ROOFING PROJECT MANUAL & SPECIFICATIONS DATED for CLEVELAND CLINIC

Cleveland, OH

Roof Areas: Identify
Date of Issue: Date
Bid Due Date: Date
SECTION 01100
INSTRUCTION TO BIDDERS

1  PART 1 - GENERAL

1.1 RELATED DOCUMENTS:
   A  Documents affecting work of this Section include, but are not necessarily limited to, Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections.

1.2 SEALED BIDS
   A  Sealed bids will be received until: Date, for general construction on designated roof areas of Lutheran Hospital as indicated on the Drawings.

   Address envelopes to:  
   Address

   Phone: #

   B  Write in the lower left corner:
   Project ID

1.3 PLANS AND SPECIFICATIONS
   A  Additional copies of blank proposals, plans, specifications and any further information desired may be obtained from Adam Bradley Enterprises, Inc. at (440) 543-4971.

1.4 DEFINITION OF TERMS
   A  Whenever the term "Owner" occurs in the Specifications or other documents, it shall mean Cleveland Clinic Foundation.

   B  Whenever the term “Owners Representative” occurs in the specifications, it shall mean Adam Bradley Enterprises, Inc.

   C  Whenever the term "Contractor" occurs in the Specifications or other documents, it shall mean a person, firm or corporation contracting with the Owner to supply labor, equipment, and materials specified herein for the successful completion of this contract.

1.5 PRE-QUALIFICATION OF BIDDERS
   A  Bidders expecting to bid may be required to file, prior to the time of award of contract, a confidential financial statement and experience questionnaire, which may be a complete report of the financial resources and liabilities, equipment, past record, and personnel.

   B  Bidders must submit names of any subcontractors to be utilized on the bid form attached. All subcontractors must be approved by Cleveland Clinic.

1.6 BIDDER REQUIREMENTS:
   A  The Prime Bidder on this Project must be a Roofing Contractor with experience and qualifications specified in the Construction Documents.

   B  Requests for substitutions of specified materials or practices must be submitted by the prime bidder. Requests for substitutions from manufacturers, suppliers or sub contractors will not be considered.

1.7 ADDENDUM TO PROPOSAL
   A  The Owner reserves the right to modify the proposal to within 24 hours of the scheduled date for the opening of proposals. All addenda shall be in writing and sent to all bidders having attended the pre bid conference.
1.8 AWARDING OF CONTRACT
   A  The Owner reserves the right to award the contract to the lowest and best, and not necessarily to the lowest bidder, or to reject any or all bids without formalities.

1.9 EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND SITE OF WORK
   A  The bidder is expected to examine carefully the site of the proposed work, the proposal, plans, specifications, supplemental specifications, special provisions and contract forms, before submitting a bid. The submission of a bid shall be considered evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work, and as to the requirements of the site conditions, plans, specifications, supplemental conditions, special provisions and contracts, and no allowance will be made for lack of knowledge concerning such conditions after the contract is signed.

1.10 PREPARATION OF BID PROPOSAL
   A  The bidder shall submit his bid upon the forms furnished by the Owner. All words and figures shall be in ink or typewritten.
   B  The bidder's bid must be signed with ink by the individual, by one or more members of the partnership, or by one or more officers of a corporation, or by an agent of the Contractor legally qualified and acceptable to the Owner. If the proposal is made by an individual, his name and business address must be shown; by a partnership, the name and business address of each partnership member must be shown; by a corporation, the name of the state under the laws of which the corporation is chartered and the name and title of the officer or officers having authority under the bylaws to sign contracts, the name of the corporation and the business address of its corporate official must be shown.

1.11 DELIVERY OF BIDS
   A  The bids shall be placed in a sealed envelope so marked as to indicate the identity of the project and the name and address of the bidder. Proposals will be received until the hour and date set for the opening thereof, and must be in the hands of the official indicated by such time. Bids received after the time for opening may be returned to the bidder unopened.
   B  Fax and/or E-mail transmittals of bids are not acceptable.

1.12 WITHDRAWAL OF BIDS
   A  A bidder may withdraw his bid, provided the request in writing is in the hands of the official indicated in the proposal by the time set for opening bid.

1.13 DISQUALIFICATION OF BIDDERS
   A  Any of the following reasons may be considered as being sufficient for the disqualification of a bidder and the rejection of his proposal or proposals:
   1  If the bid is on a form other than that furnished by the Owner or if the form is altered or any part thereof is detached.
   2  If there are unauthorized additions, conditional or substitute bids, or irregularities of any kind which may tend to make the bid incomplete, indefinite or ambiguous as to its meaning.
   3  If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award. This does not exclude a bid limiting the maximum gross amount of awards acceptable to any one bidder at any one bid letting, provided that any selection of awards will be made by the Owner.
   4  More than one proposal for the same work from an individual firm or corporation under the same or different name.
   5  Evidence of collusion among bidders. Participants in such collusion will receive no recognition as bidders for any future work of the Owner until any such participant shall have been reinstated as a qualified bidder.
B  Bid prices which obviously are unbalanced.

1.14 BID PROPOSAL FORM
A  Each bidder shall submit an individual Bid Proposal Form. The Bid Proposal Form in these documents must be utilized; no alteration of the form shall be made.

1.15 INSURANCE
A  The successful bidder shall provide The Cleveland Clinic Foundation with appropriate insurance coverage, including automobile liability, general liability, property insurance, etc. and name The Cleveland Clinic Foundation, an additional insured. Original sets of certificates shall be on file with The Cleveland Clinic Foundation before work commences. Each such certificate of insurance shall provide for payment of not less than the amount of $2,000,000.00 for injury or death of one person and $5,000,000.00 for any one accident, and $2,000,000.00 for property damage for any one accident, and a total aggregate property damage limit of $5,000,000.00. The successful bidder shall also agree to protect The Cleveland Clinic Foundation against all claims, demands, expenses, suits, or judgments arising because of, or resulting from the operations of the contractors, his agents, or his employees during the execution of this contract.

B  The successful bidder shall present evidence of insurance coverage by presenting the following prior to signing of a contract:
1  Authenticated copies of all insurance coverage.
2  Authorization by the State of Ohio to do business in the State of Ohio, if the insurance company is not a corporation of the State of Ohio.
3  Workmen's Compensation Certificate of the State of Ohio.

C  Insurance certificate shall be submitted with coverage as follows:
1  Claim under Workers' or Workmen's Compensation, disability benefit of other similar employee benefit acts;
2  Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;
3  Claims for damages because of bodily injury, sickness of disease, or death of any person other than his employees;
4  Claims for damages insured by usual personal injury liability coverage which are sustained by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or any other person;
5  Claims for damages, other than to the work itself, because of injury to or destruction of the tangible property, including loss of use resulting there from; and claims for damages because of bodily injury or death of any person, or property damage arising out of the ownership, maintenance, or use of any motor vehicle.

D  Contractor shall provide Certificate of Insurance Coverage with coverage as noted in General Requirements.

1.16 TAXES
A  The successful bidder shall be required to comply with all federal, state and local requirements with regard to any and all taxes owed and/or required.

1.17 WORK SCHEDULE AND PENALTIES
A  The Contractor shall start the Work within ten (10) days of a notice to proceed and shall execute the Work with diligence and dispatch so as to maintain such schedules and milestones as established by the Owner.

B  Contractor shall submit a preliminary construction schedule with his bid assuming a start date within three (3) weeks from the bid due date.
C In the event that the Contractor should fail to maintain the progress schedule or the schedule as established above, the Owner reserves the right, after 48 hours formal notice, either by letter or telegram to the Contractor, to procure the materials, equipment, and labor necessary to proceed with, or to complete the Work, or any portion thereof from other sources and charge the cost thereof to the Contractor.

1.18 APPLICATION FOR PAYMENT

A An invoice for payment for materials may be submitted upon delivery of materials to job site. All suppliers and subcontractors must be paid in full and Waiver of Lien by major suppliers and subcontractors must be issued prior to any subsequent payments being made to the contractor.

B When all work has been completed, and a final inspection has been made, Contractor may invoice the Owner for 90% of the remaining labor and the materials which were provided by Contractor. Once any and all deficiencies have been corrected, the Owner will make payment of 90% of the balance of the total contract price, with adds and deducts, and will make payment of the remaining 10% once the warranty has been issued.

* * * END OF SECTION - INSTRUCTIONS TO BIDDERS * * *
SECTION 01110
SUMMARY OF WORK

1 PART 1 - GENERAL

1.1 RELATED DOCUMENTS:
A Documents affecting work of this Section include, but are not necessarily limited to, Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections.

1.2 SUMMARY OF WORK:
A The Prime Bidder shall provide all labor, materials, tools, equipment, services, etc. to provide complete, watertight roof systems, drainage and other related work as shown and/or specified in the Bidding Documents.
B Areas Included: Roof IDs
C Unit Prices:
1 Provide Unit Prices on Bid Form for the following items:
   a Base Bid Unit Prices;

2 Include the following quantities and lump sum allowances in the base bid, additions to or subtractions from these indicated quantities to be adjusted by unit prices or lump sums quoted;
   a Base Bid Allowances;

D Work includes:
1 Base Bid;
   a Scope of work
2 Alternate Add Bid:
   a Scope of work.

1.3 INTENT OF THE SPECIFICATIONS:
A The intent of these specifications is to describe the materials and methods of construction required for the performance of the work. In general, it is intended that the drawings shall delineate the detailed extent of the work. When there is a discrepancy between drawings, referenced specifications, and standards and this specification, this specification shall govern.
B Consultant designed the work conveyed in the Contract Documents for Owner’s benefit. These Contract Documents are between Owner and Consultant only. Nothing contained in these Contract Documents shall create a contractual relationship between the Contractor and the Consultant.
C Assumption of Responsibility: Throughout these specifications, unless specifically noted otherwise, all work shall be assumed to be the sole responsibility of the Contractor

1.4 SPECIFICATION FORMATS AND CONVENTIONS
A Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC “MasterFormat” numbering system.
1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

   a. The words “shall,” “shall be,” or “shall comply with,” depending on the context, are implied where a colon (:) is used within a sentence or phrase

1.5 WORK UNDER OTHER CONTRACTS

A Owner may award separate contracts for related or unrelated construction operations at this site. These operations may be conducted simultaneously with work under this contract.

B Cooperation with other Contractors and Trades that may be present on the site is expected so that work on those contracts may be carried out. Owner reserves the right to resolve conflicts if required.

1.6 EXISTING HVAC AND ELECTRICAL EQUIPMENT

A Existing HVAC and electrical equipment will require temporary disconnection, relocation, and reconnection. Such work shall be a part of this Contract and shall be performed by the appropriate licensed tradesmen. Cost of the work shall be included in Base Bid.

B Electrical conduit and electrical items will have to be permanently relocated to prevent re-attachment to new roofing, flashing, or sheet metal components. Such work shall be a part of this contract and shall be performed by the appropriate licensed tradesmen. Cost of the work shall be included in Base Bid.

1.7 REGULATORY REQUIREMENTS

A TAXES:

1 Contractor shall pay all sales, consumer, use and other similar taxes required by law.

2 Cleveland Clinic is Tax exempt.

B GOVERNING CODES AND STANDARDS:

1 Work performed under this specification shall be in compliance with applicable Industry Standards and all applicable codes, laws, and ordinances of the municipal, state, and federal departments concerned. Materials and workmanship required by such regulations shall be provided by the Contractor whether or not specifically noted herein or shown on the drawings.

2 Bidders are directed to immediately advise the Consultant if they discover any materials, products, or designs that conflict with or fail to satisfy any of the following Codes, Standards or Local Ordinances;

   a Ohio Building Code (OBC)
b Americans with Disabilities Act Architectural Guidelines (ADAAG)
c National Fire Protection Association (NFPA)
d Occupational Safety and Health Standards of Construction Industry (OSHA)
e Environmental Protection Agency (EPA)
f Factory Mutual Global (FMG)
g Underwriters Laboratories (UL)

3 Industry Standards: Minimum standards of construction shall comply with all applicable standards including but not limited to;
   a NRCA
   b SMACNA

C The above notwithstanding, Industry Standards and Codes are recognized as minimum requirements. In many cases these Contract Documents specify materials, quantities, thicknesses, details, assemblies, etc., that clearly exceed the Industry Standards and prevailing Codes. In all these cases the more stringent requirements in the Contract Documents shall be required.

1.8 NOTICES AND POSTINGS:
   A The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the Work. If Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, without providing notice to building owner’s representative, Contractor shall assume full responsibility and shall bear all costs.
   B All permits shall be placed in a plastic tube and be kept in the location designated by the Fire Safety Officer for the entire duration of the work. The following shall be posted on site;
      1 Copies of all permits
      2 Copies of all MSDS sheets
      3 A Job Board showing escape routes and the locations of fire alarms and smoke detectors and other information and documents as required by the fire safety officer.
      4 A completed safety triangle listing hazardous substance ratings of products stored at or in use at the job site

1.9 PERMITS AND FEES:
   A Obtain Hazardous substance permits from Owner. All containers five (5) gallons or larger must be labeled with the permit number.
   B Obtain open burn permits and file pre and post burn inspection reports in writing on a daily basis as required by Owners Safety Office.
   C The Contractor shall apply for and secure all incidental permits, governmental fees and licenses necessary for proper execution and completion of the Work.

1.10 PROTECTION:
   A The Contractor shall use precautions necessary to provide for the safety of property owner, visitors to the site, and all connected with the work of this project.
   B All existing facilities both above and below ground shall be protected and maintained free of damage. Existing facilities shall remain operating during the period of construction unless otherwise permitted. All access roadways must remain open to traffic unless otherwise permitted.
   C Cranes and delivery vehicles may be placed only where approved by the Owner.
1.11 SAFETY REQUIREMENTS

A All application, material handling, and associated equipment shall conform to and be operated in conformance with OSHA safety requirements.

B Comply with applicable Federal, State, Local and Owner health and safety requirements.

C Applicable asbestos-containing material removal procedures must be used where asbestos is detected.

D Notify the Owner in advance whenever work is expected to be potentially hazardous and/or harmful to persons and/or property on the site. Contractor is solely responsible for employing means and methods (acceptable to the Owner) deemed necessary to prevent harm to such persons and property.

E Maintain a construction crewmember as a Floor Area Guard whenever roof decking is being repaired or replaced.

F Maintain proper fire extinguishing equipment and trained personnel within close proximity and with unobstructed access to work areas whenever power tools, torches and/or other heat-producing equipment is being used on the project.

G ALL SAFETY REQUIREMENTS OF THE BUILDING OWNER INCLUDING OBTAINING OWNER ISSUED PERMITS AND EMPLOYEE SAFETY TRAINING MUST BE FOLLOWED. NO EXCEPTIONS WILL BE PERMITTED. SAFETY ORIENTATION MEETING REQUIRED PRIOR TO PERFORMING ANY WORK. ALL EMPLOYEES MUST WEAR OWNER ISSUED IDENTIFICATION BADGES.

1.12 CONTRACTOR REQUIREMENTS

A Roofing Contractor’s Qualifications to be submitted prior to award of the Contract:

1 Certification or letter from the Manufacturer that Contractor has been an approved applicator by the Manufacturer prior to the bidding period. Certification must be maintained throughout the installation.

2 Letter from Roofing Manufacturer confirming that all bidding documents have been approved, that the site has been inspected and meets the requirements for suitability, that these Specifications and the Drawing Details are acceptable to them for the deck and surfacing to which they are to be applied, and that the specified warranty shall be provided upon satisfactory completion of the project.

a If details for any manufacturer’s systems proposed in the Contract Documents are not acceptable to the manufacturer, submit corresponding details proposed for the particular application, together with the manufacturer’s reasons for not accepting the conditions depicted in the Specifications or Drawings. No alternate details will be considered without evidence of valid objections on the part of the manufacturer to the Contract requirements.

b No deviation is to be made from this Specification without prior written approval by the manufacturer; submit such approval to the Consultant.

B Shall appoint a Safety Coordinator who shall be a member of the roofing installation crew. The name of the appointee shall be submitted, including all qualifications for the appointment.

C Maintain a daily job log to be kept on site at all times from the pre-roofing conference until final close-out. The job log shall include:

1 Copies of all submittals.

2 Safety coordinator appointment with emergency telephone numbers; fall protection plan and material safety data sheets for all products.

3 A summary of each days work including any photographs or detail revisions.

4 A field sketch showing areas of work for the day.

5 Accident reports
6 Material delivery records; and a visitor register.

7 Complaint log, listing complaints received from any party of any nature, and the actions taken and resolution, with dates and names of individuals involved.

D Contractor shall provide a foreman or superintendent to be present on the job site at all times to supervise all Work by all subcontractors utilized on the project. On site Foreman/Superintendent must have a cell phone on site at all times and provide number to Consultant and Owner.

*** END OF SECTION 01110 ***
SECTION 01140

CONTRACTOR'S USE OF PREMISES

1 PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

   A Documents affecting work of this Section include, but are not necessarily limited to, Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections.

1.2 DESCRIPTION

   A Work included: This Section applies to situations in which the Contractor or his representatives including, but not necessarily limited to, suppliers, subcontractors, employees, and field engineers, enter upon Owner's property.

1.3 QUALITY ASSURANCE

   A Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.

   B Owner may require all personnel who will enter upon the Owner's property to certify their awareness of and familiarity with requirements of this Section.

1.4 BUILDING OCCUPANCY

   A The facility will be occupied and in use during construction. Cooperate with Owner during construction process to minimize disruptions of Owner usage.

   B Contractor is fully and solely responsible for the safety and protection of all occupants going into, leaving out of, or occupying the interior of the buildings. All costs associated with providing this service are to be included in the base bids.

   C Maintain existing buildings in a weather tight condition throughout the construction process. Protect buildings and occupants during all construction operations and repair any damage caused by construction operations immediately.

1.5 TRANSPORTATION FACILITIES

   A Driveways and Entrances: Keep driveways and entrances clear. Do not park vehicles or store materials unless specifically authorized by the Owner.

      1 Schedule deliveries to minimize the use of driveways and entrances.

      2 Load, unload and store materials and equipment to minimize use of space and time requirements at loading, temporary storage and set up areas.

   B Do not use handicapped parking area(s) at any time for any purpose.

   C Provide adequate protection for curbs and sidewalks over which trucks and equipment pass to reach job site. If any damage occurs the contractor is responsible for repairs.

   D Use of cranes, dumpsters or other impediments to traffic must be confined to hours and locations allowed by the Owner;

      1 Cranes and delivery vehicles may be placed only where approved by the Owner.

      2 Set up site has underground structures, tanks and utilities. Contractor is responsible, after the award of the bid, to determine locations of underground items and their load bearing capacities. Any equipment to be placed over these structures, tanks and utilities must not exceed their load bearing capacities.
E Contractor's vehicles:
1 Require Contractor's vehicles, vehicles belonging to employees of Contractor, and all other vehicles entering upon Owner's property in performance of Work of Contract, to use only the access areas approved in advance by Owner.
2 Do not permit such vehicles to park on any street or other area of Owner's property except in the area approved by Owner as "Contractor's Parking Area." Contractor employees must obtain parking permits and park in contractor lots when required by the Owner.

1.6 LANDSCAPING
A Provide adequate protection for trees, grass, shrubs and all other landscaping during set-up or construction. If any damage occurs the contractor is responsible for repairs as designated by the Owner.
B Landscaping must be restored to original condition.
C Underground structures, tanks and utilities must be protected and must not be exposed to loads that exceed their load bearing capacity.

1.7 FACILITY USAGE
A Use of Site: Limit use of site to work in areas established during pre-bid and pre-construction meetings. Do not utilize or disturb areas of the site not previously identified beyond the work area without prior written approval.
1 Do not store materials inside building areas, including penthouses unless pre-approved by Owner.
B Safety: Do not block fire exits or doorways. Allow for egress of traffic at all times. Keep driveways and entrances serving the premises open and clear for use by the Owner. Owner’s employees and emergency vehicles at all times.
C Provide adequate protection for all interior and exterior portions of the building during set-up and construction. If any damage occurs the contractor is responsible for repairs as designated by the Owner.
D Restrooms and other amenities of the building will only be used with permission of the Owner. If such authorization is given, the Contractor is responsible for maintaining cleanliness and repairs as designated by the Owner.

1.8 OWNER CONDITIONS
A The following Owner conditions shall apply throughout the course of the work. Violation of these conditions shall be grounds for immediate and permanent removal from the site of the offending personnel, or entire crew.
1 Audio Equipment: Playing of loud radios, tape players, CD players, televisions, or other audio devices is prohibited everywhere on site.
2 Appropriate Clothing: Construction personnel shall dress in appropriate clothing at all times, everywhere on site. Shirts and full length pants shall be worn at all times. No article of clothing or visible body parts may have obscene or profane language or graphics displayed on it in any manner.
3 Smoking: Smoking is prohibited at all times. There are no designated smoking areas on any of the Owners property.
4 Language: Loud or abusive language, particularly obscene or profane language is prohibited at all times.
5 Firearms, alcoholic beverages and illegal drugs are strictly prohibited at all times.

1.9 SECURITY
A Restrict access of all persons entering upon the Owner's property to the Access Route and to the actual site of the work.
2 PART 2 – PRODUCTS (Not Used)

3 PART 3 – EXECUTION (Not Used)

*** END OF SECTION 01140 ***
SECTION 01150

REGULATORY REQUIREMENTS

1 PART 1 - GENERAL

1.1 RELATED DOCUMENTS:
   A Documents affecting work of this Section include, but are not necessarily limited to, Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections.

1.2 TAXES:
   A Contractor shall pay all sales, consumer, use and other similar taxes required by law.

1.3 PERMITS AND FEES:
   A The Contractor shall apply for and secure all incidental permits, governmental fees and licenses necessary for proper execution and completion of the Work.
   B All permits shall be placed in a plastic tube and be kept in the location designated by the Fire Safety Officer for the entire duration of the work.

1.4 GOVERNING CODES:
   A Work performed under this specification shall be in compliance with applicable codes, laws, and ordinances of the municipal, state, and federal departments concerned. Materials and workmanship required by such regulations shall be provided by the Contractor whether or not specifically noted herein or shown on the drawings.

1.5 NOTICES:
   A The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the Work. If Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, without providing notice to building owner’s representative, Contractor shall assume full responsibility and shall bear all costs.

1.6 REGULATORY REQUIREMENTS
   A Federal, State and local building and fire codes.
   B OSHA and EPA requirements

* * * END SECTION 01150 * * *
SECTION 01153

CHANGE ORDER PROCEDURE

1 PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A Documents affecting work of this Section include, but are not necessarily limited to, Drawings and
general provisions of the Contract, including General and Supplementary Conditions and other
Division 1 Specification Sections.

1.2 DESCRIPTION

A Work included:

1 Make such changes in the Work, in the Contract Sum, in the Contract Time of Completion, or any
combination thereof, as are described in written Change Orders signed by the Owner and the
Designated Owner’s representative and issued after execution of the Contract, in accordance with the
provisions of this Section.

1.3 QUALITY ASSURANCE

A Include within the Contractor's quality assurance program such measures as are needed to assure
familiarity of the Contractor's staff and employees with these procedures for processing Change Order
data.

1.4 SUBMITTALS

A Make submittals directly to the Designated Owner’s representative at his normal place of business.

B Submit the number of copies called for under the various items listed in this Section.

1.5 PRODUCT HANDLING

A Maintain a "Register of Bulletins and Change Orders" at the job site, accurately reflecting current status
of all pertinent data.

B Make the Register available to the Designated Owner’s representative for review at his request.

1.6 PROCESSING CHANGES INITIATED BY THE OWNER

A Should the Owner contemplate making a change in the Work or a change in the Contract Time of
Completion, the Designated Owner’s representative will issue a “Bulletin” to the Contractor.

1 Bulletins will be dated and will be numbered in sequence.

2 The Bulletin will describe the contemplated change, and will carry one of the following instructions
to the Contractor:

a Make the described change in the Work at no change in the Contract Sum and no change in the
Contract Time of Completion;

b Promptly advise the Designated Owner’s representative as to credit or cost proposed for the
described change. This is not an authorization to proceed with the change.

B If the Contractor has been directed by the Designated Owner’s representative to promptly advise him as
to credit or cost proposed for the described change, the Contractor shall:

1 Analyze the described change and its impact on costs and time;

2 Secure the required information and forward it to the Designated Owner’s representative for review.

3 Meet with the Designated Owner’s representative as required to explain costs and, when appropriate,
determine other acceptable ways to achieve the desired objective;
Alert pertinent personnel and subcontractors as to the impending change and, to the maximum extent possible, avoid such work as would increase the Owner's cost for making the change, advising the Designated Owner’s representative in writing when such avoidance no longer is practicable.

1.7 PROCESSING CHANGES INITIATED BY THE CONTRACTOR
A  Should the Contractor discover a discrepancy among the Contract Documents or other cause for suggesting a change in the Work, a change in the Contract Sum, or a change in the Contract Time of Completion, he shall notify the Designated Owner’s representative as required by pertinent provisions of the Contract Documents.
B  Upon agreement by the Designated Owner’s representative that there is reasonable cause to consider the Contractor's proposed change, the Designated Owner’s representative will issue a Bulletin in accordance with the provisions described in Article 1.6 above.

1.8 PROCESSING BULLETINS
A  Make written reply to the Designated Owner’s representative in response to each Bulletin.
   1  State proposed change in the Contract Sum, if any.
   2  State proposed change in the Contract Time of Completion, if any.
   3  Clearly describe other changes in the Work required by the proposed change or desirable therewith, if any.
   4  Include full backup data such as subcontractor's letter of proposal or similar information.
   5  Submit this response in single copy.
B  When cost or credit for the change has been agreed upon by the Owner and the Contractor the Designated Owner’s representative will issue a "Change Order" to the Contractor.

1.9 PROCESSING CHANGE ORDERS
A  Change Orders will be dated and will be numbered in sequence.
B  The Change Order will describe the change or changes, will refer to the Bulletin or Bulletins involved, and will be signed by the Owner and the Designated Owner’s representative.
C  The Designated Owner’s representative will issue three copies of each Change Order to the Contractor.
   1  The Contractor promptly shall sign all three copies and return two copies to the Designated Owner’s representative.
   2  The Designated Owner’s representative will retain one signed copy in his file and will forward one signed copy to the Owner.
D  Should the Contractor disagree with the stipulated change in Contract Sum or change in Contract Time of Completion, or both:
   1  The Contractor promptly shall return two copies of the Change Order, unsigned by him, to the Designated Owner’s representative with a letter signed by the Contractor and stating the reason or reasons for the Contractor's disagreement.
   2  The Contractor's disagreement with the Change Order shall not in any way relieve the Contractor of his responsibility to proceed with the change as ordered and to seek settlement of the dispute under pertinent provisions of the Contract Documents.

*** END OF SECTION 01153 ***
SECTION 01300

ADMINISTRATIVE AND SPECIAL PROJECT REQUIREMENTS

1 PART 1 - GENERAL REQUIREMENTS

1.10 RELATED DOCUMENTS:

A Documents affecting work of this Section include, but are not necessarily limited to, Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections.

1.11 COORDINATION, SEQUENCING, AND SCHEDULING

A Work Hours:

1 Work day is limited to the local city ordinance and Owner requirements.

2 Work week is confined to hours permitted by local codes. Overtime hours can be worked during hours permitted by local codes. No additional compensation for premium time or over time will be allowed.

3 Deck replacement work on all buildings may be restricted to times when building is not occupied.

4 Duct work, electrical or mechanical equipment shutdowns will be done in off hours as approved by the Owner.

B Coordinate work with all installers and subcontractors to ensure proper sequencing of related trades and efficient and orderly installation of each part of the work in a manner that minimizes inconvenience to the Owner.

C Drainage: Coordinate all removal and replacement so that all roof areas have proper and unrestricted drainage at all times.

D Coordinate and schedule work within 30 feet of air intakes with the Owner. Work to be performed only when fans and intakes can be shut down.

1 Contractor responsible to coordinate shutdown of ductwork smoke detectors and maintain an hourly fire watch and keep a written fire watch log approved by the Owner while the detectors are down.

2 Install tarpaulins over intake vents after shut down occurs.

3 Remove tarpaulins daily after work is complete and inform Owner that intakes can be re-started.

1.12 ENVIRONMENTAL REQUIREMENTS

A Do not proceed with the Work under adverse weather conditions, immediately after rainfall (for weather sensitive products), or when climatic conditions are outside manufacturer’s recommended limitations for installation. Proceed with the work only when weather forecasts are favorable for proper development of the performance characteristics of the materials.

B Do not work in rain, snow or in presence of water, dew or frost.

C Weather delays may not extend the schedule, as defined in the terms of the Construction Documents, unless specifically approved by the Owner, at the Owner’s sole discretion.
1.13 HVAC AND RELATED WORK

A The Contractor must include all costs associated with raising rooftop units, gas lines, soil stacks, conduits, etc. or with repositioning same to ensure that proper flashing heights as designed and required by the manufacturer and by industry standards are achieved. This includes costs involved in evacuating and charging HVAC units, and gas lines. Work may need to be performed during off hours to accommodate the Owner. The Contractor must also use licensed, Owner approved and proper subcontractors for all of this type of work.

B Conduits, junction boxes, cabling, etc. that are mounted on walls or copings must be moved and remounted on masonry above the counter flashings or on proper blocking or supports on the roof. No such items may be mounted or remounted in a manner in which attachment penetrates flashing or metal roof components.

1.14 PROTECTION AND CLEANING

A Protect building, property, equipment, roads, approaches, parking areas, loading dock areas, sidewalks, vehicles, underground structures, tanks and utilities and landscaping from damage due to the Work, including but not limited to contamination, soiling, staining or defacing.

B Protect workers from radiation, including rooftop microwave antennas in accordance with OSHA regulations, ANSI standards and FCC regulations published in 47 CFR 1.1307(b).

1 Do not move or disturb roof top antennas with unqualified personnel. Use only appropriate tradesmen approved by the Owner to move or relocate antennas or dishes.

C Clean and protect construction in process and adjoining materials in place during handling and installation. Apply protective coverings where necessary to prevent damage or deterioration.

D Coordinate and sequence Work so that other trades do not damage completed installations.

E The Contractor is responsible for the protection of all vegetation, persons, and property on the site and the adjoining rights of way from the Work associated with this Project. Any damaged items will be replaced or repaired to the satisfaction of the Owner.

F The Contractor is responsible for daily clean-up of all debris and for protection of all persons and property in and around the work areas. Any soiling of or damage to vehicles, pedestrians, personal property or real property caused by Work from this Project will be the responsibility of the Contractor.

G The Contractor shall not discontinue the job once work has begun. A full crew must be on site performing appropriate Contract Work on any day in which work can be performed.

H Unapproved Subcontractors cannot be utilized on this Project. All Subcontractors are subject to the Owners approval.

1.15 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

A Before submitting a bid, each Bidder will, at Bidders own expense make or obtain any additional examinations, investigations, exploration, tests, and studies and obtain any additional information and data which pertain to the physical conditions at or contiguous to the site or otherwise which may affect cost, progress performance or furnishing of the Work and which the Bidder deems necessary to determine that its Bid for performing and furnishing the Work is in accordance with the time, price and other terms and conditions of the Contract Documents.

B On request in advance, Owner will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for the submission of a Bid. Bidder shall fill all holes, clean up and restore the site to its former conditions upon completion of such exploration.
The submission of a Bid will constitute an incontrovertible representation by the Bidder that the Bidder has complied with every requirement of the Construction Documents and that without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents and such means, methods, techniques sequences or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing the Work.

2 PART 2 – PRODUCTS (Not Used)

3 PART 3 – EXECUTION

3.10 GENERAL

A Measurements: Independently verify dimensions shown on Drawings or in these specifications. Contractor is responsible for all measurements and dimensions including dimensional variations from place to place on the building, or variations between actual field dimensions and those that may be indicated in these specifications and drawings.

B Moisture: Contractor is responsible for the consequences of moisture in or on substrates that may interfere with the Work. Perform testing as necessary to determine if moisture that will interfere with the Work is present. Remove moisture or remove and replace moisture containing materials before completing installation of the Work.

END OF SECTION 01300 - ADMINISTRATIVE AND SPECIAL PROJECT REQUIREMENTS
1  PART 1 - GENERAL

1.1  SUMMARY

A. This section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General Project Coordination.
2. Conservation.
3. Cleaning and Protection.

1.2  GENERAL PROJECT COORDINATION

A. Coordination: The Contractor shall coordinate the construction operations of all the installers and Subcontractors to ensure the efficient and orderly installation of each part of the Work.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with Subcontractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Administrative Procedures: The Contractor shall coordinate scheduling and timing of required administrative procedures with all other construction activities and activities of other Subcontractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Installation and removal of temporary facilities, roadways and controls.
2. Delivery and processing of submittals.
3. Progress meetings.
4. Pre-construction meetings.
5. Project closeout activities.

C. Inspection of Conditions: Contractor shall inspect both the substrate and conditions under which Work is to be performed. Installers shall not proceed until unsatisfactory conditions have been corrected in a manner acceptable to the Installer as well as the manufacturer of the product, material, or equipment. Proceeding with an installation shall be considered prima facie evidence that the substrates and conditions under which the Work is to be performed are completely satisfactory and acceptable to the installer, and that they will not adversely affect the installation in any way.

D. Contractor shall coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

E. Leaks: It is understood that this project will be weather tight and free from leaks of any type. All leaks that occur during construction, or the Warranty period shall be immediately and properly repaired within twenty four (24) hours of its reported occurrence at no cost to the Owner unless as a result of specific warranty exclusions or if leak was a documented pre-existing condition in an area not yet worked on by the Contractor.
F. Manufacturer’s Instructions: Where installations include manufactured products or equipment, comply with manufacturer’s applicable instructions and recommendations for installation, only to the extent that these instructions or recommendations are more explicit or more stringent than other requirements shown in the Contract Documents.

G. Contractor shall install each unit of Work during weather conditions and Project status which will assure the best possible results in coordination with the entire Work. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.

H. Understanding that the introduction of moisture into the building spaces during construction can foster the growth of mold, mildew and fungi, Contractor shall be responsible for taking whatever steps necessary to prevent moisture infiltration into the building spaces during construction.

1.3 CONSERVATION

A. Conservation: Contractor shall coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

B. Salvage materials and equipment involved in performance of, but not actually incorporated into, the work.

1.4 CLEANING AND PROTECTING

A. Contractor shall clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.

B. Contractor shall clean and provide maintenance on completed construction as frequently as necessary though the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.

C. Limiting Exposures: Contractor shall supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures may include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
10. Sunlight (UV)
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.
15. Soiling, staining, and corrosion.
16. Bacteria.
17. Rodent and insect infestation.
19. Electrical current.
20. High-speed operation.
21. Improper lubrication.
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

2  PART 2 - PRODUCTS (Not Used)

3  PART 3 - EXECUTION (Not Used)

*** END OF SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION ***
SECTION 01311
PROJECT MEETINGS

1 PART 1 - GENERAL REQUIREMENTS

1.1 RELATED DOCUMENTS:
A Documents affecting work of this Section include, but are not necessarily limited to, Drawings and
general provisions of the Contract, including General and Supplementary Conditions and other
Division 1 Specification Sections.
B Related section: Section 01770 – Contract Close-Out.

1.2 SUMMARY
A This section specifies requirements for meetings and administrative procedures that include but are not
limited to the following:
1 Preconstruction conference.
2 Progress meetings.
3 Substantial Completion inspection.
4 Final Completion inspection and Project Close-out

1.3 SUBMITALS
A See Related Sections: Section 01100 – Summary, and Section 01330 – Submittals.

1.4 PRECONSTRUCTION CONFERENCE
A The Preconstruction Conference will be scheduled within 5 working days after the Owner has issued the
Notice to Proceed, but prior to actual start of the Work. All submittals must be received prior to time of
the Conference.
B Attendance: Consultant, roofing manufacturer/supplier, and Contractor’s Representative.
1 Minimum agenda: Data will be distributed and discussed on:
a Organizational arrangement of Contractor's forces and personnel, and those of Subcontractors,
materials suppliers, and the Architect.
b Channels and procedures for communication.
c Review set-up area and storage areas.
d Review all required permits.
e Construction schedule, including sequence of critical work.
f Designation of responsible personnel.
g Contract Documents, including distribution of required copies of Drawings and revisions.
h Processing of Shop Drawings and other data submitted to the Architect for review.
i Processing of field decisions and Change Orders.
j Rules and regulations governing performance of the work including working hours, use of
premises, Owner rules and requirements.
k Parking availability.
l Procedures for safety and first aid, security, quality control, housekeeping, and related matters.
1.5 PROGRESS MEETINGS
   A Will be scheduled by Consultant weekly or as described at the pre-construction meeting.
   B Minimum Attendance: Owner, Contractor’s Representative, Job Superintendent, Consultant, and Sub-Contractors, as appropriate.
   1 Minimum Agenda:
      a Review and correct minutes of the previous progress meeting.
      b Review of Work progress.
      c Field observations, problems, and decisions.
      d Identification of problems which impede planned progress.
      e Maintenance of progress schedule.
      f Corrective measures to regain projected schedules if construction is behind schedule.
      g Planned progress during succeeding work period.
      h Coordination of projected progress.
      i Maintenance of quality and work standards.
      j Effect of proposed changes on progress, schedule, and coordination.
      k Interface requirements.
      l Status of any incomplete submittals.
      m Deliveries.
      n Change orders.
      o Documentation of information for payment requests.
      p Other business relating to work.
   C Reporting: Distribute minutes of meetings no later than three working days after each meeting to each party present and to parties who should have been present.

1.6 SUBSTANTIAL COMPLETION INSPECTION
   A Related section: Section 01770 – Contract Close-Out.

1.7 FINAL INSPECTION
   A Related section: Section 01770 – Contract Close-Out

2 PART 2 – PRODUCTS (Not Used)

3 PART 3 – EXECUTION (Not Used)

END OF SECTION 01311 - PROJECT MEETINGS
SECTION 01330
SUBMITTALS

1 PART 1 - GENERAL

1.1 RELATED DOCUMENTS:
A  Documents affecting work of this Section include, but are not necessarily limited to, Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections.

1.2 SUMMARY
A  The submittals specified in this section must be submitted at the times specified in this Section and as referenced in related sections of the Construction Documents.
B  The requirements are in addition to any Submittals required in the Owner’s Bidding Requirements.

1.3 SUBMITTAL PROCEDURES
A  Coordination of submittals:
1  Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
2  Verify that each item and the submittal for it conform in all respects with the specified requirements.
3  By affixing the Contractor's signature or approval stamp to each submittal, he/she certifies that this coordination has been performed.

1.4 SUBMITTAL DOCUMENTS
A  All Bidders must submit the following documentation with their bids:
1  Construction Schedule.
2  Name of proposed roof membrane Manufacturer.
3  Submit List of Subcontractors and Suppliers
B  All Bidders must submit the following documentation for this Project prior to the award of the bid;
1  Membrane manufacturers data as specified in Section 07500 if different from the manufacturer specified as the basis for the specification.
2  Copy of the roofing manufacturer’s warranty which meets all requirements of the specified warranty.
3  Individual product identification, including manufacturer’s literature and MSDS sheets for all products to be used.
4  Confirmation of Contractor requirements enumerated in Section 01100.
5  Letter from material manufacturer confirming that all bidding documents have been approved, that the site has been inspected and meets the requirements for suitability, that these Specifications and the Drawing Details are acceptable to them for the deck and surfacing to which they are to be applied, and that the specified warranty shall be provided upon satisfactory completion of the project
a  If details for any manufacturer’s systems proposed in the Contract Documents are not acceptable to the manufacturer, submit corresponding details proposed for the particular application, together with the manufacturer’s reasons for not accepting the conditions depicted in the Specifications or Drawings. No alternate details will be considered without evidence of valid objections on the part of the manufacturer to the Contract requirements.
b No deviation is to be made from this Specification without prior written approval by the manufacturer; submit such approval to the Consultant

C Contractor must submit the following documentation for this Project no later than 5 days before start of Work:

1 Shop Drawings:
   a Metal Fascia and Copings: Show profiles, joining method, location of accessory items, anchorage and flashing details, adjacent construction interface, and dimensions.
   b Shop drawings of each item specified that differ from the basis of design specified in the Construction Documents showing layout, profiles, methods of attachment, and joining methods.
   c Shop drawings for new penthouse, doors, stairway, roof, flashings and closures.
   d Color samples of metal finishes and sealants for approval by the Owner
   e Shop drawing showing adhesive patterns for FMG 1-90 attachment. Show perimeter, corner and field densities of insulation fasteners and placement, type and spacing of perimeter nailer attachments, and adhesive patterns at perimeters, corners and field of the roof for insulation and base sheets.
   f Tapered insulation layouts

2 Schedule of values.

3 Final Construction Schedule.

4 Completed Safety Triangle for all products that will be in use or stored at the job.

5 Asbestos monitoring, removal and abatement plans and procedures to be utilized if necessary;
   a Copies of OSHA asbestos training certificates for all workers at the project
   b Contractor must submit the following asbestos related documentation as required
   c Results of air monitoring tests to be submitted daily, immediately after start of work if asbestos related procedures are required
   d Credentials and declarations of the competent person. A written summary of safety procedures required based on the results of air monitoring shall be submitted before air monitoring activity is suspended

D The following submittals are required before final payment:

1 Close-out submittals as required in Section 01770 – Contract Close-Out.

2 Warrantees as required in Section 01783 – Warrantees.

2 PART 2 – PRODUCTS (Not Used)

3 PART 3 – EXECUTION (Not Used)

END OF SECTION 01300 - SUBMITTALS
SECTION 01420

REFERENCES

1 PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A Documents affecting work of this Section include, but are not necessarily limited to, Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections.

1.2 GENERAL

A The abbreviations and acronyms defined in this section are provided as a convenience and may not be inclusive of all abbreviations and acronyms used in the specifications.

1.3 SUBMITTALS

A Shop drawing showing fastening and /or adhesive patterns for FMG 1-90 attachment and evidence of UL Class A rating for roof covering materials.

1.4 DEFINITIONS AND ABBREVIATIONS

A General: Basic Contract definitions are included in the Conditions of the Contract
B “Approved”: When used to convey Architect’s action on Contractors submittals, applications, and requests, “approved” is limited to Architect’s duties and responsibilities as stated in the Conditions of Contract.
C BMV: Brick masonry unit.
D Clean: Shall be construed to mean the level of cleanliness generally provided by skilled cleaners using commercial quality maintenance equipment and materials.
E CMU: Concrete masonry unit.
F “Directed”: A command or instruction by Architect. Other terms including “requested”, “authorized”, “selected”, “approved”, “required”, and “permitted” have the same meaning as “directed”.
G DL: Dead load.
H “Experienced”: When used with an entity, “experienced” means having successfully completed a minimum of five previous projects similar in size and scope to this Project.
I FCC: Federal Communications Commission.
J “Furnish”: Supply, deliver, or provide to the Project site, for assembly, installation, and similar operations.
K “Indicated”: Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as “indicated”.
L “Install”: Operations and procedures to set materials, components and details referred to in the Contract Documents and Drawings into place for final use.
M “Installer”: Contractor or another entity engaged by the Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
N Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as
“carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

N  LL: Live Load
O  PLF: Pounds per linear foot.
P  “Provide”: Furnish and install, complete and ready for intended use.
Q  “Project Site”: Space available for performing construction activities. The extent of Project Site is shown on the drawings and may or may not be identical with the description of the land on which Project is to be built.
R  PSF: Pounds per square foot.
S  PSI: Pounds per square inch.
T  “Regulations”: Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
U  RFI: Requests for information.
V  Roofing Terminology: Refer to the following publications for terms related to roofing work not otherwise defined in this section.
   1  ASTM D 1079: Definitions of Terms Relating to Roofing, Waterproofing, and Bituminous Materials.
   2  NRCA Roofing and Waterproofing Manual.
   3  Roof Consultants Institute Glossary of Terms.
W  SF: Square foot.

1.5 INDUSTRY STANDARDS

A  Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made part of the Contract Documents by reference.
B  Publication dates: Comply with standards in effect as of the date of the Contract Documents, unless otherwise indicated.
C  Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the more stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
   1  Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are the minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to the Architect for a decision before proceeding.
D  Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
   1  Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.
Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and web site addresses are subject to change and are believed to be accurate and up to date as of the date of the Contract Documents.

### ADAAG
- **Abbreviations and Acronyms for Standards and Regulations:**
  - **ADAAG: Americans with Disabilities Act (ADA)**
  - **Accessibility Guidelines for Buildings and Facilities**
  - Available from Access Board
  - [www.access-board.gov](http://www.access-board.gov)
  - 800-872-2253
  - 202-272-5434

### CFR
- **Code of Federal Regulations**
- Available from Government Printing Office
- [www.access.gpo.gov/nara/cfr](http://www.access.gpo.gov/nara/cfr)
- 888-293-6498
- 202-512-1530

### FS
- **Federal Specification**
- Available from Defense Automated Printing Services
  - [//astimage.daps.dla.mil/online](http:////astimage.daps.dla.mil/online)
- 215-697-6257
- Available from General Services Administration
  - [www.fss.gsa.gov/pub/fed-specs.cfm](http://www.fss.gsa.gov/pub/fed-specs.cfm)
- 202-619-8925
- Available from National Institute of Building Sciences
  - [www.nibs.org](http://www.nibs.org)
- 202-289-7800

### 1.6 ABBREVIATIONS AND ACRONYMS

#### A
- **Industry Organizations:** Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in the Gale Research’s “Encyclopedia of Associations” or in the Columbia Books’ “National Trade and Professional Associations of the US”.

#### B
- **Industry Organizations:** Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in the following list. Names, telephone numbers, and web site addresses are subject to change and are believed to be accurate and up to date as of the date of the Contract Documents.

##### AAMA
- **American Architectural Manufacturers Association**

##### ACI
- **American Concrete Institute/ACI International**
- [www.aci-int.org](http://www.aci-int.org)
- 248-848-3700

##### AIA
- **American Institute of Architects (The)**
- [www.e-architect.com](http://www.e-architect.com)
- 202-626-7300

##### AISC
- **American Institute of Steel Construction**
- [www.aisc.com](http://www.aisc.com)
- 800-644-2400
- 312-670-2400

##### ALSC
- **American Lumber Standard Committee**
- 301-972-1700

##### ANSI
- **American National Standards Institute**
- [www.ansi.org](http://www.ansi.org)
- 202-293-8020

##### APA
- **APA- The Engineered Wood Association**
- [www.apawood.org](http://www.apawood.org)
- 253-565-6600

##### ASHRAE
- **American Society of Heating, Refrigerating and Air-conditioning Engineers**
- 800-527-4723
- 404-636-8400
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<th>Section Name</th>
<th>Description</th>
<th>Website</th>
<th>Phone Number</th>
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<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
<td><a href="http://www.astm.org">www.astm.org</a></td>
<td>610-832-9585</td>
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<tr>
<td>AWPA</td>
<td>American Wood Preservers Association</td>
<td><a href="http://www.awpa.com">www.awpa.com</a></td>
<td>817-326-6300</td>
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<td>AWS</td>
<td>American Welders Society</td>
<td><a href="http://www.aws.org">www.aws.org</a></td>
<td>800-443-9353</td>
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<td>BIA</td>
<td>Brick Industry Association (The)</td>
<td><a href="http://www.bia.org">www.bia.org</a></td>
<td>703-620-0010</td>
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<tr>
<td>CISPI</td>
<td>Cast Iron Soil Pipe Institute</td>
<td><a href="http://www.cispi.org">www.cispi.org</a></td>
<td>423-892-0137</td>
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<tr>
<td>CRSI</td>
<td>Concrete Reinforcing Steel Institute</td>
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<tr>
<td>FM</td>
<td>Factory Mutual System</td>
<td>(See FMG)</td>
<td>401-275-3000</td>
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<td>FMG</td>
<td>Factory Mutual Global</td>
<td><a href="http://www.fmglobal.com">www.fmglobal.com</a></td>
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<tr>
<td>ICRA</td>
<td>International Concrete Repair Institute (The)</td>
<td><a href="http://www.icri.org">www.icri.org</a></td>
<td>703-450-0016</td>
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<tr>
<td>LPI</td>
<td>Lightning Protection Institute</td>
<td><a href="http://www.lightning.org">www.lightning.org</a></td>
<td>800-488-6864</td>
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<tr>
<td>MFMA</td>
<td>Metal Framing Manufacturers Association</td>
<td></td>
<td>312-644-6610</td>
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<td>MHIA</td>
<td>Material Handling Industry of America</td>
<td><a href="http://www.mhia.org">www.mhia.org</a></td>
<td>800-345-1815</td>
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<td>NAAMM</td>
<td>National Association of Architectural Metal Manufactures</td>
<td>312-332-0405</td>
<td><a href="http://www.naamm.org">www.naamm.org</a></td>
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<td>NACE</td>
<td>National Association of Corrosion Engineers</td>
<td><a href="http://www.nace.org">www.nace.org</a></td>
<td>281-228-6200</td>
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<td>NAIMA</td>
<td>North American Insulation Manufacturers Association (The)</td>
<td><a href="http://www.naima.org">www.naima.org</a></td>
<td>703-684-0084</td>
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<tr>
<td>NCMA</td>
<td>National Concrete Masonry Association</td>
<td><a href="http://www.ncma.org">www.ncma.org</a></td>
<td>703-713-1900</td>
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<tr>
<td>NECA</td>
<td>National Electrical Contractors Association</td>
<td><a href="http://www.necanet.org">www.necanet.org</a></td>
<td>301-657-3110</td>
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<td>NEMA</td>
<td>National Electrical Manufacturers Association</td>
<td><a href="http://www.nema.org">www.nema.org</a></td>
<td>703-841-3200</td>
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<td>NFPA</td>
<td>National Fire Protection Association</td>
<td><a href="http://www.nfpa.org">www.nfpa.org</a></td>
<td>800-344-3555</td>
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<tr>
<td>NLGA</td>
<td>National Lumber Grades Authority</td>
<td>604-524-2393</td>
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<td></td>
<td><a href="http://www.nlga.org">www.nlga.org</a></td>
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<tr>
<td>NRCA</td>
<td>National Roofing Contractors Association</td>
<td>800-323-9545</td>
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<td></td>
<td><a href="http://www.nrca.net">www.nrca.net</a></td>
<td>847-299-9070</td>
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<tr>
<td>NRMCA</td>
<td>National Ready Mixed Concrete Association</td>
<td>888-846-7622</td>
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<td><a href="http://www.nrmca.org">www.nrmca.org</a></td>
<td>301-587-1400</td>
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<td>PCA</td>
<td>Portland Cement Association</td>
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<td>PCI</td>
<td>Precast Concrete Institute</td>
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<td>PDI</td>
<td>Plumbing and Drainage Institute</td>
<td>800-589-8956</td>
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<td><a href="http://www.pdionline.org">www.pdionline.org</a></td>
<td>508-230-3516</td>
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<td>SDI</td>
<td>Steel Deck Institute</td>
<td>847-462-1030</td>
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<td><a href="http://www.sdi.org">www.sdi.org</a></td>
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<td>SJI</td>
<td>Steel Joist Institute</td>
<td>843-626-1995</td>
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<td><a href="http://www.steeljoist.org">www.steeljoist.org</a></td>
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<tr>
<td>SMACNA</td>
<td>Sheet Metal and Air Conditioning Contractors National Association</td>
<td>703-803-2980</td>
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<td><a href="http://www.smacna.org">www.smacna.org</a></td>
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<td>SPIB</td>
<td>Southern Pine Inspection Bureau</td>
<td>850-434-2611</td>
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<td><a href="http://www.spib.org">www.spib.org</a></td>
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<td>SPRI</td>
<td>SPRI (Single Ply Institute)</td>
<td>781-444-0242</td>
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<td>(<a href="http://www.spri.org">www.spri.org</a>)</td>
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<tr>
<td>SSPC</td>
<td>Society for Protective Coatings</td>
<td>800-837-8303</td>
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<td><a href="http://www.sspc.org">www.sspc.org</a></td>
<td>412-281-2331</td>
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<td>SWRI</td>
<td>Sealant, Waterproofing, and Restoration Institute</td>
<td>816-472-7974</td>
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<td><a href="http://www.swronline.org">www.swronline.org</a></td>
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<tr>
<td>UL</td>
<td>Underwriters Laboratories</td>
<td>800-704-4050</td>
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<td></td>
<td><a href="http://www.ul.com">www.ul.com</a></td>
<td>847-272-8800</td>
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**Code Agencies:** Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in the following list. Names, telephone numbers, and web site addresses are subject to change and are believed to be accurate and up to date as of the date of the Contract Documents.
### 1.7 REFERENCE STANDARDS

**A** General: Standards listed by reference, including revisions by issuing authorities, form a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviations, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referenced to by authority abbreviation and standard designation.

**B** American Society of Civil Engineers - Reference Document ASCE 7-95, Minimum Design Loads for Buildings and Other Structures.

**C** ACI 530  ACI 530-02/ASCE 5-02/TMS 402-02 “Specification for Masonry Structures”, published by the American Concrete Institute, American Society of Civil Engineers, and the Masonry Society.

**D** ACI 530.1  ACI 530.1-02/ASCE 6-02/TMS 602-02 “Specification for Masonry Structures”, published by the American Concrete Institute, American Society of Civil Engineers, and the Masonry Society.

**E** American Society of Testing and Materials (ASTM).

1. ASTM A 366 - Standard specification for Commercial Steel (CS), Carbon (0.15 Maximum percent) Cold-rolled.

2. ASTM A 653 – Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the hot dip process.

3. ASTM A 924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the hot dip process.

4. ASTM C 90 – Hollow Load Bearing Concrete Masonry Units

5. ASTM C 144 – Standard Specification for Aggregate for Masonry Mortar


7. ASTM C 165 - Compressive strength

8. ASTM C 203 - Flexural strength

11. ASTM C 270 – Standard Specification for Mortar for Masonry Unit
12. ASTM C 355 - Water vapor permeance
13. ASTM C 404 – Aggregates for Masonry Grout
14. ASTM C 476 – Grout for Reinforced and Non-reinforced Masonry
15. ASTM C 518 - Thermal resistance
16. ASTM C 1177 - Water Absorption
17. ASTM D 41 - Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
18. ASTM D 312 - Specification for Asphalt Used in Roofing
25. ASTM D 1970 - Specification for Sheet Materials, Self-Adhering Polymer Modified Bituminous, Used as Steep Roofing Underlayment for Ice Dam Protection
27. ASTM D 2626 - Specification for Asphalt Saturated and Coated Organic Base Sheet Used in Roofing
29. ASTM D 4586 - Specification for Asphalt Roof Cement, Asbestos Free
31. ASTM E 84 - Flame spread
32. ASTM E 108 – Spread of flame

F  FMG
1  FMG - Loss Prevention Data Sheets 1-7; 1-28; 1-28R; 1-29; 1-29R; 1-49.
2  FMG - (FMRC) Approval Guide - Roof Coverings.
3  FMG Standard 4470 - Approval Standard for Class I Roof Covers.

1.8 CODE AND TEST REQUIREMENTS

A  The roof system which is bid shall have been tested in compliance with the following codes and test requirements.

1  Underwriters Laboratories Class or Warnock Hersey [‘A’] external fire classification.
2. FMG Listing: Provide Roofing Membrane, Base Flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG’s “Approval Guide” for Class I construction.
   a. Fire/Winstorm Classification: Class 1A-90
   b. Hail Resistance: MH

2. PART 2 – PRODUCTS (Not Used)
3. PART 3 – EXECUTION (Not Used)

END OF SECTION 01420 - REFERENCES
SECTION 01430

QUALITY ASSURANCE

1  PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A  Documents affecting work of this Section include, but are not necessarily limited to, Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections.

1.2 COMMUNICATIONS

A  Requests for information: Contractor shall issue requests for information (RFI’s) to Architect in a timely manner, in writing, preferably by e-mail.

1  Number each RFI.

2  Indicate the latest date by which a response is needed so as not to delay the Work. Allow at least two business days after receipt for a response (complex issues may require longer to research).

3  Maintain a log of RFI’s showing status of each.

4  If practicable, include a proposed solution to each issue raised in an RFI.

1.3 CONTRACTOR AND MANUFACTURER

A  Contractor shall:

1  Be experienced in modified bitumen roofing as required in Section 01100.

2  Be acceptable by Owner and roofing material manufacturer.

3  Maintain an effective quality assurance program, independent of the activities by the Owner, Consultant, Observers, or manufacturers. Contractor may not rely on Consultants monitoring or on observation services provided by others as a substitute for performing Contractor’s own quality assurance program.

4  Accept sole responsibility for the quality of the work.

5  Notify Consultant orally, followed in writing, of conditions that the Contractor believes will yield unsatisfactory performance, or of items of non-conformity between these Contract Documents and manufacturers specifications or instructions, or of discovered errors and omissions. Failure of Contractor to submit written notification shall be construed as a representation by Contractor that the Contract Documents are acceptable to Contractor, that they are sufficient in scope and detail to indicate and convey understanding of the terms and conditions for performance and furnishing of the Work, and that Contractor reasonably believes the work will perform as intended.

6  Correct Work reported to be defective with no increase in cost to the Owner. Once defective Work is reported to the Contractor, that Work shall be considered to require correction until it is actually corrected, regardless of whether it is mentioned again. When a portion of the Work is reported as defective, the Contractor shall promptly investigate the extent to which similar Work has the same conditions. All similar Work shall be considered defective until the full extent of the defective conditions are documented to the Consultant’s satisfaction.

B  Roofing manufacturer shall:

1  Be an Associate Member in good standing with National Roofing Contractor’s Association (NRCA).
2 Notify Consultant of planned site visits in a timely manner so Consultant can coordinate his site visits to correspond.

3 Material manufacturer must supply a representative to perform periodic observations throughout the course of the Project. Written reports must be submitted to the Consultant and copies to the Contractor. Each site visit must be accompanied by a written report.

4 Provide written reports to Consultant summarizing any communication with Contractor regarding any aspect of the Work.

5 Provide a factory trained technician to attend site meetings and to perform final observations of the roofing system.

C Provide specified Warranty upon completion of satisfactory installation of the roofing system.

1.4 TESTING

A Each roof system and the ceilings under C08 must be tested for asbestos by a testing lab approved by the Owner, if asbestos is detected, it must be abated as required by current OSHA and EPA standards.

B Infra-red scan must be made prior to the request for final payment. Infra-red scanner must be approved by the manufacturer issuing the Warranty and the Consultant. Scan may not be made by Contractor who installed the work.

C Any deficiencies noted during observations, including results of the infrared scan must be corrected by the Contractor and approved in writing by the Consultant prior to scheduling inspection for Final Completion.

1.5 SUBMITTALS

A Submit certification by the manufacturer of the system materials used that these Specifications and the Drawing Details are acceptable to them for the deck and surfacing to which they are to be applied.

B If details for any manufacturer’s systems proposed in the Contract Documents are not acceptable to the manufacturer, submit corresponding details proposed for the particular application, together with the manufacturer’s reasons for not accepting the conditions depicted in the Specifications or Drawings. No alternate details will be considered without evidence of valid objections on the part of the manufacturer to the Contract requirements.

C No deviation is to be made from this Specification without prior written approval by the manufacturer; submit such approval to the Architect.

2 PART 2 - PRODUCTS

2.1 GENERAL

A Comply with Quality Control, References, Contract Documents, and Manufacturer's data. Where conflict may exist, more stringent requirements govern.

B Provide Primary Roofing Products for any system other than the specified standard, including each type of roofing sheet (felt), bitumen, adhesives, primers, base flashings, and miscellaneous flashing materials from a single manufacturer, which has produced that type of product successfully for not less than fifteen (15) years. Provide secondary products (insulation, mechanical fasteners, lumber, etc.) only as recommended and/or required by manufacturer of the roof membrane as required for the specified warranty and FMG Approval.

3 PART 3 – EXECUTION

3.1 JOB LOG

A Contractor to maintain a daily job log to be kept on site at all times from the pre-roofing conference through project close-out. The job log shall include:
1 Copies of all submittals.
2 Safety coordinator appointment with emergency telephone numbers; fall protection plan and material safety data sheets for all products.
3 A summary of each day's work including any photographs or detail revisions.
4 A field sketch showing areas of work for the day.
5 Accident reports.
6 Complaint log, listing complaints received from any party of any nature, and the actions taken and resolution, with dates and names of individuals involved.

END OF SECTION 01430 - QUALITY ASSURANCE
SECTION 1500
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1 PART 1 – GENERAL

1.1 RELATED DOCUMENTS
   A Documents affecting work of this Section include, but are not necessarily limited to, Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections.

1.2 SUMMARY
   A Work included: provide for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection. All temporary facilities shall be provided by the Contractor.
   B Temporary utilities include, but are not limited to, the following:
      1 Water: provided by Owner where available.
      2 Electric power: 120 V power only will provided by Owner where available in sufficient amperage, to be distributed by the Contractor. If amperage is insufficient as distributed by the Contractor, the Contractor must re-distribute power or provide his own supplementary power to prevent disrupting power services due to tripped breakers.
      3 Sanitary facilities: provided by the Contractor.
   C Support Facilities include, but are not limited to, the following:
      1 Waste disposal services to be provided by the Contractor.
      2 Field office, document storage, and miscellaneous services and facilities to be provided by the Contractor, if needed.
   D Security and Protection facilities include, but are not limited to, the following:
      1 Temporary fire protection to be provided by the Contractor.
      2 Barricades, warning lights and warning signs to be provided by the Contractor.
      3 Environmental protection to be provided by the Contractor.
      4 Temporary fences and gates to be provided by the Contractor.
      5 Temporary pavements, walkways and ground protection to be provided by the Contractor.
      6 Temporary scaffolding providing outside stairway access to roof to be provided by the Contractor.

1.3 SUBMITTALS
   A Within five days prior to commencement of Work, submit schedule for delivery and set up of each temporary facility.
   B If temporary utilities are used submit the following:
      1 Reports of tests, inspections meter readings and similar procedures performed on temporary utilities.
      2 Implementation and Termination Schedule: submit a schedule indicating implementation and termination of each temporary utility.
1.4 QUALITY ASSURANCE

A Regulations: If temporary utilities are utilized, comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:

1 Building code requirements.
2 Health and safety regulations.
3 Utility company regulations.
4 Police, fire department, and rescue squad rules.
5 Environmental protection regulations.


1 Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electrical service. Install service in compliance with NFPA “National Electric Code”.

C Inspections: If temporary utilities are used, arrange for Authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1 Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not allow hazardous, dangerous or unsanitary conditions or public nuisances to develop or persist on site.

1.5 PROJECT CONDITIONS

A Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility.

B Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as necessary as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on site.

2 PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A General: Provide new equipment. If acceptable to the Consultant, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended

a Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

B Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

C Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

1 Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
3  PART 3 – EXECUTION

3.1 INSTALLATION

A  Use qualified personnel for installation of temporary facilities and utilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work and the Owners use of the site.

B  Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A  General: Engage the appropriate local utility company and a licensed electrician to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company requirements.

1  Arrange with utility company and the Owner for a time when service can be interrupted, if necessary, to make connections for temporary services.

B  Toilets: Provide temporary toilet facilities for use during construction. Use of Owner facilities is not permitted.

C  Waste Collection and Disposal: Collect waste from construction and staging areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

A  Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Consultant.

B  Temporary Fire Protection: Unless fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 “Standard for Portable Fire Extinguishers” and NFPA 241 “Standard for Safeguarding Construction, Alterations, and Demolition Operations.”

1  Remove propane tanks from roof daily and place in secure cages. Cages to be located within secure barricades and fencing as approved by Owner.

2  Locate fire extinguishers at not less than one extinguisher on each roof at each point of access and near all convenient and effective points where torches are in use.

3  Store combustible materials in fire safe locations.

4  Do not obstruct access to fire hydrants, fire lanes or emergency vehicle access routes, temporary fire-protection facilities, stairways, fire exits, doorways or other emergency exit routes. Do not impede operation of smoke hatches or fire suppression systems. No smoking is allowed on site.

5  Provide supervision of welding operations, heat-producing electrical devices, combustion-type temporary heating units, and similar sources of fire ignition.

6  Provide fire watch whenever torches, welding devices or open flame are in use. Maintain fire watch for one hour after torches are extinguished. Fire watch to include interior and exterior inspection and use of hand held heat detection device to detect any hot spots. Perform pre and post burn inspections and provide written fire watch reports to Owner daily.
C Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.

D Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

E Temporary Pavements: Provide temporary construction pavements, at unpaved staging areas, consisting of graded and compacted crushed stone materials of size and thickness capable of supporting loads of all construction vehicles, traffic without deforming and rutting. Maintain surface as required.

F Temporary Signs: Provide temporary weatherproof signs to indicate construction vehicle access and the building it serves.

3.4 OPERATION, TERMINATION AND REMOVAL

A Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B Maintain facilities in a neat and orderly fashion and keep in good operating condition during the progress of the Work.

C Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

END SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS
SECTION 01600
MATERIAL AND EQUIPMENT

1 PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A Documents affecting work of this Section include, but are not necessarily limited to, Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections.

2 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.

B Storage of Materials

1 Store adhesives and ply sheets in dry area protected from water or extreme humidity.

2 Store ply sheets on ends where possible; on sloped roofs, store flat parallel to joists. Discard rolls which have been flattened, creased, or otherwise damaged.

3 Stack insulation on pallets.

4 Remove plastic packing shrouds. Cover all stored materials with tarpaulin top to bottom. Secure tarpaulin.

5 Rooftop storage: Disperse material on roof to avoid structure overloading.

C Material Handling

1 Handle all materials on site 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.

D Environmental Requirements

1 Do not work in rain, snow or in presence of water.

* * * END OF SECTION 01600 * * *
SECTION 01731
CUTTING AND PATCHING

1 PART 1 – GENERAL

1.1 RELATED DOCUMENTS:
A Documents affecting work of this Section include, but are not necessarily limited to, Drawings and
general provisions of the Contract, including General and Supplementary Conditions and other
Division 1 Specification Sections.

1.2 SUMMARY
A Procedures for cutting and patching building surfaces necessary for installation or completion of the
Work.
B Related Sections include the following:
1 All Divisions 1 through 16.

1.3 DEFINITIONS
A Cutting: Removal of existing construction necessary to permit installation or performance of other
Work.
B Patching: Fitting and repair work required to restore surfaces to original conditions after installation of
other Work

1.4 SUBMITTALS:
A Submit a proposal for prior approval, with shop drawings if necessary, describing the procedures for
any cutting and patching that is to be performed according to requirements in Section 01330 -
Submittals. Provide the following information as a minimum;
1 Extent: Describe cutting and patching, show how they will be performed, and indicate why they are
necessary.
2 Changes to Existing Construction: Describe anticipated results. Include changes to structural
elements and operating components as well as changes in building’s appearance and other significant
visual elements.
3 Products: List products to be used and firms or entities that will perform the Work.
4 Dates: Indicate when cutting and patching will be performed.
5 Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that
will be relocated and those that will be temporarily out of service. Indicate how long service will be
disrupted.
6 Structural Elements: Where cutting and patching involve adding reinforcement to structural
elements, submit details and engineering calculations showing integration of reinforcement with
original structure.
7 Consultant’s and Owner’s Approval: Obtain approval of cutting and patching proposal before
performing cutting and patching. Approval does not waive right to later require removal and
replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE
A Structural Elements: Do not cut and patch structural elements in a manner that could change their load-
carrying capacity or load-deflection ratio.

1. Structural concrete.
2. Structural steel.
3. Lintels.
4. Structural decking.
5. Miscellaneous structural metals.
7. Equipment supports.
8. Piping, ductwork, vessels, and equipment.
9. Structural systems of special construction.

B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

1. Primary operational systems and equipment.
2. Air or smoke barriers.
3. Fire-protection systems.
4. Control systems.
5. Communication systems.
6. Conveying systems.
7. Electrical wiring systems.
8. Operating systems of special construction.

C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Exterior curtain-wall construction.
4. Equipment supports.
5. Piping, ductwork, vessels, and equipment.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence that cutting and patching were performed. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.
   a. Processed concrete finishes.
   b. Stonework and stone masonry.
   c. Ornamental metal.
   d. Matched-veneer woodwork.
   e. Preformed metal panels.
   f. Roofing.
   g. Firestopping.
   h. Window wall system.
   i. Stucco and ornamental plaster.
   j. Terrazzo.
   k. Aggregate wall coating.
   l. Wall covering.
   m. HVAC enclosures, cabinets, or covers.
B Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.6 WARRANTEES

A Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

2 PART 2 – PRODUCTS

2.1 Materials

A General: Comply with requirements specified in other Sections of these Specifications.

B Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

1 If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

3 PART 3 – EXECUTION

3.1 EXAMINATION

A Examine surfaces to be cut and patched; apply sample materials if necessary to confirm color and texture matching before proceeding.

1 Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

2 Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A Temporary Support: Provide temporary support of Work to be cut

B Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

3.3 PERFORMANCE

A General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1 Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2 Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

3 Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

4 Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

5 Proceed with patching after construction operations requiring cutting are complete.

C Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications

1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

2 Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

3 Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

D Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION 01731 - CUTTING AND PATCHING
01770

CONTRACT CLOSE-OUT

1 PART 1 - GENERAL

1.1 RELATED DOCUMENTS:
A Documents affecting work of this Section include, but are not necessarily limited to, Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections.

1.2 DESCRIPTION
A Work included:
1 Provide an orderly and efficient transfer of the completed Work to the Owner.

1.3 QUALITY ASSURANCE
A Prior to requesting inspection by the Owners Representative, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.

1.4 PROCEDURES
A Substantial Completion:
1 All roofing materials and components are in place and water tight according to specifications with alternates approved by Designated Owner’s representative and Building Owner.
2 Roofing Contractor will notify designated Owner’s representative of substantial completion. Within a reasonable time after receipt of notification, the designated Owner’s representative will inspect to determine status of completion.
3 Should the designated Owner’s representative determine that the Work is not substantially completed:
   a The Designated Owner’s representative will promptly notify the Contractor, giving the reasons therefore.
   b Roofing Contractor will remedy the deficiencies and notify the Designated Owner’s representative when ready for re-inspection.
   c The Designated Owner’s representative will re-inspect the Work.
B Final Completion:
1 Designated Owner’s representative will prepare and submit a written statement at final completion.
2 Certify that:
   a Contract Documents have been reviewed;
   b Work has been inspected for compliance with the Contract Documents;
   c Work has been completed in accordance with the Contract Documents;
   d Equipment and systems have been tested as required, and are operational;
   e Work is completed and ready for final inspection.
3 The Designated Owner’s representative will make an inspection to verify status of completion.
4 Should the Designated Owner’s representative determine that the Work is incomplete or defective:
a The Designated Owner’s representative will promptly notify the Contractor, in writing, listing the incomplete or defective work.
b Remedy the deficiencies promptly, and notify the Designated Owner’s representative when ready for re-inspection.

5 When the Designated Owner’s representative determines that the Work is acceptable under the Contract Documents, he will request the Contractor to make close-out submittals.

C Close-out submittals include, but are not necessarily limited to:
1 Project Record Documents described in Section 01720, if part of specification;
2 Operation and maintenance data for items so listed in pertinent other Sections of these Specifications, and for other items when so directed by the Owners Representative;
3 Warranties
4 Evidence of payment and release of liens;
5 List of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.

D Final adjustment of accounts:
1 Submit a final statement of accounting to the Owners Representative, showing all adjustments to the Contract Sum.
2 If so required, the Designated Owner’s representative will prepare a final Change Order showing adjustments to the Contract Sum which were not made previously by Change Orders.

1.5 INSTRUCTION
A Instruct the Owner’s personnel in proper operation and maintenance of systems, equipment, and similar items which were provided as part of the Work.

* * * END OF SECTION 01770 * * *
SECTION 01741

WARRANTY

1  PART 1 - GENERAL

  1.1 RELATED DOCUMENTS:

      A  Documents affecting work of this Section include, but are not necessarily limited to, Drawings and
general provisions of the Contract, including General and Supplementary Conditions and other
Division 1 Specification Sections.

  1.2 GENERAL

      A  This portion of the specification sets forth the warranty requirements for the following roof area(s):  All

  1.3 WARRANTY

      A  Quotations for the base bid will include a 20 year NDL warranty as specified in section 07500.

      1  The material supplier will issue the warranty to the owner upon material supplier acceptance of the
project completion.

* * * END OF SECTION 01741 * * *
PART 1 – GENERAL

1.1 GENERAL

A. NEW CONSTRUCTION

Roofing for new construction shall be either a Modified Bitumen Roof or Fluid Applied Protected Membrane roof, also referred to as a PMA, Protected Membrane Assembly. No exceptions shall be allowed unless approval is obtained in writing from Cleveland Clinic’s Facility Engineering Department in advance.

These specification sections and their respective guidelines follow this section. General specifications, unrelated to specific materials (i.e. Quality Assurance, Pre-roofing Conference, Project Management, Job Conditions, etc.) shall apply to any roof utilized.

B. EXISTING CONSTRUCTION

For existing roofs, the two roof types listed above are preferred for low slope roofs. However, it is recognized that existing conditions may warrant consideration of alternative types of roofs. All alternatives must be approved in writing by the Facilities Engineering Department.

The following are design criteria for both new roofing and re-roofing projects.

C. GENERAL DESIGN CRITERIA

1. Design low-slope roof systems in accordance with the recommendations of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual and this manual.

2. Low-slope roof systems are limited to the following roofing membranes with roof insulation:
   a. Modified bituminous roofing systems
   b. Fluid-applied roofing systems
   c. Alternatives as approved by the Facilities Engineering Department

3. Re-roofed areas shall conform to this Article.

D. POLICY

No roofs shall be dead flat; design all roofs with slope to roof drains or gutters. Where the perimeter flashing height is limited, designer shall consider using a PMA.

The Cleveland Clinic supports and encourages solutions that are environmental responsible. Designers shall consider options to maximize LEED points. For example, the use of recycled material for overburden should be evaluated.
E. DESIGN LAYOUT OF LOW-SLOPE ROOFS

1. Design low-slope roof systems with a positive slope: a minimum of 1:50 (0.25 in. per ft.) up to a maximum of 1:12 (1.0 in. per ft.) to drains:
   a. Use tapered insulation or sloped structural systems to achieve the required slope. Sloped fill material shall not be allowed.
   b. Do not use NRCA defined "One-way slope" (Sloping to a level valley). See NRCA – "Tapered Roof Insulation Systems."
   c. Use NRCA defined "Two-Way slope" (actually sloping in four directions).

2. When existing slopes exceed 2” per foot, designer shall utilize insulation stops and back nail.

3. Locate drains at points of maximum deck deflection; generally at mid span of the deck between supports where possible. As an alternative, roofs may slope to a column.

3. Locate drains to the interior of the building. This is mandatory for buildings in northern climates.

4. All new roofs shall have an independent overflow drain system. Provide an overflow system compliant with all applicable Building and Plumbing Codes, with an overflow outlet no more than 2 inches above the main roof drain system.

5. For existing roofs that do not have an overflow drain system, designer shall evaluate options to comply with the code requirements for overflow drains and install an overflow system whenever possible. If it is not possible to add an interior overflow system, the designer may consider a solution utilizing scupper boxes.

6. External drainage systems are not allowed except where noted above. Gutters and downspouts shall not be used except where already present in existing buildings.

7. Designer shall address the requirements for both the building’s expansion joints and the roof’s expansion.

8. All roofs shall be completely dry within 24 hours of a rain fall.

F. ROOFING SELECTION

In selecting the right roofing system, there are a number of important factors to consider, including those listed below.

1. The size and shape of the building and roof
2. The location of the drains, whether exterior or interior
3. Aesthetic considerations, especially where the roof is visible from other portions of the building or from adjacent buildings.
4. Roof and insulation attachment methods that are dictated by the deck type
5. The insulating values desired for energy conservation and HVAC sizing. A minimum of R30 is required unless existing conditions prohibit achieving this value.
6. The interior environment of the building and the operations contained within. For example, the water vapor generated from a swimming pool, or emissions from a boiler plant, may dictate the choice of roofing.

7. The time of the year when the roofing work will occur.

8. Deck type, such as concrete or steel, and the existing slope.

9. For existing roofs, designer shall determine the cause of the failure of the existing roof, and the design shall address the cause(s) of the failure with the new roof.

10. For existing roofs, designer shall inspect the perimeter conditions to assess their integrity. This shall include curtain walls, existing flashing, counter flashing, weep holes, wall joints, copings, and window and door sills.

11. For existing roofs, designer shall inspect the condition of the roof and height available for flashing at all rooftop equipment and structures, including curbs for mechanical equipment and skylights. All roof penetrations shall be reviewed and assessed as well.

12. For existing roofs, designer shall conduct an underside inspection to include a thorough review of items attached to the roof deck. Items such as conduits, lights and ceilings may be impacted by a roof and deck replacement. The full scope of this work must be documented and an approach established to address these items prior to beginning any re-roofing project.

13. For existing roofs, designer shall inspect any duct work above the roof for leaks that may compromise the exterior envelope.

14. For existing roofs, designer shall conduct hazardous substance testing, including asbestos, lead paint, and asbestos fireproofing.

15. For existing roofs, designer shall evaluate the condition of the roof deck.

16. For existing roofs, designer shall determine roof construction, including materials and condition.

17. For existing roofs, designer shall inspect all roof appurtenances, such as skylights, to fully understand the flashing requirements.

18. In addition to the above, designer shall follow the Roof Education Guideline (REI) for assessment. Tools such as infrared testing may be necessary to fully understand the existing conditions.

19. Designer shall understand the site limitations and clarify with Owner where storage of materials and operations may occur on site.

G. ANCHORAGE OF INSULATION

Secure insulation to deck. Loose laid insulation is not permitted except for protective membrane roof insulation system.

H. OVERBURDEN

Show ballast types and weight(s) on roof plans and describe in detail in project specifications. Where applicable, indicate pavers and paver pattern, and green roof materials.
I. BASE FLASHING AND PENETRATIONS
   Use 200 mm (8 in.) minimum high base flashing at walls and penetrations. Do not use pitch pockets or similar penetration seals.
   Do not cover existing through wall flashing and weep holes.
   Do not surface mount counter flashing in masonry walls. Surface mounted flashing shall only be used on concrete walls where there is no reglet.
   Do not flash or seal over weeps for skylights or weeps in masonry walls.

J. SCUPPERS
   Locate overflow scuppers in parapet walls at top of membrane so that ponding does not exceed high point of slopes.

K. ROOF TIE OFF / DAVITS
   All new roofs shall be provided with a means for window washers and maintenance personnel to tie off. There are no exceptions to this requirement, regardless of the size of the roof.

L. PARAPET WALLS, ROOF STRUCTURES, AND WALKWAYS

   1. PARAPET WALLS
      a. Parapet walls shall be provided on all new construction unless otherwise authorized by the Facilities Engineering Department.
      b. Parapet walls shall be a minimum of 42 inches high, or as required to comply with OSHA and all applicable building codes, whichever is higher.
      c. Where parapet walls are non-bearing, utilize roof-to-wall expansion joints.

   2. ROOF STRUCTURES
      Make roof structures, such as penthouses and architectural screens enclosing or concealing roof-mounted mechanical equipment, compatible in appearance and with the material, texture, color, and shape of the building. Where it is necessary to expose roof-mounted mechanical equipment, minimize its appearance by location, low silhouette, and color.

   3. ROOF WALKWAYS
      Provide roof walkways with non-slip surfaces on access routes over roofs to mechanical equipment requiring recurrent maintenance. Provide a cage with all ladders when required by OSHA. Show their locations and provide details on architectural drawings.
M. PERMANENT ROOF ACCESS

All roofs shall have permanent roof access. For larger roofs, access by a man door shall be provided.
Smaller roofs, such as roofs over elevator penthouses, may be accessed by ladder if the ladder is permanent.
When feasible in existing roofs, add a roof hatch if none exists.

N. PERMANENT FALL PROTECTION

Permanent fall protection shall be provided on all new and existing roofs. Acceptable means of providing fall protection include parapets, guardrails and davits.
Whenever mechanical equipment requiring periodic maintenance is installed on a roof more than 6 m (20 ft.) above the ground, as a minimum, provide guardrails or fences between the roof edge and any equipment or walkways less than 3 m (10 ft.) from the edge. Design the guardrails 1050 mm (42 in.) high and in accordance with OSHA requirements for standard guardrails.

O. ROOF DRAINS

1. All roof drains shall be cast iron. Stainless steel bolts shall be used to anchor drains.

2. On re-roofing projects, test all drains prior to starting work to confirm that they are free flowing and in good condition. Repair all drains as needed prior to beginning work.

3. All drains shall be plugged during the day when work is in progress. Drains shall be unplugged at the end of the working day.

4. On re-roofing projects, adjust roof drain height as needed for the new insulation thickness, including lowering with PMA’s.

5. For all PMA’s, flood testing is required.

*****
SECTION 075216

STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Styrene-butadiene-styrene (SBS) modified bituminous membrane roofing.
   2. Vapor retarder.
   3. Roof insulation.

B. Section includes the installation of insulation strips in ribs of acoustical roof deck. Insulation strips are furnished under Division 05 Section "Steel Decking."

C. Related Sections:
   1. Division 05 Section “Metal Fabrications” for steel ladders/stairs over obstructions.
   2. Division 07 Section "Thermal Insulation" for insulation beneath the roof deck.
   3. Division 07 Section "Manufactured Roof Expansion Joints" for proprietary manufactured roof expansion-joint assemblies.
   4. Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
   5. Division 22 Section "Storm Drainage Piping Specialties" for roof drains.

1.3 DEFINITIONS

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

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

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

D. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class I or noncombustible construction, as applicable. Identify materials with FM Approvals markings.
   1. Fire/Windstorm Classification: Class 1A-90
   2. Hail Resistance Rating: SH.

E. Energy Performance: Provide roofing system with initial Solar Reflectance Index not less than 78 when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency.

1.5 SUBMITTALS

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

B. LEED Submittals:
   1. Product Test Reports for Credit SS 7.2: For roof materials, indicating that roof materials comply with Solar Reflectance Index requirement.
   2. Product Data for Credit EQ 4.1: For adhesives and sealants, including printed statement of VOC content.

C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
   1. Base flashings and membrane terminations.
   2. Tapered insulation, including slopes.
   3. Crickets, saddles, and tapered edge strips, including slopes.
   4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

D. Samples for Verification: For the following products:
   2. Roof insulation.
   3. 3 lb (1.5 kg) of aggregate surfacing material in gradation and color indicated.
   4. Walkway pads or rolls.
   5. Six insulation fasteners of each type, length, and finish.

E. Qualification Data: For qualified Installer and testing agency.
F. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of complying with performance requirements.

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

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

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

J. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

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

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

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

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

E. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

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

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affec ts roofing, including installers of roof accessories and roof-mounted equipment.

2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

5. Review structural loading limitations of roof deck during and after roofing.

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

1.7 DELIVERY, STORAGE, AND HANDLING

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

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
   1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

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

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

1.8 PROJECT CONDITIONS

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

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
   1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories, and other components of membrane roofing system.
   2. Warranty Period: 20 years from date of Substantial Completion.
PART 2 - PRODUCTS

2.1 SBS-MODIFIED ASPHALT-SHEET MATERIALS

A. SBS-Modified Bituminous Membrane Roofing:
   
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      
      a. Firestone Building Products.
      b. Johns Manville.
      c. Soprema.
      d. Tremco Incorporated

B. Granule-Surface Roofing Membrane Cap Sheet: ASTM D 6164, Grade G, Type II, SBS-
modified asphalt sheet (reinforced with polyester fabric); granular surfaced; suitable for
application method specified, and as follows:

   1. Granule Color: [White] [Gray]

2.2 BASE-SHEET MATERIALS

A. Base Sheet: ASTM D 4601, Type II, SBS-modified, asphalt-impregnated and -coated sheet,
with polyester or compatible manufacturers standard, dusted with fine mineral surfacing on both
sides.

   1. Weight: 50 lb/100 sq. ft. (2.4 kg/sq. m) minimum.

2.3 BASE FLASHING SHEET MATERIALS

A. Granule-Surfaced Flashing Sheet: ASTM D 6164, Grade G, Type II, SBS-modified asphalt
sheet (reinforced with polyester fabric); granular surfaced; suitable for application method
specified, and as follows:

   1. Granule Color: Match roof membrane granules color

2.4 AUXILIARY ROOFING MEMBRANE MATERIALS

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

   1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
   2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply
   with the following limits for VOC content when calculated according to 40 CFR 59,
   Subpart D (EPA Method 24):
      
      a. Plastic Foam Adhesives: 50 g/L.
b. Gypsum Board and Panel Adhesives: 50 g/L.
c. Multipurpose Construction Adhesives: 70 g/L.
d. Fiberglass Adhesives: 80 g/L.
e. Contact Adhesive: 80 g/L.
f. Other Adhesives: 250 g/L.
g. Nonmembrane Roof Sealants: 300 g/L.
h. Sealant Primers for Nonporous Substrates: 250 g/L.
i. Sealant Primers for Porous Substrates: 775 g/L.

B. Asphalt Primer: ASTM D 41.

C. Roofing Asphalt: ASTM D 6152, SEBS modified.

D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.

E. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.

F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing membrane components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.

G. Metal Flashing Sheet: As specified in Division 07 Section "Sheet Metal Flashing and Trim."

H. Aggregate Surfacing: ASTM D 1863, No. 6 or No. 67, clean, dry, opaque, water-worn gravel or crushed stone, free of sharp edges, or crushed slag, free of sharp edges.

I. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.5 SUBSTRATE BOARDS

A. Substrate Board: ASTM C 1396/C 1396M, Type X gypsum board, 5/8 inch (16 mm) thick.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.6 VAPOR RETARDER

A. Self-Adhering Sheet Vapor Retarder: ASTM D 1970, minimum of 40-mil- (1.0-mm-) thick, polyethylene film laminated to layer of rubberized asphalt adhesive; maximum permeance rating of 0.1 perm (6 ng/Pa x s x sq. m); cold applied, with slip-resisting surface and release paper backing. Provide primer when recommended by vapor-retarder manufacturer.
2.7 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Approvals-approved roof insulation.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class I, Grade 3, felt or glass-fiber mat facer on both major surfaces.

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48) unless otherwise indicated.

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

2.8 INSULATION ACCESSORIES

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

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

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

D. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

E. Wood Nailer Strips: Comply with requirements in Division 06 Section "[Rough Carpentry] [Miscellaneous Rough Carpentry]."

F. Tapered Edge Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

G. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch (13 mm) thick, factory primed.

   1. Products: Subject to compliance with requirements, provide the following:

      a. Georgia-Pacific Corporation; Dens Deck Prime.

H. Substrate Joint Tape: 6- or 8-inch- (150- or 200-mm-) wide, coated, glass-fiber joint tape.

2.9 WALKWAYS

A. Walkway Pads: Reinforced asphaltic composition pads with slip-resisting mineral-granule surface, or Polymer-modified, reconstituted rubber pads with slip-resisting textured surface, manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer, 3/8 inch (10 mm) thick, minimum.
1. Pad Size: 24 inch x 24 inch (610 mm x 610 mm) minimum.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Decking."
4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
6. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.

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

3.2 PREPARATION

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

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

C. Install insulation strips in ribs of acoustical roof decks according to acoustical roof deck manufacturer's written instructions.

3.3 SUBSTRATE BOARD INSTALLATION

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

1. Fasten substrate board to top flanges of steel deck according to recommendations in FM Approvals' "RoofNav" and FM Global Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.
3.4 **VAPOR-RETARDER INSTALLATION**

A. Laminate Sheet: Install laminate-sheet vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches (50 mm) and 6 inches (150 mm), respectively. Bond vapor retarder to substrate as follows:

1. Apply adhesive at rate recommended by vapor-retarder manufacturer. Seal laps with adhesive.

B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

3.5 **INSULATION INSTALLATION**

A. Comply with roofing system manufacturer's written instructions for installing roof insulation.

B. Install one lapped base-sheet course and mechanically fasten to substrate according to roofing system manufacturer's written instructions.

C. Nailer Strips: Mechanically fasten 4-inch nominal- (89-mm actual-) width wood nailer strips of same thickness as insulation perpendicular to sloped roof deck at the following spacing:

1. \[16 \text{ feet (4.88 m)}\] <Insert spacing> apart for roof slopes steeper than 1 inch per 12 inches (1:12) but less than 3 inches per 12 inches (3:12).

2. \[48 \text{ inches (1220 mm)}\] <Insert spacing> apart for roof slopes steeper than 3 inches per 12 inches (3:12).

D. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing membrane system with vertical surfaces or angle changes more than 45 degrees.

E. Install tapered insulation under area of roofing to conform to slopes indicated.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.

1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

G. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (68 mm) or more, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

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

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

I. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
J. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:
   1. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

K. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
   1. Fasten insulation according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
   2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

L. Mechanically Fastened and Adhered Insulation: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
   1. Fasten first layer of insulation according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
   2. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
   3. Set each subsequent layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

M. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints a minimum of 6 inches (150 mm) in each direction from joints of insulation below. Loosely butt cover boards together and fasten to roof deck. Tape joints if required by roofing system manufacturer.
   1. Fasten cover boards according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.

3.6 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA’s "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."
   1. Install roofing system MBSH-3-I -T-A , according to roof assembly identification matrix and roof assembly layout illustrations in NRCA's "The NRCA Roofing and Waterproofing Manual" and to requirements in this Section.

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

C. Where roof slope exceeds 1/2 inch per 12 inches (1:24), install roofing membrane sheets parallel with slope.
   1. Backnail roofing membrane sheets to nailer strips according to roofing system manufacturer's written instructions.
D. Cooperate with testing agencies engaged or required to perform services for installing roofing system.

E. Coordinate installation of roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

1. At end of each day's work, provide tie-offs to cover exposed roofing membrane sheets and insulation with a course of coated felt set in roofing cement, with joints and edges sealed.
2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Utilize insulation deadman fillers to maintain insulation stagger each day.
4. Remove and discard temporary seals before beginning work on adjoining roofing.

F. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

G. Contractor shall maintain a fire watch using a hand-held thermal scanner.

3.7 BASE-SHEET INSTALLATION

A. Install lapped base-sheet course, extending sheet over and terminating beyond cants. Attach base sheet as follows:

1. Torch applied.

3.8 BASE-PLY SHEET INSTALLATION

A. Install glass-fiber base-ply sheets according to roofing system manufacturer's written instructions starting at low point of roofing system. Align glass-fiber base-ply sheets without stretching. Extend sheets over and terminate beyond cants.

1. Torch apply each glass-fiber base-ply sheet in a continuous void-free manner.

3.9 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

A. Install modified bituminous roofing membrane sheet and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:

1. Torch apply to substrate.

B. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.

1. Repair tears and voids in laps and lapped seams not completely sealed.
2. Apply roofing granules to cover exuded bead at laps.
C. Install roofing membrane sheets so side and end laps shed water.

3.10 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof; secure to substrates according to roofing system manufacturer's written instructions, and as follows:

1. Prime substrates with asphalt primer if required by roofing system manufacturer.
2. Backer Sheet Application: Adhere backer sheet to substrate in cold-applied adhesive at rate required by roofing system manufacturer.
3. Flashing Sheet Application: Torch apply flashing sheet to substrate.

B. Extend base flashing up walls or parapets a minimum of 8 inches (200 mm) above roofing membrane and 4 inches (100 mm) onto field of roofing membrane.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.


D. Install roofing membrane cap-sheet stripping where metal flanges and edgings are set on membrane roofing according to roofing system manufacturer's written instructions.

E. Roof Drains: Set 30-by-30-inch- (760-by-760-mm-) square metal flashing in bed of asphalt roofing cement on completed roofing membrane. Cover metal flashing with roofing membrane cap-sheet stripping and extend a minimum of 6 inches (150 mm) beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.

1. Install stripping according to roofing system manufacturer's written instructions.

3.11 WALKWAY INSTALLATION

A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size according to walkway pad manufacturer's written instructions.

1. Set walkway pads in cold-applied adhesive.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and to prepare test reports.

B. Test Cuts: Test specimens will be removed to evaluate problems observed during quality-assurance inspections of roofing membrane as follows:

1. Approximate quantities of components within roofing membrane will be determined according to ASTM D 3617.

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2. Test specimens will be examined for interply voids according to ASTM D 3617 and to comply with criteria established in Appendix 3 in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."

3. Repair areas where test cuts were made according to roofing system manufacturer's written instructions.

C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

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

D. Roofing system will be considered defective if it does not pass tests and inspections.

1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.13 PROTECTING AND CLEANING

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

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

END OF SECTION 075216
PART 1 - GENERAL

1.1 OVERVIEW

A. This Design Guideline is for new construction only and includes styrene-butadiene-styrene (SBS) modified bituminous membrane roofing system, including roof insulation, and accessories.

B. The roof system of any newly constructed Cleveland Clinic facility shall only be an SBS modified bituminous membrane roofing system or a hot fluid applied rubberized system. See Section 075556 for hot fluid applied rubberized system.

C. The materials referenced in this Design Guideline shall be used to construct a finished and warranted roof system. All roof system materials shall be of the same manufacturer. All other materials such as insulation, fasteners, wood, and coatings, shall be acceptable to the roofing material manufacturer and/or all parties providing a warranty.

D. Refer to Master Specification 075216 for detailed requirements.

PART 2 - DESIGN CRITERIA

2.1 INSURANCE REQUIREMENTS

A. The design and specification of a modified bituminous membrane roofing system should be made after carefully investigating applicable code requirements and limitations imposed by the Cleveland Clinic’s insurer. Fire performance and wind-uplift resistance should be examined and understood before selecting the roofing system. Cleveland Clinic’s insurer, especially in the case of FMG, may require the modified bituminous membrane roofing system to comply with specific requirements.

2.2 WARRANTY

A. The Cleveland Clinic and their Counsel should review warranty language because the responsibilities of the roofing system manufacturer may be limited and therefore detrimental to providing adequate protections.

B. Warranty duration varies with the choice of modified bituminous membrane roofing system proposed. Coordinate roofing membrane material selections, modified bituminous membrane roofing system ply numbers, surfacing, and base flashing types with warranty required.

C. Carefully review manufacturer’s warranty coverage exclusion for wind-speed limits. Many manufacturers’ standard roofing warranties limit wind speeds to velocities considerably less than wind speeds in ASCE 7 or the model building codes.

D. Most manufacturers charge extra for standard warranties beyond 10 or 15-year durations. When selecting roofing system manufacturers, the review of a manufacturer’s published warranty
obligations, remedies, limitations, and exclusions is an important consideration. Confirmation through the submittal process that a standard manufacturer’s roofing warranty complies with requirements is important and expected.

E. Manufacturer shall provide a minimum twenty (20) year No Dollar Limit labor and materials warranty, and the roofing contractor shall provide a minimum two (2) year installation warranty. The roofing contractor shall have a minimum ten (10) year verifiable installation record with the manufacturer as a certified installer. Cleveland Clinic will review and approve the installer’s qualifications. The installer’s performance on previous projects at Cleveland Clinic or other hospital or education and research projects will be considered before approval is granted to the proposed installer. Warranty shall begin upon substantial completion of project, as determined by Cleveland Clinic.

2.3 ROOFING MATERIALS

A. The decision to use a vapor retarder should be based on a detailed analysis of the vapor pressure drive through the building’s roof and the location of the dew point temperature in relation to the total roofing system. Use of a vapor retarder may be required by authorities having jurisdiction.

B. Air barriers prevent airflow into and also reduce uplift pressures on the modified bituminous membrane roofing system. Monolithic roof decks, such as cast-in-place concrete, are impermeable and perform as air barriers. Steel decks, because of their numerous laps, allow considerable air movement. Gaps at penetrations and terminations of the roof deck require sealing.

C. Roof insulation shall be selected for compatibility with other roofing system components, the substrate, desired thermal-barrier objectives, compressive strength, durability, moisture resistance, resistance to climatic conditions, stability, installed weight, method of attachment, fire and wind resistance properties, life-cycle cost, and warranties.

1. Metal decks: Roof insulation shall be double layer minimum with staggered joints. Mechanically fasten first insulation layer with mechanical fastener type and pattern as required by wind-uplift criteria and manufacturer. Subsequent layers of insulation shall be adhered to the mechanically fastened first layer.

2. Concrete decks: Roof insulation shall be double layer minimum with staggered joints. Fully adhere and/or mechanically fasten first insulation layer according to project and manufacturer requirements and wind-uplift criteria. Subsequent layers of insulation shall be adhered to the mechanically fastened first layer.

D. Substrate boards may be used as thermal barriers, as support for vapor barriers, and as part of a fire-resistance-rated roofing system. As code-mandated thermal barriers over steel deck, substrate boards thermally isolate foam roof insulations from the interior of the building. When direct-to-deck application of foam insulation is considered, verify acceptability with authorities having jurisdiction.

E. Cover boards shall be used over foam insulation such as polyisocyanurate and extruded polystyrene before applying hot roofing asphalt. Cover board joints shall be taped to restrict migrating hot roofing asphalt from degrading the insulation.

F. Modified bituminous membrane shall be SBS-modified asphalt reinforced with polyester or glass fiber. SBS-modified asphalt has excellent elongation and recovery properties and remains
flexible at very low temperatures. Cap sheets shall be used with factory-applied protective mineral-granule-surfacing.

G. Base flashing shall be two-ply modified bitumen with the top ply being the same as the cap sheet and coated, in combination with 18 gage galvanized counter flashing with all seams welded. Stainless steel flashing may be used as an alternative counter flashing material.

H. Equipment curbs and supports, nailers, and other blocking shall be #2 grade or better, straight and without splits or cracks. Wood shall not be treated for moisture resistance due to fastener corrosion. Refer to governing codes for possible fire rating requirements for all lumber and wood products used on Cleveland Clinic roofs. All wood exposed to interior shall be fire-retardant treated.

I. Cants are preferred to be rigid insulation unless otherwise required by roofing system manufacturer or governing codes.

J. Where walk or traffic pads are specified, an extra layer of the granule cap sheet shall be applied and coated. Walk pad use and locations shall be approved by the Owner.

2.4 PERFORMANCE REQUIREMENTS

A. Roofing System Design: Design the roofing and insulation systems for applicable wind load and uplift criteria for the Project Site. Wind related design guidelines shall be governed by FM Global standards and the provisions of ASCE 7 for wind load design.

B. Solar Reflectance Index: Not less than 78.

C. Energy Performance: Provide roofing system that is listed on DOE’s ENERGY STAR “Roof Products Qualified Product List” for low-slope roof products.

D. Cool Roof Performance: LEED – low slope

E. FM Approvals Listing: Class 1-90 (for Cleveland Area)

F. Exterior Fire-Test Exposure: Class A

G. Roof U-values: Meet or exceed current requirements of ANSI/ASHRAE/IESNA 90.1. Meet envelope requirements for LEED “Optimize Energy Performance”.

2.5 ENVIRONMENTAL CONSIDERATIONS

A. The use of hot roofing asphalt in modified bituminous membrane roofing systems involves potential health, safety, and environmental risks associated with asphalt fumes. Restrictions have been placed on fume emissions and current threshold values of fume particulates for asphalt are expected to be reduced. While fume control and work practices are the responsibility of the roofing contractor, verify whether authorities having jurisdiction have additional restrictions on the use of hot roofing asphalt.

B. Refer to Cleveland Clinic’s General Conditions for additional information.
2.6 INSTALLATION CONSIDERATIONS

A. Require modified bituminous membrane roofing system installation according to roofing system manufacturer’s written instructions and applicable recommendations of NRCA/ARMA.

B. Require visible thermometer and thermostatic controls on all kettles and discard of any bitumen not heated in accordance with manufacturer’s recommendations.

C. Require coverage protection of adjacent surfaces and finishes against spilled bitumen.

D. Require an Owner engaged Testing Agency.

2.7 GENERAL DESIGN CONSIDERATIONS

A. Any modifications or deviations from this Design Guideline direction shall require written approval from the Owner.

B. For standard details, reference the following organizations and publications. Select applicable details and customize to site specific application(s):
   1. NRCA’s *The NRCA Roofing and Waterproofing Manual*
   2. SMACNA’s *Architectural Sheet Metal Manual*
   3. Manufacturers’ publications including detail drawings and instructions.

C. Building Code, FMG, UL, or other performance or insurance agency requirements for a membrane roofing system in the Project’s geographic location shall be carefully reviewed and applied.

D. Roofing membrane shall not be used as a finish material on parapet walls. No roofing membrane flashing shall extend higher than 18 inches above the finished roof on any parapets. Sheet metal shall be provided above 18 inches, up and over parapet.

E. Two-piece continuous flashing shall be provided under stone or precast concrete sill, copings and similar conditions.

F. The design of the terminations and perimeter edges that must resist wind uplift and contraction. Exposed metal items should be free to expand and contract rather than be bonded to or embedded into the roofing membrane or flashing.

G. Termination bars, if used, shall be covered with counter-flashing.

H. For roofs without parapets, consider raising the perimeter edges of the membrane above the main roof plane, where feasible, using pressure-treated wood blocking and tapered insulation edge strips.

I. Expansion and contraction control within the roof deck. Modified bituminous membrane roofing systems have a limited ability to accommodate movement. Stresses from structural deck or parapet movement can seriously damage stiff membrane roofing systems. Area dividers may be needed to supplement roof structure expansion joints.
J. Roof slopes for positive drainage and whether the slope will be achieved by sloping the structure or using tapered insulation or a combination of both. A minimum of 1/4 inch per 12 inches (1:48) is required by code.

K. How much insulation and how many layers will be required. Review the building design with the mechanical engineer and determine the required insulation value for the roof-ceiling assembly. Determine the required thermal resistance for the roof insulation and the type of insulation that will be used.

L. Whether a vapor retarder will be required. Involve the mechanical engineer to determine the design temperatures for the building and the anticipated vapor pressure through the modified bituminous membrane roofing system. Consider the choice of material and the location of the vapor retarder and whether the function of the vapor retarder will be compromised by penetrating fasteners.

M. Roof-mounted HVAC and electrical equipment locations and maintenance. Consider the frequency of access and the maintenance loadings on the roof. Consider the design of equipment curbs and supports that provide a way of maintaining and replacing the membrane roofing systems. For sloped roofing membranes, require crickets on the high sides of curbs to prevent ponding.

N. Special in-service conditions that the membrane roofing system must endure, including chemicals, grease, oil, and other contaminants.

O. Number and type of base sheets (if applicable), base-ply sheets (if applicable), and modified bituminous membrane roofing plies required in the roofing system.

P. Metal decks shall be galvanized steel construction. Securement patterns for metal decks shall be based on current FM Global and ASCE 7-05 design loading requirements. On metal decks where light weight insulating concrete is used, the deck shall be vented.

Q. Ladders or stairs and roof hatches shall be provided to access all roof levels as required. OSHA required fall protection systems shall be provided to prevent falls. Roof hatch fall protection barriers shall have a self-closing hate style closer. Roof hatches within ten (10) feet of a roof edge shall not open facing the edge of the roof. There shall be no access to roofs via windows without the expressed approval in writing by Cleveland Clinic.

R. Permanent perimeter roof fall protection shall be provided as dictated by OSHA. This may be achieved through a physical barrier at roof edge with a minimum height of 42-inches above the highest adjacent point of the finished roof system. The height may be achieved by the combination of a parapet wall and guardrail, guardrail alone, or parapet wall alone. Alternatively, a lifeline cabling system may be provided so that a harnessed worker can safely move along each non-parapet protected roof top. Tiebacks shall be provided on all structures as and at all roof levels to ensure OSHA fall protection guidelines are met. Type and location of tieback systems shall be approved in writing by Owner.

S. Davits shall be provided on all structures exceeding six stories in height. Provide tiebacks to operate in conjunction with the davit systems, and for stand-alone use. Where both davits and tiebacks are provided, they shall be supported by separate and independent structural systems. Davits shall be designed with a 5,000 lb. maximum load capacity and shall be down-rated to a 2,500 lb. normal operating load.
T. Protecting workers from falls through skylight roof openings both during and after construction has become a major issue for skylight manufacturers, even though OSHA (Occupational Safety and Health Act) regulations do not lay the responsibility on product manufacturers. Establish and implement safety procedures for minimizing risk of falls from roofs and roof openings.

PART 3 - SPECIAL CONTRACT DOCUMENT REQUIREMENTS

3.1 To be completed as required for the Project and based upon advice from CC.

PART 4 - PRODUCTS

4.1 GENERAL

A. Roof systems shall be selected based on performance characteristics that meet or exceed this Design Guideline. Alternate roofing manufacturers and product lines that meet or exceed the performance requirements of this Design Guideline may be acceptable. Submit to Cleveland Clinic for consideration and approval. Use of an alternate manufacturer’s product is subject to compliance with the specific criteria stated herein.

4.2 MANUFACTURERS: Subject to compliance with final requirements of Design Team, acceptable manufacturers are:

A. CertainTeed Corp.
B. Firestone Building Products.
C. GAF Materials Corporation.
D. Johns Manville.
E. Suprema
F. Tremco Incorporated.

4.3 MATERIALS

A. Vapor Retarder: Subject to compliance with final requirements of Design Team, three ply laminate consisting of two layers of high density polyethylene and a high strength cord grid.

B. Roof Insulation: Composite Polyisocyanurate Board Insulation with factory-applied facing top and bottom.
   1. Minimum compressive strength of 20 psi.
   2. Tapered Insulation: Provide positive drainage 1/4 inch per 12 inches (1:48) minimum.
   3. Cover insulation with ¾” thick Perlite board.

C. Base Sheet: Non-perforated, asphalt-impregnated and coated, glass-fiber sheet.
D. Base Flashing Sheet: Asphalt coated, glass-fiber sheet.

E. Substrate Board: FMG approved product, water-resistant gypsum roof board.

F. Cover Board: Perlite or cellulosic-fiber insulation board.

G. Roofing Membrane Sheet: SBS-modified asphalt sheet, reinforced with polyester/glass fibers.


I. Cool Roof Ballast: Shall have a minimum SRI value to achieve LEED Heat Island Effect: Roof requirements.

J. Walk or Traffic Pads: Where specified, an extra layer of the cap sheet shall be applied and coated. Walk pad use and locations shall be approved the Owner.
   1. Pads: 32” x 32” x 3/8” thick preformed, skid resistant, fully adhered, consisting of modified asphalt with granular surface.

K. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion resistance provisions in FM Approvals, designed for fastening roofing component to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.

L. Flashing shall be minimum 0.040 inch aluminum with Kynar finish and full cleat one (1) gage heavier.

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SECTION 075556

FLUID-APPLIED PROTECTED MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Protected, cold fluid-applied roofing membrane, reinforced.
2. Board insulation.
3. Aggregate ballast.
4. Roof pavers.

B. Related Sections:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking and curbs.
3. Section 076200 "Sheet Metal Flashing and Trim" for flashing, counter flashing, and metal roof penetration flashing.
4. Section 077100 "Roof Specialties."
5. Section 077129 "Manufactured Roof Expansion Joints."
6. Section 221423 "Storm Drainage Piping Specialties" for roof deck drains.

1.3 PERFORMANCE REQUIREMENTS

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

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

C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.
D. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.

1. Fire/Windstorm Classification: Class 1A-90
2. Hail Resistance Rating: SH.

E. Energy Performance: Provide roofing system with initial Solar Reflectance Index not less than 78 when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of roofing.

B. Shop Drawings: Show locations and extent of roofing. Include plans, sections, details, and attachments to other work, for substrate joints and cracks, flashing sheets, roof penetrations, vertical intersections, roof slope, expansion joints, and membrane terminations.

1. Show locations, extent, and details of roof pavers.

C. Samples for Verification: For each of the following products:

1. Flashing sheet.
2. Board insulation.
3. Aggregate ballast in gradation and color indicated.
4. Roof paver, full sized, in each color and texture required.
5. Paver pedestal assembly.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Test Reports: For each type of roofing product, based on evaluation of comprehensive tests performed by a qualified testing agency.

C. Field quality-control reports and manufacturer's final roof inspection report.

D. Warranties: Sample of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.
1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain roofing membrane materials sheet flashings, protection course, insulation, and pavers from single source from single manufacturer.

C. Fire-Test-Response Characteristics: Provide hot fluid-applied roofing identical to assemblies tested for fire-test-response characteristics indicated by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Exterior Fire-Test Exposure: Class A; complying with ASTM E 108, for application and slopes indicated.

D. Mockups: Install roofing membrane to 100 sq. ft. (9.3 sq. m) of deck to demonstrate surface preparation, joint and crack treatment, thickness of roofing membrane, and execution quality. Install insulation, aggregate ballast and roof pavers over roofing membrane.

1. If Architect determines mockups do not comply with requirements, reapply roofing and overlaying construction until mockups are approved.
2. Mockups maintained in an undisturbed condition may be incorporated into the completed Work.

E. Preinstallation Conference: Conduct conference at Project site.

1. Review structural load limitations of roof deck during and after roofing.
2. Review flashing, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
3. Review regulations and requirements of authorities having jurisdiction for insurance, certifications, and inspection and testing if applicable.
4. Review temporary protection requirements for roofing system during and after installation.
5. Review roof observation and repair procedures after roofing installation.

1.8 DELIVERY, STORAGE, AND HANDLING

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

1. Handle and store roofing materials and place equipment in a manner to avoid significant or permanent damage to deck or structural supporting members.

B. Protect roofing insulation materials from damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location.
1.9 PROJECT CONDITIONS

A. Environmental Limitations: Apply roofing within the range of ambient and substrate temperatures recommended by roofing system manufacturer. Do not apply roofing to a damp or wet substrate or when temperature is below 0 deg F (minus 18 deg C).

1. Do not apply roofing in snow, rain, fog, or mist.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard no dollar limit form in which manufacturer agrees to repair or replace roofing that does not remain watertight and base flashing that does not within specified warranty period.

1. Warranty also includes insulation and roof pavers.
2. Warranty Period: 20 years from date of Substantial Completion.
3. Warranty shall include removal and reinstallation of overburden, insulation, ballast, etc.

B. Roofing Installer's Warranty: Submit roofing installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including roofing membrane, base flashing, board insulation, roof pavers and aggregate ballast for the following warranty period:

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

PART 2 - PRODUCTS

2.1 ROOFING MEMBRANE

A. Fluid-Applied, Rubberized-Asphalt Roofing Membrane: Single component; 100 percent solids; cold fluid-applied, rubberized asphalt or two-componet, elastomeric fluid-applied.

1. Products: Subject to compliance with requirements, provide one of the following:
   b. Johns Manville; SeamFree Liquid Membrane
   c. Tremco Incorporated; Tremproof 150.

2.2 BASE FLASHING SHEET MATERIALS

A. Flashing Sheet: Manufacturers standard sheet with manufacturer's recommended contact adhesives as follows:
2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.

1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.

B. Primer: ASTM D 41, asphaltic primer.

C. Elastomeric Sheet: 50-mil- (1.3-mm-) thick, minimum, uncured sheet neoprene with manufacturer's recommended contact adhesives as follows:

1. Tensile Strength: 1400 psi (9.6 MPa) minimum; ASTM D 412, Die C.
2. Elongation: 300 percent minimum; ASTM D 412.
3. Tear Resistance: 125 psi (860 kPa) minimum; ASTM D 624, Die C.
4. Brittleness: Does not break at minus 30 deg F (16 deg C); ASTM D 2137.

D. Metal Termination Bars: Manufacturer's standard, predrilled, stainless-steel or aluminum termination bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.


F. Protection Course: Manufacturer's standard, 80-to-90-mil- (2.0-to-2.3-mm-) thick, fiberglass-reinforced rubberized asphalt or modified bituminous sheet.

G. Drainage Mat: Manufacturers standard three-dimensional polyethylene drainage core with a non-woven filter fabric bonded to one side of the core, minimum 3/8” (10 mm) thickness.

H. Geotextile Fabric: Woven or nonwoven polyolefin; water permeable and resistant to UV-light degradation; of type and weight recommended by insulation manufacturer for application.

2.4 BOARD INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type VII, 2.2 lb/cu. ft. (35 kg/cu. m) with two or four edges rabbeted.

2.5 AGGREGATE BALLAST

A. Aggregate Ballast: Washed, crushed stone or smooth stone that will withstand weather exposure without significant deterioration and will not contribute to membrane degradation; of the following size:

1. Size: ASTM D 448, Size 2, ranging in size from 1-1/2 to 2-1/2 inches (38 to 63 mm).

2.6 ROOF PAVERS

A. Roof Pavers: Heavyweight, hydraulically pressed, concrete units, with top edges beveled 3/16 inch (5 mm), factory cast for use as roof pavers; absorption not greater than 5 percent,
ASTM C 140; no breakage and maximum 1 percent mass loss when tested for freeze-thaw resistance, ASTM C 67; and as follows:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Hanover Architectural Products, Inc.
   b. Hastings Pavement Company, LLC.
   c. Roofbolk Limited.
   d. Sunny Brook Pressed Concrete.
   e. Wausau Tile, Inc.; Terra-Paving Division.
   f. Westile Roofing Products.

2. Size: 24 by 24 inches (600 by 600 mm). Manufacture pavers to dimensional tolerances of plus or minus 1/16 inch (1.6 mm) in length, height, and thickness.

3. Weight: 20 lb/sq. ft. (100 kg/sq. m) minimum.

4. Compressive Strength: 7500 psi (52 MPa), minimum; ASTM C 140.

5. Colors and Textures: [As indicated by manufacturer's designations] [Match Architect's samples] [As selected by Architect from manufacturer's full range].

6. Paver Supports: Paver manufacturer's standard SBR rubber, high-density polyethylene, or polyurethane paver support assembly, including adjustable or stackable pedestals, shims, and spacer tabs for joint spacing of 3/16 inch (5 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions under which roofing will be applied, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

   1. Proceed with installation only after minimum concrete drying period recommended by roofing system manufacturer has passed.
   2. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

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

3.2 PREPARATION

A. Clean and prepare substrate according to manufacturer's written recommendations. Provide clean, dust-free, and dry substrate for roofing application.

B. Mask off adjoining surfaces not receiving roofing to prevent spillage from affecting other construction.

C. Protect roof drains and other deck penetrations to prevent spillage and migration of roofing fluids.
D. Remove grease, oil, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

E. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.

3.3 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Coordinate installation of roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

1. At end of each day's work, provide tie-offs to cover exposed roofing membrane sheets and insulation with a course of coated felt set in roofing cement, with joints and edges sealed.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.

C. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 JOINTS, CRACKS, AND TERMINATIONS

A. Prepare and treat substrates to receive roofing membrane, including joints and cracks, roof drains, and penetrations, according to roofing system manufacturer's written instructions.

1. Rout and fill joints and cracks in substrate. Before filling, remove dust and dirt according to ASTM D 4258.

2. Adhere strip of elastomeric sheet to substrate in a layer of hot fluid-applied, rubberized asphalt. Extend elastomeric sheet a minimum of 6 inches (150 mm) on each side of moving joints and cracks or joints and cracks exceeding 1/8 inch (3 mm) thick, and beyond roof drains and penetrations. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.

3. Embed strip of reinforcing fabric into a layer of hot fluid-applied, rubberized asphalt. Extend reinforcing fabric a minimum of 6 inches (150 mm) on each side of nonmoving joints and cracks not exceeding 1/8 inch (3 mm) thick, and beyond roof drains and penetrations.

   a. Apply second layer of hot fluid-applied, rubberized asphalt over reinforcing fabric.

B. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge joints with elastomeric sheet extended a minimum of 6 inches (150 mm) on each side of joints and adhere to substrates in a layer of hot fluid-applied, rubberized asphalt. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.

3.5 BASE FLASHING INSTALLATION

A. Install base flashing at terminations of roofing membrane according to manufacturer's written instructions.
B. Prime substrate if required by manufacturer.

C. Extend flashing sheet up walls or parapets a minimum of 8 inches (200 mm) above insulation and 6 inches (150 mm) onto roof deck.

D. Install termination bars and mechanically fasten to top of flashing sheet at terminations and perimeter of roofing.

3.6 ROOFING MEMBRANE APPLICATION

A. Apply primer, at manufacturer's recommended rate, over prepared substrate and allow to dry.

B. Start application with manufacturer's authorized representative present.

C. Reinforced Membrane: Apply cold fluid-applied membrane to area to receive roofing. Spread to a thickness as required by the manufacturer.

D. Apply cold fluid-applied membrane over prepared joints and up wall terminations and vertical surfaces to heights indicated or required by manufacturer.

E. Cover waterproofing with protection course with overlapped joints before membrane is subject to construction traffic.

3.7 INSULATION INSTALLATION

A. Loosely lay board insulation units over roofing membrane, with long joints of insulation in continuous straight lines and with end joints staggered between rows. Abut edges and ends between units.

B. Install one or more layers of insulation to achieve required thickness over roofing membrane. Cut and fit to within 3/4 inch (19 mm) of projections and penetrations.

1. Where overall insulation thickness is 2 inches (50 mm) or more, install required thickness in two or more layers with joints of each succeeding layer staggered over joints of previous layer a minimum of 6 inches (150 mm) in each direction.

3.8 BALLAST INSTALLATION

A. To roofed area, apply aggregate ballast uniformly over geotextile fabric at rate required by insulation manufacturer, but not less than the following, carefully spreading aggregate to not damage roofing membrane and base flashings. Install roof-paver ballast according to insulation manufacturer's written instructions. Apply ballast as insulation is installed, leaving roofing membrane insulated and ballasted at end of workday.

1. Ballast: 15 lb/sq. ft. (75 kg/sq. m), Size 2 aggregate within 102 inches (2600 mm) of roof perimeter and 24 inches (600 mm) of roof penetrations; 13 lb/sq. ft. (65 kg/sq. m), Size 2 aggregate to field of roof; and install three rows of roof pavers at corners of roof according to insulation manufacturer's written instructions. Mechanically fasten securement strapping to center of first perimeter corner row of roof pavers.
2. Walkway Pavers: Install walkways formed from two rows of roof pavers, loosely laid and butted.

3.9 ROOF-PAVER INSTALLATION

A. Install roof pavers over roofed area according to insulation manufacturer's written instructions. Mechanically fasten roof-paver metal straps to center of first two perimeters and first two perimeter corner rows of roof pavers.

B. Install roof pavers on pedestals set according to pedestal manufacturer's written instructions.

3.10 FIELD QUALITY CONTROL

A. Contractor shall engage a full-time site representative qualified by roofing membrane manufacturer to inspect substrate conditions; surface preparation; and application of the membrane, base flashings, protection, insulation, and ballast; furnish daily reports.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion of roofing membrane and flashing.

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

C. Owner will engage a qualified testing agency to observe flood tests and to determine and report leaks.

D. Flood Testing: Flood test each roof deck area for leaks, according to recommendations in ASTM D 5957, after completing roofing and flashing, but before overlaying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.

1. Flood to an average depth of 2-1/2 inches (65 mm) with a minimum depth of 1 inch (25 mm) and not exceeding a depth of 4 inches (100 mm). Maintain 2 inches (50 mm) of clearance from top of base flashing.
2. Flood each area for 24 hours.
3. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installation is watertight.

E. Correct deficiencies in or remove roofing that does not comply with requirements, repair substrates, reapply roofing, and repair flashing.

1. After flood tests, repair leaks and make further repairs until roofing installation is watertight.

3.11 CLEANING AND PROTECTION

A. Protect roofing from damage and wear during remainder of construction period.
B. Protect installed insulation from damage due to UV light, physical abuse, and other causes. Provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

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

3.12 ROOFING INSTALLER’S WARRANTY

A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: <Insert name of Owner>.
2. Address: <Insert address>.
3. Building Name/Type: <Insert information>.
4. Address: <Insert address>.
5. Area of Work: <Insert information>.
6. Acceptance Date: <Insert date>.
7. Warranty Period: <Insert time>.
8. Expiration Date: <Insert date>.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
   a. lightning;
   b. peak gust wind speed exceeding <Insert wind speed in mph (m/s)>;
   c. fire;
   d. failure of roofing system substrate, including settlement, excessive deflection, deterioration, decomposition, and cracking wider than 1/8 inch (3 mm);
   e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
   f. vapor condensation on bottom of roofing; and
   g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void, unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.

7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <Insert day> day of <Insert month>, <Insert year>.

1. Authorized Signature: <Insert signature>.
2. Name: <Insert name>.
3. Title: <Insert title>.

END OF SECTION 075556
PART 1 - GENERAL

1.1 OVERVIEW

A. Coordinate this document with General Roofing Design Guide requirements.

B. This Design Guideline shall be used for roof replacement where flashing conditions occur that
would not allow for the minimum flashing height required by Section 075216 Styrene-
Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing System.

C. This system shall be used on clean decks only. Do not use on decks were insulation was adhered
with asphalt moping to the deck.

D. This Design Guideline can also be used for GREEN roof systems on concrete decks. Green
roofs shall not be installed over metal decks.

E. This Design Guideline includes fluid-applied protected membrane roofing systems, including
insulation and accessories.

F. The materials referenced in this Design Guideline shall be used to construct a finished and
warranted roof system. All roof system materials shall be of the same manufacturer. All other
materials such as insulation, fasteners, wood, and coatings, shall be acceptable to the roofing
material manufacturer and/or all parties providing a warranty.

G. Refer to Master Specification 075556 for detailed requirements.

H. Contract documents shall include requirements for contractor to supply as-built drawings to
Cleveland Clinic when roof construction is complete.

I. This system shall not be installed over concrete-filled, unvented, steel deck construction unless
approved by Cleveland Clinic.

PART 2 - DESIGN CRITERIA

2.1 INSURANCE REQUIREMENTS

A. The design and specification of a fluid-applied protected membrane roofing system should be
made after carefully investigating applicable code requirements and limitations imposed by the
Cleveland Clinic’s insurer. Fire performance and wind-uplift resistance should be examined
and understood before selecting the roofing system. Cleveland Clinic’s insurer, especially in
the case of FMG, may require the modified bituminous membrane roofing system to comply
with specific requirements.
2.2 **WARRANTY**

A. The Cleveland Clinic and their Counsel should review warranty language because the responsibilities of the roofing system manufacturer may be limited and therefore detrimental to providing adequate protections.

B. Warranty duration varies with the choice of modified bituminous membrane roofing system proposed. Coordinate roofing membrane material selections, modified bituminous membrane roofing system ply numbers, surfacing, and base flashing types with warranty required.

C. Carefully review manufacturer’s warranty coverage exclusion for wind-speed limits. Many manufacturers’ standard roofing warranties limit wind speeds to velocities considerably less than wind speeds in ASCE 7 or the model building codes.

D. Most manufacturers charge extra for standard warranties beyond 10 or 15-year durations. When selecting roofing system manufacturers, the review of a manufacturer’s published warranty obligations, remedies, limitations, and exclusions is an important consideration. Confirmation through the submittal process that a standard manufacturer’s roofing warranty complies with requirements is important and expected.

E. Manufacturer shall provide a minimum twenty (20) year No Dollar Limit total system labor and materials warranty, and the roofing contractor shall provide a minimum two (2) year installation warranty. The roofing contractor shall have a minimum ten (10) year verifiable installation record with the manufacturer as a certified installer. Cleveland Clinic will review and approve the installer’s qualifications. The installer’s performance on previous projects at Cleveland Clinic or other hospital or education and research projects will be considered before approval is granted to the proposed installer. Warranty shall begin upon substantial completion of project, as determined by Cleveland Clinic.

F. Warranty must include removal and replacement of overburden, ballast, insulation, etc.

2.3 **ROOFING MATERIALS**

A. Air barriers prevent airflow into and also reduce uplift pressures on the modified bituminous membrane roofing system. Monolithic roof decks, such as cast-in-place concrete, are impermeable and perform as air barriers. Steel decks, because of their numerous laps, allow considerable air movement. Gaps at penetrations and terminations of the roof deck require sealing.

B. Roof insulation shall be selected for compatibility with other roofing system components, the substrate, desired thermal-barrier objectives, compressive strength, durability, moisture resistance, resistance to climatic conditions, stability, installed weight, fire and wind resistance properties, life-cycle cost, and warranties. Extruded-polystyrene insulation shall be used. Insulation thickness shall be selected to provide a minimum R-30 of continuous insulation.

1. Concrete: Roof insulation shall be double layer minimum with staggered joints.

C. Fluid-applied protected membrane shall be cold fluid-applied, rubberized-asphalt.

D. Base flashing shall be elastomeric flashing sheet, SBS-modified bituminous flashing sheet or APP-modified bituminous flashing sheet, in combination with .040 prefinished aluminum
counter flashing with all seams welded. Stainless steel flashing may be used as an alternative counter flashing material.

E. Equipment curbs and supports, nailers, and other blocking shall be #2 grade or better, straight and without splits or cracks. Wood shall not be treated for moisture resistance due to fastener corrosion. Refer to governing codes for possible fire rating requirements for all lumber and wood products used on Cleveland Clinic roofs. All wood exposed to interior shall be fire-retardant treated.

F. Cants are preferred to be rigid insulation unless otherwise required by roofing system manufacturer or governing codes.

2.4 PERFORMANCE REQUIREMENTS

A. Roofing System Design: Design the roofing and insulation systems for applicable wind load and uplift criteria for the Project Site. Wind related design guidelines shall be governed by FM Global standards and the provisions of ASCE 7 for wind load design.

B. Energy Performance: Provide roofing system that is listed on DOE’s ENERGY STAR “Roof Products Qualified Product List” for low-slope roof products.

C. FM Approvals Listing: Class 1-90 (for Cleveland Area)

D. Exterior Fire-Test Exposure: Class A

E. Roof U-values: Meet or exceed current requirements of ANSI/ASHRAE/IESNA 90.1. Meet envelope requirements for LEED “Optimize Energy Performance”.

F. Roofing contractor shall demonstrate a minimum ten (10) verifiable installation record with the manufacturer as a certified installer prior to award of contract. Contractor shall provide references with bid.

G. Manufacturer shall verify in writing that they can and will meet the warranty requirements prior to award of contract.

2.5 ENVIRONMENTAL CONSIDERATIONS

A. Refer to Cleveland Clinic’s General Conditions for additional information.

2.6 INSTALLATION CONSIDERATIONS

A. Require fluid-applied protected membrane roofing system installation according to roofing system manufacturer’s written instructions and applicable recommendations of NRCA/ARMA.

B. Require coverage protection of adjacent surfaces and finishes against spilled bitumen.

C. Require an Owner engaged Testing Agency.

D. Coordinate roofing work with Division 26 – Electrical, Lightning Protection Systems.
2.7 GENERAL DESIGN CONSIDERATIONS

A. Any modifications or deviations from this Design Guideline direction shall require written approval from the Owner.

B. For standard details, reference the following organizations and publications. Select applicable details and customize to site specific application(s):
   1. NRCA’s The NRCA Roofing and Waterproofing Manual
   2. SMACNA’s Architectural Sheet Metal Manual
   3. Manufacturers’ publications including detail drawings and instructions.

C. Building Code, FMG, UL, or other performance or insurance agency requirements for a membrane roofing system in the Project’s geographic location shall be carefully reviewed and applied.

D. Specifications shall include requirements for inspections by an independent testing agency and by Cleveland Clinic throughout construction.

E. GREEN roofs shall require a 100 sf. Ft. mock-up to demonstrate materials and execution quality.

F. Roofing membrane shall not be used as a finish material on parapet walls. No roofing membrane flashing shall extend higher than 18 inches above the finished roof on any parapets. Sheet metal shall be provided above 18 inches, up and over parapet.

G. Two-piece continuous flashing shall be provided under stone or precast concrete sill, copings and similar conditions.

H. The design of the terminations and perimeter edges that must resist wind uplift and contraction. Exposed metal items should be free to expand and contract rather than be bonded to or embedded into the roofing membrane or flashing.

I. Termination bars, if used, shall be covered with counter-flashing.

J. Roof slopes for positive drainage and whether the slope will be achieved by sloping the structure or using tapered insulation or a combination of both. A minimum of 1/4 inch per 12 inches (1:48) is required by code.

K. How much insulation and how many layers will be required. Review the building design with the mechanical engineer and determine the required insulation value for the roof-ceiling assembly. Determine the required thermal resistance for the roof insulation and the type of insulation that will be used.

L. Roof-mounted HVAC and electrical equipment locations and maintenance. Consider the frequency of access and the maintenance loadings on the roof. Consider the design of equipment curbs and supports that provide a way of maintaining and replacing the membrane roofing systems. For sloped roofing membranes, require crickets on the high sides of curbs to prevent ponding.

M. Special in-service conditions that the membrane roofing system must endure, including chemicals, grease, oil, and other contaminants.
N. Ladders or stairs and roof hatches shall be provided to access all roof levels as required. OSHA required fall protection systems shall be provided to prevent falls. Roof hatch fall protection barriers shall have a self-closing hate style closer. Roof hatches within ten (10) feet of a roof edge shall not open facing the edge of the roof. There shall be no access to roofs via windows without the expressed approval in writing by Cleveland Clinic.

O. Permanent perimeter roof fall protection shall be provided as dictated by OSHA. This may be achieved through a physical barrier at roof edge with a minimum height of 42-inches above the highest adjacent point of the finished roof system. The height may be achieved by the combination of a parapet wall and guardrail, guardrail alone, or parapet wall alone. Alternatively, a lifeline cabling system may be provided so that a harnessed worker can safely move along each non-parapet protected roof top. Tiebacks shall be provided on all structures as and at all roof levels to ensure OSHA fall protection guidelines are met. Type and location of tieback systems shall be approved in writing by Owner.

P. Davits shall be provided on all structures exceeding six stories in height. Provide tiebacks to operate in conjunction with the davit systems, and for stand-alone use. Where both davits and tiebacks are provided, they shall be supported by separate and independent structural systems. Davits shall be designed with a 5,000 lb. maximum load capacity and shall be down-rated to a 2,500 lb. normal operating load.

Q. Provide fall protection barriers at skylights and other roof openings. Protecting workers from falls through skylight roof openings both during and after construction has become a major issue for skylight manufacturers, even though OSHA (Occupational Safety and Health Act) regulations do not lay the responsibility on product manufacturers. Establish and implement safety procedures for minimizing risk of falls from roofs and roof openings.

R. Provide roof walkways from roof entry point to and around all mechanical equipment. Where windows occur above a roof provide roof walkways at all areas frequented by window washing equipment.

S. Roof pavers can be used as ballast where aesthetics are a concern.

PART 3 - SPECIAL CONTRACT DOCUMENT REQUIREMENTS

3.1 Documents shall include an Extended Service Contract provision and be included as an line item on the Bid Proposal.

PART 4 - PRODUCTS

4.1 GENERAL

A. Roof systems shall be selected based on performance characteristics that meet or exceed this Design Guideline. Alternate roofing manufacturers and product lines that meet or exceed the performance requirements of this Design Guideline may be acceptable. Submit to Cleveland Clinic for consideration and approval. Use of an alternate manufacturer’s product is subject to compliance with the specific criteria stated herein.
4.2 **MANUFACTURERS:** Subject to compliance with final requirements of Design Team, acceptable manufacturers are:

A. American Hydrotech, Inc.

B. Johns Manville.

C. Suprema.

D. Tremco Incorporated

4.3 **MATERIALS**

A. Vapor Retarder: Subject to compliance with final requirements of Design Team, three ply laminate consisting of two layers of high density polyethylene and a high strength cord grid.

B. Roof Insulation: Composite Polyisocyanurate Board Insulation with factory-applied facing top and bottom.
   1. Minimum compressive strength of 20 psi.
   2. Tapered Insulation: Provide positive drainage 1/4 inch per 12 inches (1:48) minimum.

C. Base Flashing Sheet: Asphalt coated, glass-fiber sheet.

D. Substrate Board: FMG approved product, water-resistant gypsum roof board.

E. Roofing Membrane Sheet: Cold fluid-applied, rubberized asphalt.

F. Cool Roof Ballast: Shall have a minimum SRI value to achieve LEED Heat Island Effect: Roof requirements.

G. Flashing shall be minimum 0.040 inch aluminum with Kynar finish and full cleat one (1) gage heavier.

H. Drainage Mat: Three-dimensional high density polyethylene drainage core with a non-woven filter fabric bonded to one side of the core.

I. Roof Pavers: Heavy weight, hydraulically pressed concrete units, minimum 2” thickness.

J. Paver Pedestal System: Paver manufacturer’s standard high-density polyethylene or polyurethane adjustable height paver support assembly.

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