUDING BUT NOT LIMITED TO STRUCTURAL, MECHANICAL, ELECTRICAL & ARCHITECTURAL COMPONENTS.
- ALL WORK AND ACTION DEPICTED AND DESCRIBED IN CONTRACT DOCUMENTS SHALL BE PERFORMED BY THE CONTRACTOR UNLESS SPECIFICALLY NOTED OTHERWISE.
- REFERENCE TO SPECIFIC SUB-CONTRACTORS SUCH AS "MECHANICAL", "ELECTRICAL", ETC. ARE INTENDED TO SUGGEST POSSIBLE DIVISION OF RESPONSIBILITY. PRIME CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION AND EXECUTION OF ALL WORK.
- OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND INSPECTIONS.
- ALL EQUIPMENT, MATERIALS AND RELATED SYSTEM COMPONENTS SHALL BE NEW UNLESS NOTED OTHERWISE.
- REPAIR AND REPLACE AT NO COST TO OWNER ALL EQUIPMENT AND MATERIALS DAMAGED DURING CONSTRUCTION.
- STUDY THE PROJECT MANUAL & DRAWINGS OF ALL DISCIPLINES.
- ELECTRICAL CONDUITS & BOXES SHALL BE CONCEALED IN WALLS OR ABOVE CEILING WHEREVER POSSIBLE.
- ALL PENETRATIONS THRU RATED WALLS & CEILING SHALL BE SEALED USING U.L. LISTED METHODS APPROPRIATE FOR INDICATED RATING.
- NO PENETRATIONS ARE ALLOWED INTO STAIR ENCLOSURES EXCEPT AS REQUIRED FOR SERVICES UTILIZED IN THE STAIR.
- ALL INSTALLATIONS ON NEW WALLS SHALL BE FULLY RECESSED. INSTALLATIONS ON EXISTING MASONRY WALLS SHALL BE RUN WITH SURFACE RACEWAY PAINTED TO MATCH WALL FINISH AND SURFACE BOXES. INSTALLATIONS ON EXISTING STUD WALLS SHALL CUT IN OLD-WORK STYLE BOXES AND FISH WIRING IN WALL CAVITY.
- INVERTERS & SYSTEM COMPONENTS SHALL BE INSTALLED TO MEET NEC RAPID SHUTDOWN REQUIREMENTS.



KEY PLAN
SCALE: NONE

Project Title:
PHOTOVOLTAIC PROJECT AT:
JULIET LONG SCHOOL
1854 CT-12
GALES FERRY, CONNECTICUT 06335

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Revision:	Description:	Date:	Revised By:
#1	ADDENDUM #1	04/08/2024	MTC

Drawing Title:
PV ROOF PLAN & NOTES
STATE PROJECT 072-0096 RR/PV

Date:
02/02/2024

Drawing Number:
E1

Scale:
AS NOTED

Drawn By:
MTC

Project Number:
22.331