POIRIER SPORT & LEISURE COMPLEX

Building Envelope Services

633 Poirier Street, Coquitlam BC V3B 1E3

TECHNICAL SPECIFICATIONS AND DRAWINGS

Prepared for:

AME Group
638 Smithe Street, Unit 200
Vancouver BC V5B 1E3

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EGBC Permit to Practice No. 1002503

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1.0 GENERAL

1.1 Work Included

.1 Repair and/or replace clay brick veneer for non-reinforced masonry, mortar and reinforcement, anchorage and accessories in quantities identified in bid documents.

.2 Clean all areas affected by the Work to the satisfaction of the Owner.

1.2 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 British Columbia Building Code

.3	CSA S304	Design of Masonry Structures
.4	CSA A370	Connectors for Masonry
.5	CSA A371	Masonry Construction for Buildings
.6	CSA A179	Mortar and Grout for Unit Masonry
.7	CSA A82	Fired Masonry Brick Made from Clay or Shale
.8	CSA G30.18	Carbon Steel Bars for Concrete Reinforcement
.9	ASTM C652	Standard Specification for Hollow Brick (Hollow Masonry Units Made From Clay or Shale)
.10	CAN/ULC-S718	Standard for Site Quality Assurance Program for Spray Applied Polyurethane Foam
.11	CAN/ULC-S770	Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams

.12 Canadian Urethane Foam Contractors Association (CUFCA) Manual for Installation of Spray Urethane Foam Thermal Insulation

.13 Technical Note No. 20, Cleaning Brick Masonry, Brick Industry Association (BIA).

.14	ASTM A53/A53M	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
.15	CSA G164	Hot Dip Galvanizing of Irregularly Shaped Articles

1.3 Quality Assurance

.1 Source Quality Control:

.1 Clay Brick Units: Prior to delivery, submit to Consultant letter from manufacturer attesting that the bricks comply with the specified grade, type, and class.

.2 Field Quality Control:

.1 Employ only qualified experienced journeyperson masons for placing units. The execution of all phases of the work including mortar mixing is to be under the direct supervision of a journeyperson mason.

.2 Perform masonry work in accordance with CSA A371 except where specified otherwise.

.3 Perform masonry reinforcing and tying in accordance with CSA A371 and CSA S304 unless specified otherwise.

.4 Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience on projects of similar size and complexity.

.5 Use single masonry contractor for all masonry work.

1.4 Existing Conditions

.1 Before commencing masonry work, verify the site conditions will allow construction of masonry within required limitations for wall heights, wall thicknesses, openings, bond, anchorage, lateral support, and compressive strengths of masonry units and mortars.

.2 The Contractor shall make allowances in their bid for the removal and replacement of extra bricks around bricks to be replaced to facilitate installation. No extras shall be entertained after tender for the removal and reinstallation or any preparation work required to accommodate the replacement of damaged and/or deteriorated brick.

.3 Before commencing masonry work, investigate for evidence of previous repairs, cracks, moisture, and dampness beyond the area designated for replacement reporting any findings to the Consultant.

.4 The Contractor shall provide all required support to safely support all the loads.

.5 The decision to locally replace and repoint the existing masonry is based on cracked and deteriorated mortar joints, and loose and spalled brick. Immediately inform the Consultant should any other masonry deterioration be detected during the execution of the work that is unrelated to these defects.

.6 Study mortar pointing styles and develop a method for reproducing them before starting work.

1.5 Alternatives

.1 Obtain the Consultant’s review before changing the manufacturer’s brands or supply sources of mortar materials during the entire contract or other methods of mixing mortar specified elsewhere in this specification.

1.6 Submittals

.1 Provide 10 of each type and size of brick units.

.2 Supply in original cartons using cushioning materials between units. Attach label identifying:

.1 Project Name

.2 Description of Contents: name of manufacturer, trade name of product, generic description of contents.

1.7 Delivery, Storage, and Handling

.1 Deliver materials to job site in dry condition in manufacturer’s original protective packaging and store on a dry level area.

.2 Keep materials dry until use. Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

.3 Handle and store all mortar materials to prevent contamination by foreign materials, and damage from freezing or excessively high temperature.

.4 Isolate masonry units from contact with ground and other materials until laid to prevent staining.

.5 Ensure that moisture content of brick masonry units is maintained within specified limits from time of shipment from plant to completion of Work.

.6 Cover masonry unit stockpiles when work is not in progress to prevent exposure to weather.

.7 Handle and store masonry units to prevent soiling and damage.

.8 Deliver products to the place on site or as directed by the Contractor, and to meet installation schedule.

.9 If material is stored on suspended slabs, make sure the slab is not overloaded.

.10 Stored bagged products, such as lime, cement, and metal accessories, in dry waterproof sheds.

1.8 Environmental Requirements

.1 Comply with requirements of CSA A371.

.2 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

.3 Maintain dry beds for masonry and use dry masonry units only. Do not wet masonry units in winter.

.4 For masonry work which will be done below 5°C, measure temperatures of masonry material prior to use; maintain temperatures as close as possible for mortar batches; ensure mortar temperature on mortar boards does not exceed 50°C; use dry masonry units; lay masonry on unfrozen surfaces free from snow and ice; use windbreaks when laying masonry not protected by enclosures; provide a high-low registering thermometer where directed on site.

.5 When mean air temperature will, over a 24-hour period, go below 5°C but not below 0°C, conduct masonry work as for normal temperatures except heat water or sand to produce mortar temperatures between 5°C and 50°C. Protect entire constructed masonry by enclosing within weatherproof membrane for 48 hours.

.6 When mean air temperature will, over a 24-hour period, go below 0°C but not below -4°C, conduct masonry work as for normal temperatures except heat water and sand to produce mortar temperatures between 5°C and 50°C and maintain temperature of mortar boards above 0°C. Protect entire constructed masonry by enclosing within weatherproof membrane for 48 hours.

.7 When mean air temperature is below -4°C, conduct laying of masonry in enclosures heated to maintain air temperature above 0°C. Conduct masonry work as for normal temperatures except heat water and sand to produce mortar temperatures between 5°C and 50°C and heat units if necessary so that temperature of units at time of laying is minimum -7°C. Maintain enclosure in position for 48 hours and maintain air temperature within enclosure at minimum 0°C.

.8 When mean air temperature will, over a 24-hour period, go above 38°C (or 32°C with a 3.6 m/s wind), maintain mortar and grout at a temperature between 21°C and 49°C and limit spread of mortar bed to 1.22 m (4 ft.) Place units within one minute of spreading mortar. Provide shade and air breaks as required.

1.9 Protection

.1 Brace brick walls as necessary to resist wind pressure and other lateral forces during construction.

.2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction. Ensure that coverings are secured to resist wind loads.

.3 The Contractor shall maintain the stability and water tightness of the structure at all times.

1.10 Site Conditions for Mortar

.1 Heat Materials as Follows: To produce mortar temperature between 5°C and 50°C.

.1 When air temperature is between 5°C and 0°C, heat either sand or water to produce specified mortar temperature.

.2 When air temperature is below 0°C, heat both sand and water to produce specified mortar temperature.

.3 Do not heat water or sand above 50°C.

.2 Produce mortar batches subsequent to the first with a temperature variance of no more than 6°C.

1.11 Warranty

.1 The Contractor shall submit a warranty of the work of this section covering a period of not less than five years from the date of Substantial Performance of the Contract. Substantial completion shall be determined by the Consultant and the Owner.

.2 Defective work shall include, but is not limited to, cracking, crumbling, loss of adhesion, loss of cohesion, discolouration, premature deterioration, and out-of-plane movement.

2.0 PRODUCTS

2.1 Clay Brick Masonry Units

.1 Existing Clay Brick: salvaged from selective demolition where possible. Where salvage and reinstallation is not possible, new bricks shall be taken from Owner's maintenance brick stockpile. If not available:

.1 Hollow Clay Brick: To CSA A82 and to match existing.

2.2 Masonry Connectors

.1 Select any suitable conventional or non-conventional type as defined by CSA A370, and as follows:

.1 Corrosion Protection: Level II.

.2 Maximum unsupported length of connectors in cavity shall not exceed that permitted by CSA A370 or recommended by connector manufacturer, whichever is the smaller dimension.

.3 Connectors selected shall accommodate differential vertical movement between masonry veneer and structural backup.

2.3 Fasteners for Masonry Connectors

.1 Design Criteria: Capable, when installed in specified substrates, of meeting requirements of CSA A370.

.2 Corrosion Resistance: To requirements of CSA A370.

.3 Screws: Steel, hex washer head, to suit substrate.

2.4 Mortar Materials

.1 Mortar Materials: To CSA A179.

.2 Portland Cement: To CSA A3000, Type 10.

.3 Hydrated Lime: To CSA A179, Type S.

.4 Mortar Colour Admixtures: Metallic oxide pigments. Colour will be selected by Consultant from manufacturer's standard range. Pigments shall not exceed 10-15% by weight of cement content.

.5 Mortar Aggregate: Washed, clean, sharp, free of organic materials, and conforming to CSA A82.56.

.6 Water: Potable and free of deleterious matter, acids, and alkalis.

.7 Admixtures for mortar shall not be used without written approval from Consultant.

.8 Pointing Mortar: Premixed, to requirements of this Section, colour to match existing, all aggregate passing 1.18 mm sieve.

2.5 Mortar Mixing and Proportioning

.1 Mix mortar in accordance with CSA A179, using maximum amount of water consistent with workability. Provide minimum compressive strength after 28 days of 5 MPa (Type N) mortar for all masonry construction.

.2 Provide gauging equipment and ensure that shovel count is accurate.

.3 Use mechanical mixer of one sack minimum capacity for large batches, mechanically mixing for not less than 3 minutes and not more than 5 minutes. Hand mixing may be used for small batches.

.4 Use mortar within 1.5 hours of mixing when air temperature is 25°C or higher, and within 2.5 hours when air temperature is less than 25°C.

.5 Do not use anti-freeze compounds to lower the freezing point of mortar.

.6 Do not re-temper mortar.

.7 For coloured mortar, mix coloured pigment with 10% to 15% dry cement by weight. Do not use same mixer for regular and coloured mortar.

2.6 Accessory Material

.1 Cavity Weeps/Vents: Preformed plastic or galvanized steel, 100 mm long.

.2 Sheet Steel Base Flashing: As specified in Section 07 62 00.

.3 Membrane Flashing: A self-adhesive waterproofing membrane composed of SBS modified bitumen and laminated polyethylene facer self-adhering membrane with compatible primers and sealants. Acceptable Products:

.1 Lastobond Shield HT by Soprema.

.2 Blueskin PE 200 HT by Henry

.3 Acceptable substitution

.4 Spray Urethane Foam Insulation: ULC-certified sprayed/frothed rigid closed cell urethane foam to CAN/ULC S705.1 with properties indicated below and meeting National Research Council (NRC) requirements for a type III air barrier. Approved Products:

.1 Heatlok Soya HFO by Demilec Inc.

.2 Polarfoam 7300-00 Soya HFO by Demilec Inc.

.3 Walltite CM01 by BASF Canada.

.5 Steel Angles/Lintels: To CSA G40.21, 350W, galvanized for exterior use prime painted for interior use, sizes indicated for openings. Provide 150 mm minimum bearing at ends. Shop painted finish.

.6 Masonry Cleaning Compounds: Compatible with masonry unit, and acceptable to unit manufacturer for use on their product.

.7 Water Repellent Coatings: Compatible with masonry unit, and acceptable to unit manufacturer for use on their product. Confirm with Consultant prior to use.

3.0 EXECUTION

3.1 Examination and Preparation

.1 Examine work of other Sections upon which work of this Section is dependent. Should discrepancies be found that affect the proper performance of the work of this section, do not commence work until such discrepancies have been resolved. Report any defects in writing to the Consultant.

.2 Visually review and sound all surfaces of the exterior wall zones identified in the contract documents to locate targeted repair areas and localized deteriorated brick masonry and masonry mortar joints.

.3 The Contractor shall sound, identify, and mark all masonry wall areas covered in the contract that are deteriorated. The Contractor shall commence with repairs upon receipt of approval by the Consultant in writing.

.4 Establish all lines, levels, coursing, and ensure coordination with other trades as required.

.5 Provide waterproof protection over construction surfaces at mixing areas to prevent deposit of mortar and mortar materials on them.

.6 Ensure surfaces to receive new mortar are cleaned of all laitance, grease, oil, and previous mortar where required.

.7 No new mortar is to be applied until the surface preparation has been inspected and accepted by the Consultant.

.8 Ensure all damaged and/or deteriorated brick and mortar have been removed, including all dust and fragments.

.9 Remove any additional brick in good condition, as required to accommodate the installation of the new bricks. Bricks in good condition that are damaged during removal are to be replaced at no cost.

.10 The Contractor shall be responsible to replace all fixtures to original location and condition if removed to facilitate the required brick wall repairs.

.11 Protect adjacent finished materials from damage due to masonry work.

.12 Seal and protect all openings, doors, windows, and adjacent areas to minimize the potential for damage and the spread of dust, water, or other materials into the building or adjacent sidewalks and properties.

.13 Brace all openings to remain plumb.

.14 Construct cavity walls using techniques that will minimize mortar dropping in cavity space. This may require the use of batten boards to catch mortar droppings. No mortar shall bridge cavity space or plug cavity vents at bottom of cavity.

.15 Examine contract documents and coordinate installation of masonry with related sections so that this work can be performed with a minimum of cutting and patching.

3.2 Replacement of Deteriorated Mortar

.1 Remove unsound or defective mortar patches in the Contract area as directed by the Consultant.

.2 Mortar is defective when it is cracked, spalled, chalked, or otherwise crumbling.

.3 The Contractor shall notify the Consultant in writing of any other mortar joint deterioration identified prior to commencing with any repair work. The Consultant shall provide written instructions to complete any repair work.

.4 The Consultant shall review the locations of deteriorated mortar with the Contractor prior to commencing with repairs.

.5 Tools used for cutting out of the mortar joints shall be narrower than the joint.

.6 Cutting out of the joint shall be performed using:

.1 Handheld rotary saws or a grinder or wheel with a vacuum bag.

.7 The joints shall be cleaned back for the full specified depth. All mortar shall be removed on the masonry surfaces to a square surface of existing mortar at the back of the joint.

.8 All loose particles in the mortar joints shall be removed with compressed air and left open for review by the Consultant.

.9 The depth of the raking shall be carried out to at least twice the width of the joint to a minimum depth of 1” (25 mm) measured from the face of the masonry unit and beyond the existing depth of repointing.

.10 Consultant Review:

.1 The Contractor shall provide access, permit inspection, correct any defects, and obtain written comment of all raked joints prior to commencing with the pointing.

.11 Where mortar is found to be defective beyond the specified raking depth, the Contractor shall continue raking until solid mortar is encountered. Remove all loose mortar, dirt, and other undesirable material.

.12 Be aware that additional raking beyond specified depths will be necessary and that voiding can be expected. Back pointing will be required at these locations prior to re-pointing.

.13 If masonry unseats or the bond is broken, remove the unit and reset in accordance with the work outlined in this section.

.14 The Contractor shall take all reasonable precautions in order to prevent damage to the masonry units resulting from the removal process.

.15 Such damage to the masonry includes, but is not limited to, the widening of the joints, nicks, gouges, and chipped or scratched surfaces from the cutting out tools due to improper workmanship.

.16 The Contractor shall replace or repair all damaged units to the satisfaction of the Consultant with no change in the contract price or schedule.

.17 Obtain the Consultant’s written acceptance of raked out and back pointed work prior to commencing with the pointing operation.

.18 Immediately prior to pointing, thoroughly wet the joints in order to control absorption. Verify with environmental requirements. Prior to pointing, the joints should be wet, water shall be soaked into the masonry and mortar, but with no standing water.

.19 Fill all bed and head joints with pointing mortar; compact joints firmly to ensure positive adhesion to all inner surfaces.

.20 At initial set, finish neatly the joints to match the existing pointing style.

.21 Keep the work area clean; remove all droppings as the work proceeds, and again at the end of each day.

.22 Prevent the mortar from being placed or smeared onto the front face of the stone or masonry to minimize the potential for staining on the faces during the pointing.

.23 Cut out and replace all mortar joints that dry prematurely and are lighter than the surrounding joints and/or have shrinkage cracks.

3.3 Replacement of Deteriorated Brick Masonry Units

.1 The brick is damaged or deteriorated when it is cracked, chipped, spalled, or the outer face is hollow.

.2 Should the amount of deteriorated brick rise above 5% of the contract quantity, the Contractor must stop all work and notify the Consultant immediately. The Contractor must obtain written review from the Consultant prior to replacing amounts of brick totalling above 5% of the contract quantity.

.3 The Contractor shall maintain the stability and water tightness of the structure at all times.

.4 Rebuilding Areas of Brickwork:

.1 Meet or exceed requirements of CSA A371.

.2 Build masonry plumb, level, and true to line, with vertical joints in proper alignment.

.3 Lay masonry in running bond to meet specified requirements of CSA Standards, unless otherwise specified.

.4 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings with minimum of cutting.

.5 Remove laitance, loose rust, scale, and other foreign materials from supporting bed surfaces to ensure bonding.

.6 Use only dry and unfrozen materials.

.7 Where mortar has started to harden at units requiring repositioning, remove and replace with fresh mortar.

.8 Joints:

.1 Make joints of uniform thickness with vertical joints plumb over each other.

.2 Form tooled concave joints wherever exposed to view, whether behind cabinets, fitments, and wall accessories.

.3 Ensure that no mortar protrudes from joints on wall surfaces to which insulation will be applied.

.9 Stop off horizontal runs of walls by racking back a half unit in each horizontal course. Do not tooth.

.10 Install special units as may be required to form corners, returns, offsets, reveals, and indents without cut ends being exposed and without losing bond pattern or module.

.11 Fit masonry closely against electrical and plumbing outlets so that collars, plates, and covers will overlap and conceal all cuts.

.12 Use chipped and blemished units only where concealed. Do not use defective or broken units.

.13 Distribute masonry units of varying textures to avoid spotty appearance over wall surfaces exposed to view. Do not use units that contrast too greatly with overall range. Remove masonry units of non-matching colour variation. Replace with conforming units at no additional cost to the Owner.

.14 Where replacing in excess of four bricks in one area, install masonry ties to bond facing with back-up wythes of masonry.

.15 The ties should be randomly installed in rebuilt areas except where areas are sufficiently large for the ties to be set every 600 mm horizontally and vertically with staggered centres.

.16 Drill entry hole into the block backup and drive the tie into position in accordance with the Manufacturer’s recommended embedment length and hole diameter.

.17 Ensure that the ties are solidly set in the back-up wythe.

3.4 Tolerances

.1 Comply with tolerances as required and recommended in CSA A371.

3.5 Installation of Masonry Connectors

.1 Install masonry connectors in accordance with CSA A370.

.2 Comply with fastener manufacturer's recommendations for edge distance in applicable substrates. Do not fasten into mortar joints of masonry backup.

.3 Install top row of masonry connectors not more than one-half of typical tie spacing below top of veneer panels.

.4 Ensure that connectors installed over or through sheathing are adequately fastened to studs or other structural framing.

3.6 Installation of Flashing

.1 Install flashing under exterior masonry walls and as indicated on drawings.

.2 Extend flashings through brick veneer, turn up as indicated on drawings on back-up substrate.

.3 Create flashing end “dams” at all flashing ends including at lintels, sills, and wall ends.

3.7 Installation of Accessories

.1 Control Joints: Install continuous control joint fillers as indicated on drawings.

.2 Expansion Joints: Kept free of mortar, ready to receive a back-up rod and sealant.

.3 Cavity Vents:

.1 Install vents in vertical joints immediately over flashing and near tops of walls, in exterior wythes of cavity wall construction to match existing.

3.8 Adjustment and Cleaning

.1 Point all voids in brick faces.

.2 Cut out defective mortar joints and repoint.

.3 Clean brick with brushes and as otherwise recommended by the supplier to remove mortar and stains.

.4 Remove mortar droppings that adhere to the exposed face of a unit with a wooden paddle after being allowed to dry and harden. Remove remaining mortar with a stiff fibre brush.

.5 Do not use wire brushes for cleaning.

.6 Should specified cleaning methods be insufficient, proceed with other methods only with prior review and acceptance by Consultant.

.7 Protect adjacent materials and Work from damage while cleaning.

.8 Ensure that all efflorescence and mortar deposits are removed from surfaces.

.9 Exercise particular care during construction to prevent mortar smears on the face of the brick masonry.

.10 Remove efflorescent salts by dry brushing followed by flushing with clean water.

3.9 Water Repellent Coating

.1 Prior to application, an inconspicuous test area shall be coated to confirm compatibility, and to establish typical coverage rate and method of application.

.2 A representative of the coating manufacturer shall inspect and approve the surfaces and conditions before commencing with the application of the water repellent coating.

.3 Apply to exterior wall surface in accordance with manufacturer’s instructions. Protect all adjacent materials that are subject to damage, such as roofing, window framing, metal panels, and other exposed metal. Immediately clean off any glass or framing coated in accordance with manufacturer’s directions.

3.10 Cleanup

.1 Remove all debris resulting from the work of this section.

END OF SECTION

1.0 GENERAL

1.1 Section Includes

.1 Replace existing roofing system with new as outlined in the Drawings and specified herein.

.2 Clean all areas affected by the Work to the satisfaction of the Owner.

1.2 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 British Columbia Building Code

.3 Roofing Contractors Association of British Columbia (RCABC) Roofing Practices Manual

.4	ASTM C1396	Standard Specification for Gypsum Board
.5	ASTM C165	Standard Test Method for Measuring Compressive Properties of Thermal Insulations
.6	ASTM D6878/D6878M	Standard Specification for Thermoplastic Polyolefin-Based Sheet Roofing
.7	ASTM D4397	Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
.8	CSA B35.3	Tapping and Drive Screws (Slotted and Recessed Head, Thread Forming and Thread Cutting Screws, and Metallic Drive Screws) (Withdrawn)
.9	CAN/CGSB-51.33	Vapor Barrier Sheet, Excluding Polyethylene, for Use in Building Construction (Withdrawn)
.10	CAN/ULC-S704.1	Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced
.11	CAN/ULC-S706	Standard for Insulating Wood Fibre Boards for Buildings

.12	CAN/ULC-S770	Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams
.13	FM Approvals 4470	Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction
.14	CSA G164	Hot Dip Galvanizing of Irregularly Shaped Articles

1.3 Coordination

.1 Coordinate work of this Section with work of other Sections to ensure all openings, drains, pipes, sleepers, etc. are installed and flashed at the appropriate time.

1.4 Submittals

.1 Product Data: Submit data on material characteristics, performance, limitations, methods of installation, compliance with applicable reference standards, transportation, storage and handling requirements.

.2 Certifications: Submit:

.1 Letter certifying that roofing applicator is currently approved by membrane manufacturer for installation of specified membrane.

1.5 Quality Assurance

.1 Applicator Qualifications: Roofing shall be performed by applicators in a company that:

.1 is a member in good standing of the Roofing Contractors Association of British Columbia**,**

.2 is approved by the membrane manufacturer, and

.3 can substantiate a minimum of five years of experience in the installation of single-ply membrane roofing of similar scope and complexity.

.2 Installation:

.1 Perform work in strict accordance with manufacturer's printed instructions and all warranty requirements. Notify Consultant if the Specifications conflict with manufacturer's recommendations.

.2 Perform roofing Work in accordance with RCABC Roofing Manual and other specified standards.

.3 Ensure that materials, including adhesives and roof anchorage, meet requirements of Authorities having Jurisdiction and CSA A123.21.

.3 Compatibility:

.1 Compatibility between all components of roofing system is essential. Ensure that all products selected for use are compatible with each other.

.2 Procure all roofing membranes from one manufacturer who certifies that all components are compatible with each other.

1.6 Ambient Conditions

.1 Do not apply any part of roofing system over damp material or during a period of damp weather. Stop work if onset of inclement weather is forecast or appears imminent. Ensure protection of the building and products sensitive to damage and moisture. Ensure that moisture is not introduced into the building or roofing system.

.2 Apply each part of roofing system only when surfaces are clean and dry.

.3 Apply each part of roofing system only when surfaces and weather allow for a successful application.

.4 Comply with weather minimums set out in manufacturer's printed recommendations. Proceed with work when temperatures are below manufacturer's printed recommendation only with written agreement of membrane manufacturer that, with the materials and methods to be used, installation can be successfully achieved under lower temperature conditions.

1.7 Delivery, Storage, and Handling

.1 Store and protect materials at all times in dry, well-ventilated premises protected against the elements. Remove from storage only materials to be used the same day.

.2 Remove from site any material damaged by exposure to wet weather.

.3 Do not store materials on roof except with Consultant's approval.

.4 Protect membranes from cuts, abrasion, or other abuse that might adversely affect performance in service.

.5 Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck. Do not load any area beyond the design limits.

.6 Store solvent based liquids, adhesives, and sealants away from excessive heat and open flames and at temperatures between 10°C and 30°C.

.7 Protect sheet metal materials against bending, scratching, and exposure that may cause corrosion or damage.

1.8 Warranty

.1 Contractor Warranty

.1 Provide extended warranty stating that all labour and material will be provided at no cost to Owner to remedy all material and workmanship defects in modified bituminous membrane roofing and related membrane flashings which appear within five years from the date of Substantial Performance of the Work. Defects include but are not limited to: ponding in excess of manufacturer limits unless otherwise noted (whichever is more stringent), blisters, ridges, open seams, fish mouths, excessive degranulation, any defect resulting in water penetration into the roof assembly or the interior. Contractor to provide for all field review required from manufacturer to supply above warranty.

.1 Warranty to be issued on letterhead by field membrane manufacturer listing Owner, Installer, and General Contractor. Warranty to be signed and sealed by an authorized signing officer.

.2 Make all necessary repairs and replacements within 48 hours of receipt of written notification.

.3 Nothing contained in this article shall be construed as in any way restricting or limiting the liability in common law and statutory liability of the Contractor.

2.0 PRODUCTS

2.1 Thermoplastic Polyolefin Membrane

.1 Roofing Membrane: Single ply, 1.6 mm (60 mil) thick, 2.1 kg/m^2 weight, reinforced induction welded thermoplastic polyolefin membrane to ASTM D6878/D6878M. Colour: Grey. Acceptable Products:

.1 Ultra-Ply TPO Fully Adhered, by Elevate.

.2 Sure-Weld TPO Fully Adhered, by Carlisle Syntec Canada.

.3 JM TPO – 60 mil by Johns Manville

.2 Flashing Membrane: Single ply, 1.6 mm thick, 2.1 kg/m^2 weight, reinforced mechanically fastened thermoplastic polyolefin membrane to ASTM D6878/D6878M. Colour: Grey Acceptable Products:

.1 Ultra-Ply TPO by Elevate.

.2 Sure-Weld Flashing TPO, by Carlisle Syntec Canada.

.3 JM TPO – 60 mil by Johns Manville

2.2 Accessories

.1 Fully Reinforced Liquid Waterproofing Membrane: Acceptable products:

.1 Liquiseal Liquid Flashing, by Carlisle

.2 Approved alternate.

.2 Material Fasteners: To CSA A123.21 standards for wind uplift and corrosion resistance and in accordance with membrane manufacturer’s written recommendations. Furnish fasteners of length required by roof system thickness plus 25 mm max.

.3 Induction Fastener Plates Proprietary fastener plates as recommended by the membrane manufacturer to secure TPO roof membrane to the substrate via induction welding.

.4 Bonding Adhesive: Compatible product by membrane manufacturer.

.5 Sealant: Polymeric one-part general purpose sealant; compatible product by membrane manufacturer.

.6 Cut Edge Sealant: Polymeric sealant; compatible product by membrane manufacturer.

.7 Material Fasteners: Corrosion-resistant screws and hexagonal steel plates meeting Factory Mutual approval.

3.0 EXECUTION

3.1 Examination

.1 Examine all surfaces and conditions relating to the work of this Section to determine the acceptability of such surfaces and conditions before commencing work of this Section.

.2 Report in writing to the Consultant any observed defects or deficiencies in any surfaces or conditions that would adversely affect work of this Section.

.3 Commencement of work of this Section implies acceptance of all surfaces and conditions.

3.2 Preparation

.1 Protect adjacent parts of the building from damage caused by roofing operations. Cover walls and other surfaces in the vicinity of hoisting apparatus with heavy canvas or other suitable protective material.

.2 Locate equipment and materials away from building in areas designated by the Owner.

.3 Take precautions when using adhesives at or near rooftop vents or air intakes. Coordinate with operation of vents and air intakes to avoid intake of adhesive odour. Keep lids on unused cans at all times.

.4 Use warning signs and barriers. Maintain in good order until completion of work.

3.3 Substrate Preparation

.1 Roof deck and existing roof construction shall be structurally sound to provide support for new roof system. Notify Consultant of any rusted or deteriorated decking to determine method of treatment or replacement.

.2 Remove existing roofing system, flashings, and wood blocking down to structural deck. Remove only that amount of roofing and flashing that can be made watertight with new materials during a one-day period or before onset of inclement weather.

.3 Ensure that substrate surfaces are free from dust, loose material, excess moisture, and oil-based curing agents.

.4 Remove any sharp ridges or other projections that may penetrate the membrane.

3.4 TPO Membrane

.1 For Fully Adhered Membrane

.1 Beginning at low point of roof, unroll roofing membrane, without stretching, over the acceptable substrate and allow to relax a minimum of 30 minutes before attachment or splicing. As ambient air temperatures decrease, relax time will increase.

.2 Line up membrane to achieve required laps. Fold membrane onto itself to expose the underside avoiding creation of wrinkles.

.3 Apply bonding adhesive to both the underside of the TPO membrane and the substrate simultaneously using a solvent resistant paint roller. Avoid globs and puddles. Do not contaminate splice area.

.4 Allow bonding adhesive to dry until tacky but not stringy to touch. Consult manufacturer for approximate time frames.

.5 Roll coated membrane onto coated substrate avoiding wrinkles. Broom membrane with a stiff push broom to ensure proper contact.

.6 Repeat procedure for remaining portion of sheet and subsequent sheets.

.7 Ensure lap splice area is clean. If area has become contaminated, clean with appropriate product as recommended by membrane manufacturer. Clean an area at least 150 mm wide. If membrane is left exposed for more than 12 hours, clean prior to welding.

.8 Lap end laps of membrane minimum of 75 mm and side laps a minimum of 150 mm. Stagger end laps in such a way that a four corner lap condition will not occur.

.9 Heat weld seams. Seams made with automatic welder approved by manufacturer shall be a minimum of 38 mm wide. Seams made with hand welders shall be a minimum of 50 mm wide.

.10 Allow completed seam to cool for 30 minutes and probe edge with a slotted screwdriver or dulled scratch awl to expose any deficient welds. Repair as necessary.

.11 Apply T-Joint patches at all seam intersections.

.12 Apply cut edge sealant at all locations where membrane may be cut and reinforcement scrim exposed.

3.5 Membrane Flashings

.1 Install flashing membrane in accordance with system requirements using longest pieces practical. Terminate flashing as shown on Drawings and in accordance with manufacturer’s instructions.

.2 Fully adhere flashing with bonding adhesive applied in accordance with manufacturer’s instructions.

.3 Apply T-Joint patches at all seam intersections.

.4 Apply cut edge sealant at all locations where membrane may be cut and reinforcement scrim exposed.

3.6 Metal Flashings

.1 Coordinate work of this Section with work of Section 07 62 00.

3.7 Field Quality Control

.1 Review and testing of membrane roofing and associated work will be done by an agency appointed and paid for by Owner. Notify Consultant at least 48 hours before commencement of any roofing work.

.2 Consultant may have cut tests made to establish quality of work. Such tests will be made in presence of Contractor. Cost of tests and subsequent repairs shall be borne by the Contractor.

.3 Notify Consultant in event that Specifications conflict with manufacturer’s recommendations.

.4 Review and testing service does not relieve Contractor of responsibility for quality control.

3.8 Protection

.1 Schedule roofing work such that traffic over new or existing roofing is minimized. Where traffic cannot be avoided, protect roof areas with minimum 12.5 plywood sheathing. Repair any damage to roofing.

.2 Dispose of rainwater away from face of building until drains or hoppers are installed and connected.

.3 At end of each day's work, or when stoppage occurs due to inclement weather, provide protection for completed work.

.4 Seal and protect exposed edges.

3.9 Completion of Day's Work

.1 Conduct operations to leave deck exposed for minimum period of time. Protect, as required, to prevent water infiltration or environmental damage to building interior.

.2 All aspects of roofing operation shall follow in close sequence. No part of operation shall be so far ahead of succeeding part that the latter cannot be finished that working day.

.3 Install water cutoffs at end of each day's work or when work stoppage occurs due to inclement weather, and remove completely before continuing further roofing applications.

.4 Inspect all laps of membrane application to ensure they are properly bonded. Repair any deficiencies before leaving site for day.

.5 Leave no openings for water ingress into roofing assembly overnight. Provide temporary night seals each night and remove completely before continuing with roofing installation.

.6 Ensure membrane edges are always either mechanically fastened or sufficiently ballasted to protect against wind uplift.

3.10 Cleaning

.1 Ensure membrane is clean of all spilled adhesives or residues and presents an aesthetically attractive appearance.

END OF SECTION

1.0 GENERAL

1.1 Work Included

.1 Provide labour, materials, equipment, and supervision to prepare slabs and vertical surfaces, detail cracks and joints, patch perimeter and voids, and install a waterproofing system and drainage grid to areas designated on Drawings.

.2 Supply and install 2-ply waterproof membrane to designated surfaces, as indicated on drawings, including watertight durable details at perimeters and terminations.

.3 Protection board, joint fillers, and related items as indicated on Drawings and this Section.

1.2 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 Vancouver Building Bylaw

.3 Roofing Contractors Association of British Columbia (RCABC) Roofing Practices Manual

.4	CGSB 37-GP-56M	Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing (Withdrawn)
.5	CAN/CGSB-37.29	Rubber-Asphalt Sealing Compound (Withdrawn)
.6	CGSB 37-GP-19M	Cement, Plastic, Cutback Tar (Withdrawn)
.7	CGSB 37-GP-15M	Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing (Withdrawn)
.8	CAN/CGSB-37.5	Cutback Asphalt Plastic Cement (Withdrawn)
.9	CAN/ULC-S704.1	Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced
.10	CAN2-51.31	Thermal Insulation, Mineral Fibre Board for Above Roof Decks (Withdrawn)

.11	CAN/CGSB-51.33	Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction (Withdrawn)
.12	CAN/CGSB-51.34	Vapor Barrier, Polyethylene Sheet for Use in Building Construction (Withdrawn)
.13	CAN/CGSB-51.38	Cellular Glass Thermal Insulation (Withdrawn)
.14	CSA A123.3	Asphalt Saturated Organic Roofing Felt
.15	CSA A123.4	Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems
.16	CSA A231.1/A231.2	Precast Concrete Paving Slabs / Precast Concrete Pavers
.17	CAN/ULC-S706.1	Standard for Insulating Wood Fibre Boards for Buildings
.18	CSA A284	Mineral Aggregate Thermal Roof Insulation
.19	ASTM C1396	Standard Specification for Gypsum Board
.20	CAN/ULC-S770	Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams
.21	CAN/ULC-S701.1	Standard for Thermal Insulation, Polystyrene Boards
.22	ASTM D5957	Standard Guide for Flood Testing Horizontal Waterproofing Installations

1.3 Submittals

.1 Product Data: Provide data on material characteristics, performance criteria and limitations

.2 Maintenance Data: Submit data covering care, cleaning, and maintenance as per Section 01 78 23.

1.4 Quality Assurance

.1 Provide a competent foreperson to supervise all work and act as the Contractor’s representatives unless designated otherwise.

.2 Use only skilled trades people, experienced in type and class of work. Work shall be carried out in accordance with best standard practice of the industry.

.3 Torch applicators shall be certified by membrane applicator.

1.5 Performance Requirements

.1 Reference to products does not relieve manufacturer of responsibility to comply fully with all specified criteria.

1.6 Inspection and Testing

.1 Review and testing of membrane roofing and associated work will be done by Consultant appointed by Owner. Notify Consultant at least 48 hours before commencement of any roofing work.

.2 Consultant reserves the right to have cut tests made to establish quality of work. Such tests shall be made in the presence of the Contractor. Cost of tests and subsequent repairs shall be borne by the Contractor.

.3 Notify Consultant in event that Specifications conflict with manufacturer's recommendations.

.4 The review and testing service does not relieve the Contractor of their responsibility for quality control of production and for errors made by them.

1.7 Delivery, Storage, and Handling

.1 Deliver and store all materials in their original packaging bearing the manufacturer's name, grade, weight, and standards pertaining thereto, as well as any other reference or markings considered standard.

.2 Store and protect materials at all times on dry, well-ventilated premises and protect against the elements. Only materials to be used the same day shall be removed from storage.

.3 Any material damaged and/or exposed to the weather shall be removed from the work site at the discretion of the Consultant.

.4 Distribution of materials is at Contractor's expense.

.5 Store rolls on ends with selvage edge up, one pallet high only.

.6 Ensure all rolled base sheet membranes are stored at a minimum temperature of 10°C prior to use. Ensure entire membrane has attained this temperature.

1.8 Compatibility

.1 Compatibility between all components of roofing system is essential.

.2 The Contractor shall be responsible for ensuring that all items elected for use are compatible with each other.

.3 Procure all roofing membranes from one manufacturer certified by them that all components are compatible with each other.

1.9 Standards

.1 In the event that Drawings and Specifications differ from manufacturer's printed instruction to such a degree that the specified warranties may be affected, consult the Consultant for their written instructions.

1.10 Warranty

.1 Contractor Warranty

.1 Provide extended warranty stating that all labour and material will be provided at no cost to Owner to remedy all material and workmanship defects in modified bituminous membrane roofing and related membrane flashings which appear within five years from the date of Substantial Performance of the Work. Defects include but are not limited to: ponding in excess of manufacturer limits unless otherwise noted (whichever is more stringent), blisters, ridges, open seams, fish mouths, excessive degranulation, any defect resulting in water penetration into the roof assembly or the interior. Contractor to provide for all field review required from manufacturer to supply above warranty.

.1 Warranty to be issued on letterhead by field membrane manufacturer listing Owner, Installer, and General Contractor. Warranty to be signed and sealed by an authorized signing officer.

.2 Make all necessary repairs and replacements within 48 hours of receipt of written notification.

.3 Nothing contained in this article shall be construed as in any way restricting or limiting the liability in common law and statutory liability of the Contractor.

2.0 PRODUCTS

2.1 Modified Bitumen Membrane

.1 Two-ply system made from prefabricated modified bitumen membranes containing minimum 15% of elastomer Styrene Butadiene Styrene (SBS) and reinforced with non-flammable, fireproof, and stress-resistant insert of composite.

.1 Cap Sheet and Cap Sheet Flashing/Stripping Torch Application

.2 Base Sheet and Base Sheet Flashing/Stripping Torch Application

.2 Manufacturer and Product Name:

.1 Soprema Inc.

.1 Torch Applied Base Sheet: Colphene Flam HR

.2 Torch Applied Cap Sheet: Colphene Flam HR

.3 Torch Applied Stripping Cap Sheet: Sopraply Traffic Cap Plus 4.0G/P

.2 Siplast Inc.

.1 Torch Applied Base Sheet: Paradiene 20 TG

.2 Torch Applied Cap Sheet: Paradiene 20 HT TG Cap

.3 Torch Applied Stripping Cap Sheet: Parafor 30 TG

2.2 Accessories

.1 Adhesives: As recommended by manufacturer of materials being adhered, and for use under climatic conditions to be encountered.

.2 Reinforced Liquid-Applied Waterproofing Membrane: Two-component polymethyl methacrylate-based (PMMA) liquid membrane combined with fleece fabric to form a reinforced membrane for flashings.

.1 Alsan RS 230 Flash, by Soprema

.2 Parapro 123 Flashing System by Siplast

.3 Pourable Sealer: Solvent asphalt based mastic and sealing compound.

.1 Polyproof by Tremco Ltd.

.2 Sealtight Pitch Pan Sealant by W.R. Meadows

.4 Gypsum Sheathing Joint Tape: Masking tape 50 mm in width.

.5 Material Fasteners: Corrosion-resistant screws and hexagonal steel plates. Standard of Acceptance to meet Factory Mutual approval.

3.0 EXECUTION

3.1 Asphalt Primer

.1 Apply by brush or spray at a rate as designated by manufacturer.

3.2 Base Sheet

.1 For Torch-Applied Base Sheet:

.1 Plan membrane application so that laps are not superimposed over laps of the underlying gypsum board. Mark a chalk line where first course is to start. Unroll 2.0 m to 3.0 m of membrane and line it up to chalk line or selvage edge. Reroll and commence application. If roll goes out of line by more than 12 mm, cut and realign.

.2 With a torch, adhere underside of membrane. Carefully heat underside of membrane and slowly unroll. Constantly check adhesion to ensure proper bonding is achieved.

.3 Side laps must cover selvage edge and be a minimum of 75 mm, end laps must be 150 mm.

.4 Using a torch and round nosed roofing trowel, embed surface granules (if present) into heated and soft bitumen, from chalk line to edge of base sheet at top of horizontal surface (minimum distance of 200 mm from edge of sheet).

3.3 Cap Sheet

.1 For Torch-Applied Cap Sheet:

.1 Plan membrane application so that laps are not superimposed over laps of base sheet. Mark a chalk line where first course is to start. Unroll 2.0 m to 3.0 m of membrane and line it up to chalk line or selvage edge. Reroll and commence application. If roll goes out of line by more than 12 mm, cut and realign.

.2 With a torch, adhere one-ply of membrane, granule side up. Carefully heat underside of membrane and slowly unroll. Constantly check adhesion to ensure proper bonding is achieved.

.3 Side laps must cover selvage edge and be a minimum of 75 mm, end laps must be 150 mm.

.4 Using a torch and round nosed roofing trowel, embed surface granules into heated and soft bitumen, from chalk line to edge of cap sheet at top of horizontal surface (a minimum distance of 200 mm from edge of cap sheet).

3.4 Membrane Sheet Stripping

.1 Plan two-ply membrane stripping application so that laps are not superimposed over laps on underlying membrane.

.2 Install membrane stripping with full roll widths perpendicular to the deck.

.3 Install reinforcing gussets at all inside and outside corners as per the manufacturer’s recommendations.

.4 Install base sheet stripping prior to horizontal cap sheet application. Extend membrane 100 mm (4”) onto horizontal surface and 450 mm (16”) up verticals, or as indicated on detail drawings. Set membrane by torch application for material specified previously.

.5 Using a chalk line, lay out a straight line on cap sheet surface. Set line parallel to roof edge and 200 mm (8”) from base of cant.

.6 Install cap sheet stripping after application of horizontal cap sheet. Extend membrane 200 mm (8”) onto horizontal surface and 450 mm (16”) up verticals or as indicated on detail drawings.

.7 Granules shall be embedded for preparation of selvage where membrane will overlap on mineral surface.

.8 Secure all membrane strippings to verticals with continuous securement strips installed along top edge of membrane strippings and fastened at 200 mm (8") o.c. or as detailed. Lap all strips to selvage a minimum of 75 mm and seal laps securely.

3.5 Metal Flashings

.1 Metal flashings are specified in Section 07 62 00. Coordinate this work with that Section.

3.6 Completion of Day's Work

.1 Install water cut-offs at end of each day's work; remove completely prior to continuing further roofing applications.

.2 Inspect all laps of the membrane application to ensure proper bonding. Repair any deficiencies before leaving site for the day.

.3 Base sheet applications should not be left exposed overnight unless all seams are torch welded prior to leaving the work site.

.4 Provide one-hour fire watch at end of each day when torching membrane. Walk day's entire production area to check for smoke and hot spots.

3.7 General

.1 Patching of the cap sheet membrane shall be carried out utilizing patches with a minimum size of 450 mm (16") by 1000 mm (3 ft.)

.2 Minimum length of cap sheet on flat run of roof shall not be less than 1000 mm (3 ft.)

.3 Wrinkled or deformed ends of cap sheet rolls will not be tolerated and therefore must be discarded prior to application.

.4 Following completion of new roofing, torch soften and apply a liberal application of approved bulk type mineral granules to cap sheet membrane edges where asphalt has extruded or flowed beyond clean lines and to all surface damage.

.5 Splices in delivered rolls of membrane are to be removed. Cut back the roll 450 mm (16") on both sides of the splices and remove prior to installation.

END OF SECTION

1.0 GENERAL

1.1 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 British Columbia Building Code

.3 RCABC Roofing Practices Manual and Roofstar Guarantee Proram

.4 SMACNA Architectural Sheet Metal Manual

.5	ASTM A792/A792M	Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process
.6	ASTM B32	Standard Specification for Solder Metal
.7	ASTM B152/B152M	Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar
.8	ASTM B209/B209M	Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
.9	ASTM B370	Standard Specification for Copper Sheet and Strip for Building Construction
.10	CAN/CGSB 37.5	Cutback Asphalt Plastic Cement (Withdrawn)
.11	CSA B111	Wire Nails, Spikes and Staples (Withdrawn)
.12	AA Aluminum Standards and Data	
.13	AAMA 1402	Standard Specifications for Aluminum Siding, Soffit and Fascia
.14	CSSBI S8	Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products

1.2 Submittals

.1 Product Data: Provide manufacturer's technical data for materials to be used.

1.3 Delivery, Storage, and Handling

.1 Do not expose stored products to wetting or damage. Store neatly and properly stacked.

.2 Transport, handle, and store products so as to prevent damage. Stack preformed products in manner to prevent twisting, bending, and rubbing.

.3 Remove all units or components that are stained, watermarked, cracked, bent, chipped, scratched, or otherwise unsuitable for installation and replace with new.

.4 Protect finish and edges in accordance with manufacturer's directions.

.5 Store material in accordance with manufacturer's directions.

.6 Prevent contact of dissimilar metals during storage and protect from acids, flux, and other corrosive materials and elements.

2.0 PRODUCTS

2.1 Sheet Metal Materials

.1 Carbon Steel:

.1 Z275 galvanized steel sheet to ASTM A653/A653M, commercial quality coating. Thickness: 24 gauge (0.6070 mm).

.2 Finish:

.1 Prefinished steel with factory applied silicone modified polyester on primer, both paint and primer back cured. Include paint system coating to reverse side of coil stock to prevent corrosion of backside surfaces and uniform colour.

.2 Performance Level: "CSSBI S8. Coating thickness not less than 25 µm ± 3 µm (1.0 mils ± 0.1 mils).

.3 Product: Perspectra Plus Series

.3 Colour match existing finishes.

2.2 Accessories

.1 Plastic Cement: Cutback asphalt type, to CAN/CGSB 37.5.

.2 Sealants: In accordance with Section 07 92 00.

.3 Cleats and Starter Strips: Of same materials and temper as sheet metal, minimum 50 mm (2”) wide x thickness same as sheet metal being secured.

.4 Fasteners: Of same material as sheet metal, corrosion resistant, to CSA B111, flat head roofing nails of length and thickness suitable for metal flashing and trim application.

.5 Washers: Of same material as sheet metal, 1.0 mm thick with rubber packings.

.6 Solder: To ASTM B32, alloy composition 50% pig lead and 50% block tin.

.7 Flux: Commercial quality as recommended by sheet metal manufacturer.

.8 Touch-Up Paint: As recommended by prefinished material manufacturer.

2.3 Fabrication

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable RCABC details and specifications.

.2 Fabricate aluminum flashings and other sheet aluminum work in accordance with Aluminum Association Sheet Metal Work in Building Construction.

.3 Form to maximum 2400 mm (8 ft.) lengths using one piece for each flashing section. Make allowance for expansion at joints.

.4 Use flat-lock folded seams for all joints and splices of thru-cavity flashings. S-lock joints may be used if all flashing surfaces are sloped greater than 3:1.

.5 Use standing seams for all joints and splices for cap flashings. Use flat-lock seams where cap flashings are accessible to occupants.

.6 Hem exposed edges on underside 12 mm; mitre and seal corners with sealant.

.7 Form sections square, true, and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.8 Ends of thru-cavity flashing shall have 1/2" folded upturn, creating an end dam. Do not cut and caulk upturns.

.9 Form metal flashing on a bending brake with shaping trimmed. Perform hand seaming on a bench, as far as practicable, with proper sheet metal working tools. Make angles of bends and folds for interlocking metal with full regard to expansion and contraction to avoid buckling and damage to metal.

.10 Form flashings, copings, and fascia to profiles indicated on Drawings and as required to complement and finish membrane roofing and wall systems.

2.4 Saddle and Cap Flashings

.1 Shop fabricate complete saddle flashing in one piece with soldered seams. Grind seams smooth, prime, and shop paint to match sheet stock.

3.0 EXECUTION

3.1 Examination

.1 Examine surfaces to receive flashings. Notify the Consultant of surfaces that are considered unacceptable to receive work of this Section.

3.2 Preparation

.1 Protect work of other Sections from damage by work of this Section.

3.3 Installation - General

.1 Install sheet metal work in accordance with RCABC standards.

.2 Use concealed fastenings throughout, except where approved by the Consultant prior to the start of work.

.3 Provide underlay under sheet metal; secure in place and lap joints 100 mm (4”).

.4 Counter-flash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flashing joints using standing seams forming tight fit over hook strips.

.5 Use flat-lock joints for all metal flashing except roof. S-pocket and standing seams are acceptable. Lock end joints and caulk with sealant.

3.4 Counter Flashings

.1 Install metal counter flashings as soon as possible after membrane flashings are in place and reviewed by Consultant.

.2 Counter flashing shall have crimped bottom edge, stiffening break, and extend at least 400 mm (16”) up verticals or as detailed on Drawings and extend down to horizontal plane of roof surface.

.3 Where detailed on Drawings, turn top edge of flashing into walls, secure with lead wedge or friction fit pins into reglet, and caulk at joint to wall.

.4 Secure sections in S-pocket joints and allow sufficient tolerance for expansion and contraction between each piece.

.5 Secure metal counter flashing a minimum of 300 mm (12”) above roof membrane. Use fasteners of sufficient length to penetrate at least 25 mm (1”) into substrate.

3.5 Cap Flashings

.1 Supply and install continuous metal starter strips, secure at 600 mm o.c. (24” o.c.), maximum of 50 mm above drip edge, with fastener of sufficient length to penetrate a minimum of 25 mm (1”) into substrate.

.2 Supply and install metal cleats at 600 mm o.c. (24” o.c.) and as detailed. Use fastener of sufficient length to penetrate a minimum of 25 mm (1”) into substrate.

.3 Form cap flashings to profiles shown on Drawings and ensure positive drainage to interior roof surface areas.

3.6 Touch-Up and Cleaning

.1 Remove grime and dirt from flashing materials by dry wiping as material is erected.

.2 Remove all excess solder. Remove excess sealant with sealant manufacturer recommended solvent that will not harm finish.

.3 Wipe off all handprints, smudges, and other superficial stains.

.4 Remove and replace all dented and damaged materials.

END OF SECTION

1.0 GENERAL

1.1 Reference Standards

.1 All referenced Standards are latest editions referenced by the Building Code in the Place of the Work, or latest editions if not referenced by Code.

.2 British Columbia Building Code

.3	ASTM C679	Standard Test Method for Tack-Free Time of Elastomeric Sealants
.4	ASTM C719	Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)
.5	ASTM C794	Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
.6	ASTM C834	Standard Specification for Latex Sealants
.7	ASTM C919	Standard Practice for Use of Sealants in Acoustical Applications
.8	ASTM C920	Standard Specification for Elastomeric Joint Sealants
.9	ASTM C1193	Standard Guide for Use of Joint Sealants
.10	ASTM C1330	Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants
.11	ASTM C1472	Standard Guide for Calculating Movement and Other Effects When Establishing Sealant Joint Width
.12	ASTM C1521	Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints
.13	ASTM D412	Standard Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension
.14	ASTM D2202	Standard Test Method for Slump of Sealants

.15 Sealant, Waterproofing and Restoration Institute (SWRI) publication, Sealants: The Professionals' Guide 2013.

1.2 Submittals

.1 Product Data: Provide manufacturer's technical data for materials to be used.

1.3 Maintenance Material Submittals

.1 Leave one unopened tube of each sealant type and colour on site upon completion of work.

1.4 Qualifications

.1 Perform the work of this Section using skilled mechanics having at least five years of experience, and trained and competent in use of sealant materials.

1.5 Performance Requirements

.1 Sealant system shall satisfy the following requirements for the duration of the warranty period:

.1 Totally waterproof, flexible, and thermally compatible with substrate under applicable service conditions.

.2 Provide a weathertight seal that does not allow moisture penetration.

.3 Withstand active cyclical movements of extension and compression of joint width and remain bonded and watertight.

.4 Shall not debond, crack, or craze.

.5 Shall not leak.

.2 Reference to products does not relieve manufacturer of responsibility to comply fully with all specified criteria.

1.6 Delivery, Storage, and Handling

.1 Deliver, handle, store, and protect materials as recommended by materials manufacturer.

.2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water, and contact with ground or floor.

.3 Store material in heated conditions during winter work.

1.7 Field Conditions

.1 Comply with requirements of WHMIS regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada.

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

.3 Minimum application temperature for sealant to be per sealant manufacturer's written application instruction.

.4 Special care must be taken to ensure that substrate surfaces are clean and dry. If applying sealants below 4°C, the applicator is to consult with the sealant manufacturer and follow any additional recommendations.

2.0 PRODUCTS

2.1 Materials

.1 Joint Cleaner: Xylol, methylethylketone, alcohol, or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

.2 Primers: Types recommended by sealant manufacturer.

.3 Joint Back-Up: Round closed cell foam, oversized 30-50%, compatible with sealant and primer, non-adhering to sealant, and non-gassing.

.4 Sealants:

.1 Category 1: One-component polyurethane, conforming to ASTM C920 Type S

.1 Dymonic 100 by Tremco Ltd.

.2 MasterSeal NP1 by Masters Builders Solutions

.3 Approved alternate

.2 Colour of sealants to match adjacent finishes.

3.0 EXECUTION

3.1 Examination

.1 Examine surfaces before commencing work of this Section.

.2 Installation of sealant implies acceptance of surfaces. Notify Consultant in writing of any existing conditions that may affect bonding or performance of the sealant for resolution before installation of materials.

3.2 Preparation

.1 Ensure ambient and existing site conditions are suitable for installation of work of this Section, as recommended by manufacturer.

.2 Ensure all existing sealant and extruded tapes are removed and surfaces prepared and primed in accordance with manufacturer's recommendations.

.3 Prepare surfaces in strict accordance with manufacturer's recommendations, including preparation and smoothing of rough surfaces and detailing of cracks, joints, and voids.

.4 Ensure joint surfaces are sound and free of all moisture, dust, oils, and other materials that may adversely affect sealant bond.

.5 Clean metal flashings and mullions so as not to damage surface finishes.

.6 On non-porous substrates, use a two-wipe method when cleaning. First wipe shall contain the solvent, followed immediately by second wipe with a clean cloth to collect any re-deposited material loosened by the first wipe.

.7 After cleaning, ensure that joints are dry, dust free, and frost free before applying sealant.

.8 Examine joint sizes and correct to achieve depth ratio of one-half of joint width with minimum width and depth of 6.0 mm and maximum width of 25 mm.

.9 Install joint back-up to achieve correct joint depth.

.10 Where necessary to prevent staining, mask adjacent surfaces before priming and caulking.

.11 Apply bond breaker tape where required, in accordance with manufacturer's instructions.

.12 Prime sides of joints in accordance with manufacturer's instructions immediately before caulking.

3.3 Application

.1 Apply sealants in accordance with manufacturer's instructions. Apply using gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.

.2 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, and embedded impurities. Tool surface neatly to produce slight concave joint.

.3 Do not use application procedures that result in toxic fumes or flammable solvents collecting and endangering workers or building occupants.

.4 Category 1: Apply sealant to following exterior locations.

.1 At junctions of dissimilar materials (i.e. frame construction to concrete construction).

.2 Where detailed.

.5 Cure sealants in accordance with sealant manufacturer’s instructions.

3.4 Field Quality Control

.1 Provide safe access for Consultant to perform periodic reviews of various phases of the work of this Section.

.2 Notify Consultant and any testing agency that may be designated by the Consultant 24 hours in advance of work to be performed under this Section.

.3 Repair test locations.

.4 Tests may be performed at the Consultant’s discretion to confirm in-situ material thickness.

3.5 Cleaning and Protection

.1 Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings, using recommended cleaners as work progresses. Remove masking tape after tooling of joints.

.2 Protect caulked joints until sufficiently cured.

.3 Protect completed work of this Section from staining or contamination.

END OF SECTION