Grand Rapids Public Schools
2025 Roof Replacement Project

1.01 GENERAL PROJECT DESCRIPTION

Ridgemoor Park Montessori School:

A. Ridgemoor Park Montessori School located at 2555 Inverness Road SE in Grand Rapids, MI. Matt Henkey is the Owner's Representative and may be contacted regarding any questions following the pre-bid. The owner's rep contact phone number is 616-916-0847 and email is matth@metaltech.com. **Please do not contact the school directly.**

B. The project consists of removal of the existing roofs and installing a 60-mil Reinforced EPDM Adhered Roofing System with tapered insulation and a Metal Standing Seam Architectural Roof.

Existing Conditions:

Main Flat Roof – EPDM with Tapered Insulation system over Coal Tar Pitch system with a Metal Deck.
Exterior Flat Roofs – Combination of PVC and Modified Bitumen systems over CTP system.
Sloped Roof Sections – Architectural Shingle system (single layer) with singly ply membrane system at eave drain system.

New Roofs:

Main, Exterior, Eave Edge Drain Area Flat Roofs: Tear off and dispose of all existing roofing material down to the deck. Install 2 layers of 2.6" PolyIso insulation to meet R30. Install a tapered insulation system to provide proper drainage to the existing roof drains. All insulation will be mechanically attached to the deck. Install a recovery board system between the insulation and membrane. The roof system shall be 60mil reinforced EPDM membrane that is fully adhered to the recovery board. Provide an alternate (ALT #2) to install new drain covers. Provide an alternate (ALT #3) to install new perimeter trim. The base bid will be to reuse existing perimeter trim and drain covers.

Sloped Roofs (all): Tear off and dispose of all existing roofing material down to the deck. Install and ice and water heat shield over the entire roof to meet current code. Install the pre-finished, pre-fabricated Architectural standing seam roof system. Reinstall all existing perimeter trim. All metal perimeter trim, accessories, fasteners, ventilation, and sealants as part of this section. Provide an alternate (ALT #3) to install new perimeter trim.

C. ALTERNATE #1 – SLOPED ROOFS (all) – Fiberglass-Based Asphalt Shingles

Sloped Roofs (all): Tear off and dispose of all existing roofing material down to the deck. Install new edge metal at exposed edges. Refer to existing design on the building. Install and ice and water shield along eave/rake edges to meet current code. Install synthetic felt over balance of roof. Install a complete shingle system on the sloped roof. Reinstall all existing fake edge "box fascia" trim. Install ventilation at ridge cap(s), refer to existing as needed. Provide an alternate (ALT #3) to provide and install new rake edge "box fascia" trim.

1.02 EXTENT OF WORK

A. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of a Metal Standing Seam Roof and 60-mil Reinforced EPDM Fully Adhered Roofing System, including flashings and insulation as specified herein and in accordance with the manufacturer's most current specifications and details.
B. The roofing contractor shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job site conditions that will affect their work.
C. The roofing contractor shall confirm all given information and advise the building owner's representative, prior to bid, of any conflicts that will affect their cost proposal.
D. Permit will be required by the bidder and all necessary drawings.

1.03 SUBMITTALS

A. Prior to starting work, the roofing contractor must submit the following:
    1. Shop drawings showing layout, details of construction and identification of materials.
    2. Sample of the manufacturer's warranty.
    3. Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.
    4. Certification of the manufacturer's warranty reserve.

B. Upon completion of the installed work, submit copies of the manufacturer's final inspection to the specifier prior to the issuance of the manufacturer's warranty.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the job site in the manufacturer's original, unopened containers or wrappings with the manufacturer's name, brand name and installation instructions intact and legible. Deliver in sufficient quantity to permit work to continue without interruption.

B. Comply with the manufacturer's written instructions for proper material storage. Store materials containing solvents in dry, well-ventilated spaces with proper fire and safety precautions. Keep lids on tight. Use before expiration of their shelf life.

C. Insulation must be on pallets, off the ground, and tightly covered with waterproof materials. Manufacturer's wrap does not provide sufficient waterproofing.

D. Any materials which are found to be damaged shall be removed and replaced at the applicator's expense.

1.05 WORK SEQUENCE

A. Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care should be exercised to provide protection for the interior of the building and to ensure water does not flow beneath any completed sections of the membrane or metal systems.

B. Do not disrupt activities in occupied spaces.

1.06 USE OF THE PREMISES

A. Before beginning work, the roofing contractor must secure approval from the Owner's Representative for the following:

1. Areas permitted for personnel parking.
2. Access to the site.
3. Areas permitted for storage of materials and debris.
4. Areas permitted for the location of cranes, hoists and chutes for loading and unloading materials to and from the roof.
5. Smoking or the use of any tobacco products, drugs, or alcohol is prohibited on site.

B. Interior access may not be used for removing debris or delivering materials. Unless authorized by GRPS.

1.07 EXISTING CONDITIONS

If discrepancies are discovered between the existing conditions and those noted in the bid file, immediately notify the building owner's representative by phone and solicit the

manufacturer's approval prior to commencing with the work. Necessary steps shall be taken to make the building watertight until the discrepancies are resolved.

1.08 PRE-CONSTRUCTION MEETING

A. A pre-bid meeting will be held at Ridgemoor Park Montessori School at 9:00am on July 14th, 2025. Contact the Owner's Representative, Matt Henkey, at 616-916-0847 if there are any questions.

B. Prior to bid submittal, it is the responsibility of the bidding party to have inspected of observed actual conditions and verify all dimensions on the roof. The initial job site inspection will occur on the day of the pre-bid meeting. Should access to the roof be necessary after the pre-bid meeting, the contractor must contact the Owner's Representative, Matt Henkey, to coordinate an appropriate time.

1.09 BID INFORMATION

A. Sealed Bids, in triplicate, are due to the following address by 11:00 am on Monday, July 21st, 2025. A public bid opening at the address below will take place shortly after.

Grand Rapids Public Schools
Attn: Dale Cammenga
900 Union Ave, NE
Grand Rapids, MI 49503

RE: 2025 Roof Replacement Project
Ridgemoor Park Montessori School Roof Replacement Project

B. A 5% bid bond made to Grand Rapids Public Schools shall accompany the bid.

C. Grand Rapids Public Schools Board of Education reserves the right to reject any and all bids, or to waive irregularities as its interest may require.

D. Any conditions which are not shown on the shop drawings should be indicated on a copy of the shop drawing and included with bid submittal if necessary to clarify any conditions not shown.

E. Post bid interviews of the two (2) lowest bidders will immediately follow the bid opening on July 21st, 2025.

1.10 TEMPORARY FACILITIES AND CONTROLS

A. Temporary Utilities:

1. Restroom and electrical service for construction purposes are not available at the site and will not be made available to the roofing contractor.

2. Provide all hoses, valves, and connections for water from source designated by the owner when made available.

3. When available, electrical power should be extended as required from the source. Provide all trailers, connections, and fused disconnects.

B. Temporary Sanitary Facilities:

Sanitary facilities will not be available at the job site. The roofing contractor shall be responsible for the provision and maintenance of portable toilets or their equal.

C. Building Site:

1. The roofing contractor shall use reasonable care and responsibility to protect the building and site against damage. The contractor shall be responsible for the correction of any damage incurred as a result of the performance of the contract.

2. The roofing contractor shall remove all debris from the job site in a timely and legally acceptable manner so as to not detract from the aesthetics or the functions of the building.

3. The roofing contractor is responsible for their own dumpster for the removal of their demolition work and debris.

4. Preform daily clean-up to collect all wrappings, empty containers, paper and other debtris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.

D. Security:

Obey the owner's requirements for personnel identification, inspection, and other security measures.

1.11 JOB SITE PROTECTION

A. The roofing contractor shall adequately protect building, paved areas, service drives, lawn, shrubs, trees, etc. from damage while performing the required work. Provide canvas, boards, and sheet metal (properly secured) as necessary for protection and remove protection material at completion. The contractor shall repair or be responsible for costs to repair all property damaged during the roofing application. The contractor is responsible to protect and ensure that the exposed deck is protected.

B. During the roofing contractor's performance of the work, the building will continue to be occupied at times. The contractor shall take precautions to prevent the spread of dust and debris, particularly where such material may seep into the building. The roofing contractor shall provide labor and materials to construct, maintain, and remove necessary temporary enclosures to prevent dust or debris in the construction area(s) from entering the remainder of the building.

C. Once school starts and construction is in progress a temporary safety fence to protect the entrance/exit doors is required. Also protection of areas below the roof while working in each section to ensure the areas are protected from falling objects.

D. Do not overload any portion of the building, either by use of or placement of equipment, storage of debris, or storage of materials.

E. Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.

F. Take precautions to prevent drains from clogging during the roofing application. Remove debris at the completion of each day's work and clean drains, if required. At completion, test drains to ensure the system is free running and drains are watertight. Remove strainers and plug drains in areas where work is in progress. Install flags or other telltales on plugs. Remove plugs each night and screen drain.

G. Store moisture susceptible materials above ground and protect with waterproof coverings.

H. Remove all traces of piled bulk materials and return the job site to its original condition upon completion of the work.

1.12 SAFETY

The roofing contractor shall be responsible for all means and methods as they relate to safety and shall comply with all school and MIOSHA policies. **Safety shall be the responsibility of the roofing contractor.** All related personnel shall be instructed daily to be mindful of the full-time requirement to maintain a safe environment for the facility's occupants including staff, visitors, customers, and the occurrence of the public on or near the site.

1.13 WORKMANSHIP

A. Applicators installing new roofs, flashing, and related work shall be factory trained and approved by the manufacturer they are representing.

B. All work shall be of highest quality and in strict accordance with the manufacturer's published specifications and to the building owner's satisfaction.

C. There shall always be a supervisor on the job site while work is in progress.

1.14 JOB SITE HOURS/SAFETY

A. This project will have school starting **August 18th, 2025**.

B. Work can take place at any time of the day within the requirements of the City of Grand Rapids until the morning of **August 18th**.

C. Starting the morning of **August 18th, 2025,** school hours are **8:30am to 4:30pm**. Work has to be done outside of school hours starting August 18th, 2025.

D. Base Bid will be to complete work outside of school hours.

ALTERNATE #4 – Work can be performed during school hours with the following rules and requirements:

A. For the work on the flat roofs starting August 18th:
   1. Equipment and material must be loaded onto the roof and brought down outside of school hours.
   2. Heavy machinery **CAN NOT** be used during school hours.
   3. If working near the perimeter of the roof, the area below must be zoned off with safety barriers before work is started.
   4. Roof access ladders must be zoned off with safety barriers.
   5. The area near the main entrance must be completed outside of school hours.
   6. Signage must be used along with safety barriers to prevent pedestrians.

B. For the work on the sloped roofs starting August 18th:
   1. Equipment and material must be loaded onto the roof and brought down outside of school hours.
   2. Heavy machinery **CAN NOT** be used during school hours.
   3. Work must be completed one section at a time with the area below completely zoned off.
   4. Roof access ladders must be zoned off with safety barriers.
   5. The area near the main entrance must be completed outside of school hours.
   6. Signage must be used along with safety barriers to prevent pedestrians.

1.15 QUALITY ASSURANCE

A. The Roofing System must achieve a UL Class A.

B. The specified roofing assembly must have been successfully tested by a qualified testing agency to resist the design uplift pressures calculated according to ANSI/SPRI WD-1 "Wind Design Standard Practice for Roofing Assemblies" American Society of Civil Engineers (ASCE 7-10)

International Building Code (IBC 2015)

C. Unless otherwise noted in this specification, the roofing contractor must strictly comply with the manufacturer's current specifications and details.

D. The bidder must submit proof of the following criteria with their bid to ensure that Grand Rapids Public Schools receives the optimal quality installation. Bidders must have met either the Carlisle or Holcim criteria within the last five years. Failure to provide proof will result in disqualification of bid.

i. **Bidder shall be able to complete the timeline for installation.**
    1. **Project must be fully complete by October 31st, 2025.**
ii. **Bidder shall be a reputable, recognized organization with at least ten (10) years of successful experience in work of this type and scope.**
iii. **Bidder shall have a license as required by local authorities having jurisdiction.**
iv. **Bidder shall have financial resources to complete this work.**
v. **Carlisle Syntec ESP Award / Carlisle Perfection Award.**
vi. **Holcim Elevate Master Contractor Award / Elevate Inner Circle of Quality Award.**
vii. **Minimum of 5 years with manufacturer's license from Carlisle Syntec or Holcim Elevate.**

E. The bidder must fill out the following forms and submit them with the bid:

i. **Familial Disclosure Statement**
ii. **Iran Business Relationship Affidavit**
iii. **Non-Collusive Agreement**
iv. **Debarment and Suspension Certification**

F. Provide an adequate number of experienced laborers regularly engaged in this type of work who are skilled in the application techniques of the materials specified. Provide at least one thoroughly trained and experienced superintendent on the job at all times roofing work is in progress.

G. There shall be no deviations made from this specification or the approved shop drawings without the prior written approval of the specifier. Any deviation from the manufacturer's installation procedures must be supported by a written certification on the manufacturer's letterhead and presented for the specifier's consideration.

1.16 JOB CONDITIONS, CAUTIONS AND WARNINGS

Refer to the manufacturer's specification for General Job Site Considerations.

A. Safety Data Sheets (SDS) must be on location at all times during the transportation, storage and application of materials.

B. When loading materials onto the roof, the Roofing contractor must comply with the requirements of the building owner to prevent overloading and possible disturbance to the building structure.

D. Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.

E. Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.

F. Provide protection, such as 3/4 inch thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.

G. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil, and grease.

H. New roofing shall be complete and weather tight at the end of the work day.

I. Contaminants such as grease, fats, and oils shall not be allowed to come in direct contact with the roofing membrane.

END OF SECTION

SECTION 074100
PREFORMED METAL STANDING SEAM ROOFING

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION

A. Ridgemoor Park Montessori School is located at 2555 Inverness Road SE in Grand Rapids, MI. Matt Henkey is the Owner's Representative and may be contacted regarding any questions following the pre-bid. The contact phone number is 616-916-0847. **Please do not contact the school directly.**

B. The section consists of removal of existing shingles and installing an Architectural standing seam roof as outlined below:

1. Removal of existing shingles on all areas of the sloped roof down to the deck
2. Install ice and water heat shield over entire roof areas.
3. Install the pre-finished, pre-fabricated Architectural standing seam roof system. All accessories, fasteners, ventilation, and sealants as part of this section.
4. The base bid is to reinstall all existing perimeter trim. Provide an alternate price (ALT #3) to provide and install new perimeter trim.

1.02 EXTENT OF WORK

1. This section covers the pre-finished, pre-fabricated Architectural standing seam roof system. All metal trim, accessories, fasteners, and sealants indicated as part of this section.
2. General provisions of the Contract, including general and Supplementary Conditions and General Project Conditions Specifications, apply to this section.
3. Permit will be required by the bidder and all necessary drawings.

1.03 DEFINITIONS

A. Metal Roof Panel Assembly: Metal roof panels, attachment system components, miscellaneous metal framing, thermal, and accessories necessary for a complete weathertight roofing system.
B. References:
    1. American Society for Testing and Materials (ASTM)
        a. ASTM A 653: Steel Sheet, Zinc Coated by the Hot Dip Process
        b. ASTM A 792: Steel Sheet, Aluminum-Zinc Alloy Coated by the Hot Dip Process
        c. ASTM B 209: Aluminum and Aluminum Alloy Sheet and Plate
        d. ASTM B370 Standard Specification for Copper Sheet and Strip for Building Construction
    2. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
        a. SMACNA Architectural Sheet Metal Manual, 1993 edition

3. American Iron and Steel Institute (AISI)
    a. AISI Cold Formed Steel Design Manual
4. Aluminum Association
    a. Aluminum Design Manual
5. Metal Construction Association
    a. Preformed metal Wall Guidelines
6. Code References
    a. ASCE, Minimum Loads for Buildings and Other Structures
    b. BOCA National Building Codes
    c. UBC Uniform Building Code
    d. SBC Standard Building Code

1.04 QUALITY ASSURANCE

A. Petersen Aluminum Corp, Elk Grove Village, IL, 800-323-1960 products establish a minimum of quality required.
B. Manufacturer and erector shall demonstrate experience of a minimum of five (5) years in this type of project.
C. Panels shall be factory-produced only. No portable, installer-owned or installer-rented machines will be permitted.

1.05 SUBSTITUTIONS

A. The material, products and equipment specified in this section establish a standard for required function, dimension, appearance and quality to be met by any proposed substitution.
B. Substitutes will not be allowed. All substitutions can be proposed as alternates or value engineering.

1.06 SYSTEM DESCRIPTION

A. Material to comply with:
    1. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process

1.07 ROOF SYSTEM PERFORMANCE TESTING

A. General Performance: Metal roof panels shall comply with performance requirements without failure due to defective manufacture, fabrication, installation or other defects in construction.
B. Roof System shall be designed to meet Standard Building Code Wind Load requirements.
C. Panels to meet:
    1. Water Penetration: When tested per ASTM E-283/1680 and ASTM E-331/1646 there shall be no uncontrolled water penetration or air infiltration through the panel joints.

2. The Roof System shall be designed to meet a UL Class 90 wind uplift in accordance with UL standard 580 and panel system shall be ASTM 1592 Tested and approved
3. UL 2218 - Impact Resistance rated.

1.08 WARRANTIES

A. Weathertight warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
    1. Warranty Period: 5 Years from date of Substantial Completion
B. Finish warranty: Manufacturer's standard form in which manufacturer agrees to repair finish or replace standing seam metal roof panels that show evidence of deterioration of factory-applied finish within specified warranty period.
    1. Exposed Panels Finish - deterioration includes the following:
        a. Color fading more than 5 hunter units when tested according to ASTM D 2244
        b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214
        c. Cracking, checking, peeling or failure of a paint to adhere to bare metal.
    2. Warranty Period: 20 Years from the date of substantial completion
C. Applicator shall furnish written warranty for a two (2) year period from date of substantial completion of building covering repairs required to maintain roof and flashings in watertight condition.

1.09 SUBMITTALS

A. Furnish detailed drawings showing profile and gauge of exterior sheets, location and type of fasteners, location, gauges, shape and method of attachment of all trim locations and types of sealants, and any other details as may be required for a weather-tight installation.
B. Provide finish samples of all specified colors.
C. Shop drawings: Show fabrication and installation layouts of metal roof panels, metal wall panels or metal soffit panels, details of edge conditions, side-seam joints, panel profiles, corners, anchorages, trim, flashings, closures and accessories, and special details. Distinguish between factory and field-assembled work
D. Coordination Drawings: Roof plans, drawn to scale, on which the following are shown and coordinated with each other, based on input from installer of the items involved:
    1. Roof panels and attachments
    2. Metal trusses, bracings and supports
    3. Roof-mounted items including snow guards and items mounted on roof curbs.

1.10 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer's ordering instruction and lead time requirements to avoid construction delays.

B. Deliver components, sheets, metal roof panels and other manufactured items so as not to be damaged or deformed. Package metal roof panels for protection during transportation and handling.
C. Unload, store and erect metal roof panels in a manner to prevent bending, warping, twisting and surface damage.
D. Stack metal roof panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal roof panels to ensure dryness. Do not store metal roof panels in contact with other materials that might cause staining, denting or other surface damage.
E. Protect strippable protective coating on any metal coated product from exposure to sunlight and high humidity, except to the extent necessary for material installation.

1.11 PROJECT CONDITIONS

A. Weather Limitations: proceed with installation only when existing and forecasted weather conditions permit metal roof panel work to be performed.
B. Field Measurements: Verify actual dimensions of construction contiguous with metal roof panels by field measurements before fabrication.

1.12 COORDINATION

A. Coordinate metal roof panels with rain drainage work, flashing, trim and construction of decks, parapet walls and other adjoining work to provide a leakproof, secure and noncorrosive installation.

PART 2 - PRODUCTS

2.01 PANEL DESIGN

A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips inside laps. Include clips, cleats, pressure plates and accessories required for a weathertight installation.
B. Roof panels shall be Snap Clad standing seam in 16" widths with 1 3/4" high seam.
C. Panels to be produced without Factory supplied hot melt mastic in the seams.
D. Panels to be produced Smooth - Factory Standard.
E. Panels to be one continuous length from eave to peak.
F. Panels to be designed for attachment with concealed fastener clips, spaced as required by the manufacturer to provide for both positive and negative design loads, while allowing for the expansion and contraction of the entire roof system resulting from variations in temperature.
G. Forming: Use continuous end rolling method. No end laps on panels. No portable rollforming machines will be permitted on this project, no installer-owned or installer-rented machines will be permitted. It is the intent of the Architect to provide Factory-Manufactured panel systems only for this project.

2.02 ACCEPTABLE MANUFACTURERS

A. This project is detailed around the roofing product of Petersen Aluminum Corporation Petersen Aluminum Corp, Elk Grove Village, IL, 800-323-1960, Snap Clad.

2.03 MATERIALS AND FINISHES

A. Preformed roofing panels shall be fabricated of 24 GA Steel
B. Color shall be *Standard Pac-Clad Finish as selected by owner.
C. Finish shall be Kynar 500 or Hylar 5000 Fluorocarbon coating with a top side film thickness of 0.70 to 0.90 mil over a 0.25 to 0.3 mil prime coat to provide a total dry film thickness of 0.95 to 1.25 mil, to meet AAMA 621. The bottom side shall be coated with a primer with a dry film thickness of 0.25 mil. Finish shall conform to all tests for adhesions, flexibility and longevity as specified by Kynar 500 or Hylar 5000 finish supplier.
D. If Strippable coating to be applied on the pre-finished panels to the top side to protect the finish during fabrication, shipping and handling, film shall be removed before installation.
E. Trim: Trim shall be fabricated of the same material, gauge, and finish to match the roof, and will be press broken in lengths of 10 to 12 feet. Trim to be erected in overlapped condition. Use lap strips only as indicated by the manufacturer.
F. Closures: use composition or metal profiled closures at the top of each elevation to close ends of the panels. Metal closures to be made in the same material and finish as face sheet.
G. Fasteners: Fasteners shall be of type, material, size, corrosion resistance, holding power and other properties required to fasten miscellaneous framing members to substrates.
H. Substrate shall be Plywood
I. Roofing Underlayment
    1. On all surfaces to be covered with roofing material, furnish and install a 40 mil “Peel & Stick membrane”, required as outlined by metal panel manufacturer. Membrane to be a minimum of 40 mil thickness, smooth, non-granular, high temperature. **Basis of design:** Carlisle WIP 300 HT High Temperature Protection Self Adhering Roofing Underlayment. Other acceptable manufacturers include:
        a. W.R Grace "Ice & Water Shield"
        b. Interwrap Titanium PSU-30
        c. Tamko TW Tile and Metal Underlayment
    2. Underlayment shall be laid in horizontal layers with joints lapped toward the eaves a minimum of 6” and well secured along laps and at ends as necessary to properly hold the felt in place. All underlayment shall be preserved unbroken and whole.
    3. Peel and Stick Underlayment shall lap all hips and ridges at least 12” to form double thickness and shall be lapped 6” over the metal of any valley or built-in gutters and shall be installed as required by the Standing Seam Panel Manufacturer to attain the desired 20 Year Weathertightness Warranty.
J. Sealants

1. Provide two-part polysulfide class B non-sag type for vertical and horizontal joints or
2. one part polysulfide not containing pitch or phenolic extenders or
3. Exterior grade silicone sealant recommended by roofing manufacturer or
4. One-part non-sag, gun grade exterior type polyurethane recommended by the roofing manufacturer.

K. Penetrations
    1. All penetrations are to be flashed with Dektite boots with manufactures recommendations for sealing and attaching.
L. Ventilation
    1. Provide ventilation with manufacturers recommendations.

2.04 FABRICATION

A. Comply with dimensions, profile limitations, gauges and fabrication details shown and if not shown, provide manufacturer's standard product fabrication.
B. Fabricate components of the system in factory, ready for field assembly.
C. Fabricate components and assemble units to comply with fire performance requirements specified.
D. Apply specified finishes in conformance with manufacturer's standard, and according to manufacturer's instructions.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine alignment of structural steel and related supports, primary and secondary roof framing, solid roof sheathing, prior to installation.
B. For the record, prepare a written report, endorsed by installer, listing conditions detrimental to performance of the Work.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 FASTENERS

A. Secure units to supports.
B. Place fasteners as indicated in manufacturer's standards.

3.03 INSTALLATION

A. Panels shall be installed plumb and true in a proper alignment and in relation to the structural framing. The erector must have at least five years successful experience with similar applications.
B. Install metal panels, fasteners, trim, ventilation and related sealants in accordance with the approved shop drawings and as may be required for a weather-tight installation.
C. Remove all strippable coating and provide a dry wipe down cleaning of the panels as they are erected.

3.04 DAMAGED MATERIAL

A. Upon determination of responsibility, repair or replace damaged metal panels and trim to the satisfaction of the Owner.

3.05 DAILY SEAL

A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the workday, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.
B. Complete an acceptable seal in accordance with the manufacturer's requirements.

3.06 CLEAN UP

A. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
B. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

END OF SECTION

SECTION 075323
ETHYLENE-PROPYLENE-DIENE-MONOMER ROOFING

PART 1 – GENERAL

1.01 GENERAL DESCRIPTION

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B. The section consists of demo and installing a 60-mil Reinforced EPDM Adhered Roofing System as outlined below:

1. Removal of existing material on all flat roof and membrane at the eave edge drains down to the deck.
2. Apply the Fully Adhered EPDM Roofing System in conjunction with a recovery board and 2 layers of mechanically attached 2.6" PolyIso to meet R-30, 25 psi, after tear off of the existing roof system(s) to expose the decking for verification of suitable substrate as specified herein. The roofing system shall include tapered saddles as necessary to promote positive drainage, and 8' square drain targets around each drain to promote additional water flow to the drains.
3. The base bid is to reinstall all existing perimeter trims and reuse existing drain covers. Provide an alternate price (ALT #2) to install new drain covers, and an alternate price (ALT #3) to provide and install new perimeter trim.

1.02 EXTENT OF WORK

A. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of a 60-mil Reinforced EPDM Fully Adhered Roofing System, including flashings and tapered insulation as specified herein and in accordance with the manufacturer's most current specifications and details.

B. The roofing contractor shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job site conditions that will affect their work.

C. Permit will be required by the bidder and all necessary drawings.

1.03 SUBMITTALS

A. Prior to starting work, the roofing contractor must submit the following:
   1. Shop drawings showing layout, details of construction and identification of materials.
   2. Sample of the manufacturer's Membrane System Warranty.

3. Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.
4. Certification of the manufacturer's warranty reserve.

B. Upon completion of the installed work, submit copies of the manufacturer's final inspection to the specifier prior to the issuance of the manufacturer's warranty.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the job site in the manufacturer's original, unopened containers or wrappings with the manufacturer's name, brand name and installation instructions intact and legible. Deliver in sufficient quantity to permit work to continue without interruption.

B. Comply with the manufacturer's written instructions for proper material storage.

1. Store materials between 60°F and 80°F in dry areas protected from water and direct sunlight. If exposed to lower temperature, restore to 60°F minimum temperature before using.
2. Store materials containing solvents in dry, well-ventilated spaces with proper fire and safety precautions. Keep lids on tight. Use before expiration of their shelf life.

C. Insulation must be on pallets, off the ground, and tightly covered with waterproof materials. Manufacturer's wrap does not provide sufficient waterproofing.

1.05 QUALITY ASSURANCE

A. The Roofing System must achieve a UL Class A.

B. The specified roofing assembly must have been successfully tested by a qualified testing agency to resist the design uplift pressures calculated according to

ANSI/SPRI WD-1 "Wind Design Standard Practice for Roofing Assemblies"
American Society of Civil Engineers (ASCE 7-10)
International Building Code (IBC 2015)

C. Unless otherwise noted in this specification, the roofing contractor must strictly comply with the manufacturer's current specifications and details.

D. The bidder must submit proof of the following criteria with their bid to ensure that Grand Rapids Public Schools receives the optimal quality installation. Bidders must have met either the Carlisle or Elevate criteria within the last two years. Failure to provide proof will result in disqualification of bid.

i. **Carlisle Syntec ESP Award and the Carlisle Perfection Award**
ii. **Elevate Master Contractor Award and the Elevate Inner Circle of Quality Award**

E. Provide adequate number of experienced laborers regularly engaged in this type of work who are skilled in the application techniques of the materials specified. Provide at least one thoroughly trained and experienced superintendent on the job at all times roofing work is in progress.

F. There shall be no deviations made from this specification or the approved shop drawings without the prior written approval of the specifier. Any deviation from the manufacturer's installation procedures must be supported by a written certification on the manufacturer's letterhead and presented for the specifier's consideration.

G. Upon completion of the installation, the applicator shall arrange for an inspection to be made by a non-sales technical representative of the membrane manufacturer in order to determine whether or not corrective work will be required before the warranty will be issued. Notify the building owner seventy-two (72) hours prior to the manufacturer's final inspection.

1.06 WARRANTY

A. Provide manufacturer's 20-year Roof System Warranty covering both labor and material with no dollar limitation. The maximum wind speed coverage shall be peak gusts of 72mph measured at 10 meters above ground level. Certification is required with bid submittal indicating the manufacturer has reviewed and agreed to such wind coverage.

B. Warranty shall cover leaks caused by "accidental cuts and punctures", if applicable.

C. Pro-rated or Policy-based System Warranties shall not be accepted.

D. Evidence of the manufacturer's warranty.

PART 2 PRODUCTS

2.01 GENERAL

Acceptable Manufacturers:
1. **Carlisle Syntec Systems**
2. **Holcim Elevate**

A. All components of the specified roofing system shall be products from a single manufacturer or accepted by the manufacturer as compatible.

B. Unless otherwise approved by the membrane manufacturer, all products (including insulation, fasteners, fastening plates, and edgings) must be manufactured and supplied by the roofing system manufacturer and covered by the warranty.

2.02 MEMBRANE

Furnish 60-mil White Reinforced EPDM (Ethylene, Propylene, and Diene Terpolymer) in the largest sheet possible. The membrane shall conform to the minimum physical properties of ASTM D751 and shall be manufactured in a single panel with no factory splices to reduce splice intersections.

2.03 INSULATION

A. When applicable, insulation shall be installed in multiple layers. The first and second layer of insulation shall be mechanically fastened or adhered to the substrate in accordance with the manufacturer's published specifications.

B. Insulation shall be Tapered insulation adhered and supplied by Carlisle SynTec or Elevate. Minimum R-value will need to be R-30 to meet the current energy code.

1. **Carlisle HP-H PolyIso**: A foam core insulation board covered on both sides with a medium weight fiber-reinforced felt facer meeting ASTM C 1289-06, Type II, Class 1, Grade 2 (25 psi). The product is available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available.
2. **EcoStorm Substrate Board** – an engineered composite building material made from a proprietary blend of plastic and cellulose fiber sourced from post-industrial and post-consumer waste streams. EcoStorm VSH is a durable, extremely moisture and mold resistant building material with a core that does not disintegrate or delaminate in the presence of water. Available in 1/2" thick and 4' x 8' size board.
3. **Elevate –** Approved equal products to those listed above.

2.04 ADHESIVES, CLEANERS AND SEALANTS

All products shall be furnished by Carlisle or Elevate and specifically formulated for the intended purpose.

A. **Carlisle 90-8-30A Bonding Adhesive:** A high-strength, yellow colored, synthetic rubber adhesive used for bonding Sure-Seal EPDM membranes to various surfaces.

B. **Elevate Bonding Adhesive BA-2004:** A solvent based contact adhesive designed specifically for bonding RubberGard membranes and flashings.

C. **Carlisle Sure-Seal SecurTAPE™:** A 3" or 6" wide (used for Mechanically Fastened Roofing Systems and 20-year Warranty Systems) by 100' long splice tape used for splicing adjoining sections of EPDM membrane. Complies with the South Coast Air Quality Management District Rule 1168.

D. **Elevate QuickSeam Splice Tape:** A 3" or 6" wide tape designed for field splicing of RubberGard EPDM membrane panels and flashing.

E. **Carlisle Sure-Seal HP-250 Primer:** A solvent-based primer used to prepare the surface of EPDM membrane for application of splice tape or pressure-sensitive products. This primer can also be used in conjunction with EP-95 Splicing Cement in lieu of splice cleaner.

F. **Elevate QuickPrime Plus:** A solvent-based primer used to clean and primer RubberGard EPDM membrane prior to application of QuickSeam products where required by Elevate Specifications and Details.

G. **All other applicable accessories must meet the manufacturer's specifications and/or requirements for the 20-year full system warranty.**

2.05 FASTENERS AND PLATES

To be used for mechanical attachment of insulation and to provide additional membrane securement:

A. **Carlisle InsulFast Fasteners:** a threaded #12 fastener with #3 Phillips drive used for insulation attachment into steel or wood decks.

B. **Elevate Heavy Duty Fasteners:** a threaded 0.275" diameter fastener with #3 Phillips drive used for insulation attachment into steel or wood decks.

C. **Carlisle Seam Fastening Plate**: a 2" diameter metal fastening plate used in conjunction with RUSS or EPDM membrane for additional membrane securement.

D. **Elevate Metal Seam Plate:** a 2" diameter metal plate designed to be used with Elevate Reinforced Perimeter Fastening Strips as specified.

E. **Carlisle Insulation Fastening Plates**: a 3" diameter metal plate used for insulation attachment.

F. **Elevate Insulation Fastening Plates:** a 3" diameter metal plate used for insulation attachment.

2.06 METAL EDGING AND MEMBRANE TERMINATIONS

A. **General**: All metal edging shall be tested and meet **ANSI/SPRI ES-1** standards and comply with the International Building Code.

B. **Sheet Metal**: A metal fascia/edge system with a 22g. continuous anchor cleat, a

concealed joint and 24g. Kynar coated steel fascia. Metal fascia color shall be as designated by the Owner's Representative.

C. **Metal Coping**: A coping system with a 22g. anchor cleat, a concealed joint cover and 24g. Kynar coated steel coping cap. Metal coping cap color shall be designated by the Owner's Representative.

D. **Termination/Compression Bar**: A 1" wide extruded aluminum bar pre-punched 6" on center; incorporates a sealant ledge to support necessary sealant and provide increased stability for membrane terminations.

PART 3 EXECUTION

3.01 GENERAL

A. Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, jobsite considerations and weather restrictions.

B. Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.

C. The prepared existing roof surface must be dry, clean, and smooth with no obtrusions or irregularities.

D. Comply with the manufacturer's written instructions and these specifications for all renovations and associated work.

E. Handle materials to prevent damage to building components and project site areas.

F. Flashings shall be installed along with roof systems to ensure weather tight termination.

G. Do not cut any material with a solvent or diluter unless specifically instructed by the manufacturer in writing.

3.02 INSULATION PLACEMENT

A. Install insulation or membrane underlayment over the substrate with boards butted tightly together with no joints or gaps greater than 1/4 inch. Stagger joints both horizontally and vertically if multiple layers are provided.

B. Secure insulation to the substrate with the required mechanical fasteners.

C. Miter and fill the edges of the insulation boards at ridges, valleys, and other changes in plane to prevent open joints or irregular surfaces. Avoid breaking or crushing of the insulation at the corners.

D. Do not install any more insulation than will be completely waterproofed each day.

E. Wood Blocking must be at least 3 ½ inches wide or 1 inch wider that adjacent metal flange. Thickness must equal that of insulation but not less than 1 inch thickness.

3.03 MEMBRANE PLACEMENT AND BONDING

A. Unroll and position membrane without stretching. Allow the membrane to relax for approximately 1/2 hour before bonding. Fold the sheet back onto itself so half the underside of the membrane is exposed.

B. Apply the bonding adhesive in accordance with the manufacturer's published instructions, to both the underside of the membrane and the substrate. Allow the adhesive to dry until it is tacky but will not string or stick to a dry finger touch.

1. Roll the coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded half of the membrane sheet with a soft bristle push broom to achieve maximum contact.

2. Fold back the un-bonded half of the membrane sheet and repeat the bonding procedure.

C. Install adjoining membrane sheets in the same manner, overlapping edges approximately 4 inches. Do not apply bonding adhesive to the splice area.

3.04 MEMBRANE SPLICING WITH 3" TAPE

A. Tape splices must be a minimum of 2-1/2" wide using 3" wide seam tape extending 1/8" minimum to 1/2" maximum beyond the splice edge. (pre-applied tape is also available.) Field splices at roof drains must be located outside the drain sump.

B. Position membrane sheet to allow for required splice overlap. Mark the bottom sheets with an indelible marker approximately 1/4" to 1/2" from the top sheet edge. The pre-marked line on the membrane edge can also be used as a guide for positioning splice tape.

C. Fold the top sheet back and clean the dry splice area (minimum 3" wide).

D. Apply membrane primer to splice area.

E. Apply seam tape in accordance with the manufacturer's specifications and roll the top sheet onto the mating surface.

F. When adhering pre-applied tape, pull the backing from beneath the top sheet and allow the top sheet to fall freely onto the exposed primed surface. Press top sheet on to the bottom sheet using firm, even hand pressure across the splice towards the

splice edge.

G. Immediately roll the splice with positive pressure using a 2” wide steel roller. Roll across the splice edge, not parallel to it.

H. At all field splice intersections, install manufacturer’s T-joint detail.

3.05 FLASHING

A. Wall and curb flashing shall be cured EPDM membrane. Continue the deck membrane as wall flashing where practicable.

B. Follow manufacturer’s typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

3.06 DAILY SEAL

A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the workday, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.

B. Complete an acceptable membrane seal in accordance with the manufacturer’s requirements.

3.07 CLEAN UP

A. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.

B. Prior to the manufacturer’s inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

END OF SECTION

SECTION 073113
ASPHALT SHINGLE ROOFING SYSTEM – ALTERNATE #1

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION

A. Ridgemoor Park Montessori School is located at 2555 Inverness Road SE in Grand Rapids, MI. Matt Henkey is the Owner's Representative and may be contacted regarding any questions following the pre-bid. The contact phone number is 616-916-0847. **Please do not contact the school directly.**
B. The section consists of removal of existing shingles and installing Fiberglass-Based Asphalt Shingles as outlined below:

1. Removal of existing shingles on all areas of the sloped roof down to the deck
2. Install new edge metal at exposed edges and install ice and water shield along eave/rake edges to meet current code.
3. Install ice and water shield over the balance of the roof.
4. Install a complete asphalt shingle roof system.
5. The base bid is to reinstall all existing rake edge "box fascia" trim. Provide an alternate price (ALT #3) to provide and install new rake edge "box fascia" trim.

1.02 EXTENT OF WORK

A. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of the asphalt shingle roof system, as specified herein and in accordance with the manufacturer's most current specifications and details.

B. The roofing contractor shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job site conditions that will affect their work.

C. Permit will be required by the bidder and all necessary drawings

1.03 SUBMITTALS

A. Product Data: Provide manufacturer's printed product information indicating material characteristics, performance criteria, and product limitations.

B. Manufacturer's Installation Instructions: Provide published instructions that indicate preparation required and installation instructions.

C. Certification of Compliance: Provide Certification of Compliance from an independent laboratory indicating that the asphalt fiberglass shingles made in normal production meet or exceed the following:
4. ASTM E 108/UL 790 Class A Fire Resistance.

5. ASTM D 3161/UL 997 Wind Resistance.
6. ASTM D 3462

D. Shop Drawings: Indicate specially configured metal flashing, jointing methods and locations, fastening methods and locations and installation details.

1.04 QUALITY ASSURANCE

A. Installer Minimum Qualifications: Installer should be licensed or otherwise authorized by all federal, state and local authorities to install all products specified in this section. Installer shall perform work in accordance with NRCA Roofing and Waterproofing Manual Work shall be acceptable to the synthetic slate tile manufacturer.

B. Maintain once copy of manufacturer's application instructions on the project site.

C. Verify that the manufacturer’s label contains references to specified ASTM standards.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer’s unopened packaging until ready for installation.

B. Deliver shingles to the site in manufacturer's unopened labeled bundles. Promptly verify quantities and conditions. Immediately removed damaged products from the site.

1.06 PROJECT CONDITIONS

A. Anticipate and observe environmental conditions (temperature, humidity, and moisture) within limits recommended by manufacturers for optimum results. Do not install products under environmental conditions outside manufacturer’s absolute limits.

B. Take special care when applying shingle underlayment and shingles when ambient or wind chill temperatures is 45 degrees Fahrenheit.

1.07 WARRANTY

A. Manufacturer’s Warranty: Furnished shingle manufacturer’s warranty for the product:
   1. Manufacturers Lifetime limited warranty.

B. Provide manufacturer’s 5-year workmanship warranty.

C. Evidence of manufacturer's Warranty

PART 2 – PRODUCTS

2.01 GENERAL

Acceptable Manufacturers:
1. **CertainTeed**
2. **GAF**

A. All components of the specified roofing system shall be products from a single manufacturer or accepted by the manufacturer as compatible.

B. Unless otherwise approved by the manufacturer, all products must be manufactured and supplied by the roofing system manufacturer and covered by the warranty.

2.02 Asphalt Fiberglass Shingles

A. CertainTeed Landmark Pro.
   a. Conforming to ASTM D 3018 Type I.
   b. 80-mph Wind Resistance and UL Class A fire resistance.
   c. Color to be selected by owner.

B. GAF Timberline Ultras:
   a. Conforming to ASTM D 3018 Type I.
   b. 110-mph Wind Resistance and UL Class A fire resistance.
   c. Color to be selected by owner.

2.03 SHEET MATERIAL

A. Eaves Protection: Manufacturer's approved sheet barrier of self-adhering rubberized asphalt membrane shingle underlayment having internal reinforcement and "split" back plastic release film; provide warranty equal in duration to that of shingles being applied. Install manufacturers recommended ice and water shield along eave/rake edges.

B. Underlayment: Install manufacturers recommended Ice and Water shield for use on wood decks as a water-resistance layer beneath asphalt shingles.

2.04 FLASHING MATERIAL

A. Sheet Flashing: ASTM A 361/A361M; 26 Gauge (0.45mm) steel with minimum G115/Z350 galvanized coating

B. Sheet Flashing: ASTM B 209; 0.025 (0.63mm) thick aluminum, mill finish.

C. Sheet Flashing: ASTM B 370; cold rolled copper; 16 ounces per square foot (0.55mm), natural finish.

D. Bituminous Paint: Acid and alkali resistant type; black color.

E. Tinner's Paint: Color to be selected by owner to coordinate with shingle color.

2.05 ACCESSORIES

A. Nails: Standard round wire type roofing nails, corrosion resistant, hot dipped zinc coated steel, aluminum or chromated steel; minimum 3.8 inch (9.5mm) head diameter; minimum 11- or 12-gauge (2.5mm) shank diameter; shake to be sufficient in length to penetrate through roof sheathing or ¾ inch (19mm) into solid wood, plywood or non-veneer wood decking.

B. Asphalt Roofing Cement: ASTM D 4586, type I or II.

2.06 FLASHING FABRICATION

A. Form flashing to profiles indicated on roof and to protect roofing material from physical damage and shed water.

B. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

PART 3 – EXECUATION

3.01 EXAMINATION

A. Verify that roof penetrations and stacks are in place and flashed to the deck surface

B. Verify deck surfaces are dry and free of ridges, wraps, or voids

3.02 ROOF DECK PREPARATION

A. Follow manufacturer's instructions for preparation for the deck

B. Broom clean deck surfaces under eave protection and underlayment prior to their application.

3.03 INSTALLATION – EAVE/RAKE ICE DAM PROTECTION

A. Place edge metal at all exposed edges with flashing tight with fascia boards. Weather lap joints 2 inches (50mm). Secure flange with nails spaced 8 inches (200mm) on center.

B. Apply manufacturers ice and water shield shingle underlayment at all exposed edged for protection in accordance with manufacturers' recommendation.

C. Extend edge protection membrane minimum 48 inches (1280mm) up slope beyond interior face or exterior wall.

3.04 INSTALLATION – PROTECTIVE UNDERLAYMENT

A. Eaves Protection: Install perimeter protected based on manufacturers recommendations.

B. Underlayment: Install manufactures recommended ice and water shield reinforced underlayment based on manufacturers' recommendations for installation based on the slope of the roof.

3.05 INSTALLATION – METAL FLASHING

A. Weather-lap joints at a minimum of 2 inches (50mm).

B. Seal work projecting through or mounting on roof with asphalt roofing cement and make weather tight.

3.06 INSTALLATION – ASPHALT SHINGLES

A. Install shingles in accordance with manufacturer's instructions for product type and application shield.

3.07 INSTALLATION – ROOF VENTILATION

A. Install ridge vents in accordance with manufacturer's instructions for product type and application shield

3.08 PROTECTION OF FINISHED WORK

A. Do not permit traffic over finished roof surface.

3.09 DAILY SEAL

A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the workday, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.

B. Complete an acceptable membrane seal in accordance with the manufacturer's requirements.

3.10 CLEAN UP

A. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.

B. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

END OF SECTION

END OF SPECIFICATION