

PROJECT MANUAL AND SPECIFICATIONS

ROOF REPLACEMENT FOR FIRE DEPARTMENT BUILDING HUBBARDSTON ROAD AND S ROAD TEMPLETON, MASSACHUSETTS



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Bid Documents

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PROJECT MANUAL AND SPECIFICATIONS

FILED SUB BID SECTIONS – NOT APPLICABLE
DRAWINGS – NOT APPLICABLE

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, general provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements, are a part of this Section and shall be binding on all Contractors and Subcontractors who perform this work.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Access to site.
 - 4. Work restrictions.
 - 5. Specification.
 - 6. Miscellaneous provisions.

1.3 PROJECT INFORMATION

- A. Project Identification: Roof Replacement for Fire Department Building.
 - 1. Project Location: Hubbardston Road and S Road, Templeton, MA
- B. Owner: Town of Templeton, Massachusetts, 160 Patriot's Road, E. Templeton, MA 01438, Carter Terenzini, Interim Town Administrator.
- C. Architect: The Contract Documents were prepared for Project by Andrew Jerome Cannata, AIA – Architect, 5 Upland Avenue, Boston, MA 02124.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of this Phase is defined by the Contract Documents and consists of the following:
 - 1. The re-roofing of an approximately 3,720 gross square foot (gsf) one story gable-roof Town Fire Department Building.
- B. The work includes but is not limited to:
 - 1. Installation of approximately 4,040 square feet (ft²) of glass fiber-reinforced roof shingles. Included in the work will be drip edges, standard underlayment and self-adhering underlayment sheets, replacement of a portion missing aluminum eave cladding, and other miscellaneous appurtenant items.
 - 2. Removal of existing asphalt roof shingles, underlayments, and metal drip edges.
 - 3. Temporary protection of shrubbery, grounds and paving during the demolition and installation work of this project.

1.5 SCHEDULE

- A. General: The Contractor shall prepare a detailed construction schedule, to be submitted to

the Owner, Architect, and Owner's Representative for review and approval. The schedule must clearly demonstrate the proper sequencing of construction activities.

1.6 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on other portions of the Project site.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Confine the parking of workmen's and construction vehicles, and the storage of construction materials to a designated staging area determined by the Owner.
 - 2. Owner Occupancy: Allow for Owner occupancy of Project site.
 - 3. Driveways and Entrances: Keep driveways and entrances serving premises.
 - a. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.7 COORDINATION WITH OCCUPANTS

- A. Owner's Occupancy of Areas of Construction: Owner will occupy the facility during the implementation of this Contract.

1.8 WORK RESTRICTIONS

- A. On-Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, except otherwise indicated.
 - 1. Weekend Hours: Coordinate with Owner and Owner's Representative.
- B. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to abutters with Owner.
 - 1. Notify Owner's Representative \geq 2 days in advance of proposed disruptive operations.
 - 2. Obtain Owner's Representative's permission before proceeding with disruptive operations.
- C. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

- A. Drawings: There are no drawings on this Project.
- B. Specification Format: The Specifications are organized into Divisions and Sections using the 48-division format and CSI/CSC's "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 because all available Section numbers are not used. Consult the table of contents at the beginning of the Project

Manual to determine numbers and names of Sections in the Contract Documents.

- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. 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 and meanings shall be interpreted as appropriate. 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. 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.
 - 3. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

1.10 CODES, STANDARDS AND PERMITS

- A. All work under this contract shall conform to all codes and standards in effect as of the date of receipt of Bids which are applicable to this Project. All work shall also conform to specific requirements and interpretations of local authorities having jurisdiction over the Project. These Codes, standards, and authorities are referred to collectively as "the governing codes and authorities" and similar terms throughout the Specifications. Determination of applicable codes and standards and requirements of the authorities having jurisdiction shall be the responsibility of the Contractor; as shall be the analysis of all such codes and standards in regard to their applicability to the Project for the purposes of determining necessary construction to conform to such code requirements, for securing all approvals and permits necessary to proceed with construction, and to obtain all permits necessary for the Owner to occupy the facility for their intended use. In the case of conflicts between the requirements of different codes and standards, the most restrictive or stringent requirements shall be met.
- B. The codes that were used in the design of this Project are as follows:
 - 1. Commonwealth of Massachusetts State Building Code, 780 CMR Eighth Edition, including all referenced standards.
 - a. 2009 International Building Code w/ MA amendments.
 - b. 2009 International Existing Building Code (w/ 780 CMR Ch. 34 amendments).
- C. Code Enforcement and Approvals: Secure the general building permit for the work, for which all fees will be paid by the Owner, and conform to all conditions and requirements of the permit and code enforcement authorities.
- D. Identify all permits (other than general building permit) required from authorities having jurisdiction over the Project for the construction and occupancy of the work. Prepare the necessary applications and submit required plans and documents to obtain such permits in a timely manner.
 - 1. Display all permit cards as required by the authorities, and deliver legible photocopies of all permits to the Owner's Representative and Owner promptly upon their receipt.

2. Arrange for all inspections, testing and approvals required for all permits. Notify the Owner, Owner's Representative and Architect \geq 3 business days in advance, so they may arrange to observe.
3. Comply with all conditions and provide all notices required by all permits.
4. Perform and/or arrange for and pay for all testing and inspections required by the governing codes and authorities, other than those provided by the Owner, and notify the Owner, Owner's Representative, and Architect of such inspections \geq 3 business days in advance, so they may arrange to observe.
5. Where inspecting authorities require corrective work in conjunction with applicable codes and authorities, promptly comply with such requirements, except in cases where such requirements clearly exceed the requirements of the Contract Documents, in which case proceed in accordance with the procedures for modifications to the Work established in the Contract Documents.

E. The following Permit and Application fees have been waived by the Town of Templeton:

1. Templeton Building Permit and inspection fees.

1.11 OCCUPATIONAL SAFETY AND HEALTH ACT

- A. The Contractor and each Subcontractor shall comply with the requirements of the Occupational Safety and Health Act of 1970 and the Construction Safety Act of 1969, including all standards and regulations which have been promulgated by the Governmental Authorities which administer such Acts. Said requirements, standards and regulations are incorporated herein by reference.
1. Each Contractor and Subcontractor shall comply with M.G.L. Chapter 306 of the Acts of 2004 which requires that all employees on the Project site complete a course in construction safety and health approved by the U.S. Occupational Safety and Health Administration (OSHA), known as the "OSHA 10-hour course."
- B. The Contractor and each Subcontractor shall comply with said regulations, requirements and standards and require and be directly responsible for compliance therewith on the part of his agents, employees, material, men, and Subcontractors; and shall directly receive and be responsible for all citations, assessments, fines or penalties which may be incurred by reason of his agents, employees, material men or Subcontractors failing to so comply.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous construction waste.
 - 2. Recycling nonhazardous construction waste.
 - 3. Disposing of nonhazardous construction waste.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.
- A. The Contractor shall prepare and submit a Construction Waste Management Plan to the Owner and Architect for approval. The CWM Plan shall outline the provisions to be implemented by the Contractor and Subcontractors to recycle and salvage demolition and construction waste generated during the project.
- B. Upon approval of the CWM Plan by the Owner and Architect, it shall be implemented by the Contractor and Subcontractors throughout the duration of the project, and documented in accordance with the Submittal Requirements below.
- C. The Construction Waste Management Plan shall include, but not be limited to, the following components:
 - 1. Listing of Targeted Materials: The contractor shall develop a list of the waste materials from the Project that will be targeted for reuse, salvage, or recycling. The following materials, at minimum, shall be accounted for (materials that will not be recycled shall be indicated as such):

- a. Cardboard, paper, packaging
 - b. Beverage containers
 - c. Metals including steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
2. Landfill Information: The contractor shall provide the name and location of the landfill(s) where trash will be disposed of.
 3. Recycling or Salvaging Facilities: The contractor shall provide the names and locations of the recycling or salvaging facilities where waste materials will be delivered.
 4. Sorting Method: The contractor shall provide a description of the proposed means of sorting and transporting the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for off-site sorting). Waste haulers using off-site sorting operation shall provide a written description of the sorting process used, and their method for calculating project-specific recycling rates.
 5. Packaging Waste: The contractor shall note whether suppliers will eliminate or take back packaging for major materials delivered to the site.
 6. Implementation and Supervision: The contractor shall include provisions in the Construction Waste Management Plan for addressing conditions in the field that do not adhere to the CWM Plan, including provisions to rectify non-compliant conditions.
 7. Additional Information: The contractor shall include any additional information deemed relevant to describe the scope and intent of the CWM Plan to the Owner and Architect.
- D. Construction Waste Management and recycling requirements shall be incorporated into all Subcontractors' contracts.

1.5 SUBMITTALS

- A. Waste Management Plan: Submit 3 copies of plan \leq 30 days of date established for the Notice to Proceed.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

1.7 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Include separate sections in plan for demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this

- Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 3. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 4. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement waste management plan as approved by Owner. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 4. Store components off the ground and protect from the weather.
 5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.3 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 2. Polystyrene Packaging: Separate and bag materials.
 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood

- pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

3.4 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Warranties.
 - 3. Product maintenance manuals.
 - 4. Final cleaning.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 3. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 4. Complete final cleaning requirements, including touchup painting.
 - 5. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect or Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect or Owner will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect or Owner, that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 - 1. Submit certified copy of Architect's or Owner's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or

2. otherwise resolved for acceptance.
 2. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 3. Submit lien waivers and/or certificate of payment received, as required by Owner, from all subcontractors.
 4. Instruct Owner's personnel in maintenance of products.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit list, including location of roof area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect or Owner for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual and place into a 9x12 envelope with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

- a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep broom clean adjacent affected paved areas. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake affected adjacent grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove labels that are not permanent.
 - i. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - j. Leave Project clean and ready for occupancy.
2. Before requesting final inspection for determining date of Final Completion, complete cleaning operations listed above as required following Substantial Completion and completion of all punch list items.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.
1. Comply with waste ban regulations of the Massachusetts Department of Environmental Protection (MassDEP), 310 CMR 19.017, for disposal of asphalt shingles and metal.

3.2 REPAIR OF THE WORK

- A. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
1. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, general provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements, are a part of this Section and shall be binding on all Contractors and Subcontractors who perform this work.

1.2 SUMMARY

- A. Work of this Section includes the following:
 - 1. Demolition work of existing construction and building described by provisions of this Section, including:
 - a. Demolition of existing asphalt roof shingles, underlayments, and metal drip edges.
- B. Related work of other Sections includes the following:
 - 1. Installation glass fiber-reinforced shingles over sheathing after removal of existing items described by provisions of this Section, is specified in Division 07.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- C. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- D. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 SUBMITTALS

- A. Landfill Records: Indicate receipt and acceptance of demolished material by a landfill facility authorized to accept such material.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 DEMOLITION, GENERAL

- A. Carry out all demolition work in a neat and orderly manner. Keep noise, dust, and similar nuisances to a minimum. Do not collapse walls. Do not throw or drop materials.
- B. Removed and Reinstalled Items:
 - 1. Clean and repair items to functional condition adequate for intended reuse.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Owner's Representative, items may be removed to a suitable, protected storage location off-site during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.2 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent materials to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect existing utilities and services indicated to remain in service and protect them against damage during demolition operations.
 - 4. Protect pavement and ground including seeded areas, and shrubbery exposed to damage during selective demolition operations.
 - 5. Cover and protect equipment that has not been removed.
 - 6. Patch, repair or replace materials and items accidentally damaged during demolition operations.
 - 7. Confine dust and debris to immediate area of demolition activity to the greatest extent practicable.
- B. Remove temporary barricades and protections where hazards no longer exist.

3.3 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Remove and transport debris in accordance with the Standard General and Supplemental General Conditions.

3.4 RECYCLING OF MATERIALS

- A. Recycling of Materials:
 - 1. Contractor shall recycle any such items for which there exists an established local or state recycling program.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Glass Fiber-Reinforced Asphalt shingles for sloped roofs.
 - 2. Underlayment and self-adhering sheet underlayment.
 - 3. All hoisting and scaffolding necessary for the completion of the roof work.
 - 4. Waste disposal.
- B. Related Sections include the following:
 - 1. Division 01 Section "Construction Waste Management And Disposal".
 - 2. Division 02 Section "Selective Demolition" for demolition of existing asphalt roof shingles, underlayments, and metal drip edges.
 - 3. Division 07 Section "Sheet Metal Flashing and Trim" for metal drip edges and selected eave cladding.
 - 4. Division 07 Section "Snow Guards" for pad type snow guards installed with asphalt shingle roofing.

1.3 DEFINITIONS

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

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of asphalt shingle indicated.
- C. Samples for Verification: For the following products, of sizes indicated, to verify color selected.
 - 1. Glass Fiber-Reinforced Asphalt Shingle: Full-size asphalt shingle strip.
 - 2. Ridge and Hip Cap Shingles: Full-size ridge and hip cap asphalt shingle.
- D. Qualification Data: For Installer.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for glass fiber-reinforced asphalt shingles.
- F. Research/Evaluation Reports: For glass fiber-reinforced glass fiber-reinforced asphalt shingles.
- G. Maintenance Data: For glass fiber-reinforced asphalt shingles to include in maintenance manuals.

- H. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual that is approved, authorized, or licensed by glass fiber-reinforced asphalt shingles roofing system manufacturer to install roofing system indicated.
- B. Fire-Test-Response Characteristics: Provide glass fiber-reinforced asphalt shingle and related roofing materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Exterior Fire-Test Exposure: Class A; ASTM E 108 or UL 790, for application and roof slopes indicated.
- C. Wind-Resistance-Test Characteristics: Provide glass fiber-reinforced asphalt shingles and related products identical to those tested according to ASTM D 7158 Class H 150 mph wind resistance and passed. Identify each bundle of asphalt shingles with appropriate markings of applicable testing and inspecting agency.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Approved mockups shall become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing materials in a dry, well-ventilated, weathertight location according to glass fiber-reinforced asphalt shingles manufacturer's written instructions. Store underlayment rolls on end on pallets or other raised surfaces. Do not double-stack rolls.
 - 1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.
- B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.7 PROJECT CONDITIONS

- A. Existing Roof: There are no Contract Drawings on this Project and Bidders are encouraged to visit the site to verify field conditions prior to submitting Bid. For estimating purposes note the following physical characteristics:
 - 1. Roof has "saltbox" type gable (2 unequal roof planes of same slope) with total area approximately 4,040 ft².
 - a. Smaller Front Plane +/- 1,610 ft².
 - b. Larger Rear Plane +/- 2,430 ft².
 - c. Slope +/- 3⁻⁵/₈:12.
 - d. Perimeter +/- 258 lineal feet.

2. Roof edge has gutter-less, straight, pre-finished aluminum-clad eaves. Rake ends are tapered from an overhang of +/- 2'-4" at ridge tapering to +/- 10 inches at eave, also with pre-finished aluminum-cladding.
- B. Temporary Support Facilities: Furnish and install all temporary lifts, hoists, staging, scaffolding, rigging, labor and materials, and temporary support to perform all operations in connection with the installation of this Work. Remove all temporary support facilities when no longer required.
- C. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt shingle roofing to be performed according to manufacturer's written instructions and warranty requirements.
 1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.8 WARRANTY

- A. Standard Warranty: Standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Manufacturing defects.
 - b. Structural failures including failure of asphalt shingles to self-seal after a reasonable time.
 2. Material Warranty Period: Lifetime, prorated, with first 10 years non-prorated.
 3. Algae-Discoloration Warranty Period: Asphalt shingles will not discolor 10 years from date of Substantial Completion.
 4. Workmanship Warranty Period: 10 years from date of Substantial Completion.
- B. Special Project Warranty: Roofing Installer's Warranty, signed by roofing Installer, covering the Work of this Section, in which roofing Installer agrees to repair or replace components of asphalt shingle roofing that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: 2 years from date of Substantial Completion.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Glass Fiber-Reinforced Asphalt Shingles: 100 ft² of each type, in unbroken bundles.

PART 2 - PRODUCTS

2.1 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Granule surfaced self-sealing asphalt shingle with fiberglass reinforced core and mineral granule surfacing. Traditional 3-tab styling with a 5 inch exposure. ASTM D3462.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide "Marquis Weathermax" shingles by GAF or comparable product by one of the following:

- a. CertainTeed.
 - b. Owens Corning.
2. Strip Size: Manufacturer's standard.
 3. Algae Resistance: Granules treated to resist algae discoloration.
 4. Color: As selected by Architect or Owner from manufacturer's full range for line selected.
- B. Ridge Shingles: Manufacturer's standard units to match glass fiber-reinforced asphalt shingles.

2.2 UNDERLAYMENT MATERIALS

- A. Synthetic Underlayment: Meeting the physical requirements of ASTM D 226 or ASTM D 4869, UV stabilized polypropylene, breathable non-woven construction.
1. Obtain felt underlayment from same manufacturer of glass fiber-reinforced asphalt shingles, or equal product approved in writing by manufacturer, as required to maintain specified warranty of system.
 2. Products: Subject to compliance with requirements, provide the following or equal:
 - a. CertainTeed; "DiamondDeck High-Performance Synthetic Underlayment".
 - b. GAF; "Tiger Paw".
 - c. Owens Corning; "Deck Defense".
- B. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, ≥ 40 mil thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release paper backing, in 36 in. wide rolls; cold applied.
1. Obtain self-adhering sheet underlayment from same manufacturer of asphalt shingles, or equal product approved in writing by manufacturer, as required to maintain specified warranty of system.
 2. Products: Subject to compliance with requirements, provide 1 of following or equal:
 - a. CertainTeed; "WinterGuard Granular".
 - b. Grace, W. R. & Co.; "Grace Ice and Water Shield".
 - c. Johns Manville International, Inc.; "Roof Defender".
 - d. Owens Corning; "WeatherLock M".
 - e. Polyguard Products, Inc.; "Polyguard Deck Guard".

2.3 ACCESSORIES

- A. Roofing Nails: ASTM F 1667; hot-dip galvanized steel wire shingle nails, ≥ 0.120 inch diameter, barbed shank, sharp-pointed, with $\geq \frac{3}{8}$ in. diameter flat head and of sufficient length to penetrate $\frac{3}{4}$ in. into solid wood decking or extend $\geq \frac{1}{8}$ in. through plywood sheathing.
1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

2.4 METAL FLASHING AND TRIM

- A. General: Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim."

- B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item.
 - 1. Drip Edges: Fabricate in lengths \leq 10 ft. with 2 in. roof deck flange and 1½ in. fascia flange with $\frac{3}{8}$ in. drip at lower edge.
- C. Vent Pipe Flashings: ASTM B 749, Type L51121, \geq $\frac{1}{16}$ in. thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof and extending \geq 4 in. from pipe onto roof.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through glass fiber-reinforced asphalt shingles.
 - 3. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
- B. Single-Layer Synthetic Underlayment: Install on composite nailbase insulated sheathing parallel with and starting at the eaves. Lap sides \geq 2 in. over underlying course. Lap ends \geq 4 in. Stagger end laps between succeeding courses \geq 72 in. Fasten with roofing nails.
 - 1. Install synthetic underlayment on roof deck not covered by self-adhering sheet underlayment. Lap sides of felt over self-adhering sheet underlayment \geq 3 in. in direction to shed water. Lap ends of felt \geq 6 in. over self-adhering sheet underlayment.
 - 2. Install fasteners \leq 36 in. o.c.
- C. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on composite nailbase insulated sheathing. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated on Drawings, lapped in direction to shed water. Lap sides \geq 3-1/2 inches. Lap ends \geq 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment \leq 7 days.
 - 1. Install over entire roof perimeter, 36 in. (roll width) in from edge, and centered over ridge 18 in. each side, at chimney perimeter, and chimney base to eave.

3.3 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in

Division 07 Section "Sheet Metal Flashing and Trim."

- B. Rake Drip Edges: Install rake drip edge flashings over underlayment and fasten to roof deck.
- C. Eave Drip Edges: Install eave drip edge flashings over underlayment and fasten to roof sheathing.
- D. It is anticipated that the existing flashing at plumbing vent pipes and the stepped flashing at the brick masonry chimney is acceptable and will be reemployed in the Work.

3.4 GLASS FIBER-REINFORCED ASPHALT SHINGLE INSTALLATION

- A. Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
 - 1. Fasten asphalt shingles to roof sheathing with roofing nails.
 - 2. Fasten asphalt shingles with ≥ 6 fasteners per shingle in accordance with 780CMR Massachusetts State Building Code. Stapling of shingles is not allowed.
- B. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip ≥ 7 inches wide with self-sealing strip face up at roof edge.
 - 1. Extend glass fiber-reinforced asphalt shingles $\frac{1}{2}$ inch over fascia at eaves and rakes.
 - 2. Install starter strip along rake edge.
- C. Install first and remaining courses of glass fiber-reinforced asphalt shingles stair-stepping diagonally across roof deck with 5 inch offset pattern at succeeding courses, maintaining uniform exposure.
- D. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- E. Fasten glass fiber-reinforced asphalt shingles strips with ≥ 6 roofing nails located according to manufacturer's written instructions.
 - 1. Where roof slope is $< 4:12$, seal glass fiber-reinforced asphalt shingles with asphalt roofing cement spots.
 - 2. When ambient temperature during installation is $< 50^{\circ}$ F, seal asphalt shingles with asphalt roofing cement spots.
- H. Ridge Cap Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.

3.5 WASTE DISPOSAL

- A. Disposal: At completion of roofing work, transport demolished materials and waste off Owner's property. Separate, salvage, recycle, and legally dispose of materials in accordance with the Commonwealth of Massachusetts Waste Ban, 310 CMR 19.017, and Section 01 74 19 Construction Waste Management And Disposal.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Formed Products: Furnished and installed by Division 07 Section "Glass Fiber-Reinforced Asphalt Shingles":
 - a. Formed continuous drip edges.
 - b. Formed eave cladding at selected locations.
 - 2. All hoisting and scaffolding necessary for the completion of the work.
 - 3. Waste disposal.
- B. Related Sections:
 - 1. Division 07 Section "Glass Fiber-Reinforced Asphalt Shingles".
 - 2. Division 07 Section "Snow Guards".
- A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change (Range): 120° F, ambient; 180° F, material surfaces.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Fabrication Samples: For roof edge flashings made from 12 in. lengths of full-size components including fasteners, cover joints, accessories, and attachments.
- C. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection.
- D. Qualification Data: For qualified fabricator.
- E. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

- F. Warranty: Sample of special warranty.

1.6 QUALITY ASSURANCE

- A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect or Owner's approval. If modifications are proposed, submit comprehensive explanatory data to Owner for review.
- B. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- C. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.8 COORDINATION

- A. Coordinate installation of manufactured roof specialties with interfacing and adjoining construction to provide a leak-proof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading > 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
 - 1. Surface: Smooth, flat.
 - 2. As-Milled Finish: Mill.
 - 3. Exposed Coil-Coated Finish:
 - a. 2-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing \geq 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with total dry film thickness \geq 0.5 mil.

2.2 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - 2. Fasteners for Aluminum Sheet: Series 300 stainless steel.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape $\frac{1}{2}$ in. wide and $\frac{1}{8}$ in. thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound,

recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

- G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of $\frac{1}{4}$ in. in 20 ft. on slope and location lines as indicated and within $\frac{1}{8}$ in. offset of adjoining faces and of alignment of matching profiles.
- C. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant.
- D. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.
- E. Do not use graphite pencils to mark metal surfaces.

2.4 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Steep slope roof sheet metal fabrications.
- B. Drip Edges: Fabricate from the following material:
 - 1. Aluminum: 0.032 in. thick.
 - 2. Finish: Two coat fluoropolymer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to

performance of the Work.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
4. Install sealant tape where indicated.
5. Do not use graphite pencils to mark metal surfaces.

- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

- C. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing $\geq 1\frac{1}{4}$ in. for nails and $\geq \frac{3}{4}$ in. for wood screws.

- D. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members ≥ 1 in. into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, $\geq 40^\circ\text{F}$ and $\leq 70^\circ\text{F}$, set joint members for 50% movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures $< 40^\circ\text{F}$.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3 in. centers.

- C. Formed Eave Cladding: Install eave cladding at location where it is missing at left end of front elevation of building, approximately 8 lineal feet.

3.4 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of $\frac{1}{4}$ in. in 20 ft. on slope and location lines as indicated and $\leq \frac{1}{8}$ in. offset of adjoining faces and of alignment of matching profiles.
- B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.5 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- C. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

3.6 WASTE DISPOSAL

- A. Unless otherwise indicated, excess materials are Contractor's property. At completion of roofing work, remove from Project site. Separate, salvage, recycle, and legally dispose of materials in accordance with 310 CMR 19.017 Commonwealth of Massachusetts Waste Ban.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Pad-type, flat-mounted snow guards.
- B. Related Sections:
 - 1. Division 07 Section "Glass Fiber-Reinforced Asphalt Shingles" for installation of pad-type, flat mounted snow guards.
 - 2. Division 07 Section "sheet Metal Flashing and Trim" for drip edges and formed eave flashing.

1.3 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for snow guards.
- B. Shop Drawings: Include roof plans showing layouts and attachment details of snow guards.
 - 1. Include calculation of number and location of snow guards based on snow load, roof slope, roof type, components, spacings, and finish.
- C. Samples:
 - 1. Full size pad style.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of snow guard, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.5 PROJECT CONDITIONS

- A. Temporary Support Facilities: Furnish and install all temporary lifts, hoists, staging, scaffolding, rigging, labor and materials, and temporary support to perform all operations in connection with the installation of this Work. Remove all temporary support facilities when no longer required.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Performance Requirements: Provide snow guards that withstand exposure to weather and resist thermally induced movement without failure, rattling, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

1. Temperature Change: 120° F, ambient; 180° F, material surfaces.
- B. Structural Performance: In accordance with 780 CMR- Massachusetts State Building Code.

2.2 PAD-TYPE SNOW GUARDS

- A. Flat-Mounted Metal Snow Guard Pads:
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Model No. PD40 "Half Round Pad-Style Snow Guard" manufactured by Alpine Snow Guards, division of Vermont Slate & Copper Services, Inc., or comparable product by 1 of the following:
 - a. Rocky Mountain Snow Guards, Inc.
 - b. Sno Gem, Inc.
 2. Material: Cast aluminum with Firestone "Una-Clad paint" finish. Color to be as selected by Owner or Architect by manufactures full range.
 3. Fasteners: Galvanized steel, copper, or stainless steel. Compatible with snow guards and roof deck. Provide ≥ 2 fasteners per snow guard.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, snow guard attachment, and other conditions affecting performance of the Work.
 1. Verify compatibility with and suitability of substrates including compatibility with existing finishes or primers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and prepare substrates for bonding snow guards.
- B. Prime substrates according to snow guard manufacturer's written instructions.

3.3 INSTALLATION

- A. Install snow guards according to manufacturer's written instructions.
- B. Attachment for Asphalt Shingle Roofing:
 1. Flat-Mounted, Snow Guard Pads: Mechanically anchored through predrilled holes concealed by the shingles.
- C. Install snow guards at 15 in. o.c. horizontally, staggered at alternating rows. Vertical spacing shall conform to following.
 1. 1st row Up 30 in. from eave drip edge.

2. 2nd row Up 15 in. from 1st row.
3. 3rd row Up 15 in. from 2nd row.

4. Building Front Roof Plane: Full roof plane width.

5. Building Rear Roof Plane: Over doors only, full width of opening plus 15 in.

END OF SECTION