

SURVEILLANCE DES TRAVAUX
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WORK PROCEDURES

Roof Replacement – Building 1
Project No. 342-92201

Sainte-Anne-des-Plaines Complex
Archambault Building Minimum
Building 1
244, Gibson Boulevard
Sainte-Anne-des-Plaines, QC

Client Reference: SCC100
O/F : TC-22-1507-03

February 2, 2023




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Client Reference: SCC100
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PARTIE 1 – GENERAL CONDITIONS

1. PROJECT

- 1.1 The purpose of this project is to replace the roof system on Building 1 of the Archambault Building Minimum location in Ste-Anne-des-Plaines Complex.
- 1.2 The Contractor must file a schedule prior to commencing the Work, which must be approved by the ministry representative. The schedule must consider the operating activities associated with the building and the planned work must interfere as little as possible with these activities.

2. SCOPE OF WORK

- 2.1 This document is for the roof replacement of Building 1 having approximately 366 m² (3,946 sq.ft.)
The following list of work is not necessarily exhaustive:
 1. Beforehand, the contractor must verify the existing structure.
 2. The commencement of the work by the contractor will constitute the contractor's acknowledgement that this specification can be implemented satisfactorily, under the project conditions and with all the prerequisites necessary for the issuance of the guarantee by the contractor responsible for carrying out the work. No modification of the amount of the contract will be made under the pretext of a lack of consultation of the documents issued for this contract or the site conditions that may exist during the execution of the work.
 3. Removal of all non-reused materials and transport of these to an authorized site.

According to the information collected, the existing roof is composed of:

Building 1 (approximately 3,946sq.ft.): Conventional roof system with modified bitumen membrane, fiberboard support panels 1'', slope expanded polystyrene insulation (6'' where measured), 2 plies of paper felt vapor barrier and concrete deck

On-site installation:

1. The ground installation will have to be coordinated by the representatives of the Ste-Anne-des-Plaines Complex, security fences will have to be erected and monitored during the work and kept closed at the end of each working day so that no one can enter.
2. Also provide the installation of guardrails on the perimeter of the roof with a net to prevent the fall of debris on users on the ground or surrounding surfaces.
3. Before proceeding with the use of mechanical equipment, it will be necessary to ensure the authorization of the representative of the Ste-Anne-des-Plaines Complex.
4. Debris will need to be removed from the site daily to avoid any risk of vandalism.
5. Equipment with flammable products will have to be removed from the site daily or padlocked without possible access at the end of each day.

Demolition:

1. Remove and dispose of all components including flashings, counter flashings and/or metal drips;
2. Removal of the materials composing the roofing system described above, up to the existing concrete deck. Please note that the existing vapor barrier, if observed to be in good condition,

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not humid and well adhered to the existing concrete deck, may be preserved. This will be confirmed by the Consultant during daily demolition.

3. Removal of existing plumbing vents, pay particular attention by checking and ensuring that the vents are properly anchored before proceeding with removal.
4. Removal of rotten or damaged woodwork (if applicable). Notify the representative if large replacement quantities (**greater than 50 sq.ft.**) are expected.
5. Thoroughly clean the surface of the roof of any debris, dry the surfaces well before the installation of new materials.
6. Demolish roof sections that can be sealed up to the base sheet of the roof system or temporary protective membrane, do not leave any roof sections exposed to existing wood at the end of a working day.

Installation:

7. Any rotten wood must be replaced, notify the customer's representative and the consultant when the wood to be replaced is discovered, wait until the customer's representative has provided the approval to replace the materials.
8. As required on the roof details, modify the parapets, control joints, equipment bases, all before receiving new materials.
9. Supply and install the new vapor-barrier, base insulation, and slope insulation. support panels and modified bitumen membrane all adhered with asphalt type 2 and new white marble pea stone ballast adhered with SEBS bitumen.
10. Supply and install the new pre-painted metal flashings gage 24 (color to be selected by the client).
11. Supply and install new anti-vandalism copper roof drains with U-Flow type connection.
12. Supply and install new aluminum vents.
13. Eliminated from the roof level any obsolesces bases including the roof hatch
14. The contractor is responsible for any disconnection or reconnection of mechanical units or electrical wires.
15. Before starting the work and at the end, clean the roofs drains with a snake device assuring they are not blocked by any debris.
16. Make sure temporary roof drains are connected to the exiting rain pipes with U-Flow type connection.
17. Keep the construction site clean at all times and allow for a complete and thorough cleaning at the end.

The installation of all products and materials planned for this project must comply with the most recent requirements, recommendations and written specifications of manufacturers and suppliers, including any available technical bulletins, installation instructions specified in product catalogues and packaging cartons, as well as indications in data sheets.

3. TEMPORARY INSTALLATIONS

- 3.1 Upon mobilization, the contractor will proceed with the installation of various equipment required for subsequent work. This equipment will be installed at the expense of the contractor. The authorized areas for these temporary facilities will be indicated to the Contractor by the ministry representative during the site visit or at subsequent site meetings. However, at no time the contractor must interfere with the operational activities of the building.

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- 3.2 Before commencing any work, the Contractor must ensure that the condition of the project and the works that are to receive the materials provided for, are satisfactory.
- 3.3 The decision to begin work implies that the contractor accepts the basic works and is responsible for their corrections, if any. During the execution of work, the relocation of equipment or materials must be coordinated with the ministry representative.
- 3.4 No unplanned drilling in the structure without the permission of the ministry representative will be authorized.

4. WATERPROOFING OF THE BUILDING

- 4.1 The building must be impervious to any ingress of water, visible or not visible from inside the building, regardless of the source. If an infiltration occurs during the duration of the work, the contractor must diligently determine the cause, make the necessary corrections, and repair it at his own expense.
- 4.2 At the end of each working day, the contractor must ensure that the exposed parts of the roof basins are covered with temporary protective membranes. To prevent potential rain damage to all unprotected surfaces.
- 4.3 The schedule and work methods used by the contractor must be prepared in such a way as to maintain the tightness of the building throughout the duration of the work.

5. PRECAUTIONS TO TAKE

- 5.1 The contractor must ensure that they do not damage or contaminate materials or installations in and around the building. He is responsible for the supply and installation of the appropriate protective devices and for the cleaning of all soiled surfaces during the work by stains, asphalt, mortar, sealing and caulking slides or other product used during the work, to the complete satisfaction of the customer.
- 5.2 Overhead protection must be erected near entrances as well as where there is a risk of falling materials on sidewalks or parking.
- 5.3 During the Work, the Contractor shall take all necessary precautions not to damage the parts of the adjacent siding.
- 5.4 No work is permitted on partially or finished parts without the surfaces in question being properly protected.

6. EXECUTION AND COORDINATION

- 6.1 The execution will be of the best quality in accordance with the usual standards for this category of work, qualified and competent personnel will be used, and all work must be carried out in accordance with the spirit of the plans, details and specifications as well as the recommendations of manufacturers, the Building Code and according to the recommendations of the Association des Maitres Couvresseurs du Québec (AMCQ).

- 6.2 The Contractor will be responsible for having all work performed by other trades to allow the complete execution of the work.
- 6.3 Materials and their installation, as represented in this document, is subject to monitoring under the client's responsibility.
- 6.4 The Contractor shall guarantee all roof repair work for a period of five (5) years. This complete guarantee will be without prejudice to the civil liability established by the new Civil Code of the Province of Quebec. The contractual warranty periods will begin on the date of provisional acceptance of the work determined by the ministry representative. The contractor must also provide a complete warranty from the manufacturer for a period of ten (10) years including materials and labor.
- 6.5 Before starting work, ensure that the temperature meets the manufacturer's requirements.

7. SAFETY AND FIRE

- 7.1 At all times, the contractor must comply with the safety instructions described in the manufacturer's manual as well as the applicable local requirements.
- 7.2 The Contractor is responsible for ensuring safety at the site of the Work. He must ensure his obligations and responsibilities under the Act respecting occupational health and safety (R.S.Q., chapter 5.2.1) or the specific requirements of the building.
- 7.3 The contractor must protect the various areas of the site and must also ensure that no area is left in a dangerous condition for his workers, the ministry workers, and the public.
- 7.4 The contractor is responsible for the supply and installation of all safety features required for the execution of the work. Included in these devices are scaffolding, work platforms, guardrails, and others. The use of these devices must be made in accordance with the requirements of the Commission de la Santé et de la Sécurité du travail (CNESST).
- 7.5 The contractor shall be solely responsible for the design, erection, operation, maintenance and removal of temporary framing and other temporary installations and for the design and application of the construction methods necessary for their use. The contractor must take all measures to ensure the health, safety and physical well-being of its workers. Depending on the case, an engineer's approval may be requested.

- 7.6 Fuel waste, wood, sawdust, paper, containers of paint or oil, etc., will be removed from the site every day after the work. It will be forbidden to burn waste at or near the construction site.
- 7.7 Flammable liquids or materials will be stored in locked, special locations approved by the ministry representative. The contractor must designate these places by signs and must post notices to prevent and avoid any source of fire in the vicinity.
- 7.8 The use of gasoline-powered equipment shall be kept to the minimum possible. Under no circumstances will the storage of gasoline in the building or on the roof be permitted.

8. WORKSHOP DRAWINGS AND DATA SHEETS

- 8.1 The shop drawings must indicate the materials to be used and the methods of construction and fastening or anchoring to be used, and they must contain the assembly diagrams, explanatory notes and any other information necessary for the execution of the work. Refer to drawings and design specifications.
- 8.2 Before mobilization at the site and the start of work, submit for approval workshop drawings for metal structures, metal flashings, location of anchorages, method of assembly and relevant installation specific to the type of coating. Include data sheets for all screws, anchors and accessories that will be used.
- 8.3 Modifications made to the shop drawings by the designer are not intended to vary the price of the contract. If they affect the cost of the work, notify the designer in writing before undertaking the work.
- 8.4 Make changes to the shop drawings required by the designer in accordance with the requirements of the contractual documents. When resubmitting them, notify the designer in writing of any changes made, other than those required. When the shop drawings have been verified by the designer and approved, a copy is returned by email, and the work and installation can be undertaken.

9. DELIVERY AND STORAGE

- 9.1 Adhesives and sealants must be stored at a temperature equal to or greater than +5°C in any way.
- 9.2 Materials must be delivered in their original container and packaging, and manufacturers' seals must be intact.
- 9.3 Material handling and storage must comply with the most recent written recommendations from manufacturers.
- 9.4 **The contractor must, at his own expense, provide on the site a shelter to protect against the weather all building materials likely to be damaged by water, ice, sun, wind, and dust.**
- 9.5 All damaged and non-usable materials will be marked, removed from the job site, and replaced with new and compliant replacement materials.

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10. START AND PROGRESS OF WORK

- 10.1 Kick-off meeting: before the start of repair work on the roof of Building 1, including discussion of the implementation of materials and requirements to obtain the warranty.
1. All parties directly involved in the quality of the work, or concerned with the execution of the work, must be present at this meeting.
 - a. Notify the consulting firm, 48 hours in advance, of the location, date, and time of the meeting.
- 10.2 The contractor must carry out the work without interruption and with diligence, in order to be able to complete it within the stipulated time.
- 10.3 If, in the course of the work, circumstances or difficulties arise, other than those associated with climatic conditions that may cause a delay in the schedule of work, the contractor will then be required to immediately notify the supervisor in writing. Only under these conditions, and if the contractor is not found responsible for the delay, the supervisor may then accede to the contractor's request for the purpose of extending the time limit. Otherwise, the contractor will be held responsible for delays and will have to suffer the consequences.
- 10.4 All work described in this document will be subject to inspections from the time the contractor takes possession of the site until the completion of the work.

11. FINAL ACCEPTANCE OF THE WORK

- 11.1 Final acceptance of the work will take place when all deficiencies identified during the provisional inspection have been corrected. The Entrepreneur must provide the ministry representative (client), all the required attestations and documents before his final payment request.

APPENDIX 1

Specifications

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Part 1 General**1.1 SUMMARY**

- .1 This Section includes the following:
 - .1 Demolition and removal of all roofing components up to the existing structure

1.2 DEFINITIONS

- .1 Demolition: rapid destruction of building following removal of hazardous materials.
- .2 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly.
- .3 Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .4 Construction Waste Management Plan (CWM Plan): Written plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19 - Construction Waste Management and Disposal
- .5 Construction Waste Management Report (CWM Report): Written report identifying actual materials that formed CWM Plan for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19 - Construction Waste Management and Disposal

1.3 REFERENCE STANDARDS

- .1 Canada Green Building Council (CaGBC)
 - .1 LEEDr Reference Guide for Building Design and Construction, Version 4
- .2 CSA Group (CSA)
 - .1 CSA S350-[M1980(R2003)], Code of Practice for Safety in Demolition of Structures.
- .3 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Assessment Act (CEAA), 2012
 - .2 Canadian Environmental Protection Act (CEPA), 2012
 - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
 - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations
 - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34
 - .4 Motor Vehicle Safety Act (MVSA), 1995

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- .5 Hazardous Materials Information Review Act, 1985
- .4 National Fire Protection Association (NFPA)
 - .1 NFPA 241 - 96, Standard for Safeguarding Construction, Alteration, and Demolition Operations
- .5 National Research Council Canada (NRC)
 - .1 National Building Code of Canada [2015] (NBC).
 - .2 National Fire Code of Canada [2015] (NFC).
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S660-[08], Standard for Nonmetallic Underground Piping for Flammable and Combustible Liquids
 - .2 ULC/ORD-C58.15-[1992], Overfill Protection Devices for Flammable Liquid Storage Tanks
 - .3 ULC/ORD-C58.19-[1992], Spill Containment Devices for Underground Flammable Liquid Storage Tanks
- .7 United States Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles
 - .2 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles
 - .3 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate with Owner for the material ownership including but not limited to:
 - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
 - .2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during demolition remain Owner's property.
- .2 Pre-Demolition Meetings:
 - .1 Convene pre-installation meeting (1) week prior to beginning work of this Section and on-site installation, with Contractor and Consultant.
- .3 Scheduling:
 - .1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.
 - .2 In event of unforeseen delay notify Representative & Consultant in writing.

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1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Shop Drawings: Submit drawings stamped and signed by professional engineer registered or licensed in Province as follows:
 - .2 Submit documents and samples required.
 - .3 Schedule of Demolition Activities.
- .2 Informational Submittals: Provide the following submittals when requested by the Consultant:
 - .1 Qualification Data: Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including; but not limited to, lists of completed projects with project names and addresses, names and addresses of Consultants and Representative, for work of similar complexity and extent.
- .3 Sustainable Design Submittals:
 - .1 LEEDr v4 Document Submittals.
 - .2 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: Ensure Work is performed in compliance with applicable Provincial/Territorial and Municipal regulations.
- .2 Comply with hauling and disposal regulations of Authority Having Jurisdiction.
- .3 Standards: Comply with ANSI A10.6 and NFPA 241.

1.7 SITE CONDITIONS

- .1 Review "Designated Substance Report" and take precautions to protect environment.
- .2 If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Owner and Consultant immediately.
 - .1 Proceed only after receipt of written instructions.
- .3 Notify Owner and Consultant before disrupting building access or services.
- .4 Environmental protection:
 - .1 Ensure Work is done in accordance with Environmental Procedures.

1.8 EXISTING CONDITIONS

- .1 Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

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- .1 Hazardous materials will be as defined in the Hazardous Materials Act.
- .2 Hazardous materials will be removed by Owner before start of the Work.

Part 2 Products

2.1 EQUIPMENT

- .1 Equipment and heavy machinery:
- .2 On-road vehicles to: CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations and CEPA-SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.
- .3 Off-road vehicles to: EPA CFR 86.098-10 and EPA CFR 86.098-11.
- .4 Machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 EXAMINATION

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.
- .2 Consultant does not guaranty that existing conditions are the same as those indicated in Project Record Documents.
- .3 Inventory and record the condition of items being removed and salvaged.
- .4 Promptly submit a written report to consultant.
- .5 Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during demolition operations.
- .6 Verify that hazardous materials have been remediated before proceeding with demolition operations.

3.2 PREPARATION

- .1 Protection of In-Place Conditions:
 - .1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.
 - .2 Keep noise, dust, and inconvenience to occupants to minimum.

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- .3 Protect building systems, services and equipment.
- .4 Provide temporary dust screens, covers, railings, supports and other protection as required.
- .5 Do Work in accordance with Health and Safety Requirements.
- .2 Demolition/Removal:
 - .1 Demolish parts of the roof system as indicated.
 - .2 Remove parts of existing building to permit new construction.
 - .3 At end of each day's work, leave Work in safe and stable condition.
 - .4 Protect interiors of parts not to be demolished from exterior elements at all times.
 - .5 Demolish to minimize dusting.
 - .6 Only dispose of material specified by selected alternative disposal option for own use.

3.3 SITE RESTORATION & REPAIRS

- .1 General: Promptly repair damage to adjacent construction caused by demolition operations.
- .2 Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- .3 Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.4 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Refer to demolition drawings and specifications for items to be salvaged for reuse.
- .4 Waste Management: separate waste materials for reuse and recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 07 26 00 – Vapour retarders
- .2 Section 07 52 00 – Modified bituminous membrane roofing.
- .3 Section 07 62 00 - Sheet Metal Flashing and Trim
- .4 Section 07 92 00 – Joint Sealants

1.2 DEFINITIONS

- .1 Thermal Resistance: Means long-term thermal resistance (LTTR) in accordance with CAN/ULC-S770 or ASTM C 1303/C 1303M.

1.3 REFERENCE STANDARDS

- .1 ASTM International (ASTM):
 - .1 ASTM C 208-[12(2017)e2], Standard Specification for Cellulosic Fiber Insulating Board
 - .2 ASTM C 578-[19] Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
 - .3 ASTM C 591-[21], Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
 - .4 ASTM C 612-[14], Standard Specification for Mineral Fibre Block and Board Thermal Insulation
 - .5 ASTM C 726-[17], Standard Specification for Mineral Fiber Roof Insulation Board
 - .6 ASTM C 728-[17a], Standard Specification for Perlite Thermal Insulation Board
 - .7 ASTM C 1126-[19], Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation
 - .8 ASTM C 1289-[21], Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
- .2 American Society of Heating Refrigeration and Air-Conditioning (ASHRAE):
 - .1 ASHRAE 90.1-2019(I-P), Standard 90.1-2019 (I-P Edition) -- Energy Standard for Buildings Except Low-rise Residential Buildings. (ANSI Approved; IES Cosponsored)
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
 - .1 Safety Data Sheets (SDS)
- .4 Underwriters Laboratories of Canada (ULC):

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- .1 CAN/ULC-S102-[10], Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- .2 CAN/ULC-S114-[05], Standard Method of Test for Determination of Non-Combustibility in Building Materials
- .3 CAN/ULC-S704-[11], Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit documents and samples required.
- .2 Product Data:
 - .1 Submit manufacturer's product literature, and data sheets for each type of board insulation. Include product characteristics, performance criteria, physical sizes, and limitations.
 - .2 Submit WHMIS SDS
- .3 Shop Drawings: for slope insulation
- .4 Certificates: When requested, submit manufacturer's product certificates certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .5 Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .6 Manufacturer's Instructions: Submit manufacturer's installation instructions.
- .7 Sustainable Design Submittals:
 - .1 Environmental Product Declaration (EPD): Submit an Industry-wide EPD and identify which insulation product outlined in the EPD correspond to the required insulation types. Provide EPD with at least a cradle to gate scope, identifying the following impact categories (minimum):
 - .1 Global Warming Potential (GWP): All GWP information submitted in the form of kgCO₂ eq.
 - .2 Ozone Depletion Potential (ODP): All ODP information submitted in the form of kgCFC-11 eq.
 - .3 Acidification Potential (AP): All AP information submitted in the form of kgSO₂ eq.
 - .4 Eutrophication Potential (EP): All EP information submitted in the form of kgN eq.
 - .5 Smog Formation Potential (SFP): All SFP information submitted in the form of kgO₃ eq.
 - .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and

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percentages of [post-consumer][and][post-industrial] content, and total cost of materials for the project.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Common Product Requirements.
 - .1 Deliver board insulation marked with its thermal resistance value, associated reference standard number, Type, and Class. Packaged in accordance with the associated reference standard.
- .2 Storage and Handling Requirements:
 - .1 Store materials in a clean, dry area and in accordance with manufacturer's recommendations.
 - .2 Store and protect plastic insulation from sunlight except as necessary during installation, protect from ignition sources, hydrocarbons, other petroleum derivatives, and other products that may cause degeneration.

Part 2 Products

2.1 INSULATION

- .1 Rigid Cellular Polyisocyanurate:
 - .1 Faced: to CAN/ULC-S704.
 - .1 Polyisocyanurate Core - Type 2 minimum 140 kPa or Type 3 minimum 170 kPa
 - .2 Surfaces:
 - .1 Facers: glass fibre.
 - .3 Shape: flat & tapered 1%.
 - .4 Board Thickness: 63.5 mm (2.5'') at the drain or as indicated on drawings.
 - .5 Thermal Resistance: Minimum RSI 1.06 per 25.4 mm
 - .6 Size: Max 1200 mm x 1200 xx (48''x48'').
 - .2 Perlite Insulation Board: To ASTM C 728, Type 2 - roof cover/recover board.
 - .1 Board Thickness: 12.5 mm(1/2'') – installed in two layers for a total thickness of 25.4 mm (1'').
 - .2 Maximum Size: 1200 mm x 1200mm (48'' x 48'').

2.2 ADHESIVE

- .1 Asphalt – conform to CSA A123.4-M and/or UL-55A standards.
 - .1 Type 2

**Part 3 Execution****3.1 EXAMINATION**

- .1 Verification of Conditions: Verify that conditions of substrate previously installed are clean, dry, smooth, and acceptable for application of board insulation in accordance with manufacturer's instructions.
 - .1 Inspect substrates in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed Consultant.

3.2 INSTALLATION - GENERAL

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .2 Fit insulation tight around penetrating mechanical boxes, roof drains, plumbing piping, and other protrusions.
- .3 Cut and trim insulation neatly to fit spaces. Butt joints tightly. Fill empty spaces created by cuts with mineral wool
- .4 In multi-layered applications, offset vertical and horizontal joints.
- .5 Use only insulation boards free from chipped or broken edges.
- .6 Do not enclose, cover, or perform backfilling of insulation until it has been reviewed and accepted by the Consultant.

3.3 INSTALLATION - RIGID INSULATION

- .1 Apply Type 2 full adherence to vapor barrier and/or polyisocyanurate insulation board at rate of 1.2 kg/m² (25 lbs/100pi²) with a mop and as per manufacturer's recommendations.

3.4 INSTALLATION – PERLITE PANELS

- .1 Apply Type 2 full adherence to slope polyisocyanurate insulation board at rate of 1.2 kg/m² (25 lbs/100pi²) with a mop and as per manufacturer's recommendations for the first layer.
- .2 Offset vertical and horizontal joints.
- .3 Apply Type 2 full adherence to perlite panels at rate of 1.2 kg/m² (25 lbs/100pi²) with a mop and as per manufacturer's recommendations for the second layer.
- .4 Offset vertical and horizontal joints

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3.5 CLEANING

- .1 Progress Cleaning: daily.
- .2 Final Cleaning: upon completion.
- .3 Waste Management

3.6 PROTECTION

- .1 Temporarily protect installed board insulation from inclement weather and sunlight.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 07 21 13 – Board insulation
- .2 Section 07 52 00 – Modified bituminous membrane roofing
- .3 Section 07 62 00 – Sheet metal flashing and trim
- .4 Section 07 92 00 - Joint Sealants

1.2 REFERENCE STANDARDS

- .1 CSA A123.23-15 Type A Classe

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit documents and samples as required.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for vapour retarders and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit one electronic copy of WHMIS SDS.
- .3 Certificates:
 - .1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 - .2 Environmental Product Declaration (EPD): Submit an Industry-wide EPD for each vapour retarder product outlined in the specification. Provide EPD with at least a cradle to gate scope, identifying the following impact categories (minimum):
 - .1 Global Warming Potential (GWP): All GWP information submitted in the form of kgCO₂ eq.
 - .2 Ozone Depletion Potential (ODP): All ODP information submitted in the form of kgCFC-11 eq.
 - .3 Acidification Potential (AP): All AP information submitted in the form of kgSO₂ eq.
 - .4 Eutrophication Potential (EP): All EP information submitted in the form of kgN eq.
 - .5 Smog Formation Potential (SFP): All SFP information submitted in the form of kgO₃ eq. Also referred to as Photochemical ozone creation potential (POCP).

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1.4 QUALITY ASSURANCE

- .1 Mock-Ups:
 - .1 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.
 - .2 Mock-up will be used to judge quality of work, substrate preparation, and material application.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect specified materials from damages, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 SHEET VAPOUR BARRIER

- .1 Modified bitumen membrane with SBS and fiber glass reinforcement. Both faces are sanded.
 - .1 Thickness: 2.2 mm (79 mils)
 - .2 Reinforcement: fiber glass

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for vapour retarder installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of the Consultant.
 - .2 Inform the Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Consultant.

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3.2 INSTALLATION

- .1 Install sheet vapour retarder on the existing concrete deck to form a continuous barrier. Any perforations must be repaired before continuing work
- .2 Bring the vapor barrier membrane above the insulation height on the vertical of parapets, control joints, mechanical bases etc to wrap the insulation panels.
- .3 Allow for glazing of the vapor barrier surface if the weather calls for rain or snow should the vapor barrier be used as temporary protection.

3.3 EXTERIOR SURFACE OPENINGS

- .1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

3.4 INSTALLATION: PREMOULDED SHEET VAPOUR BARRIER

- .1 Apply membrane in accordance with manufacturer's instructions to provide a permanent, monolithic vapor seal without voids or open seams all adhered with asphalt type 2 in full adherence.
- .2 Ensure accessory materials are compatible with membrane and approved by membrane manufacturer.
- .3 Place membrane in position by either Dutch lap method with laps sealed with bonding asphalt or by butt joint method with joints sealed with joint tape.
- .4 Point exposed edges with pointing mastic to prevent water from traveling under membrane.
- .5 Adhere membrane to vertical surfaces with asphalt type 2.

3.5 CLEANING

- .1 Progress Cleaning: daily.
- .2 Final Cleaning: remove surplus materials, rubbish, tools, and equipment upon completion.
- .3 Waste Management.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 07 21 13 – Board insulation.
- .2 Section 07 26 00 – Vapour Retarders
- .3 Section 07 52 00 - Modified Bituminous Membrane Roofing
- .4 Section 07 62 00 - Sheet Metal Flashing and Trim
- .5 Section 07 92 00 - Joint Sealants

1.2 DEFINITIONS

- .1 Environmental Product Declaration (EPD): Third-party verified documentation with the supporting Product Category Rule (PCR) and Life cycle assessment information. Prepared in accordance with ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
 - .1 Industry-wide (generic) EPD with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator.
 - .2 Product-specific Type III EPD -- Products with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator.

1.3 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International Inc:
 - .1 ASTM C 726-[17], Standard Specification for Mineral Fiber Roof Insulation Board
 - .2 ASTM C 728-[17a], Standard Specification for Perlite Thermal Insulation Board
 - .3 ASTM C 1002-20, Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
 - .4 ASTM C 1177/C 1177M-[17], Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
 - .5 ASTM C 1396/C 1396M-[17], Standard Specification for Gypsum Board
 - .6 ASTM D 41/D 41M-[11(2016)], Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
 - .7 ASTM D 312/D 312M-[16a], Standard Specification for Asphalt Used in Roofing
 - .8 ASTM D 2178/D 2178M-[15a], Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing

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- .9 ASTM D 6162/D 6162M-[16], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements
- .10 ASTM D 6163/D 6163M-[16], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements
- .11 ASTM D 6164/D 6164M-[16], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements
- .12 ASTM D 6222/D 6222M-[16], Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcement
- .13 ASTM D 6223/D 6223M-[16], Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcement
- .14 ASTM D 6509/D 6509M-[16], Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcement
- .15 ASTM D 6622/D 6622M-[20], Standard Guide for Application of Fully Adhered Hot-Applied Reinforced Waterproofing Systems
- .16 ASTM E 96/E 96M-16, Standard Test Methods for Water Vapor Transmission of Materials
- .17 ASTM E 2707-[15], Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure
- .18 ASTM E 2886/E 2886M-[20], Standard Test Method for Evaluating the Ability of Exterior Vents to Resist the Entry of Embers and Direct Flame Impingement
- .2 Canadian General Standards Board (CGSB):
 - .1 CGSB 37-GP-9Ma-[83], Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing
 - .2 CGSB 37-GP-56M-[80b(A1985)], Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing
 - .3 CAN/CGSB-51.33-[M89], Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction
- .3 Canadian Roofing Contractors Association (CRCA):
 - .1 CRCA Roofing Specifications Manual- Current Version
- .4 CSA Group (CSA):
 - .1 CSA-A123.3-[05], Asphalt Saturated Organic Roofing Felt (Reaffirmed 2010)
 - .2 CAN/CSA-A123.4-04, Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems, Includes Update No. 1 (2006)
 - .3 CSA A123.21-[20], Standard Test Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane-Roofing Systems
 - .4 CSA A231.1:19/A231.2:19, Precast Concrete Paving Slabs/Precast Concrete Pavers, Includes Update No. 1 (2020).

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- .5 CAN/CSA O80 SERIES-[15], Wood Preservation, Includes Update No. 1 (2017) and Update No. 2 (2019).
- .6 CSA O121-[17], Douglas Fir Plywood
- .7 CSA O151-[17], Canadian Softwood Plywood
- .5 Factory Mutual (FM Global):
 - .1 FM Approvals - Roofing Products
 - .2 FM Approval Standard #4470, Approval Standard for Singly-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied for use in Class 1 and Non-combustible Roof Deck Construction
- .6 Health Canada / Workplace Hazardous Materials Information System (WHMIS):
 - .1 Safety Data Sheets (SDS)
- .7 Underwriters Laboratories of Canada (ULC):
 - .1 ULC 102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies. (ULC S102)
 - .2 ULC 107, Methods of Fire Tests of Roof Coverings. (CAN/ULC S107 10)
 - .3 ULC 701.1, Standard for Thermal Insulation, Polystyrene, Boards
 - .4 ULC 702.2, Mineral Fibre Thermal Insulation for Buildings, Part 2: Application Guidelines. (ULC S702.2-15)
 - .5 ULC 704, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced. (CAN/ULC-S704-11)
 - .6 ULC 770, Standard Test Method for Determination of Long-term Thermal Resistance of Closed-Cell Thermal Insulating Foams CAN/ULC-S770-(15)
 - .7 CAN/ULC-S107-[10], Methods of Fire Tests of Roof Coverings

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Convene pre-installation meeting one week before beginning Work, with roofing contractor's representative, the Owner and the Consultant during these items will be verified and discussed:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Coordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide documents and samples as required.
- .2 Product Data:
 - .1 Provide two copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.

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- .2 Provide one electronic copy of WHMIS SDS, and indicate VOC content for:
 - .1 Primers.
 - .2 Asphalt.
 - .3 Sealers.
- .3 Provide shop drawings:
 - .1 Provide layout for tapered insulation.
- .4 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
- .5 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .6 Sustainable Design Submittals:
 - .1 Environmental Product Declaration (EPD): Submit an Industry-wide EPD for each membrane roofing product outlined in the specification. Provide EPD with at least a cradle to gate scope, identifying the following impact categories (minimum):
 - .1 Global Warming Potential (GWP): All GWP information submitted in the form of kgCO₂ eq.
 - .2 Ozone Depletion Potential (ODP): All ODP information submitted in the form of kgCFC-11 eq.
 - .3 Acidification Potential (AP): All AP information submitted in the form of kgSO₂ eq.
 - .4 Eutrophication Potential (EP): All EP information submitted in the form of kgN eq.
 - .5 Smog Formation Potential (SFP): All SFP information submitted in the form of kgO₃ eq. Also referred to as Photochemical ozone creation potential (POCP).

1.6 QUALITY ASSURANCE

- .1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems with 5 years documented experience and approved by manufacturer and active member of the Quebec Master Roofing Association.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.
 - .2 Provide and maintain dry, off-ground weatherproof storage.
 - .3 Store rolls of felt and membrane in upright position. Store membrane rolls with salvage edge up.

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- .4 Remove only in quantities required for same day use.
- .5 Place plywood runways over completed Work to enable movement of material and other traffic.
- .6 Store sealants at +5 degrees C minimum.
- .7 Store insulation protected from [daylight][and][weather] and deleterious materials.
- .3 Packaging Waste Management: remove for reuse of packaging materials.
 - .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
 - .2 Fold up metal banding, flatten and place in designated area for recycling.

1.8 SITE CONDITIONS

- .1 Ambient Conditions
 - .1 Do not install roofing when temperature remains below -18 degrees C for torch application, or for mop application.
 - .2 Minimum temperature for solvent-based adhesive is -5 degrees C.
- .2 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.
- .3 Fire Protection
 - .1 Fire Extinguishers:
 - .1 Maintain minimum one fire extinguisher,
 - .2 ULC labelled for A, B and C class protection, 9 kg.
 - .3 On roof level, per each torch, less than 6 mm from the torch. Maintain also fire extinguishers on the ground where the asphalt tanker is stored.
 - .2 Maintain fire watch for 1 hour after each day's roofing operations cease.

1.9 WARRANTY

- .1 Warranty Certificate: 5 years from the contractor and 10 years from the manufacturer including labor and materials.

Part 2 Products

2.1 PERFORMANCE CRITERIA

- .1 Compatibility between components of roofing system is essential. Provide written declaration to Consultant stating that materials and components, as assembled in system, meet this requirement.
- .2 Roofing System: to CSA A123.21 for wind uplift resistance.

2.2 DECK COVERING

- .1 Plywood (parapets/control joints/mechanical bases):
 - .1 Exterior grade 12.5 mm thick or as indicated on the drawings

2.3 DECK PRIMER

- .1 Primer comprised of elastomeric bitumen, volatile solvents and adhesive enhancing additives as recommended by membrane roofing manufacturer to suit substrate and installation conditions to ASTM D 41.

2.4 AIR AND VAPOUR RETARDER

- .1 Base sheet vapour retarder: composed of Styrene-Butadiene-Styrene (SBS) elastomeric polymer and glass mat reinforcement both sides are sanded.
 - .1 Top and bottom surfaces: Sanded/sanded.
 - .2 Thickness 2.2 mm (79 mils)
 - .3 Reinforcement: glass mat
 - .4 Asphalt type 2 in accordance with CSA A123.4 and/or ASTM D312. The following characteristics of the bitumen must indicate: equiviscosity temperature, limit blowing temperature and flash point

2.5 POLYISOCYANURATE INSULATION

- .1 Primary Flat and Sloped Insulation: Closed-cell polyisocyanurate foam core laminated to heavy non asphaltic glass fibre reinforced facers to CAN/ULC-S704, Type 2, thickness 63.5 mm (2.5'' minimum at the roof drain. Dimensions 1200 mm x 1200mm (48''x48'') max.

2.6 EXPANDED PERLITE INSULATION

- .1 Mineral aggregate thermal roof insulation: in accordance to ASTM C 728, Type 2 thickness 12.5 mm (1/2'') with square edges
- .2 Maximum dimensions of 1200 mm x 1200 mm (48 ''x48'')
- .3 Installed in two layers for a total thickness of 25 mm (1'').

2.7 MEMBRANE

- .1 Base sheet: in accordance to CGSB 37-GP-56M reinforced with polyester fibers.
 - .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer, polyester reinforcement, having nominal weight of 180 g/m².
 - .2 For full adherence installation
 - .3 Type 2 fully adhered.
 - .4 Top and bottom surfaces: Sanded/sanded

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- .5 Base sheet membrane properties: to CGSB 37-GP-56M and CSA A123.23-15 type B, Class 3.
 - .1 Strain energy (longitudinal/transversal): 8.0/4.0 kN/m.
 - .2 Ultimate elongation (longitudinal/transversal): 50/60 %.
 - .3 Dimensional Stability: 0.5/0.1 %.
- .2 Cap sheet membrane: in accordance to CGSB 37-GP-56M reinforced with polyester fibers.
 - .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer, polyester reinforcement, having nominal weight of 180 g/m².
 - .2 For full adherence installation
 - .3 Type 2 fully adhered.
 - .4 Top and bottom surfaces: Sanded/sanded
 - .5 Base sheet membrane properties: to CGSB 37-GP-56M and CSA A123.23-15 type B, Class 3.
 - .1 Strain energy (longitudinal/transversal): 8.0/4.0 kN/m.
 - .2 Ultimate elongation (longitudinal/transversal): 50/60 %.
 - .3 Dimensional Stability: 0.5/0.1 %.

2.8 POLYESTER MESH

- .1 Spun bond, ring-spun, heat bonded, heat resistant non-woven polyester fabric designed for superior strength and toughness
- .2 Conforming to ASTM D526 Type 1, Thermoplastic Fibers Used in Hot Applied Roofing Systems
- .3 Dimension for the first vertical reinforcement ply 330 mm (13'') and for the second ply 508 mm (20'')

2.9 BITUMEN

- .1 Asphalt: to CAN/CSA A123.4 and/or ASTM D 312, Type 2 minimum. For the vapor barrier, base and slope insulation, perlite support panels and the vertical upstand made of asphalt saturated cotton fabric
- .2 SEBS: SEBS based modified bitumen conforming to ASTM D6152 for the vertical upstands and white marble gravel

2.10 ACCESSORIES

- .1 Perimeter Fire Seal: SBS modified bitumen, minimum 60 gm/m² glass fleece reinforced, self adhering membrane having sanded top face, cut into strips minimum 150 mm wide x nominal 1.5 mm thick.
- .2 Sealers
 - .1 Waterproofing mastic: bitumen and caoutchouc base

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- .2 Sealants - see Section 07 92 00 - Joint Sealants.
- .3 Flashing and sheet metal in accordance with section 07 62 00 - Sheet Metal Flashing and Trim.
- .4 Cant Strips
 - .1 Cut from fibreboard material, to measure 140 mm on slope.
- .5 Ballast
 - .1 Stone: 5-20 mm size, well graded crushed white marble stone, non-porous, washed, free from fines, long splinters, moisture, ice and snow.
- .6 Torches: Use only torches designed for torching roofing material and acceptable to manufacturer.

2.11 ROOF DRAINS/VENTS

- .1 Copper roof drain with fixed ring and gravel stop. Factory cast aluminum roof drain strainer fits inside the mounting ring
- .2 Connection to the rain column: sealing donut used to seal the sleeve to the rain column
- .3 Drain indicator: rigid fiberglass drains indicator rod, length 1210 mm
- .4 Vent: composed of heavy gauge rigid aluminum sleeve and a welded aluminum flange

Part 3 Execution

3.1 QUALITY OF WORK

- .1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and CRCA Roofing Specification Manual along with the QMRA manual
- .2 Do priming in accordance with manufacturers written recommendations.
- .3 On the parapets, control joints and mechanical bases, install a new plywood to the existing. On the top of the parapets and control joints, add a wood slope ensuring water positively drains towards the interior of the roof.

3.2 EXAMINATION OF ROOF DECKS

- .1 Verification of Conditions:
 - .1 Verify existing conditions
 - .2 Inspect with the Consultant the deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.
- .2 Evaluation and Assessment:
 - .1 Before beginning of work ensure:

- .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.
 - .2 Curbs have been built.
 - .3 Roof drains have been installed at proper elevations relative to finished roof surface.
 - .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.
- .3 Do not install roofing materials during rain or snowfall.
 - .4 Provide fire protection during installation.

3.3 PROTECTION OF IN-PLACE CONDITIONS

- .1 Cover walls, walks and adjacent work where materials hoisted or used.
- .2 Maintain in good order warning signs and barriers until completion of Work.
- .3 Clean off drips and smears of bituminous material immediately.
- .4 Dispose of rainwater off roof and away from face of building until roof drains or hoppers installed and connected.
- .5 Protect roof from traffic and damage. Comply with precautions deemed necessary by the Consultant.
- .6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.

3.4 PRIMING DECK

- .1 Apply deck primer to concrete roofing substrate at the rate recommended by manufacturer.
- .2 Surfaces to be primed must be free of rust, dust or any residue that may hinder adherence.
- .3 Cover primed surfaces with roofing membrane within time limits recommended by roofing membrane system manufacturer.

3.5 VAPOUR BARRIER

- .1 Embed one ply of modified bitumen membrane, sanded/sanded in hot bitumen spread at rate of 1.2 kg/m².
- .2 Depending on the weather conditions (rain or snow announced), apply a layer of hot asphalt on the finished sanded surface of the vapor barrier of used as a temporary seal.

3.6 CONVENTIONAL MEMBRANE ROOFING

- .1 Insulation: fully adhered, bitumen application:
 - .1 Embed insulation in 1 to 1.5 kg/m² mopping of bitumen.
 - .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
 - .3 Cut end pieces to suit.
- .2 Tapered insulation application:
 - .1 Mop insulation to vapour retarder [and top layer of insulation to bottom layer] with hot asphalt at rate of 1 to 1.5 kg/m².
 - .2 Install tapered insulation as second insulation layer, in accordance with shop drawings. Stagger joints between layers 150 mm minimum.
- .3 Installation of perlite panels:
 - .1 Adhere the support panels (first and second row) in bitumen applied with a mop at a rate of 1 to 1.5 kg/m².
 - .2 Install panels in staggered parallel rows; the panels must be joined in tight contact.
 - .3 At the end of row, cut panels per the required length.
 - .4 Install the can't strips per article 3.7.
- .4 Base Sheet Application (Mopped):
 - .1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align, and reroll from both ends.
 - .2 Unroll and embed base sheet in uniform coating of asphalt applied at rate of 1.2 to 1.5 kg/m², at 230 degrees C.
 - .3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.
 - .4 Application to be free of blisters, wrinkles and fishmouths.
 - .5 Subsequently, overlapping the base sheet, install the finishing membrane in the same way starting from the low and central point of the roof drain
 - .6 Seal the overlap joints of the base or cap sheet at the end of each working day; perform the work without interruption to avoid tearing and the formation of gaps, air pockets or ridges
 - .7 Cut corners at end cap strips covered by the next roll
 - .8 Complete underlayment at the top of the can't strip
- .5 Perimeter Fire Seal Application
 - .1 Apply perimeter fire seal to roof perimeter and curb substrates prior to applying base sheet materials. Apply fire seal to vertical joints in parapet or curb sheathing, and at vertical corners.
 - .2 Extend fire seal minimum 50 mm up parapet faces and extend fire seal minimum 75 mm onto adjacent substrates. Ensure air bubbles and fish mouths are removed.
 - .3 Install perimeter fire seal to act as temporary moisture seal until installation of flashing materials.

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- .6 Reinforced gusset installation:
 - .1 Install gussets at every angle, and on inside and outside corners.
 - .2 Install self adhesive gussets before installing self adhesive base sheet flashing membranes.
- .7 Base sheet flashing installation:
 - .1 Install in full adhesion in hot asphalt type 2, saturated cotton fabric on parapets, control joints, vertical or any vertical upstands.
 - .2 Subsequently, install membrane flashings using two layers of polyester membrane adhered with SEBS modified bitumen. The first layer must have 330 mm (13'') and the second layer 508 mm (20'').
 - .3 The second layer must exceed the first by 50 mm (2'') on the horizontal surface.
 - .4 Cover the left over exposed wood on top of the exterior parapets with the installation of a self-adhesive membrane to prevent overflows of asphalt or SEBS modified bitumen.

3.7 CANTS

- .1 Install prefabricated fibreboard cants over rigid insulation.
- .2 Apply hot bitumen to receiving surface and embed cant firmly by hand.
- .3 Angle cut cants to fit tightly on back and bottom where roof to wall angle varies from 90 degrees.

3.8 BALLAST AND PROTECTIVE COVERING

- .1 Apply white marble stone ballast, dry, as soon as possible the completion of the roofing membrane and bituminous flashings.
- .2 Pour a layer of SEBS modified bitumen at a rate of 3 kg/m² (60 lbs/square).
- .3 Immediately, spread the white marble ballast at a rate of 20 kg/m² (400 lbs/square).
- .4 Spread more white marble ballast on the perimeter of the roof, over a width of 1200 mm (48''), lightly sweep the ballast in place, pour a second layer of SEBS modified bitumen and apply an additional layer of white marble ballast.
- .5 Install a double spreading also in the corners of the roof on 2400 mm x 2400 mm (8''-0''x8'-0''), lightly sweep the installed ballast, pour a second layer of SEBS modified bitumen and apply an additional layer of white marble ballast.
- .6 Ballast must be dry, free of frost and dust always.

3.9 SITE QUALITY CONTROL

- .1 Inspections:

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- .1 Inspection and testing of roofing application will be carried out by testing laboratory designated by ministry representative.
- .2 Ministry Representative will pay for tests if required.
- .2 Testing:
 - .1 Manufacturers' Field Services:
 - .1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its products, and submit written reports in acceptable format to verify compliance of Work with Contract.
 - .2 Manufacturer's field services: provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits to review Work at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.
 - .4 Obtain reports within three days of review and submit.

3.10 CLEANING

- .1 Remove bituminous markings from finished surfaces.
- .2 Consult manufacturer of surfaces for cleaning advice and complying with their documented instructions in areas where finished surfaces are soiled caused by work of this section.
- .3 Repair or replace defaced or disfigured finishes caused by work of this section.
- .4 Waste Management: separate waste materials for reuse and recycling.
 - .1 Place materials defined as hazardous or toxic in designated containers.
 - .2 Clearly label location of salvaged material's storage areas and provide barriers and security devices.
 - .3 Ensure emptied containers are sealed and stored safely.
 - .4 Divert unused aggregate materials from landfill to an authorized local facility for reuse.
 - .5 Unused paint, coating material must be disposed of at official hazardous material collections site.
 - .6 Do not dispose of unused adhesive, sealant and asphalt materials into sewer system, streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
 - .7 Dispose of unused adhesive material at official hazardous material collections site.
 - .8 Dispose of unused sealant material at official hazardous material collections site.
 - .9 Dispose of unused asphalt material at official hazardous material collections site

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END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 07 21 13 – Board Insulation
- .2 Section 07 26 00 - Vapour Retarders
- .3 Section 07 52 00 – Modified Bituminous Membrane Roofing
- .4 Section 07 62 00 – Sheet Metal Flashing and Trim
- .5 Section 07 92 00 - Joint Sealants

1.2 DEFINITIONS

- .1 Environmental Product Declaration (EPD): Third-party verified documentation with the supporting Product Category Rule (PCR) and Life cycle assessment information. Prepared in accordance with ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
 - .1 Industry-wide (generic) EPD with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator.
 - .2 Product-specific Type III EPD -- Products with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator.

1.3 REFERENCE STANDARDS

- .1 Canadian Roofing Contractors Association (CRCA):
 - .1 Roofing Specifications Manual Current Edition
- .2 Canadian Sheet Steel Building Institute (CSSBI):
 - .1 CSSBI S8- [2018] Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products.
 - .2 CSSBI B17- [2002] Barrier Series Prefinished Steel Sheet: Product Performance & Applications.
 - .3 CSSBI Sheet Steel Facts #12 [2003] Fastener Guide for Sheet Steel Building Products.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Installation Meeting
 - .1 Include sheet metal flashing and trim on agenda of pre-installation meetings of affected sections.

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1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals: documents and samples as required.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature including product specifications and technical data sheets for sheet metal flashing fasteners and accessory materials. Include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop Drawings:
 - .1 Submit shop drawings only for sheet metal flashing and trim items that differ from those indicated in Contract Documents for all sheet metal fabrications.
 - .2 Indicate sheet thickness, flashing dimensions and fastenings. Include anchorage, expansion joints and other provisions for thermal movement.
 - .3 Submit manufacturer's catalogue cut sheets for manufactured items.
- .4 Samples:
 - .1 Submit samples of each type of sheet metal material, finishes and colour.

1.6 QUALITY ASSURANCE

- .1 Installer: Engage an experienced installer having a minimum of three years experience who has completed projects similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- .2 Construct and install roof metal flashings in accordance with CRCA Manual details and in accordance with the CRCA Manual. If requirements conflict, this specification takes precedence over the manual.
- .3 Mock-ups
 - .1 Include flashings in mock-ups as specified for work of other affected sections.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer recommendations.
- .2 Handle and store flashing materials to prevent creasing, buckling, scratching, or other damage.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling.

1.8 WARRANTY

- .1 The same warranty provisions apply to flashings associated with roofing as to the roofing.
- .2 Provide Warranty for sheet metal flashing and trim to include in maintenance manuals.



Part 2 Products

2.1 BASE SHEET METAL MATERIALS

- .1 Provide prepainted sheet metal commercial grade as fallow:
 - .1 Conforming to ASTM A446 last revision with zinc coating conforming to G90 ASTM A525 last revision
 - .2 Gage 24
 - .3 Color to be selected by the client
 - .4 All nails, screws, clips and any other required equipment must be compatible.

2.2 METAL FLASHINGS

- .1 Fabricate flashings, trims and fascias to specified profiles of gage 24 with prepainted sheet metal.
- .2 All dimensions to be taken on site prior to fabrication.
- .3 The lengths must be 2400 mm (8'-0") long.
- .4 All flashings must be installed with an "S" joint, allowing for expansion and contraction.
- .5 Apply a layer of sealant under each joint where a nail/screw must be installed to secure the metal flashing
- .6 No nails should be visible.
- .7 Any damaged, scratched or deformed metal flashing will be replaced. No paint touch-ups will be allowed.
- .8 All horizontal and vertical joints will be sealed with sealant concealed in the "S" joints.

2.3 ACCESSORIES

- .1 Sealants: in accordance with Section 07 92 00 - Joint Sealants, in colour to match flashing finish colour.
 - .1 Mastic Sealant: conforming to Section 07 92 00 - Joint Sealants.
 - .2 Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Section 07 92 00 - Joint Sealants.
- .2 Cleats and hook strips: of same material, and temper as sheet metal, minimum same as sheet metal being secured.
 - .1 Provide continuous cleats at outside of parapets.
- .3 Nails: of same material as sheet metal to ASTM F 1667, [ring thread] flat head roofing nails of length and thickness suitable for metal flashing application.

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- .4 Screws: of same material as sheet metal, TO ASTM F 1667 Suitable for substrate and material being fastened, coloured head, neoprene washer.
- .5 Metal Accessories: Provide non-corrosive sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work. Accessories shall match or be compatible with material being installed; size and thickness as require.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking and fastener disengagement.
- .2 Install metal flashings on all surfaces such as roof cant edges, sleepers, parapets and cap type, wall junctions, roof dividers, curbs, roof control joints, through roof penetrations and the like, and as otherwise required to provide flashing type protection to details. Extend all flashings down and onto the horizontal portion of the roof unless otherwise directed. Install counter and base flashings unless otherwise directed by the Consultant.
- .3 Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.
- .4 Provide sheet metal flashing and trim to create a rain screen assembly to the completed air/vapour and roofing membrane termination details.
- .5 Install prefinished metal fascia to complete edge details. Install as separate piece from flashing.
- .6 Coordinate installation of flashing work of this Section with flashing work of other Sections which ties into this work. Coat surfaces of different metals such as aluminum and galvanized steel which are in contact to each other, with bituminous paint to prevent electrolysis.

3.3 INSTALLATION: METAL FLASHING

- .1 Install sheet metal work as detailed and indications on the drawings.
- .2 Install sheet metal flashing and trim in accordance with performance requirements, manufacturer's installation instructions, and SMACNA's Architectural Sheet Metal Manual.

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- .3 Fasten metal base flashing to walls or upstands along top of flashing. Do not secure to cant strip. Form lapped corner joints. Extend rolled edge of base flashing approximately 25 mm on to roof from toe of cant, and rest on top of roof surface.
- .4 Use concealed fastenings except where approved before installation.
- .5 Provide underlay under sheet metal.
 - .1 Provide self-adhesive membrane to tie into adjacent assemblies.
- .6 Counter flashing at intersections of roof with vertical surfaces and curbs.
 - .1 Flash joints using S-lock forming tight fit over hook strips, as detailed.
- .7 Lock end joints and caulk with sealant.
- .8 Separate metal from non compatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.
- .9 Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.

3.4 CLEANING

- .1 Proceed in accordance with daily cleaning.
- .2 Remove surplus materials, excess materials, rubbish, tools and equipment on completion and verification of performance of installation.
- .3 Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- .4 Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Performance.
- .5 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 07 21 13 – Board insulation.
- .2 Section 07 26 00 – Vapor retarder
- .3 Section 07 52 00 – Modified bituminous membrane roofing
- .4 Section 07 62 00 – Sheet metal flashings and trims

1.2 DEFINITIONS

- .1 Environmental Product Declaration (EPD): Submit an Industry-wide EPD for each metal product outlined in the specification. Provide EPD with at least a cradle to gate scope, identifying the following impact categories (minimum):
 - .1 Global Warming Potential (GWP): Submit GWP information in the form of kgCO₂ eq.
 - .2 Ozone Depletion Potential (ODP): Submit ODP information in the form of kgCFC-11 eq.
 - .3 Acidification Potential (AP): Submit AP information in the form of kgSO₂ eq.
 - .4 Eutrophication Potential (EP): Submit EP information in the form of kgN eq.
 - .5 Smog Formation Potential (SFP): Submit SFP information in the form of kgO₃ eq. Also referred to as Photochemical ozone creation potential (POCP).

1.3 REFERENCE STANDARDS

- .1 ASTM International (ASTM):
 - .1 ASTM C 834-[17], Standard Specification for Latex Sealants
 - .2 ASTM C 919-[19], Standard Practice for Use of Sealants in Acoustical Applications
- .2 Canadian General Standards Board (CGSB) 1330:
 - .1 CAN/CGSB-19.24-[M90], Multi-component, Chemical Curing Sealing Compound
- .3 Department of Justice Canada (Jus):
 - .1 Canadian Environmental Protection Act, 1999 (2018) (CEPA)
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
 - .1 Safety Data Sheets (SDS)
 - .2 Sealant, Waterproofing, and Restoration Institute (SWRI): Sealants: The Professionals' Guide 2013

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- .5 Transport Canada (TC):
 - .1 Transportation of Dangerous Goods Act, 1992 (2019 amended.) (TDGA)

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples.
- .2 Product Data:
 - .1 Submit manufacturer's product data for each type of primer, backer rod, and sealants and include product characteristics, performance criteria, available colours, compatibility warnings, compliance standards and limitations.
 - .2 Manufacturer's product to describe:
 - .3 Submit one electronic copy of WHMIS SDS.
- .3 Samples:
 - .1 Submit two samples of each type of joint sealant material and colour.
 - .2 Submit two cured samples of exposed sealants of each colour to match adjacent material.
- .4 Certificates: When requested by Consultant, submit manufacturer's product certificates indicating proposed sealant is appropriate for each application on this Project.
- .5 Manufacturer's Instructions:
 - .1 Submit instructions for each type of product.
- .6 Sustainable Design Submittals:
 - .1 Submit required documents and samples.
 - .2 Environmental Product Declaration (EPD): Submit an Industry-wide EPD for each joint sealant product outlined in the specification. Provide EPD with at least a cradle to gate scope, identifying the following impact categories (minimum):
 - .1 Global Warming Potential (GWP): Submit GWP information in the form of kgCO₂ eq.
 - .2 Ozone Depletion Potential (ODP): Submit ODP information in the form of kgCFC-11 eq.
 - .3 Acidification Potential (AP): Submit AP information in the form of kgSO₂ eq.
 - .4 Eutrophication Potential (EP): Submit EP information in the form of kgN eq.
 - .5 Smog Formation Potential (SFP): Submit SFP information in the form of kgO₃ eq. Also referred to as Photochemical ozone creation potential (POCP).
 - .3 Low Emitting Materials: Provide low VOC emitting Products (within the building waterproofing membrane), in compliance with VOC emission limits referenced in [LEED][sustainability] program standards, for the following categories:
 - .4 Interior primers, adhesives, and sealants applied on site.
 - .5 Submit manufacturer's information indicating VOC emission limit in grams per litre (g/L).

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1.5 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: Submit maintenance data for incorporation into manual.

1.6 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Manufacturer: Obtain each type of joint sealant from a single manufacturer.
 - .2 Minimum five years successful experience in Work of similar size and complexity.
- .2 Compatibility: Ensure sealants are compatible with adjacent materials and are approved by manufacture for use with adjacent materials.
- .3 Mock-Ups:
 - .1 Before performing sealant, work do sample applications of each type of sealant for review.
 - .2 Site locations for sample applications shall be designated Consultant.
 - .3 Construct joint sealant mock-ups in assemblies of other Sections with joint sealants, which are referenced in this Section.
- .4 Comply with requirements of WHMIS regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Safety Data Sheets (SDS) acceptable to Health Canada.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, with manufacturer's label.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground, in a ventilated dry indoor location and in accordance with manufacturer's recommendations.
 - .2 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
 - .3 Do not dispose of unused sealant material into sewer system, streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
 - .4 Divert unused joint sealing material from landfill to official hazardous material collections site approved .

1.8 AMBIENT CONDITIONS

- .1 Proceed with installation of joint sealants only when:
 - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 5 degrees C.
 - .2 Joint substrates are dry.

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- .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

1.9 WARRANTY

- .1 Manufacturer's warranty: Provide manufacturer's standard warranty documentation.
- .2 Warrant that sealant work will not leak, crack, crumble, melt, shrink, run, lose adhesion, or stain adjacent surfaces in accordance with General Conditions, except for three years.
- .3 Installer's Warranty: Provide an installation warranty, installer agrees to repair or replace joint sealants that do not comply with requirements of this Section for two years from Substantial Performance.

Part 2 Products

2.1 SUSTAINABILITY CHARACTERISTICS

- .1 When low toxicity sealants are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.
- .2 VOC emissions limits shall be as follows:
 - .1 Sealant Primers:
 - .1 for non-porous surfaces: 250 g/L
 - .2 for porous surfaces: 775 g/L
 - .3 for modified bituminous membranes: 500 g/L
 - .2 Sealants:
 - .1 architectural: 250 g/L

2.2 PERFORMANCE REQUIREMENTS

- .1 Each sealant system shall meet the following requirements for warranty period:
 - .1 Waterproof, flexible, and compatible with substrate under applicable service conditions.
 - .2 Provide a weather-tight seal that does not allow moisture penetration.
 - .3 Shall not de-bond, crack, or craze.
 - .4 Shall not leak.

2.3 SEALANT MATERIALS

- .1 In air handling units and supply air system, use sealants without strong odours, without toxic chemicals, and are mould resistant. When low toxicity sealants are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.

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- .2 Provide primers in accordance with manufacturer recommendation.

2.4 SEALANT MATERIAL DESIGNATIONS

- .1 Type S-7: One-component polyurethane sealant; non-sag, for general construction.
 - .1 To ASTM C 920, CAN/CGSB-19.24: type S; grade NS; class 35; use NT, M, A, O.
- .2 Modified bitumen SBS waterproofing sealant conforming.
 - .1 To CAN/CGSB-37.5-M89 and ASTM D4586.
- .3 Sealant and one-component water reactive elastomeric adhesive, polyether resin based, odorless and low VOC conforming to ASTM C639, ASTM S1475, ASTM D412, ASTM D1002, ASTM C661, ASTM D816, ASTM C792, ASTM C679.
- .4 One-component water-reactive elastomeric sealant based on polyether resin, odorless and low VOC content (15 g/L) conforming to ASTM S1475, ASTM C661, ASTM C679.

2.5 SEALANT SELECTION

- .1 Where no specific type of sealant is scheduled, provide one of the sealants indicated in this Section appropriate for its application and consistent with manufacturer's recommendations [and the recommendations of SWRI, Sealants: The Professionals' Guide].
- .2 Make sealant selections consistent with manufacturer's recommendations.
- .3 Use polyurethane sealant, one-component, non-sag Type S-7 for metal flashing/masonry joints, metal flashings/metal flashings.
- .4 Use modified bitumen sealant at modified bitumen membrane junctions.
- .5 Use sealant and one-component water-reactive elastomeric adhesive polyether resin based to seal around roofing details where penetrations present a technical challenge, also as an adhesive for the precast moldings.
- .6 Use one-component water-reactive elastomeric sealant, polyether resin based to seal around roofing details where penetrations present a technical challenge and as a filler inside the precast moldings.

2.6 ACCESSORIES

- .1 Precast moldings:
 - .1 Precast moldings based on polyester resin. The ends are bevelled. Designed to retain, contain, and protect water-reactive sealant and adhesive around roofing details where penetrations present a challenge.
 - .2 Joint cleaner: provide non-corrosive, non-staining cleaner compatible with joint and sealant materials as recommended by manufacturer.
 - .3 Primer: Provide primer in accordance with sealant manufacturer's recommendations.

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2.7 COLOURS

- .1 Sealant Colours: Match colour of adjacent materials where visible, as selected by Consultant, from manufacturer's complete colour range.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed are acceptable for joint sealants installation in accordance with manufacturer's instructions.
 - .1 Visually inspect substrate.
 - .2 Verify joint surfaces are dry and frost free.
 - .3 Verify substrates are without contaminants capable of interfering with sealant adhesion. Remove contaminants where occurring.
 - .4 Examine joint sizes and conditions to establish acceptable depth to width ratio for installation of backup materials and application of sealants.
 - .5 Verify joint widths are within the limits recommended by joint sealant manufacturer for applications indicated.
 - .6 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .7 Proceed with installation only after unacceptable conditions have been remedied.

3.2 SURFACE PREPARATION

- .1 Clean bonding joint surfaces of harmful contaminates including dust, rust, oil grease, and other matter which may impair adhesion.
- .2 Do not apply sealants to joint substrates treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .3 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

- .1 Mask adjacent surfaces prior to priming and sealing where necessary to prevent staining.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately applying sealant, except when manufacturer's instructions explicitly state priming is not required.
- .3 Prime all porous material (e.g. wood, masonry, concrete, ceramic or paver tile, etc).

3.4 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.5 APPLICATION

- .1 Sealant: Application: Apply sealants in accordance with manufacturer's instructions, and as follows:
 - .1 Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature range.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 For joints where movement is possible, apply backer rod to achieve a joint depth of one half the joint width but not less than 9 mm; for joints larger than 25 mm use a depth of 13 mm
 - .4 Apply sealant in a continuous bead.
 - .5 Apply sealant using gun with proper size nozzle.
 - .6 Fill voids and joints solid.
 - .7 Form sealant surface with a smooth full bead, without from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .8 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .9 Ensure bead is solid, filling entire space between sides and bedding material, exerting sufficient pressure to obtain maximum bond, by allowing sealant to bulge out in advance of nozzle.
 - .10 Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature range.
 - .11 Seal at all locations where dissimilar material meet.
- .2 Sealant Curing:
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until after curing has completed.
- .3 Waterproofing system with precast moldings
 - .1 Surfaces must be clean, dry, and free of all debris, dust, loose particles, oils, corrosion, rust, condensation, or any other contaminants
 - .2 Position the precast moldings in the desired location and trace the outline for reference
 - .3 Make sure to a minimum space of 25 mm (1'') between the interior wall of the moldings and the penetrations.
 - .4 Using a standard cartridge extruder, seal the base of each penetration with the sealing mastic and water-reactive adhesive. Make sure to exceed the height of the precast moldings by at least 25 mm (1'')
 - .5 Spread under and at the ends of the precast moldings, on the flat surface, a bead of 6 mm (1/4'') at the perimeter and in the center of the surface. Place and align the precast moldings on the reference line on the roof. Apply pressure on the precast moldings until there is an overflow on each side of the precast moldings to avoid any infiltration of water between the granules and the moldings. Install all precast moldings to achieve the desired configuration.

- .6 Apply a bead of sealant and adhesive to the joints of the moldings and to the exterior perimeters of the desired configuration. Use the tip of a trowel to adhere the sealant and adhesive to the membrane.
- .7 For horizontal surfaces: fill the cavity completely with sealing mastic
- .8 For vertical surfaces: fill the cavity entirely with the sealant and water-reactive adhesive

3.6 CLEANING

- .1 Progress Cleaning: Daily cleaning required.
 - .1 Clean adjacent surfaces immediately of excess primers and sealants.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
- .2 Final Cleaning: upon completion.
- .3 Waste Management:
 - .1 Do not dispose of unused sealant materials into sewer system, streams, lakes, onto ground, or other location where it might pose a health or environmental hazard.
 - .2 Divert unused sealants from landfill to a hazardous material collection site.
 - .3 Place materials defined as hazardous or toxic in designated containers.
 - .4 Dispose of hazardous materials in accordance with the CEPA, TDGA, regional and municipal regulations.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by joint sealants installation.

END OF SECTION

APPENDIX 2

Roof Plan

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APPENDIX 3

Details

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