Appendix A – ALTERNATE #1 – CAPTAIN (Section F)

PART 1 - GENERAL

1.01 SCOPE OF WORK – CAPTAIN ELEMENTARY (SECTION F)

A. Remove existing roof system down to the existing structural metal deck. Structural metal deck shall be cleaned of all debris. Installation of NEW SA vapor barrier to primed metal deck ensuring all perimeters and penetrations are sealed. Furnish and install a base layer of 1.5" polyisocyanurate insulation mechanically fastened with 1-90 fastening pattern with a minimum of 16 (WHITE) fasteners per board. Install a layer of 1/8" per foot tapered polyisocyanurate board insulation, fully adhered with low rise foam adhesive. Install one layer of ½" High Density polyisocyanurate insulation to tapered layer of insulation with low rise foam adhesive. The new roof system shall consist of a heat welded Single-Ply, Thermo-Plastic, fully adhered PVC membrane system, separate piece PVC membrane flashing installation and allied metal component installation. Installation of new 24 ga. counter flashings. Installation of new drain flashings and related components.

B. Work includes:
   1. Removal and replacement of existing roof membrane, membrane flashing and allied components down to the metal deck system. Removal of all drain components with the exception of fixed drain bowls. Replace any missing or broken roof drain components with new metal components.
   2. Removal and replacement of all metal roof edge/fascia systems on all sections.
   3. Installation of the following in accordance with FM 1-90 requirements:
      a. Installation of NEW SA vapor barrier to primed metal deck as required.
      b. Install one layer of 1.5" polyisocyanurate board insulation, mechanically fastened to metal deck. (Minimum 16 fasteners per 4x8.
      c. Install 1/8" per foot taper insulation to base layer of 1.5" polyisocyanurate with low rise foam.
      d. Install a layer ½" HD polyisocyanurate board adhered with low rise foam adhesive to tapered layer of polyisocyanurate, off set all layers 12" minimum.
      e. 24 ga. metal counter flashing around perimeter.
      f. 24 ga. Kynar coated metal coping at expansion joints. All metal coping section joints drive cleats of the same thickness metal.
      g. 22 ga. Kynar coated metal slide/counter flashing at expansion joints.
      h. PVC flashing boots on soil stack projections.
      i. Protection pads around all unit curbs requiring maintenance, (anything with a motor).
      j. Replacement of pitch pans with preformed flashing wherever possible.
      k. 1/2 inch per foot tapered crickets behind rectangular curbs and skylights, adhered with low rise foam adhesive.
      l. Pre-manufactured six (6) inch "feather edge" at cricket/saddle down slope terminations.

C. Installation of:
   1. Roof Membrane
      Description: .060" PVC membrane
   2. PVC Flashing Membrane (Separate membrane from roof membrane)
      Description: .060" PVC membrane
   3. PVC Bonding Adhesive

Description: Solvent-based, formulated for compatibility with the THERMO-PLASTIC membrane and a wide variety of substrate materials, including masonry, wood, insulation facings.

4. Heat weld at laps.

1.02 QUALITY CONTROL

A. Roofing contractor shall:
   1. Be experienced in all specified work required to successfully complete this project.
      a. Four (4) years minimum.
      b. Be acceptable by Clayton School District. Manufacturer and Consultant.
   2. Provide qualified supervisory personnel at job site during entire project.

B. Project meetings:
   1. Pre-construction conference.
   2. Pre-job conference:
      Will be scheduled by Consultant within ten (10) days after notice of award.
      a. Attendance:
         1) Clayton School District. Representative
         2) Project foreman.
         3) Consultant Project Manager.
      b. Agenda:
         1) Submittal of project completion schedule.
         2) Submittal of insurance certificates.
         3) Submittal of executed bonds and insurance certificates.
         4) Per standard contract provisions
         5) Execution of Clayton School District. - Contractor Agreement.
         6) Contract documents distributed during invitation to Bid.
         7) Review and approve submittals for project.
         8) Review Safety Manual.
         9) Submittal of list of subcontractors, material submittals, and progress schedule.
         10) Designation of responsible personnel.
         11) Walkover inspection.

C. Final inspection:
   1. Will be scheduled by Clayton School District Representative /Consultant upon job completion.
   2. Attendance:
      a. Clayton School District Representative
      b. Consultant
      c. Project Foreman
   3. Minimum agenda:
      a. Walkover inspection.
      b. Identification of problems which may impede issuance of warranty.
      c. Identification of problems which may be unacceptable to Clayton School District and/or Consultant.

D. Regulatory requirements:
   1. ASTM E108, Class "A".
   2. UL 790, Class "A".
   3. FM 1-60.
   4. FM 1-90 at perimeter metal edge attachment, installed as per FM Loss Prevention Data 1-49.

E. Plans and specifications:
   1. Contractor must notify Consultant of any omissions, contradictions or conflicts five (5) days before bid date. Consultant will provide necessary corrections or additions to plans and specifications by addendum. If he does not so notify Clayton School District and Consultant of any such condition, it will be assumed he has included the necessary items in his bid to complete this specification.

F. It is the intent that this be a completed project as far as the contract documents set forth. It is not the intent that different phases of work on this project be delegated to various trades and subcontractors by the contract documents. Contractor must make his own contracts with various subcontractors, setting forth the work these subcontractors will be held responsible for. Contractor alone will be held responsible by the Clayton School District for the completed project.
   1. If the contractor feels a conflict exists between what is considered good roofing practice and these specifications, he shall state in writing all objections prior to submitting quotations.
   2. It is the contractor's responsibility during the course of the work, to bring to the attention of the Clayton School District Representative any defective membrane, insulation or deck discovered where not previously identified.

1.03 SUBMITTALS

A. Submit at Pre-Job Conference:
   1. Product data:
      a. Product data sheets.
      b. Material safety data sheets.
      c. Shop drawings or samples of metal flashings, showing exact profile, lengths, joints, terminations, and methods of attachment.
   2. Gantt (or equal) progress chart to project completion, identifying all segments of work, with appropriate timetables.
   3. Do not order project materials or start work before receiving contract/purchase order for this project work.

1.04 DELIVERY, STORAGE AND HANDLING

A. Delivery of materials:
   1. Deliver materials to job-site in new, dry, unopened, and well-marked containers showing product and manufacturer's name.
   2. Deliver materials in sufficient quantity to allow continuity of work.
   3. Coordinate delivery with Clayton School District Representative.

B. Storage of materials:
   1. Store cut roll goods on ends only. Discard rolls that have been flattened, creased, or otherwise damaged. Place materials on pallets. Do not stack pallets.
   2. Stack insulation on pallets.
   3. Store materials marked "keep from freezing" in areas where temperatures will remain above 40^0F.
   4. Neatly stack wood on dunnage.
   5. Remove plastic packaging shrouds. Cover top and sides of all stored materials with canvas or plastic reinforced tarpaulin (not polyethylene). Secure tarpaulin.
   6. Rooftop storage: Disperse material to avoid concentrated loading.
   7. Cover top and sides of all exterior stored materials with canvas tarpaulin (not polyethylene). Secure tarpaulin.

8. No materials may be stored in open or in contact with ground or roof surface.
9. Should Contractor be required to quickly cover material temporarily, such as during an unanticipated rain shower, all materials shall be stored on a raised platform covered with secured canvas tarpaulin **(not polyethylene),** top to bottom.
10. Contractor shall assume full responsibility for the protection and safekeeping of products stored on premises.

C. Material handling:
1. Handle materials to avoid bending, tearing, or other damage during transportation and installation.
2. Material handling equipment shall be selected and operated so as not to damage existing construction or applied roofing. Do not operate or situate material handling equipment in locations that will hinder smooth flow of vehicular or pedestrian traffic.

1.05 SITE CONDITIONS

A. Field measurements and material quantities:
1. **Applicator shall have SOLE responsibility for accuracy of all measurements, estimates of material quantities and sizes, and site conditions that will affect work.**

B. Existing conditions:
1. Building space directly under roof area covered by this specification will be utilized by on-going operations. Do not interrupt Clayton School District operations unless written approval is received from Clayton School District Representative.
2. Access to roof shall be from exterior or preapproved access area. No roofing employees will be allowed within building unless otherwise stated at preconstruction meeting, except for interior protection and cleanup of roofing and roofer related debris.
3. Exhaust units and other equipment shall be moved and/or raised as required to install roofing materials complete and in accordance with plans and specifications. When units and equipment are to be moved, they shall be carefully disconnected and moved to a protected area so as not to damage any part or component the roof and shall be reconnected in such a way that they are restored to a prior operating condition. All work is the responsibility of the Contractor and is to be coordinated and approved by Clayton School District Representative before proceeding.
4. All disconnection and re-connection shall be performed by a mechanical and/or electrical company licensed to perform such work and shall be the responsibility of the Contractor.
5. Appropriate measures shall be taken to prevent vapors, gases or odors from entering the building during roof removal, replacement or repair.
6. Abandoned equipment, sheet metal, curbs, debris shall be removed by the Contractor on a daily basis.

C. Environmental requirements:
1. Do not work in rain, snow, or in presence of water.
2. **Do not work in temperatures below 40° F.**
3. Do not install materials marked "keep from freezing" when daily temperatures are scheduled to fall below 40° F.
4. Do not perform masonry work below 35° F. Make proper provisions to protect work from freezing 48 hours after installation if work is performed between 35° F. and 45° F.
5. Remove any work exposed to freezing.

D. Safety requirements:
   1. Fall protection measures shall be incorporated into this roof project, as found in the Code of Federal Regulations 29 - Part 1926, Subpart M - Fall Protection, effective February 6, 1995.
   2. All application, material handling, and associated equipment shall conform to and be operated in conformance with OSHA safety requirements.
   3. Comply with federal, state, local and Clayton School District fire and safety requirements.
   4. Advise Clayton School District Representative whenever work is expected to be hazardous to Clayton School District employees and/or operators.
   5. Maintain a crewman as a floor area guard whenever roof decking is being repaired or replaced.
   6. Maintain fire extinguisher within easy access whenever power tools, hot air welders are being used.
   7. Advise Clayton School District Representative when volatile materials are to be used near air ventilation intakes so that they can be shut down or blocked.
   8. Do not work after dark.

E. Security Requirements:
   1. Comply with Clayton School District security requirements.
   2. Provide Clayton School District Representative with current list of accredited persons scheduled to work on the project.
   3. Require identification be displayed by all persons employed by Contractor while physically working on this project at all times while on Clayton School District property.

F. Temporary sanitary facilities:
   1. Furnish, install, and maintain temporary sanitary facilities for employee use during project. Remove on project completion.
   2. Place portable toilets in conformance with applicable laws, codes, and regulations.

1.06 CONSTRUCTION PROJECT SAFETY

A. GENERAL
   1. Description:
      a. Work Included:
         To assure the work site environment is safe for the employees of all contracts, subcontract inspectors, and building occupants. This section has been written to identify and underline the importance of safe working conditions. If any conflict should arise over a specific provision or rule, the laws and rules governing that specific location shall be followed.
   2. Related Work:
      a. Additional safety items may be found in the individual technical sections.
   3. Standards:
      a. Occupational Safety and Health Act of 1970.
      b. 29 CFR - Part 1926, Subpart M - Fall Protection.
      c. State, County, and City requirements, as applicable.
   4. Quality Assurance:
      a. Contractor shall have sole responsibility in seeing that the job site is safe, whether or not the Clayton School District Representative or Consultant is present on the project. Contractor shall appoint a "competent person" to be present on the project who will have authority to make decisions regarding safety and health issues on the Contractor's behalf.

5. Submittals:
   a. Contractor shall submit Material Safety Data Sheets for materials to be used on the project.

B. PRODUCTS
1. Materials and Equipment:
   a. General: Contractor shall supply all necessary material and equipment required to complete the work in a manner consistent with a safe work site, and as required by regulatory agencies.
   b. All equipment used on the project shall be in a safe operating condition and be maintained in a safe condition for the project duration. Equipment found to be unsafe or in disrepair will be repaired and made safe, or will be removed from the job site, and replaced if necessary, at no cost to the Clayton School District.
   c. Disposal of any solvents, containers, and other regulated materials shall meet all applicable laws.

C. EXECUTION
1. General: The safety requirements listed here are by design broad in nature. The Contractor will augment as necessary the information contained in this section with more specific information from OSHA and roofing industry requirements.
2. Contractor Employee Training:
   a. Contractor will provide adequate training for employees to ensure their safety and the safety of others on the project site. Provide instruction in the proper operation of power tools, hoisting equipment and other pieces of equipment employees will be required to use in the completion of the work.
   b. One (1) employee per job crew is required to have received Red Cross Training.
   c. Ensure each worker is aware of job and site specific hazards, and the safety precautions appropriate to each.
   d. Contractors shall present a safety and loss prevention orientation program to each new employee before that employee starts work.
   e. Contractors and subcontractors shall inform their employees of all safety and health rules pertaining to their particular job.
   f. Contractors and subcontractors shall inform their employees of location and use of safety devices such as first aid kits, phones, fire extinguishers, etc.
   g. Contractors shall implement a regular system of work inspection to detect and correct hazardous conditions, safety rule violations and unsafe working practices.
3. Accident Reporting:
   a. The proper reporting and investigating of accidents is necessary for all contractors and subcontractors. An accident report and investigation shall be immediately made out by the foreman in charge, reviewed and approved by the contractor. Contractor shall provide to the Clayton School District a copy of the Completed Accident Report, Employer's First Report of Injury or Illness or such other similar reports required by federal, state, county and municipal or local safety laws. All record keeping requirements will be in accordance with OSHA.
4. First Aid:
   a. Contractors and subcontractors shall be responsible for providing first aid and medical treatment for their employees. The name, address and telephone number of contractor's and subcontractor's doctors, hospital and ambulance services shall be conspicuously posted, as required by law.

b. An OSHA approved first aid kit will be located at all times on the job. It shall be conspicuously located and readily accessible at all times. The unit shall be of an appropriate size for the roofing crew.

5. Individual Conduct and Safety:
   a. Contractor's and subcontractor's employees shall be made aware of and comply with the following rules which will be in effect on all job sites.
   b. Alcoholic beverages and illegal drugs will not be permitted. Employees entering job site under the influence or in possession of alcohol or drugs shall be subject to removal from the job site. The carrying of firearms and all other weapons is prohibited. Fighting, gambling, stealing, soliciting and horseplay will not be tolerated. Abusive language or disrespectful behavior in public areas will not be tolerated. **No Smoking.**
6. Employees shall be made aware of any job site alarm, code signal, appropriate responses, and the requirements for actions that will be needed to be taken.
7. Protective Equipment and Clothing:
   a. The contractor shall furnish and require the use and wearing of proper protective devices and personal protective equipment by its employees.
   b. Approved eye and face protection should be worn when warranted by the exposure. Safety glasses are required in all circumstances where there is an exposure to flying particles. Side shields offer additional protection. Plastic face shields should be worn for guarding against flying particles and spraying liquids or corrosives.
   c. Appropriate clothing and eye protection shall be worn when working with chipping or tear off equipment.
   d. Hard hats must be worn at all times whenever there is a possibility of head injury from impact, flying or falling objects.
8. Housekeeping:
   a. The contractor or subcontractor shall maintain good housekeeping standards at all times as an integral part of his work. **Daily cleanup of work, lay-up, and personnel areas is required, and must be performed.**
   b. **Daily cleanup** of any roofing and/or roofer related debris to the interior of the building is required.
   c. Materials shall be piled so that safe clearances are maintained and topping or movement is prevented. Loose materials on the roof must be secured so that they cannot be blown or bumped off.
   d. Accumulation of material that may create a fire hazard is not permitted. Never store excessive amounts of material in one place to overweigh the roof.
   e. **Roof areas are to be "watertight at night" at all times during the job. Contractors or subcontractors failure to do so can be grounds for dismissal.**
      1) Roofing Contractor will be held liable for any and all damage to occupied areas and its contents resulting from his work or negligence.
      2) Roofing Contractor is required to respond within two (2) hours for any leak occurring to the interior. The leak will be repaired or measures taken to insure that operations are not interrupted until the leak can be repaired and clean-up is affected inside the building.
9. Signs and Barricades:
   a. When it is necessary to barricade an area for overhead work, to protect personnel from hazardous operations, or to move equipment or cranes, barricades are to be provided by the contractor or subcontractor. Barricades must be erected before the work requiring them begins. If the barricades are in a roadway or walkway, blinking lights must be used after dark. When the work is completed, the barricades must be removed from the job site.

b. Contractors or subcontractors are forbidden to remove posted signs. All barricades must be scheduled and approved by Clayton School District Representative before erection.
c. A warning line system, as described in 29 CFR 1926 Guarding of Low-Pitched Roof Perimeters, for protection of employees will be erected by contractors or subcontractors on roofs with pitch less than 4:12 with roof height of more than 16 feet and width of 50 feet or more. The warning line will consist of rope, wire or similar material, flagged with highly visible material at 6 foot intervals which must be installed 42 to 45 inches above the roof and be able to take 16 pounds of pressure against the rope before falling over.
d. Inspect all rigging equipment prior to use (chains, ropes, slings, shackles, etc.)
e. Ground fault detectors or an assured equipment guarding conductor program are to be used on all job sites as required by Law, Section 1926-400 (h), (1), (2), an (3).

10. Ladders:
    a. Contractors and subcontractors shall provide good ladders on the job. Ladders with split or cracked side rails and damaged rungs will be removed. They should be tagged "out of service" until they are fixed. Ladders in doorways, walkways or other congested areas must be barricaded or guarded.
    b. Ladders should be of adequate length and must extend at least three feet above the upper landing.
    c. Place straight ladders on solid, level footings with the foot of the ladder in a minimum distance from the wall equal to one fourth the length of the ladder from the resting point.
    d. Straight ladders shall have non-skid feet and be securely tied off.
    e. Face the ladder and use both hands going up or down.
    f. Do not climb or descend ladders with tools, equipment or material in your hands.
    g. Metal ladders must not be used near, or for electrical service.
11. Fire Protection:
    a. Fire extinguishers must be located at all times on the job site. A fire extinguisher rated not less than 2A shall be provided for each 3,000 sq. ft. of the roof area under construction. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 75 feet.
    b. Extinguishers that are in poor condition, not an appropriate size, or have been discharged will be required to be replaced.
    c. **Smoking is prohibited on the entire Clayton School District Campus**. **If caught smoking you will be asked to leave the job site immediately**.
    d. All flammable liquids will be required to be stored in approved safe containers. Contents will be described and marked flammable.
    e. Storage in excess of 10 gallons of flammable liquids on the roof will not be permitted.
    f. When using flammable liquids to clean, dispose of the rags in OSHA approved containers, or they should be removed from the roof daily to prevent possible spontaneous combustion.
    g. Never store bulk flammable material or liquids closer than 25 feet from open flames or other source of ignition.
12. Crane and Hoist:
    a. Contractor shall comply with the manufacturer's specifications and limitations. Rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be conspicuously visible from the operator's station.
    b. Accessible areas within the swing radius of the rear of the rotating superstructure shall be properly barricaded to prevent the public or employees from being struck or crushed by the crane.
    c. All crawler or truck cranes in use shall meet the requirements as prescribed in the ANSI B30-5-1968 Safety Code for Crawler and Truck Cranes.

1.07 SUBSTITUTIONS

A. When a particular make or trade name is specified, it shall be indicative of standard required. Bidders proposing substitutes shall submit following five (5) days prior to bid date to Clayton School District and RMT Inc.:
   1. Written application with explanation of why it should be considered.
   2. Accredited testing laboratory certificate comparing substitute's physical/performance attributes to those specified.
   3. Three (3) job references available for inspection within fifty (50) miles of Clayton School District where substitutes were used under similar conditions.
   4. Only substitutes approved in writing by Clayton School District prior to scheduled bid date will be considered.

B. Notification of approvals will be mailed at least three (3) days before bid opening.

C. Clayton School District reserves right to be final authority on acceptance or rejection of any substitute.

1.08 PAYMENT SECURITY

A. Payment and Performance Bond:
   1. Clayton School District will require the successful Contractors to furnish and pay for a Performance Bond and a Labor and Material Bond, each in an amount equal to and not less than 100% of the Contract Sum. Cost of Bonds shall be included in the Bidder's Base Bid.
   2. The bonds are to be executed by any acceptable surety company or companies, acceptable to Clayton School District, authorized to execute such in the State of Missouri written in favor of Clayton School District.

B. Progress payments:
   1. Contractor shall establish with Clayton School District and RMT Inc., procedure for payment and retainages prior to commencement of work on this project.
   2. All pay requests shall be through the offices of RMT Inc.
   3. Partial or progress payments shall not relieve contractor of performance obligations under this contract, nor shall such payments be viewed as approval or acceptance of work performed.
   4. Final payment shall be withheld until all provisions of the specifications are met.

1.09 UNIT PRICES

A. Quote unit prices on:
   1. As identified on Proposal Form.

1.10 WARRANTY/GUARANTEE

A. Guarantee:
   1. Upon project completion, Consultant and Clayton School District. Representative acceptance, and before final payment can be made, Contractor shall:
      Shall submit signed written guarantee for the installation of roofing and flashing to be watertight for a period of two (2) years from the date of completion of the roof replacement project. The Contractor shall make all repairs during this two (2) year period to maintain the roof watertight and in conformance with these Specifications without additional cost to the

Clayton School District.

1) All blisters, bubbles, open laps, wrinkling of membrane roofing and flashings, and other defects shall be repaired by the Contractor at his own expense.
2) If, within 24 hours after notification of roof leakage, the Contractor has not responded, Clayton School District. Representative shall have the right, without invalidating this guarantee, to make any temporary repairs that are required in order to protect the building and the contents of the building from damage due to the roof leaking.

B. Warranty:
1. Upon project completion, Consultant and Clayton School District acceptance, and before final payment can be made, Contractor shall deliver to Clayton School District a twenty (20) year Manufacturer's Roofing System Warranty against leaks as a result of workmanship and/or materials.

PART 2 - PRODUCTS

2.01 GENERAL

A. Comply with quality control, references, specifications, and manufacturer's data.

2.02 ACCEPTABLE MANUFACTURER

A. Versico

B. Sika/Sarnafil

C. Carlisle

2.03 ROOF DECKING

A. Metal roof deck:
1. 22 ga. minimum, rib depth, rib configuration - match existing; **three (3) span minimum**; lapped and stitched joints; mechanically fastened to existing structural purlins.
2. Sheet steel: ASTM A 611-85, Grade C structural quality with factory applied prime coat.
3. Butt and finish strips: Twenty (20) ga. sheet steel.
4. Acceptable manufacturers:
   a. Wheeling Corrugating Co., Division Wheeling-Pittsburgh Steel Corp., Wheeling WV.
   b. Consolidated Systems, Inc., Columbia, SC.
   c. Roll Form Products, Inc., Boston, MA.
   d. Roof Deck, Inc., Hightstown, NJ.
   e. United Steel Deck, Inc., Summit NJ.
   f. Verco Manufacturing Co., Phoenix, AZ.
   g. Vulcraft Division, Nucor Corp., Charlotte, NC.

2.04 INSULATION

A. High density polyisocyanurate cover board: Closed cell polyisocyanurate foam with coated glass matt facer laminated to both faces, complying with the following additional characteristics:
1. Thickness: 0.5 inches.
2. Size: 48 inches by 48 inches, nominal.

3. R-Value (LTTR):
   a. 0.5 inches, R-Value: 2.5, minimum.
4. Compressive Strength: 100 psi.
5. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
6. Recycled Content: 8.3 percent post-industrial, average.

B. Polyisocyanurate board insulation: Closed cell polyisocyanurate foam with black glass reinforced mat laminated to faces, complying with the following additional characteristics:
1. Thickness: 2.0" true thickness.
2. Size: 48 inches by 96", nominal.
   a. **Exception:** Insulation to be attached using adhesive may be no larger than 48" by 48", nominal.
3. R-Value (LTTR):
   a. 1.0 inch Thickness: 5.56, minimum.
4. Compressive Strength: 20 psi when tested in accordance with ASTM C 1289.
5. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
6. Recycled Content: 19 percent post-consumer and 15 percent post-industrial, average.
7. Acceptable Product: ISO 95+ GL Polyisocyanurate Insulation by Firestone or approved equal.
   a. Must be a true 2.0 inches thick.

C. Tapered polyisocyanurate insulation boards:
1. FS HH-I-1972/2(1), Class 1; polyisocyanurate insulation.
2. Slope per running foot: 1/8 inch.
3. Compressive strength: 20 psi
4. Flame spread: <25.

D. Tapered polyisocyanurate insulation board for crickets/saddles:
1. FS HH-I-1972/2(1), Class 1; polyisocyanurate insulation.
2. Slope per running foot: 1/2 inch.
3. Minimum thickness: 1/2 inch.
4. Compressive strength: 20 psi
5. Flame spread: <25.

E. Insulation adhesive to base ply and substrate layer insulation:
1. Low rise foam adhesive
2. ¾" thick beads
3. 6" wide bead spacing in the roof field
4. 4" wide bead spacing at perimeter and corners

2.05 MECHANICAL FASTENERS

A. Wood to wood:
1. Galvanized, common, annular ring nail.
2. Length: Sufficient to penetrate underlay blocking 1-1/4".

B. Insulation to steel deck:
1. Firestone All Purpose Fasteners, insulation plate
2. Insul-Fixx #12, metal plate by Fabco RIF, Elyria, OH.
3. Permaseal, **(WHITE**) coated No. 12 PH deck screw by Powers Rawl.
4. Olympic Fastener #12-10, metal plate by Olympic Manufacturing Group, Agawam, MA.
5. Permaseal, coated No. 12 PH deck screw by Powers Rawl.

C. Wood to metal:
   1. 10-24, flat head TEKS/4 by Buildex Div. of ITW, Itasca, IL

D. One (1) inch cap nails:
   1. Type: Spiral or annular ring shank, twelve (12) ga. minimum, with integral one (1) inch cap.
   2. Acceptable manufacturers:
      a. Hillwood Manufacturing Co., Cleveland, OH.
      b. Hoffler Wire Products Co., Inc., Nevada City, CA.
      c. Independent Nail, Inc., Bridgewater, MA.
      d. W. H. Maze Co., Peru, IL.
      e. National Nail Corp., Grand Rapids, MI.
      f. Simplex Nails, Inc., Americus, GA.

E. Sheet metal to wood blocking:
   1. FS FF-N-105B(3) Type II, Style 20, roofing nails; 6061-T913 alloy wire, flat head, diamond point, round, barbed shank.
   2. Length: Sufficient to penetrate wood blocking 1-1/4 inches minimum.

F. Termination bar to concrete/brick:
   1. Olympic Lead Masonry Anchors
   2. Length: Sufficient to provide 1-1/4 inch embedment minimum.

G. Termination bar to sheet metal:
   1. Fab-Lok FAC 10-8 stainless steel screw, aluminum sleeve by Fabco Fastening Systems, West Newton, PA.

H. Drawband:
   1. Gold Seal stainless steel worm gear clamp by Murray Corporation, Cockeysville, MD.
   2. Power-Seal stainless steel worm drive clamps by Breeze Clamp Company, Saltsburg, PA.

2.06 ROOFING MATERIALS

A. 10 MIL poly for vapor barrier and multipurpose tape

B. Roof Membrane Field: Reinforced, PVC synthetic single-ply membrane composed of polyvinyl chloride polymer.
   1. Membrane Type: **.060" Reinforced PVC**
   2. Color: White

C. Roof Membrane Flashing: PVC unsupported Flashing, Non-reinforced, PVC, single-ply flashing composed of polyvinyl chloride polymer
   1. Nominal Thickness: .060"
   2. Color: White

D. PVC Bonding Adhesive:
   1. Description: Solvent-based, formulated for compatibility with the PVC membrane and a wide variety of substrate materials, including masonry, wood, insulation facings.
   2. Product/Producer:
      a. PVC Bonding Adhesive.

E. Pourable Sealer:
   1. Description: **2-Part urethane, 2-color reliable mixing.**

F. Seam Plates:
   1. Description: Steel with barbs and a Galvalume coating.
   2. Reference Standard: Corrosion-resistant to meet FM-4470 criteria.

G. Termination Bar:
   1. Description: 1.3" x 0.10" thick aluminum bar with integral caulk ledge.
   2. Product/Producer:
      a. Termination Bar

H. PVC Cut Edge Sealant
   1. Polymeric sealant for use where exposed reinforcement is encountered.
   2. Product/Producer:
      a. PVC Cut Edge Sealant

I. PVC General Purpose Sealant
   1. Polymeric one part general purpose sealant
   2. Product/Producer:
      a. PVC General Purpose Sealant

J. PVC Molded Flashing Accessories
   1. PVC membrane Pre-Molded for a variety of flashing details (i.e.; PipeBoots, Inside-Outside corners, etc.)
   2. Product/Producer:
      a. PVC Pre-molded Flashing Accessories.

2.07 METAL FLASHINGS

A. Termination bar under counterflashing:
   1. Metal-Flash Termination Bar Flashing:
      a. 1/8 x 1 inch flat aluminum bar

B. Termination bar sealant:
   1. Metal cleaner: No. 200 Cleaner
   2. Metal primer: Primer No. 6
   3. Reglet joint sealant

C. Counter flashing:
   1. Kynar coated sheet steel: ASTM A 526-85, 24 ga., thick steel.

D. Metal Edge Fascia:
   1. Kynar coated sheet steel: ASTM A 526-85, 24 ga., thick steel.
   2. Cleat: ASTM A 526-85, 22 ga. thick G-90 galvanized sheet steel with 1.25 oz. /sq. ft. galvanized coating.
   3. Tested per ANSI/SPRI/FM 4435/ES-1
   4. FM 1-90 Approved
   5. Size: Sufficient to cover existing wood nailer a minimum of 2”

E. Expansion Joint Cover:
   1. Kynar coated sheet steel: ASTM A 526-85, 24 ga., thick steel.
   2. Cleat: ASTM A 526-85, 22 ga. thick G-90 galvanized sheet steel with 1.25 oz. /sq. ft. galvanized coating.

F. Existing Pitch Pans:
   1. To be removed and wherever possible, replaced with new PVC clad metal pans and umbrella flashing

G. Pitch pan mastic:
   1. Self-reinforcing, polyurethane modified, two-component mix.

H. Work shall be in accordance with Architectural Sheet Metal Manual, Third Edition, as issued by Sheet Metal and Air Conditioning Contractors' National Association, Inc., (SMACNA).

I. Plumbing Vents:
   1. Pre-formed flashing boot

2.08 SYSTEM PERFORMANCE REQUIREMENTS

Testing	Minimum Values	Typical values (SI Units)
Thickness, min, mm (in.)	0.060”± 10%	
Sheet-overall	0.060”± 10%	0.060”± 10%
Coating over scrim	0.406” (0.015)	0.406”± 10%
Tensile strength, min, MPa (psi)	1,500	
Breaking strength, min, kN (lbf)	45	45
Elongation, ultimate, min, %	NA	
Elongation at break, min, %	250	270
Tensile set, max, %	NA	
Seam strength, % of tensile strength	75	

2.09 SKYLIGHTS

A. General: Provide metal-framed skylights capable of withstanding loads and thermal and structural movements indicated without failure. Failure includes the following:
   1. Deflection exceeding specified limits.
   2. Thermal stresses transferred to the building structure.
   3. Skylight framing members transferring stresses, including those caused by thermal and structural movement, to glazing.
   4. Weakening of fasteners, attachments, and other components.

B. Deflection Limits: As follows:
   1. Deflection of the entire length of framing members in direction normal to glazing plane is limited to 1/175 of clear span.

C. Lateral Support: Compression flanges 75% of flexural members requiring lateral be laterally braced by cross members with minimum depths equal to flexural member depth and by anchors to the building structure. Glazing material does not provide lateral support.

D. Structural Loads: Provide metal-framed skylights, including anchorage, capable of withstanding the effects of the following design loads when supporting full dead loads:
   1. Roof Loads
      a. Concentrated Load: 250 lbs applied to framing members at location that produces the most severe stress or deflection.

E. Structural Performance: Provide metal-framed skylights, including anchorage, capable of withstanding pressures indicated without material and deflection failures and permanent deformation of structural members exceeding 0.2 percent of span when tested according to ASTM E 330.

F. Air Infiltration: Provide metal-framed skylights with maximum air leakage of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of surface when tested according to ASTM E 283 at a minimum static-air-pressure differential of 6.24lb/sq. ft. (300 Pa).

G. Water Penetration: Provide metal-framed skylights that do not evidence water penetration when tested according to ASTM E 331 at a minimum differential static pressure of 20 percent of positive design wind pressure, but not less than 15 lb/sq. ft. (718 Pa).

H. Thermal Movement: Provide metal-framed skylights that allow for thermal movements resulting from the following maximum change (range) in ambient temperatures by preventing buckling, sealant failure, and other detrimental effects.
   1. Temperature Change (Range): 100 degrees F.

2.10 VAPOR RETARDER ON STEEL DECKS

A. SA - 32 mil (0.8 mm) self-adhesive vapor barrier that can also serve as temporary roof protection. Self-Adhered is available in rolls 44.9 inches x 133.8 feet (1.14 x 40.8 m).

B. SA Primer WB - A polymer emulsion water based primer designed to improve the adhesion of SA vapor retarder on approved substrates. Application temperature must be 41°F (5°C) and above. The coverage rate will range from 163 - 400 ft2/gal (4 - 9.8 m²/L) for non-porous surfaces to 82 - 135 ft2/gal (2 - 3.3 m²/L) for porous surfaces. The VOC content is 3 g/L.

C. SA VB needs to be installed along vertical surface of walls and or penetrations even with base layer of insulation. Perimeter walls need to be caulked along top surface of VB to ensure adhesion to wall substrate.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify conditions as satisfactory to receive work.

B. Do not begin roofing until all unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions.

C. Verify that work of other trades penetrating roof deck or requiring men and equipment to traverse roof deck has been approved by Clayton School District.

D. Check projections, curbs, and deck for inadequate anchorage, foreign material, moisture, or unevenness that would prevent quality and execution of new roofing system.

3.02 GENERAL WORKMANSHIP

A. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather that day.

B. Lay roof insulation in courses parallel to roof edges.

C. Neatly fit insulation to all penetrations, projections, and nailers. Insulation shall fit tightly, with gaps not greater than 1/4". All gaps greater than 1/4" shall be filled with acceptable material. Under no circumstances shall the roofing membrane be left unsupported over a space greater than 1/4". Tapered insulation shall be installed at scupper locations to provide proper slope for drainage. Miter roof insulation edges at ridge, valley and other similar non-planar conditions. When installing multiple layers of insulation within new membrane.

D. Base flashing height:
   1. Not less than eight (8) inches above finished roof surface.

E. Two-part sealants: Add curative to base unit. Mix thoroughly (six (6) to eight (8) minutes). Mixing equipment: 1/2 inch slow speed drill; approved mixing paddle.

3.03 PREPARATION

A. Protection:
   1. Contractor shall be responsible for protection of property during course of work. Lawns, shrubbery, paved areas, and building shall be protected from damage. Repair damage at no extra cost to Clayton School District.
   2. Provide at site prior to commencing removal of debris, a dumpster or dump truck to be located adjacent to building where directed by Clayton School District Representative.
   3. **Roofing, flashings, drain flashing, membrane repairs, and insulation shall be installed and sealed in a watertight manner on same day of installation or before arrival of inclement weather that day.**
   4. Preparation work shall be limited to those areas that can be covered with installed roofing material on same day or before arrival of inclement weather that day.
   5. Arrange work sequence to avoid use of existing roofing for storage, walking surface, and equipment movement. Move equipment and ground storage areas as work progresses.
   6. Protect building surfaces at set-up areas with tarpaulin. Secure tarpaulin. Remove dumpster from premises when full and empty at approved dumping or refuse area. Deliver empty dumpster to site for further use. Upon job completion, dumpster shall be removed from premises. Spilled or scattered debris shall be cleaned-up immediately. Removed material to be disposed from roof as it accumulates.
   7. At end of each working day, removal areas shall be sealed with water stops along edges to prevent water entry.
   8. Provide clean plywood walkways and take other precautions required to prevent tracking of aggregate/debris from existing membrane into new work area where aggregate/debris pieces can be trapped within new roofing membrane. Contractor shall instruct and police his workmen to ensure that aggregate/debris is not tracked into new work areas on workmen's shoes or equipment wheels. Discovery of entrapped aggregate/debris within new membrane is sufficient cause for its rejection.

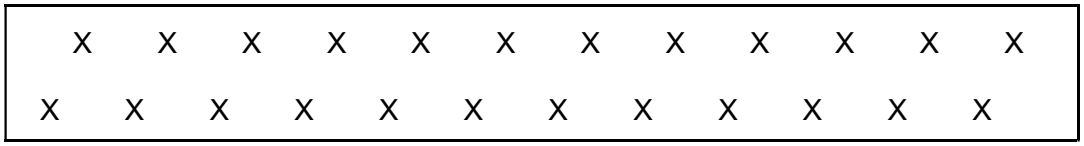
9. Cover windows with protective covering prior to removal and application of water proofing materials.

B. Surface preparation:
   1. Base flashings:
      a. Remove counterflashing.
   2. Remove flashings to substrate.
   3. Remove as directed by Clayton School District. Representative:
      a. Unused equipment.
      b. Sleepers.
   4. Remove perimeter roof edge/fascia to wood blocking.

3.04 CARPENTRY

A. Base flashings:
   1. Mechanically attach wood blocking to flashing base, **where required**.
      a. Blocking thickness: Equal to final insulation thickness.
      b. Width: four inches nominal.
   2. Fasteners shall be installed in two (2) rows staggered. Spacing in any one (1) row shall not exceed twenty-four (24) inches. Within eight (8) feet of outside corners, spacing shall not exceed twelve (12) inches in any one (1) row.
   3. Offset blocking layers twelve (12) inches; weave corners.

B. Wood blocking fastening pattern:



3.05 ROOF DECK REPAIRS/ REPLACEMENT

A. Metal Roof Deck Repairs:
   1. Deck Reinforcement: Install sheet steel reinforcement profiled to existing decking configuration over all rusted openings 16" or less. If two (2) or more rusted openings exist in same panel, replace panel.
   2. Deck protection: Apply rust inhibiting paint over surface rust after cleaning loose surface rust from deck panel with the use of a wire brush.

B. Metal Deck Replacement:
   1. Replace with 22 ga. metal roof panel of the same style and profile as existing panels. Minimum length: Three (3) span panels.
   2. Erect metal roof panel according to SDI Design Manual. If unable to lap, butt to adjacent deck with rib configuration cut-outs, creating an overlap to existing panel. Minimum bearing on steel supports: 1".
   3. Mechanically fasten side laps 18" o.c. maximum.

3.06 THERMAL INSULATION

A. Base layer 1.5” polyisocyanurate insulation board mechanically fastened to metal deck with a minimum of 16 fasteners per 4x8 board.

B. Install a layer of 1/8" in 12" tapered polyisocyanurate board insulation, fully adhered in two-part low-rise foam adhesive. Apply low rise foam in ¾" wide beads, 6" apart in the field of the roof and 4" apart 12' in from the perimeter and corners.

C. Tapered polyisocyanurate insulation board (for crickets) adhered to base layer of 1.5" polyisocyanurate with low rise foam adhesive. Slope: 1/2" in 12". Apply low rise foam in ¾" wide beads, 6" apart in the field of the roof and 4" apart 12' in from the perimeter and corners.

D. One (1) layer 1/2" HD polyisocyanurate insulation board adhered to top layer of polyisocyanurate insulation with low rise foam adhesive. Apply low rise foam in ¾" wide beads, 6" apart in the field of the roof and 4" apart 12' in from the perimeter and corners.

E. Stagger all insulation joints at least six (6) inches in two (2) directions.

E. Install insulation boards in courses parallel to roof edges mopping surface up.
   1. Firmly butt each insulation board to surrounding boards. Maximum gap acceptable: 1/8". Do not jam or deform boards.
   2. Eliminate open joints and uneven surfaces.

F. Maximum insulation gap: 1/8 inch.

G. Fill insulation board joint gaps larger than 1/4 inch with same kind insulation.

H. Maximum elevation variation between boards at joints: 1/8 inch.

I. Cut and fit insulation boards where roof deck intersects vertical surfaces. Cut board 1/4 inch from vertical surface.

J. Filler size, for tie offs: Eighteen (18) inches in length or width, minimum.

K. Lay insulation in forty-eight (48) inch wide courses.

3.07 ROOF SYSTEM APPLICATION

A. Starting at the low point of the roof, place the membrane panels without stretching over the acceptable substrate. Position subsequent membrane sheets in the same manner, overlapping the ends of adjoining sheets a minimum of 3" and side laps a minimum of 6". Install panels to ensure that laps shed water.
   1. Where PVC Membrane has been cut to expose reinforcing membrane, PVC Cut Edge Sealant or PVC General Purpose Sealant must be used to encapsulate exposed edge.

3.08 MEMBRANE LAP SPLICING

A. Lap splice areas that have been contaminated must be wiped down with a dry or damp (manufacturer's membrane cleaner only) clean cloth prior to heat welding and allow to completely dry.

B. All field and flashing splices on the horizontal surface shall be completed using an automatic heat welder that has been designed for hot air welding of thermoplastic membranes.

C. Hand held welders are only to be used on vertical welds or where an automatic welder is not practical or cannot be used.

D. Seams made with the automatic welder shall be a minimum of 1-1/2" wide. Seams made with hand welders shall be a minimum of 2" wide. Use 2" side silicone or silicone coated steel hand rollers to assure proper mating of surfaces as hand heat welding proceeds.

E. Probe all completed welds using a flat screwdriver or cotter pin puller type tool to verify seam integrity. Do not probe welds until they have had time to cool to ambient conditions. Any welds found to be insufficiently welded need to be repaired daily.

3.09 MEMBRANE SECUREMENT

A. Secure membrane at all locations where the membrane terminates or goes through an angle change greater than 1" in 12" except for round pipe penetrations less than 18" in diameter and square penetrations less than 4" square.
   1. Mechanically fasten Seam Plates with Fasteners in accordance with RMT Details.
   2. Install PVC membrane as flashing.

3.10 FLASHING - PENETRATIONS

A. General:
   1. Remove all existing flashings (i.e., lead, asphalt, mastic, etc.)
   2. Flash all penetrations passing through the membrane.
   3. The flashing seal must be made directly to the penetration.

B. Pipes, Round Supports, etc.
   1. Flash with PVC Pipe Flashings where practical
   2. Flash using PVC unsupported Flashing membrane when Pre-Molded Flashing is not practical.

C. Structural Steel Tubing
   1. Use a field fabricated pipe-flashing detail provided that the minimum corner radius is greater than1/4" and the longest side of the tube does not exceed 12". When the tube exceeds 12: use a standard curb detail.

D. Pipe Clusters and Unusual Shaped Penetrations
   1. Fabricate penetration pockets to allow a minimum clearance of 1" between the penetration and all sides.
   2. Secure penetration pockets per Details.
   3. Fill penetration pockets with Pourable Sealer, so as to shed water.

E. Hot Pipes
   1. Protect the PVC components from direct contact with steam or heat sources when the in-service temperature is in excess of 140□F. In all such cases flash to an intermediate insulated "cool" sleeve per details.

F. Flexible Penetrations
   1. Provide a weather tight gooseneck set in Water Block Seal and secured to the deck.
   2. Flash in accordance with Details.

G. Scuppers
   1. Remove existing scupper box and attached downspouts.
   2. Replace with new PVC coated metal scupper inserts and 26 ga. Kynar coated downspouts.
   3. Flash in accordance with Manufacturer's requirements.

H. Expansion Joints
   1. Install as shown on roof drawings in accordance with details.

3.11 FLASHING PARAPETS, MECHANICAL EQUIPMENT CURBS, SKYLIGHTS, ETC.

A. General:
   1. Using the longest pieces practical, flash all walls, parapets, curbs, etc., a minimum of 8" high per Details.

B. Evaluate Substrate:
   1. Evaluate the substrate and overlay per specifications as necessary.

C. Remove all existing flashings.

D. Remove foreign material to provide a smooth, sound surface for new flashings.

E. Apply PVC Bonding Adhesive at about the same time to both the membrane flashing and the surface to which it is being bonded so as to allow approximately the same drying time. Apply Bonding Adhesive by rolling the adhesive on to the mating surfaces evenly, avoiding globs or puddles.

F. Allow PVC Bonding Adhesive to flash off until tacky. Touch the Bonding Adhesive surface with a clean, dry finger to be certain that the adhesive does not stick or string. As you are touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, then it is not ready for mating. Flash off time will vary depending on ambient air conditions.

G. Roll the flashing into the adhesive evenly and carefully so as to minimize wrinkles.

H. To ensure proper contact, compress the flashing to the substrate with a stiff push broom or roller.

I. Complete the splice between membrane flashing and the main roof sheet by hot air welding. Provide lap splices in accordance with Details.

J. Provide termination directly to the vertical substrate as shown in Details.

K. Install PVC T-Joint covers at field and flashing splice intersections as required by Manufacturer.

L. Install intermediate flashing attachment as required by Specifications and Details.

3.12 WALKWAY INSTALLATION

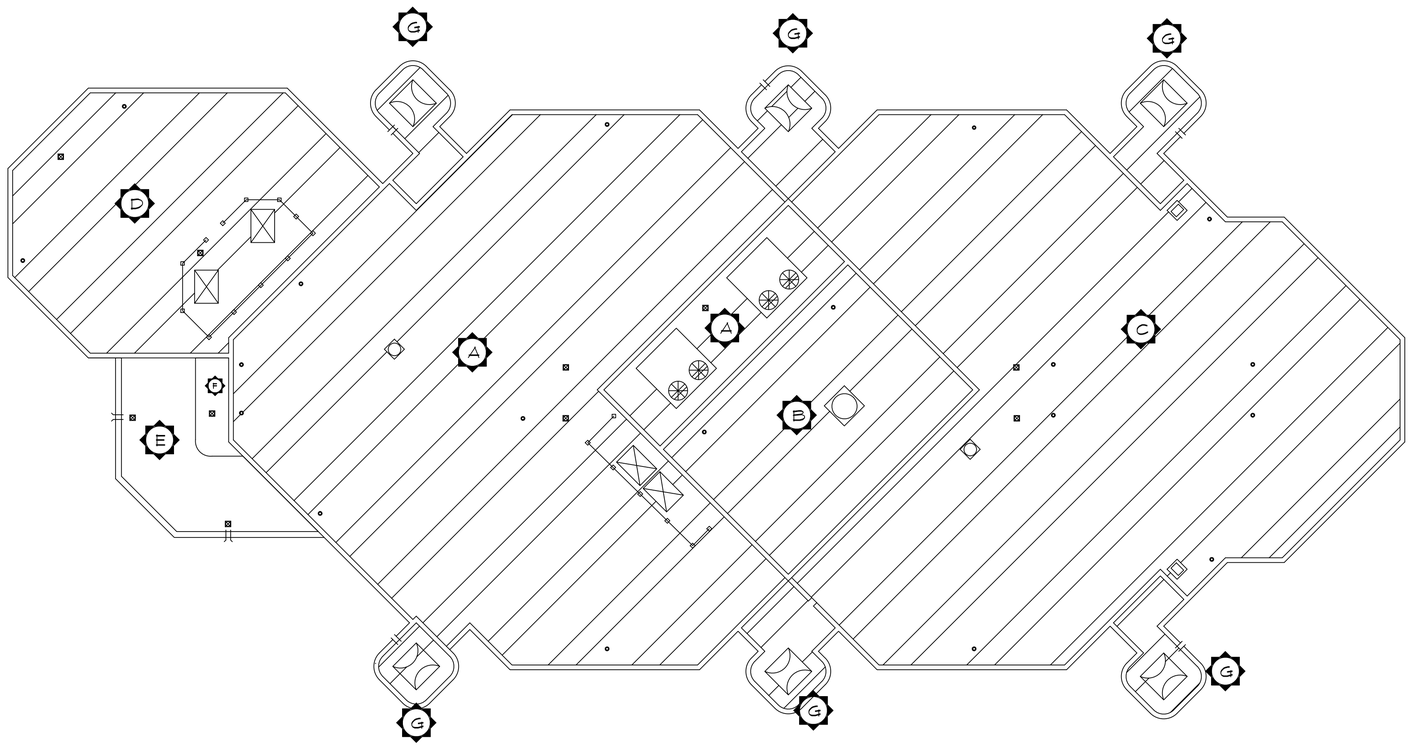
A. Provide walkways composed of Manufacturer’s system recommended material around **all** units and equipment requiring scheduled maintenance, ladder accesses and scuttle access hatch.

3.13 ADJUSTING AND CLEANING

A. Repair of deficiencies:
   1. Installations of details noted as deficient during Final inspection must be repaired and corrected by applicator, and made ready for re-inspection, within five (5) working days.

B. Clean-up:
   1. Immediately upon job completion, roof membrane and flashing surfaces shall be cleaned of all debris.
   2. Clean adjacent buildings of current roofing related debris.
   3. Remove roofing and roofer related debris from Clayton School District property work site.

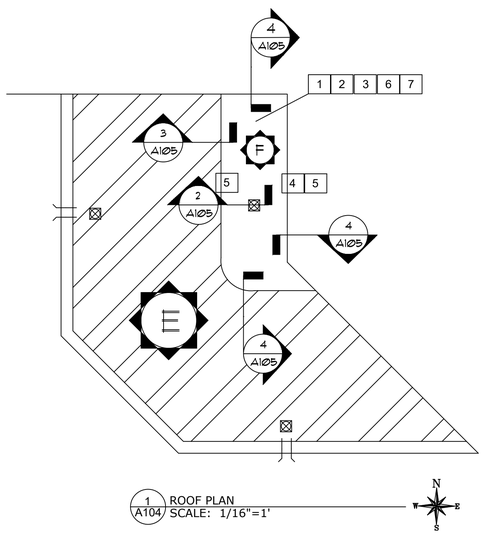
END OF SPECIFICATIONS



1 A104 ROOF PLAN
SCALE: 1/16"=1'

RENOVATION NOTES - CAPTAIN ELEMENTARY

1. ROOF WORK LIMITED TO SECTION 'F'
2. INSTALL TAPERED INSULATION
3. INSTALL KYNAR COATED, 24 GA. FASCIA METAL. FROM METAL FOR RADIUS
4. INSTALL NEW 24 GA. KYNAR COATED COUNTERFLASHING METAL
5. INSTALL NEW PVC MEMBRANE FLASHING AT WALLS
6. INSTALL NEW 60 MIL, FULLY ADHERED PVC MEMBRANE ROOF SYSTEM
7. SA VAPOR BARRIER OVER PRIMED METAL DECK



1 A104 ROOF PLAN
SCALE: 1/16"=1'

LEGEND

	ROOF DRAIN
F	FAN
AC	AC UNIT ON CURB
	VENT STACK
	PIPE PENETRATION
	SKYLIGHT
	SCUPPER
	HEATER STACK
	PITCH PAN
	MECHANICAL UNIT/ HVAC
	LADDER
	MASONRY CHIMNEY
	ROOF ACCESS HATCH
	STACK ON BASE
A	ABANDONED CURB/UNIT
EVP	EVAPORATIVE COOLER
	DOMED VENTILATOR

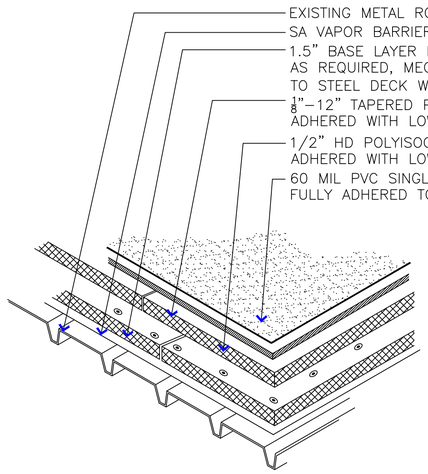
05/11/2021 | ISSUED FOR BID
DRAWN BY: KEO | CHECKED BY:

RMT ROOFING AND WATERPROOFING CONSULTANTS, INC.
410 SOVEREIGN COURT #18
MANCHESTER, MO 63011
(636)-391-2185

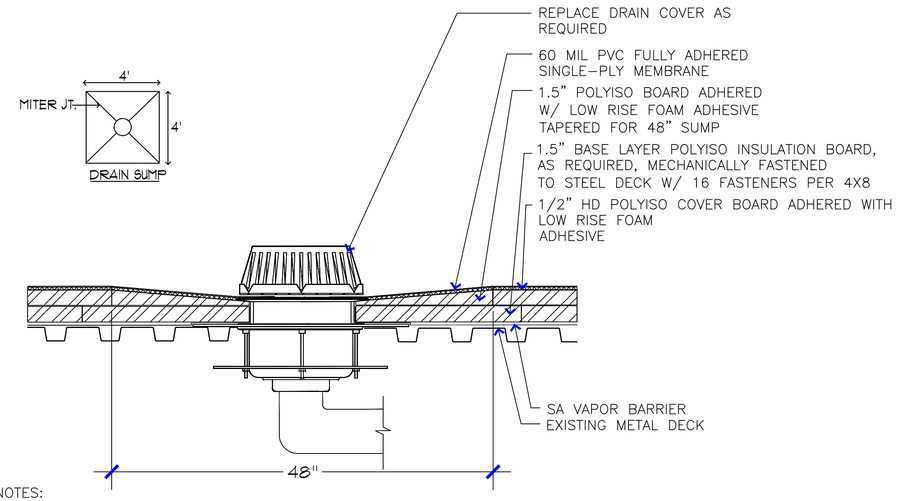
CAPTAIN ELEMENTARY SCHOOL
ROOF REPLACEMENT
SCHOOL DISTRICT OF CLAYTON, MISSOURI
ROOF PLAN

PROJECT NUMBER
S3805-21

SHEET
A104 OF 7

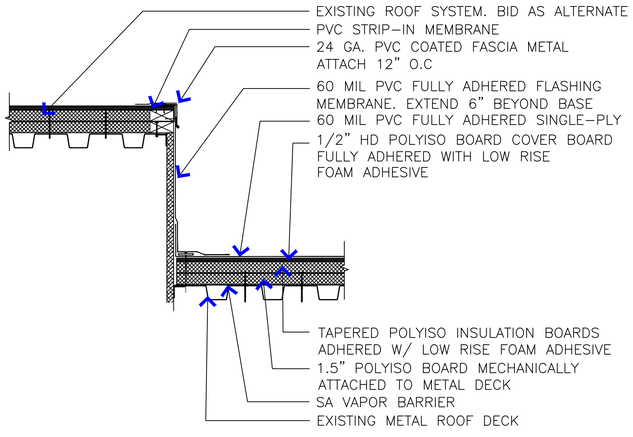


1 A105 CROSS VIEW
SCALE: NTS

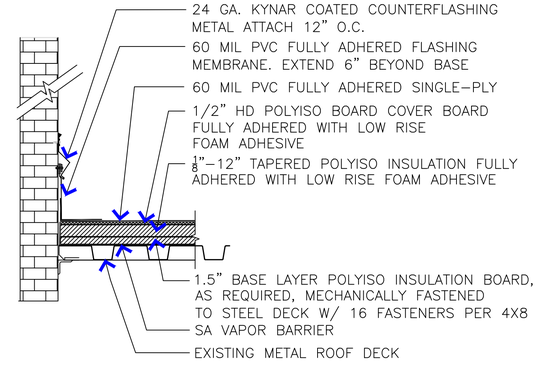


NOTES:
1. ROOFING CONTRACTOR IS RESPONSIBLE FOR ALL COSTS REQUIRED FOR RAISING OR LOWERING THE DRAIN BOWL
2. THE DRAIN BOWL HEIGHT MUST MATCH THE TOTAL THICKNESS OF THE INSULATION AT THE EDGE OF THE DRAIN BOWL

2 A105 DRAIN DETAIL
SCALE: 1 1/2"=1'–0"



3 A105 CHANGE IN ELEVATION
SCALE: 1 1/2"=1'–0"



4 A105 WALL FLASHING DETAIL
SCALE: 1 1/2"=1'–0"

3/11/2021	ISSUED FOR BID
DRAWN BY: KFO	CHECKED BY:

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410 SOVEREIGN COURT #18
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CAPTIAN ELEMENTARY SCHOOL
ROOF REPLACEMENT
SCHOOL DISTRICT OF CLAYTON, MISSOURI
ROOF DETAILS

PROJECT NUMBER
S3805-21

SHEET
A105 OF 7