

BID DOCUMENT

160 KENDAL AVE., TORONTO - GBC CASA LOMA CAMPUS

ROOF REPAIR AND REPLACEMENT

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DIVISION 01 – GENERAL REQUIREMENTS

Section 01 03 00 – General Instructions

1. GENERAL

1.1 PROJECT SCHEDULE

.1 Schedule

- .1 The successful bidder must provide a project schedule within 5 (five) days of project award. An updated project schedule must be submitted every two (2) weeks. Payment will not be certified without submission of an updated project schedule.

1.2 PERMITS, INSPECTIONS AND CERTIFICATES

- .1 The Contractor shall pay all costs associated with, and be responsible for, obtaining all permits, tests, and certificates, as required by the local municipality. The Owner will obtain and pay for the building permit, if required.
- .2 The Contractor shall be responsible for filing and posting a "Notice of Project" as required by the Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 Copies of inspection/approval certificates must accompany any invoices and shall be sent to the Owner.

1.3 SAFETY CODES AND STANDARDS

- .1 All work shall be in accordance with the latest edition of the Occupational Health and Safety Act and Regulations for Construction Projects in the Province of Ontario.
- .2 Perform all work in accordance with the latest edition of the Ontario Building Code (OBC) unless otherwise specified.
- .3 Work to meet or exceed the requirements of specified standards, codes, and referenced documents, the Fire Marshall, City Fire Prevention and Building Management.
- .4 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, storage, handling and disposal of hazardous materials, and regarding labelling and the provision of material safety data sheets

1.4 SUPPLEMENTARY DEFINITIONS

- .1 In the specifications, references such as, "shown on the Drawings," "specified", "scheduled", "called for", and the like, shall be deemed to include work required by the Contract Documents.
- .2 In the specifications, the expression "Trade(s)" is synonymous with subcontractor(s) if the context permits. The expression "All Trades" shall be deemed to include the Contractor.

1.5 SUPERVISION

- .1 The Contractor's supervisor or foreman shall be identified prior to the commencement of construction. The supervisor or foreman shall be physically on site while any or all work is being undertaken by all trades. The foreman or supervisor shall not be changed without

72 hours written notice to the Owner and provided that the proposed foreman meets the Owner's approval.

1.6 CONTRACTOR'S SANITARY FACILITIES

.1 Sanitary facilities are not available on site for use by the Contractor.

1.7 CONTRACTOR'S ELECTRICAL SUPPLY

.1 Electrical power supply is available on site – coordinate with Owner. Contractor to supplement available supply as required.

1.8 CONTRACTOR'S WATER SUPPLY

.1 Water supply is available to the limit of the existing service in the building on site and will be provided for construction usage, as directed by the Owner. Use of the water service will be permitted only so far as the supply provided to the building occupants is not restricted.

1.9 CONTRACTOR'S PARKING

.1 Parking is not available on site. Paid parking lots exist in the area around the campus.

1.10 TEMPORARY WORKS

.1 Means and methods of construction are completely and solely the responsibility of the Contractor. Cost of all temporary work to be included in the Contract Price.

.2 The Contractor shall provide all temporary works to facilitate construction. Contractor to design, erect, maintain, remove and assume full responsibility for temporary work required for the safe and complete execution of the work.

.3 Access of heavy construction equipment and accumulation of construction materials on the floors are not permitted unless the Contractor has provided engineered load checks, due diligence site investigation and whatever else the Owner and Consultant deem required.

.4 Submit shop drawings for all temporary works for review before fabrication commences. Shop drawings shall be sealed by a professional engineer registered in the Province of Ontario.

1.11 CONTRACTOR'S USE OF THE SITE

.1 All individuals accessing the roof must sign a waiver prior to starting work.

.2 Do not encumber the site with materials or equipment.

.3 Limit areas of work and storage to areas agreed to with the Owner.

.4 Maintain full entry and exit facilities at all times. Keep all existing egress routes free from materials, equipment and obstructions of all kinds.

.5 The Contractor is responsible for all damage to the interior finishes, cladding, roofing structure, landscaping (shrubs, bushes, grass, sidewalks etc.), as a result of the work. The Contractor shall rectify any damages as part of the Base Bid.

- .6 No destructive temporary protection, hoarding, traffic flow, etc., measures can impact the structure, waterproofing systems, etc. The contractor is responsible for including non-destructive methods in their cost.

1.12 OCCUPATION AND PROTECTION OF PREMISES

- .1 The Contractor is solely responsible for the safety and security of the construction site.
- .2 From the time of commencement to the completion of the total contract, the Contractor shall protect the premises and all persons from hazards that are likely to occur as a result of his operations. The Contractor is solely responsible for any damages or such claim for damages as a direct or indirect result of their operations.
- .3 Execute the work to cause minimum interference to occupants and personal affects and the daily operations of the site. Coordinate all work 1 week in advance of execution with the Owner's Representative.
- .4 Do not permit public access to the construction area or to areas immediately below or adjacent to work areas.
- .5 The building will remain in full operation during the execution of the work.
- .6 Control dust, water and odours from operations to the complete satisfaction of the Owner as well as to municipal and provincial regulations.
- .7 All protection barriers, pedestrian control measures, signage, temporary lighting, dust control, odour control, noise control, protection of building elements (such as exterior wall cladding, interior finishes etc.) etc., shall be inclusive to the contract and no further or separate payment shall be made.

1.13 WORKING HOURS

- .1 Permissible working hours are:
 - .1 General: Monday to Friday, 8:00 AM to 6:00 PM
 - .2 Noisy work: Monday to Friday, after 6:00 PM and within applicable by-laws
 - .3 All work to be in accordance with applicable by-laws.
 - .4 All work must be coordinated with the Owner.

1.14 EXISTING CONDITIONS

- .1 Report in writing to the Owner, prior to commencing the work, any conditions or defects encountered on site and which may adversely affect the performance of the work.
- .2 Do not commence with the work until such conditions or defects have been investigated and corrected.
- .3 Commencement of the work implies acceptance of surfaces and conditions. No claim for damages or resulting extra work will be accepted where such conditions were known, visible or reasonably inferable at the time of bidding.
- .4 Ascertain the location of any services buried in the structure prior to cutting and take protective measures.

- .5 The Owner or Consultant will not be liable for any difficulties encountered or expenses incurred resulting from any condition known, or visible, at the time of bidding.
- .6 Check and verify on site all dimensions details and measurements required for any part of the work, which is to fit to or conform to work already installed.

1.15 RESPONSIBILITY FOR TEMPORARY STRUCTURES

- .1 Take precautions to prevent the overloading of scaffolding, and other temporary structures. Make good, at own expense, any damage resulting from such overloading.
- .2 Make good all areas affected by the use of any and all temporary structures.

1.16 TEMPORARY PROTECTION

- .1 Contractor to provide new-looking 6-foot height chain link fence/fast fence around the entire work area perimeter, covered with well-maintained, new, black scaffnet fabric and custom signage. Contractor to maintain a neat and tidy site appearance at all times.
- .2 Provide, maintain and remove protection barriers, dust-tight partitions, lighting and warning signs and protect the building and adjacent areas from flying debris, dust, water impingement and any and all such hazards as may cause damage or destruction to persons, vehicles, furnishings or elements of the structure.
- .3 Protection must be provided to ensure the building finishes, especially flooring, are not marked or damaged in all areas travelled by the Contractor within the building.
- .4 Rectify any damage resulting from inadequate protection during the work.
- .5 Do not exceed the safe live load capacity due to loads from equipment, materials, and the like, without the areas being adequately shored. Wherever possible, materials to be stored on grade. At a minimum, the contractor must include for an engineered letter and drawing confirming allowable material, equipment, etc., loads allowed during construction. Letter must be provided prior to mobilization.

1.17 MAINTAINING LIFE SAFETY SYSTEMS IN OCCUPIED FACILITIES

- .1 Maintain operational life safety systems and public access to exits in occupied areas during all stages of the work.
- .2 Determine nature and exact locations of existing fire and smoke sensors prior to the commencement of the work. Avoid direct or indirect jarring while working in adjacent areas and exercise caution to avoid triggering these devices.
- .3 Be responsible for costs incurred by Owner on account of false fire alarms activated as a result of the execution of the work without adequate precautions.

1.18 COORDINATION

- .1 The entire project will require strict coordination with the building operation staff and tenants.
- .2 It is conceivable that a scheduled unit replacement can be altered the same day due to unanticipated tenant requirements or building operations. The contractor is to be prepared with alternate unit replacement so as not to lose production days.

1.19 PROJECT SIGNS

- .1 No signs or advertisements of any description, other than those regarding safety, caution, and instructions shall be permitted.

1.20 MAINTENANCE

- .1 Maintain all parts of the work from the time of installation until final acceptance. Any completed work damaged prior to completion of the work shall be rectified at the Contractor's expense.
- .2 Report immediately, in writing to the Owner, all incidents of damage to the installations by vandals or others prior to acceptance.

1.21 RESTORATION

- .1 Repair all areas having been damaged in the process of execution of the work and replace all items being damaged beyond repair, to the complete satisfaction of the Owner.
- .2 Repair all areas having been damaged on adjacent properties in the process of execution of the work and replace all items damaged beyond repair, to the complete satisfaction of the Owner and the adjacent property Owner. In all cases, blend with existing conditions.

1.22 REVIEW

- .1 Give timely notice when any phase of the work is ready for review by the Consultant and notice in writing when the work is complete and ready for final inspection. A minimum of forty-eight (48) hours notice is required.
- .2 The Consultant's general review during construction are undertaken to inform the Owner of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve the Contractor of contractual responsibility.
- .3 The Contractor shall provide access to the Consultant to facilitate the review of the work at no extra cost to the Owner or the Consultant. Where work is carried out by swing stage, provide a third life-line.
- .4 Should additional work and/or visits by the Consultant be required because of the Contractor's failure to perform in accordance with the Contract Documents, or if additional design or drafting time is required by the Consultant to provide/review corrective measures caused by the Contractor's failure to perform in accordance with the Contract Documents, the Contractor shall reimburse the Consultant at the rate of direct personnel expense plus 150% overhead plus travel, equipment and material costs plus H.S.T. where applicable. This cost cannot be passed onto the Owner.

1.23 SUBMITTALS

- .1 Within (5) five days after award of contract, the Contractor shall submit the following information for review:
 - .1 General Liability Insurance
 - .2 Bonding
 - .3 WSIB

.4 Schedule

1.24 WARRANTY

- .1 General: The Contractor shall submit a full labour and material warranty against defective workmanship or materials that result in maintenance or repair for a period of two (2) years from the date of Substantial performance of the Contract.
- .2 Warranty coverage to include the repair of any premise/content property damaged as a result of failure of the roof waterproofing assembly system.
- .3 The warranty is to be supplied on the official company letterhead and shall bear the corporate seal.
- .4 Refer to each technical specification section for manufacturer's warranty requirements.

1.25 CLEANLINESS AND REMOVAL OF RUBBISH

- .1 Keep the building site and work areas free from accumulation of dirt, debris, and excess materials.
- .2 At the end of each working day, the work areas shall be made clean. Remove waste from premises at the close of each day or more often, if required.
- .3 Upon completion of the work and immediately prior to final inspection by the Consultant and Owner, thoroughly clean the work area(s). Clean all elements of the building adjacent to and affected by the work, including but not limited to: glass, roof, and walls.

END OF SECTION 01 03 00

DIVISION 01 – GENERAL REQUIREMENTS

Section 01 11 13 – Work Covered by Contract Documents

1.1 GENERAL

- .1 Bids shall be based on the materials and methods as outlined in the bid documents. If the Contractor cannot meet the requirements, no bid shall be entered.
- .2 Refer to Section 01 03 00 - General Instructions for the hours of operation, noise restrictions, and hoarding requirements, etc.
- .3 Refer to the technical specifications and drawings sections for products, and technical requirements.

1.2 SCOPE OF WORK

- .1 The work outlined herein is a general description. The specific requirements for the execution of the Work shall be as described in the bid documents. The itemized tasks of work outlined below correspond with the items outlined in the bid form table.

1.3 PURPOSE OF WORK

- .1 The purpose of this project is to repair roof areas through wholesale and localized repairs which are currently experiencing water leaks.

1.4 BASE BID

.1 Mobilization

- .1 Mobilize on site all plant, tools, equipment and labour required to carry out this Work.

.2 Bonds and Permits

- .1 Provide specified bonds to the Owner following the contract award. Work must not commence without the submission of the Performance Bond, and the Material and Labour Bond.
- .2 Obtain and pay for all Federal, Provincial and Municipal permits necessary for this work, with the exception of the building permit, which will be obtained by the Owner.

.3 General Requirements

- .1 Provide all the necessary labour, plant, equipment, and materials necessary to conform to all requirements as specified in the Contract Documents. This includes, but is not limited to temporary lighting, access (interior and exterior as required to facilitate work), shoring, etc.
- .2 Install all necessary fencing, hoarding, barriers and signage to protect staff, building elements, vehicular and pedestrian traffic in accordance with the Occupational Health and Safety Act. Include all necessary construction signage and coordination. Signage is to be properly lettered and visible. In addition to preventing injury, all work areas must be protected from damage due to equipment.

- .3 Provide temporary support to existing structural loads, where required, to ensure the building is maintained in a safe condition and damage is not caused to building elements. Any damage as a result of inadequate shoring or support shall be rectified at no additional cost to the Owner.
 - .4 Include the manufacture and installation of all necessary material and performance of site mock-ups that will be required to the satisfaction of the Owner and Consultant. Make allowances during construction for down time made necessary for access to and review of the Work by Consultant.
 - .5 Make allowances as required to facilitate the Consultant's review of the work at all aspects of the Work.
- .4 Demobilization and Site Cleanup
- .1 Demobilize all plant, tools, equipment and labour for this Work from the site. Upon completion of Work, and immediately before the Consultant's final review for Total Performance of the work, all areas of the building affected by this Contract shall be thoroughly cleaned. Include the dismantling and removal of the scaffolding at the completion of the project. Remove all temporary protection, equipment, waste and surplus materials from the site and leave the site in neat, tidy condition to the satisfaction of the Owner.
- .5 Repair Area 1 Roof Replacement
- .1 Existing Roof Assembly Removal
 - .1 Remove the existing assembly down to the concrete deck. Existing 2-ply built-up asphalt vapour barrier and rubberized asphalt flood coat to be fully removed and concrete surface to be cleaned free of debris and contaminants.
 - .2 Remove all existing breather vents, part of existing lightweight insulating concrete system. All existing roofing penetrations, roof drains, gas and duct lines to remain in place.
 - .3 Remove and reinstate electrical conduit to facilitate roof replacement. Existing concrete pedestals to be removed and reinstated on new XPS insulation. Electrical conduits to be secured to concrete pedestals.
 - .4 Remove, store, and reinstate metal cover and concrete pedestals. Existing electrical cables which run below cover to be temporarily raised to facilitate roof replacement.
 - .5 Temporarily raise mechanical unit to facilitate roof replacement. Reinstall existing mechanical unit supports. Remove and reinstall conduits on existing rubber supports.
 - .6 Remove, store, and reinstall all existing concrete pavers and ladders to facilitate roof replacement. Cracked/damaged concrete pavers to be replaced with new. All concrete pavers are to be installed on new XPS insulation.

- .7 Door threshold to be removed and reinstated to facilitate membrane upturn and termination.
- .2 New Roof Assembly
 - .1 Supply and install new roof assembly, including replacement of metal cap and counter flashings at parapets and upturns, and replacement of roof drains.
 - .2 Provide tapered insulation shop drawings. 1% roof slope to drain is to be achieved.
 - .3 Remove the existing metal flashing in its entirety at all parapets and upturns and replace with new 24-gauge pre-painted galvanized steel flashing complete with 20 Ga starter strips, S-lock seams, and drip edges to match existing. Provide colour wheel chart to the Consultant and Owner to select the colour of the new sheet metal upon Contract Award.
 - .4 Install new ½" plywood at the interior face of all curbs and upturns to provide a clean surface for the new membrane flashing system.
 - .5 Build up existing expansion joint curb with wood blocking to achieve minimum 6" membrane upturn as per detail 2/R501.
- .3 Mechanical and Electrical Allowance
 - .1 This includes a contingency for mechanical and electrical system repairs not specified in the Contract Documents that are made necessary by the Work, due to conditions that were not visible upon, or reasonably inferable from an examination of the site as determined by the Consultant. Unexpended portions of this allowance will be deducted from the Contract Price. Increase in allowance beyond the stipulated amount shall be authorized by a Change Order.
- .6 Repair Area 2 Localized Roof Replacement
 - .1 Localized Roof Replacement
 - .1 Remove the existing roof assembly at the localized repair area. Existing vapour retarder is to remain.
 - .2 Repair the existing vapour retarder with cold applied repair material.
 - .3 Remove and replace the roof drain with new retrofit roof drain. Install sump pit at roof drain. Size to match existing.
 - .4 Replace existing penetration within Repair Area 2 with a new chem curb seal.
 - .5 Existing built-up wood sleepers to remain. Replace existing membrane flashings and metal flashings. Include for new seals around penetrations.
- .7 Repair Area 3 Localized Membrane Flashing Replacement and Supplementary Sealant at Three Decommissioned Stacks

- .1 Localized Membrane Flashing Replacement
 - .1 Remove and replace existing metal flashing and replace modified bitumen membrane flashings in cold applied asphaltic adhesive around three decommissioned stacks.
- .2 Stack Supplementary Sealant Installation
 - .1 Supply and install sealant and silicone membrane strip at all joints at three decommissioned stacks. Seal all fastener heads with silicone sealant.
- .8 Repair Area 4 Roof Replacement
 - .1 Existing Roof Assembly Removal
 - .1 Remove the existing assembly down to the concrete deck. Existing 2-ply built-up asphalt vapour barrier to be fully removed and concrete surface to be cleaned free of debris and contaminants.
 - .2 Remove and dispose of existing capped curbs down to roof deck.
 - .3 Remove, store, and reinstate all existing concrete pavers to facilitate roof replacement. Cracked/damaged concrete pavers to be replaced with new. All concrete pavers are to be installed on new XPS insulation.
 - .4 Remove and reinstate the gas line to facilitate roof replacement.
 - .5 Remove and reinstate conduits to facilitate roof replacement.
 - .6 Existing mechanical equipment remains in place. Remove and reinstate the screens to access and replace the roof area below mechanical unit at elevated roof area.
 - .7 Existing pitch pockets to remain. Remove existing metal boxes and install new and infill with compatible mastic.
 - .2 New Roof Assembly
 - .1 Supply and install new roof assembly, including replacement of metal cap and counter flashings at parapets and upturns, and replacement of roof drains.
 - .2 Remove the existing metal flashing in its entirety at all parapets and upturns and replace with new 24-gauge pre-painted galvanized steel flashing complete with 20 Ga starter strips, S-lock seams, and drip edges to match existing. Provide colour wheel chart to the Consultant and Owner to select the colour of the new sheet metal upon Contract Award.
 - .3 At the elevated roof area at Roof E, supply and install a new roof assembly (5/R500). Remove and replace the drip edge flashing part of EIFS wall. Cut the EIFS to achieve a 6" minimum membrane upturn. Roofing membrane to overlap existing EIFS air-vapour barrier and seal with compatible sealant. Include for new sealant bead between EIFS and metal drip edge.

.4 Install new ½" plywood at the interior face of all curbs and upturns to provide a clean surface for the new membrane flashing system.

.3 Mechanical and Electrical Allowance

.1 This includes a contingency for mechanical and electrical system repairs not specified in the Contract Documents that are made necessary by the Work, due to conditions that were not visible upon, or reasonably inferable from an examination of the site as determined by the Consultant. Unexpended portions of this allowance will be deducted from the Contract Price. Increase in allowance beyond the stipulated amount shall be authorized by a Change Order.

1.5 UNIT PRICES

.1 There are no unit prices required as part of the contract.

1.6 ALTERNATE PRICES

.1 There are no alternate prices required as part of the contract.

1.7 SEPARATE PRICES

.1 Repair Area 1 Roof Replacement with New Lightweight Insulating Concrete System

.1 Existing assembly (1/R500) to be removed and replaced with new roof assembly (6/R500). New roof assembly to include new lightweight insulating concrete system, tapered to achieve 1% slope to drain in lieu of 2" base and tapered polyisocyanurate insulation.

.2 Existing 2-ply built-up asphalt vapour barrier and rubberized asphalt flood coat to be fully removed and concrete surface to be cleaned free of debris and contaminants prior to new self-adhered vapour barrier installation.

.3 Existing breather vents to be removed and reinstated for new roofing assembly containing lightweight insulating concrete. Supply and install supplementary breather vents, as required, to meet spacing requirements as per manufacturer's standard requirements

.2 Repair Area 1 Roof Replacement with Removal and Reinstatement of Existing Pipework

.1 Existing assembly (1/R500) to be removed and replaced with new roof assembly (4/R500).

.2 Remove and reinstate warm water pipes in Repair Area 1 in lieu of pipework remaining in place. Include for new insulated wrap around ducts in repair area only. Coordinate shut down with consultant and owner.

.3 Repair Area 3 Localized Membrane Flashing Replacement and Supplementary Sealant at Five Commissioned Stacks

.1 Remove and replace existing metal flashing and replace modified bitumen membrane flashings in cold applied asphaltic adhesive around five commissioned stacks.

- .2 Supply and install high temperature sealant at all joints at five commissioned stacks. Seal all fastener heads with high temperature sealant.
- .4 Repair Area 4 Roof Replacement with Removal and Reinstatement of Existing Ductwork
 - .1 Existing assembly (2/R500) to be removed and replaced with new roof assembly (5/R500).
 - .2 Remove and reinstate ductwork in localized area in Repair Area 4 (as shown on drawing R104) in lieu of ductwork remaining in place. Include for new insulated wrap around ducts in removal area only. Coordinate shut down with consultant and owner.

END OF SECTION 01 11 13

DIVISION 3 – CONCRETE

Section 03 52 00 – Lightweight Insulating Concrete Roof Insulation

1. GENERAL

1.1 SECTION INCLUDES:

- .1 Lightweight Insulating Concrete Application to Prepared Substrate

1.2 RELATED SECTIONS

- .1 01 11 13 Work Covered by Contract Documents
- .2 07 52 00 Modified Bituminous Roofing
- .3 07 62 00 Sheet Metal Flashing and Trim
- .4 07 90 00 Sealant

1.3 GENERAL REQUIREMENTS

- .1 All work necessary for completion of work of this section, including but not limited to setting up of scaffolding, swing-stages, permits, authorization from utilities, etc. The cost associated with these items will not be paid for separately, but will be considered incidental to work of this section.
- .2 Obtain all permits required by local agencies and pay all fees which may be required for the performance of the work.

1.4 REFERENCES

- .1 ASTM C150 Standard Specification for Portland Cement
- .2 ASTM C332 Standard Specification for Lightweight Aggregates for Insulating Concrete
- .3 ASTM C578 Rigid Cellular Polystyrene Thermal Insulation

1.5 SUBMITTALS

- .1 Submit manufacturer's instructions for proper placement of the proposed lightweight insulating concrete roof insulation system.
- .2 Submit a letter from the supplier of the proposed lightweight insulating concrete system confirming that the expanded polystyrene used as a component in the lightweight insulating concrete system is to be furnished by the supplier of the proposed lightweight insulating concrete system.
- .3 Submit shop drawings including a roof plan, roof slopes, drain sump locations, and thickness of insulation.

- .4 Submit a sample copy of the warranty covering the proposed lightweight insulating concrete system. Submit a sample copy of the roof system guarantee covering the proposed lightweight insulating concrete system and roof membrane system.
- .5 Submit a letter from the roof membrane manufacturer confirming the intention to issue the roof system guarantee covering the proposed lightweight insulating concrete system and roof membrane system at project completion.
- .6 Submit a letter from the proposed lightweight insulating concrete system supplier confirming that the Contractor is approved to install the proposed lightweight insulating concrete system.

1.6 QUALITY ASSURANCE

- .1 Perform the work in accordance with the manufacturer's written project recommendations.
- .2 Give a minimum of 5 days' notice to the Owner and manufacturer prior to commencing any work and notify both parties on a daily basis of any change in work schedule.
- .3 Familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA and other industry or local governmental groups.

1.7 QUALIFICATIONS

- .1 The installation of the work shall be performed by a recognized specialized applicator, having at least five (5) years of experience, with skilled mechanics, thoroughly trained and competent in all phases of the work.
- .2 The contractor must be certified in writing prior to bid by the supplier to install the proposed lightweight insulating concrete system.

1.8 DELIVERY, STORAGE, AND PROTECTION

- .1 Deliver materials in the supplier's original unopened packages, fully identified as to manufacturer, brand or other identifying data and bearing the proper Underwriters Laboratories label.
- .2 Store bagged concrete aggregate products in a dry location until ready for application. Expanded polystyrene board should not be stored in areas of standing water prior to application but can be exposed to rainwater before application. Boards must be clean and free from foreign substances.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Do not apply materials during precipitation or in the event there is a probability of precipitation during application. Take adequate precautions to ensure that materials and building interiors are protected from possible moisture damage or contamination.

- .2 When air temperatures of 40°F (4.4°C) or above are predicted to occur within the first 24 hours after placement, normal mixing and application procedures may be used. When air temperatures of 32°F to 40°F (0°C - 4.4°C) are predicted to occur within the first 24 hours after placement, warm water may be used. The mix temperature should not exceed 100 degrees Fahrenheit (37.8°C) at the point of placement. Do not install the lightweight insulating concrete system when air temperatures are below 32°F (0°C).

1.10 CONSULTANT REVIEW

- .1 The Contractor shall provide access, permit inspection, correct any defects and obtain written approval to proceed from the Consultant prior to commencing with each phase of work.
- .2 The Consultant's general review during construction are undertaken to inform the Owner of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve the Contractor of contractual responsibility.
- .3 Should additional work and/or visits by the Consultant be required because of the Contractor's failure to perform in accordance with the contract documents, or if additional design or drafting time is required by the Consultant to provide/review corrective measures caused by the Contractor's failure to perform in accordance with the contract documents, the Contractor shall reimburse the Consultant at the rate of direct personnel expense plus 150% overhead plus travel, equipment and material costs plus H.S.T. where applicable.

1.11 WARRANTY

- .1 Refer to 01 03 00 General Instructions.

2. PRODUCTS

- .1 NVS Lightweight insulating concrete roof insulation system
- .2 Provide a lightweight insulating concrete roof insulation system incorporating vermiculite aggregate and expanded polystyrene board supplied by a single manufacturer.
- .3 Effective Thermal Performance: R-25 (hr °F ft²)/BTU
- .4 Slope: Min. 1% or as noted by the Consultant, min. 2% slope at drain sumps, and include min. 2% sloped crickets at all penetrations and curbs where standing water may accumulate.
- .5 Acceptable System:
 - .1 NVS Roof Insulation System by Siplast Inc.
 - .2 Elastizell Composite Insulation by Elastizell Corp.

2.1 LIGHTWEIGHT INSULATING CONCRETE

- .1 Portland Cement: Portland cement conforming to Type I, II, or III as defined by ASTM C 150.

- .2 Vermiculite Aggregate: Vermiculite concrete aggregate conforming to ASTM C 332.
 - .1 Acceptable Product: NVS Premix Concrete Aggregate by Siplast Inc. or approved equivalent.
- .3 For patches as recommended by the manufacturer: Zono-Patch by Siplast Inc. or approved equivalent.
- .4 Mix Design: Mix Portland cement and vermiculite concrete aggregate in 1:3.5 volume ratio with water to achieve a wet density ranging from 60 to 68 pcf (960 to 1089 kg/m³), resulting in a minimum dry density of 35 pcf (561 kg/m³), and minimum compressive strength of 300 psi (2068 kPa) or per manufacturer's recommendations.

2.2 EXPANDED POLYSTYRENE INSULATION BOARD

- .1 Expanded polystyrene (EPS) insulation board having a nominal density of 1 pcf (16 kg/m³) defined as Type I by ASTM C 578 and containing approximately 3% open area. Each bundle of board shall be delivered to the job site with clear identification as to manufacturer and shall carry the Factory Mutual approval label and the Underwriter's Laboratories Classified label on each bundle.
- .2 Acceptable product: Insulperm Insulation board by Siplast Inc. or approved equivalent.

3. EXECUTION

3.1 EXAMINATION

- .1 Ensure that all surfaces to receive lightweight insulating concrete are free of oil, grease, paints/primers, loose mill scale, dirt, or other foreign substances. Where necessary, cleaning or other corrections of surfaces to receive lightweight insulating concrete is the responsibility of the party causing the unacceptable condition of the substrate.
- .2 With the general contractor present, examine surfaces to receive the roof insulation system and determine that the surfaces are acceptable prior to placement of the lightweight insulating concrete system.

3.2 SURFACE PREPARATION

- .1 Remove water or any other substance that would interfere with bonding of the lightweight concrete system.
- .2 Submit a letter from the manufacturer confirming surface preparation requirements and that surface preparation has been completed prior to application of the lightweight insulating concrete roof insulation system.

3.3 SLURRY COAT APPLICATION

- .1 Place a 1/8 inch (3 mm) minimum thickness of insulating concrete slurry coat over top of the prepared substrate.

3.4 INSULATION BOARD APPLICATION

- .1 Place the thickness of expanded polystyrene insulation panels shown in the approved shop drawings within 30 minutes of applying the insulating concrete slurry coat to the substrate.
- .2 The maximum allowable panel step in a stair-step design is 1 inch (25 mm).
- .3 Fill the holes in the expanded polystyrene insulation panels with lightweight concrete per manufacturer's recommendations.

3.5 TOPPING APPLICATION

- .1 Place a 1 inch (25 mm) minimum thickness of insulating concrete over top of the expanded polystyrene insulation panels within the same day's application.

3.6 FIELD QUALITY CONTROL

- .1 Avoid roof-top traffic over the roof insulation system until one can walk over the surface without creating surface damage.
- .2 Monitor the thickness and wet density of the lightweight insulating concrete at the time of placement to determine conformance to the manufacturer's requirements. Monitor the placement of proper thickness of polystyrene insulation board in accordance with the contract documents.
- .3 Conduct a base ply fastener pull test 3 or more days following the application of the lightweight insulating concrete to ensure a minimum withdrawal resistance of 40 pounds (18 kg) per fastener.
- .4 Any imperfections, cracks, spalls, and any other defects as recommended by the manufacturer shall be patched and repaired using patch material (Zono-Patch) or other materials approved by the lightweight insulating concrete supplier.

END OF SECTION 03 52 00

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

Section 07 52 00 – Modified Bituminous Roofing

1. GENERAL

1.1. SECTION INCLUDES

- .1 2-ply modified bitumen membrane system
- .2 Fibreboard coverboard
- .3 Polyisocyanurate insulation
- .4 Air barrier / vapour retarder
- .5 Accessories

1.2. ENVIRONMENTAL REQUIREMENTS

- .1 Membrane installation shall be performed only on a dry substrate, free of snow and ice. The Contractor shall use only dry materials and apply only during weather that will not introduce moisture into the system.
- .2 The Contractor shall ensure substrate temperature and moisture content conforms to manufacturer's minimum requirements, before proceeding with the work.
- .3 Roofing shall not be carried out when ambient temperatures are less than seven (7) degrees Celsius.

1.3. PERFORMANCE REQUIREMENTS

- .1 Install a watertight, modified bitumen membrane roofing system with compatible components that will not permit the passage of liquid water and will withstand wind loads, thermally induced movements and exposure to weather without failure.
- .2 Install roofing to the standards of Canadian Roofing Contractors Association Metric Specification Manual (CRCA).
- .3 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, storage, handling and disposal of hazardous materials, and regarding labeling and the provision of material safety data sheets.

1.4. SCOPE OF WORK

- .1 Refer to Section 01 11 13 Work Covered by the Contract Documents.

1.5. SYSTEM DESCRIPTION

- .1 At conventional roof assemblies, the roof membrane system shall be comprised of 2-ply modified bitumen. Assembly of components (all new) including 2-ply modified bitumen roofing system on a prepared existing roof deck substrate, and including but not limited to:
 - .1 2-ply modified bitumen membrane system.
 - .2 Coverboard.

- .3 Roof insulation.
- .4 Air barrier / vapour retarder.

1.6. REFERENCES

- .1 CSA - Canadian Standards Association
- .2 CGSB - Canadian General Standards Board
- .3 ULC - Underwriters Laboratories of Canada
- .4 ULI - Underwriters Laboratories Incorporated
- .5 FM - Factory Mutual Engineering Corporation
- .6 ASTM - American Society for Testing and Materials
- .7 CRCA - Canadian Roofing Contractors' Association
- .8 CWC - Canadian Wood Council
- .9 CSSBI - Canadian Sheet Steel Building Institute
- .10 OIRCA - Ontario Industrial Roofing Contractors' Association

1.7. SUBMITTALS BEFORE START OF WORK

- .1 List of Materials: Submit a complete list of materials to be utilized for the work of this section.
- .2 Installation Data: Manufacturer's special installation requirements, including special procedures, and perimeter and penetration conditions requiring special attention.
- .3 Product data sheets and material Safety Data Sheets (MSDS) for all products to be used at the site and/or incorporated in the Work.

1.8. QUALITY ASSURANCE

- .1 The installer shall be knowledgeable in the proper installation of the roofing and shall have a minimum of five (5) years of proven experience for projects of similar size and complexity.
- .2 The Contractor shall provide the proper equipment, workers, and supervision on the job site to install the system in compliance with the project specifications.
- .3 The Contractor must employ a full-time on-site foreman for this Work who will be responsible for all aspects of this Work. Once established, the foreman is not to change for the duration of the Work unless previously approved by the Owner's Representative.

1.9. STORAGE AND HANDLING

- .1 Deliver and store all materials in their original unopened containers. The manufacturer's label intact and visible for review.
- .2 Store all materials in a safe, off ground, protected storage area to prevent damage. All materials must be protected from exposure to water and freezing. Maintain temperatures as per manufacturer's written instructions.

- .3 Store rolls of membrane in upright position. Always store on smooth, flat surfaces and avoid gravel surfaces.
- .4 All materials must be tarped to protect from water damage and ultraviolet deterioration.
- .5 Place plywood runways over work to enable movement of material and other traffic.
- .6 Store sealants at five (5) degrees Celsius minimum.
- .7 Store insulation protected from sunlight, weather and deleterious materials.
- .8 Damaged materials shall be removed and replaced with new materials, unless otherwise agreed with the Consultant.
- .9 Replace any materials damaged during manufacture, shipping, storage or installation.

1.10. WARRANTY

- .1 The roof system manufacturer will issue a written document in the owner's name, valid for a ten (10), year period, stating that they will repair any leaks in the roofing membrane to restore the roofing system to a dry and watertight condition, to the extent that membrane manufacturing or installation defects caused water infiltration. This is a labour, material and workmanship warranty. The warranty must cover for the entire cost of the repair(s) during the entire warranty period. The warranty must be transferable, at no extra cost, to subsequent building owners starting from the date of acceptance. No letter amending the manufacturer's standard warranty will be accepted and the warranty certificate must reflect these requirements.
- .2 The contractor will provide a warranty for this project, valid for a period of two (2) years covering labour, materials and workmanship for the entire area of reroofing project.

2. PRODUCTS

2.1. MANUFACTURER

- .1 Acceptable roof membrane system manufacturers include:
 - .1 Soprema
 - .2 Tremco
 - .3 Siplast

2.2. ROOF MEMBRANE SYSTEM

- .1 Base Bid: 2-ply modified bitumen membrane system in cold applied asphaltic adhesive.

2.3. PRIMER

- .1 A stabilized bituminous emulsion primer used to enhance adhesion of membranes.
- .2 As recommended by the roof membrane system manufacturer.

2.4. ROOF MEMBRANE BASE SHEET FLASHING

- .1 CGSB 37-GP-56M, Type 2 for covered roofing application, Class C, Plain surfaced, Grade 2

- .2 Roofing membrane with glass and polyester reinforcement and SBS modified bitumen to ASTM D6162. Top face sanded, underface sanded.
 - .3 180 reinforcement weight.
- 2.5. ROOF MEMBRANE BASE SHEET
- .1 CGSB 37-GP-56M, Type 2 for covered roofing application, Class C, Plain surfaced, Grade 2
 - .2 Roofing membrane with glass and polyester reinforcement and SBS modified bitumen to ASTM D6162. Top face covered sanded, underface sanded.
 - .3 180 reinforcement weight.
- 2.6. ROOF MEMBRANE CAP SHEET
- .1 CGSB 37-GP-56M, Type 1 for exposed roofing application, Class A, Granule surfaced, Grade 2
 - .2 ULC certifications, Class C
 - .3 Roofing membrane with a composite of glass and polyester reinforcement and elastomeric bitumen to ASTM D6162. Top surface covered with ceramic granules, underface sanded.
 - .4 250 reinforcement weight.
- 2.7. ROOF MEMBRANE CAP SHEET FLASHING
- .1 CGSB 37-GP-56M, Type 1 for exposed roofing application, Class A, Granule surfaced, Grade 2
 - .2 ULC certifications, Class C
 - .3 Roofing membrane with a composite of glass and polyester reinforcement and elastomeric bitumen to ASTM D6162. Top surface covered with ceramic granules, underface sanded.
 - .4 250 reinforcement weight.
- 2.8. COLD APPLIED ADHESIVE FOR MEMBRANE FLASHINGS
- .1 Polyether or asphaltic based adhesive for SBS modified bitumen membrane flashings for use on vertical or sloped surfaces.
 - .2 As recommended by the roof membrane system manufacturer.
- 2.9. FIBREBOARD COVERBOARD
- .1 Base Bid: Semi-rigid roofing support panel composed of ½" fibreboard coverboard.
 - .2 As recommended by the roof membrane system manufacturer.
- 2.10. BOARD ADHESIVE
- .1 Low-rise two-part urethane adhesive with no solvents.
 - .2 As recommended by the roof membrane system manufacturer.

2.11. INSULATION MATERIALS

- .1 Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, HCFC-free, with felt or glass-fibre mat facer on both major surfaces. Thickness: 3 inches (2 layers of 3 inches). No paper facing.
- .2 Tapered Insulation (Polyisocyanurate): ASTM C 1289, Type II, Class 1, Grade 2, HCFC-free, with felt or glass-fibre mat facer on both major surfaces. No paper facing.

2.12. WATERPROOFING OF PENETRATIONS

- .1 One component polyurethane / bitumen resin to waterproof roof penetrations and complex details.
- .2 As recommended by the roof membrane system manufacturer.

2.13. WATERPROOFING MASTIC

- .1 Mastic made of synthetic rubbers, plasticized with bitumen and solvents.
- .2 As recommended by the roof membrane system manufacturer.

2.14. AIR BARRIER/VAPOUR RETARDER

- .1 Description: Self-adhesive air/vapour barrier membranes composed of bitumen modified with thermoplastic polymers and high-density polyethylene film.
- .2 As recommended by the roof membrane system manufacturer.

2.15. LUMBER MATERIAL

- .1 Blocking, nailing strips, grounds curbs, cants, and sleepers:
 - .1 S2S is acceptable.
 - .2 Board and dimension sizes – Standard or better grade.
- .2 Panel Materials – Canadian softwood plywood (CSP) to CSA 0151 Standard.

2.16. ROOF ACCESSORIES

- .1 Retrofit roof drains
 - .1 Copper Roof Drain manufactured by Thaler, complete with vandal-proof strainer dome with operable flap. Acceptable product is RD-4A or approved alternative. Drain diameter to match existing, and shall include a flow control fitting where this feature is included in the existing drains. Connection to existing rain water leader shall incorporate an MJ connection at steel roof decks. All new interior plumbing shall include pipe wrap insulation.
- .2 Penetration Sealing System
 - .1 Polyether based penetration sealing system with precast curb components, pourable sealant and structural sealant.
 - .2 Product: Chemcurb by Chemlink
- .3 Precast Concrete Pavers

- .1 New precast concrete pavers to conform to CSA A23.1.1.
- .2 Pavers shall be 2 feet x 2 feet x 2 inches thick.
- .3 Install new XPS insulation pedestals at all new pavers.

3. EXECUTION

3.1. GENERAL

- .1 The membrane manufacturer shall visit the site and provide project specific recommendations on installation requirements and details. All work shall be completed in accordance with the membrane manufacturer's project specific recommendations.
- .2 Roofing work shall be performed in accordance with applicable, standard in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual, except where specified.
- .3 Apply each part of roofing system only when surfaces are clean and dry. Install roofing on a dry deck, free of snow and ice, and oils and solvents. Use only dry materials and apply roofing only during weather that will not introduce moisture into roofing system.
- .4 All adjacent parts of the building shall be protected from damage caused by roofing operations. Any damage caused by this Contract shall be repaired to match the original materials and appearance.
- .5 Locate equipment and materials in areas designated by the Owner and the Consultant.
- .6 Conduct operations so as to leave the roof deck exposed for a minimum period of time. Protect as required to prevent water infiltration or environmental damage to building interior.
- .7 Strictly adhere to manufacturers' recommendations and specifications.
- .8 All aspects of the re-roofing operations shall follow in close sequence.
- .9 The Contractor shall comply with the latest edition and amending regulations of the following documents, and in the case of conflicts between documents, the more stringent rule shall apply:
 - .1 Occupational Health and Safety Act (Revised) Statutes of Ontario 1990.
 - .2 Hazardous Projects Act and the Canada Labour Code, most recent edition.
 - .3 Occupational Health and Safety Regulation for Construction Projects, Revised Statutes of Ontario, Regulation 213-91.
 - .4 The Workers' Compensation Act, Revised Statues of Ontario, 1990 and Regulations of Board as amended 1990, Toronto.
 - .5 Ontario Building Code Act Chapter 51 and Ontario Regulation 413/90 including amendments to the Regulation 158/93 and 160/93.
 - .6 Ontario Regulation 454 - Fire Code.

- .10 Furnish and maintain all equipment such as stairs, ladders, ramps scaffolds, hoists, runways, derricks, chutes, elevators, etc., as required for proper execution of work including all flood lights and equipment.
 - .11 The Roofing Contractor shall provide any guardrails, temporary barricades and barriers as necessary to carry out the work in accordance with the current safety regulations.
 - .12 Comply with the requirements of the Workplace Hazardous Materials information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials, and regarding labeling and the provision of material safety data sheets.
 - .13 In addition to the requirements of the Occupational Health and Safety Act, and Regulations for Construction Projects, provide temporary safeguards and protection against:
 - .1 Accident or injury to any workmen or other persons on the site, adjacent work and property, roads and walks.
 - .2 Damage to any part of the work and to any adjoining or adjacent structure, properties, pavements, walks, services, and other similar items by frost, weather, overloading, and any other cause resulting from the execution of the work.
 - .14 Make good with material identical to existing and adjoining surfaces any damage resulting from the execution of the work to any part of the work or any buildings, pavements, landscaping or surrounding the site.
 - .15 Exposure within the main building of any fumes, water or dust shall be minimized. The Contractor shall coordinate their work in the area of intakes with the Construction Manager and the Building Operations Staff.
 - .16 Skilled workers especially trained and experienced in this type of work shall perform all work. If the Contractor chooses to sub-contract any part of this Work, the proposed sub-contractor's qualifications shall meet all applicable parts of this Specification and their name shall be filed with the Owner.
- 3.2. SUBSTRATE PREPARATION
- .1 Fully remove the existing roof deck vapour barrier down to the concrete surface.
 - .2 Clean the substrate free from oil, dust, dirt, debris, and any other substance that prevent tenacious bond of the new roofing system components.
 - .3 Commencing with the work indicates acceptance of the surface conditions by the Contractor.
- 3.3. APPLICATION OF ASPHALT PRIMER
- .1 Roofing substrates of wood, metal, concrete, masonry or gypsum board surfaces will receive a coat of AB/VR primer as per the manufacturer's recommendations. All surfaces to be primed must be free of rust, dust or any residue that may hinder adherence. Cover primed surfaces with roofing membrane as soon as possible. Application temperature limit -10°C.

3.4. INSTALLATION OF AIR BARRIER/VAPOUR RETARDER

- .1 Beginning at the bottom of the slope, without adhering the membrane, unroll onto the substrate for alignment. Do not immediately remove the release sheet.
- .2 Peel back one end of the release sheet and adhere this part of the membrane to the substrate. Peel back the remaining release sheet at a 45° angle to avoid wrinkles in the membrane.
- .3 If the membrane is not properly aligned, do not try to adjust it. Instead, cut the roll and start again, making sure that it is properly aligned and that it overlaps the end of the misaligned piece by 150 mm.
- .4 Overlap adjacent membranes by 75 mm. Overlap end laps by 150 mm. Stagger end laps by at least 300 mm.
- .5 When the AB/VR is installed directly on the steel deck, place a thin sheet of metal under the end lap of the AB/VR.

3.5. INSULATION INSTALLATION

- .1 Lay insulation board in parallel courses with staggered and offset joints between pieces and layers.
- .2 Lay out insulation board boards so that no less than half a board is used at any location.
- .3 Cut and fit insulation board snugly around all curbs, projections, drains etc.
- .4 At conventional roof assemblies, set in adhesive in accordance with the pattern required by the Manufacturer. Insulation board must be stepped in place as soon as the adhesive begins to foam. Do not reposition boards once they are laid.

3.6. INSTALLATION OF COVER BOARD

- .1 Lay cover board panels in parallel courses with staggered and offset joints between pieces and layers.
- .2 Lay out cover board panels so that no less than half a panel is used at any location.
- .3 Cut and fit cover board panels snugly around all curbs, projections, drains etc.
- .4 At conventional roof assemblies, set in adhesive in accordance with the pattern required by the Manufacturer. Cover board panels must be stepped in place as soon as the adhesive begins to foam. Do not reposition boards once they are laid.

3.7. ROOFING BASE SHEET INSTALLATION

- .1 Unroll base sheet flashing at drain level with first side lap lined up with drain centre (parallel to roof edge).
- .2 Install sheets with adhesive in continuous strips spaced 300 mm (12 in) on the field. Decrease the spacing between ribbons to a minimum of 150 mm (6") at the perimeter and 100 mm (4") at the corners.

- .3 Adhere the first 60 mm (2.5 in) of the self-adhesive side and end laps by removing the silicone release paper and using a membrane roller, then heat-weld the last 40 mm (1.5 in) (self-adhesive, heat-welded side laps).
- .4 All sheets must be evenly and tightly butted together
- .5 Avoid forming wrinkles, swelling or fishmouth

3.8. ROOFING CAP SHEET INTALLATION

- .1 Once base sheet is applied and no defects are apparent, proceed with cap sheet installation.
- .2 Beginning at the drains and perpendicular to the slope, install the cap sheet in a full bed of brush grade adhesive applied at the rate of 6 to 8 litres per 10 square metres using a notched 5 mm. (3/16") neoprene squeegee. Use trowel grade adhesive on granulated overlaps with a notched 5 mm. (3/16") trowel.
- .3 Lap side joints 100 mm. and end joints 150 mm. Stagger end joints and joints between membranes plies by a minimum of 300 mm. Base and cap sheet membranes must be staggered by at least 300 mm.
- .4 Immediately after placement of the sheet in adhesive, brush the surface to ensure complete and uniform embedment.
- .5 Cut off corners at end laps to be covered by the next roll.
- .6 Provide a smooth application, free of wrinkles, fishmouths, air pockets or tears.
- .7 Terminate the cap sheet at the top of the cant or at the perimeter

3.9. BASE-SHEET FLASHING INSTALLATION

- .1 Apply primer to the substrate at a rate specified by the manufacturer. Allow primer to dry before installation of base sheet.
- .2 Install reinforcing gussets at all inside and outside corners.
- .3 Install base sheet flashing in one-(1) metre widths to cover roofing substrate over 100 mm. Overlap side laps by 75 mm. Stagger side laps by at least 100 mm from base sheet overlaps on roof to avoid excessive layering.
- .4 Apply base sheet flashing directly onto substrate by removing cover sheet. Proceed from top to bottom. Once in place, apply pressure manually in a uniform fashion to obtain homogenous adherence over entire surface. Preferably seal seams with rubber roller. Nail outside edge at 300 mm o/c.
- .5 Avoid forming wrinkles, air pockets or fishmouths.

3.10. CAP SHEET FLASHING INSTALLATION

- .1 Apply adhesive to vertical and horizontal surfaces at the required rate by the membrane manufacturer in a continuous manner using steel trowels. Ensure that all membranes are fully adhered.

- .2 Plan 2-ply membrane flashing application so that the laps are not super-imposed over the laps of the underlying membrane.
- .3 Install membrane flashing with full roll widths perpendicular to the roof deck.
- .4 Install gussets at all inside and outside corners as per manufacturer's written instructions.
- .5 Install base sheet flashing prior to horizontal cap sheet application. Extend membrane 4 inches onto horizontal surface.
- .6 Install cap sheet flashing after application of horizontal surface. Heat weld all flashing seams.

3.11. INSTALLATION OF ROOF ACCESSORIES

- .1 Remove and reinstate all rooftop accessories as required to facilitate the work. Ensure all accessories are reinstated in the same or better condition.

3.12. CLEANING

- .1 Clean to Consultant's approval, soiled surfaces, spatters and damage caused by the Work.
- .2 Check drains and plumbing vents to ensure cleanliness and proper function, remove debris and excess equipment from site.

END OF SECTION 07 52 00

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

Section 07 62 00 – Sheet Metal Flashing and Trim

1. GENERAL

1.1 SECTION INCLUDES

- .1 Pre-painted Galvanized Steel Flashing

1.2 REFERENCES

- .1 Canadian Roofing Contractors Association (CRCA).
 - .1 Roofing Specifications Manual.
- .2 CSA B111 - Wire Nails, Spikes and Staples.
- .3 SMACNA (Sheet Metal and Air Conditioning Contractors' National Association) - Architectural Sheet Metal Manual.
- .4 Canadian Roofing Contractors Association (CRCA).
 - .1 Roofing Specifications Manual.
- .5 CSA B111 - Wire Nails, Spikes and Staples.
- .6 SMACNA (Sheet Metal and Air Conditioning Contractors' National Association) - Architectural Sheet Metal Manual.

1.3 SUBMITTALS

- .1 Submit duplicate 300 x 300 mm samples of each type of sheet metal material, colour and finish.

1.4 QUALIFICATIONS

- .1 The sheet metal work shall be performed by a recognized specialized fabricator and installer, having at least five (5) years of experience, with skilled mechanics, thoroughly trained and competent in all phases of the work.

2. PRODUCTS

2.1 GALVANIZED SHEET STEEL

- .1 Zinc coated steel sheet: 24 gauge, commercial quality to ASTM A 653/A 653M, with Z275 designation zinc coating. Colour to match existing.

2.2 JOINTING

- .1 Linear mating of Cap flashings and Parapet flashings shall be with an "S" lock joint.
- .2 Corner mating shall be completed with a standing seam.
- .3 Jointing at gutters shall be fully soldered.

2.3 ACCESSORIES

- .1 Starter Strips

- .1 Same material as sheet metal, minimum 50mm (2") wide with bent to accept cap flashing.
- .2 Thickness to be 0.8mm (20Ga) and fastened at 300 mm o.c.
- .2 Touch-up paint
 - .1 As recommended by prefinished material manufacturer.
- .3 Isolation Coating
 - .1 Bituminous Paint to meet CGSB1-GP-108.
- .4 Sealant
 - .1 Refer to Section 07 90 00 - Sealant

2.4 FASTENERS

- .1 Galvanized, hot dipped or non-ferrous type, appropriate for purpose intended and approved by system manufacturer; length required for thickness of material.
- .2 The following is a list of acceptable fasteners:

Element	Substrate	Fastener	Min. Embedment	Max. Spacing	
				<8' from outside corner	>8' from outside corner
Starter strip (exterior face)	Wood	No. 8 screw	3/4"	24"	24"
Starter strip (exterior face)	Concrete or Masonry	No. 8 screw	3/8"	24"	24"
Starter strip (exterior face)	Metal	1/4" Tapcon screw	1"	24"	24"
Starter strip (interior face)	Wood	No. 10 screw w/ neoprene washer	1"	30"	30"
Starter strip (interior face)	Concrete or Masonry	1/4" Tapcon screw	1"	30"	30"
Counter flashing	Masonry	1/4" Tapcon screw	1"	36"	36"

- .3 Exposed fasteners for Cap Flashing
 - .1 Hex head with nylon coating.
 - .2 c/w with attached EPDM washer.
- .4 Stainless Steel Pop Rivets shall be 3 mm diameter.

2.5 FABRICATION

- .1 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints by use of "S-lock" joints one end. "S-lock" to have a 25mm sleeve for mating with free end of consecutive flashing.
- .2 Hem exposed edges on underside 12 mm.
- .3 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .4 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

3. EXECUTION

3.1 INSTALLATION

- .1 Install sheet metal to achieve the wind uplift resistance required of the ballast integrated insulation boards in accordance with the insulation board manufacturer requirements.
- .2 Install continuous starter strips where indicated or required to present a true, non-waving, leading edge. Anchor to wood blocking, concrete or masonry substrate to provide rigid, secure installation.
- .3 Install cap flashing by locking into starter strip, pull back tight and screw into blocking at a maximum of 600mm (24") o/c. Nail flange of "S-lock" into blocking. Face nailing of joints will not be permitted.
- .4 The second cap flashing will follow the same procedure locking into the "S-lock" a minimum of 20mm onto the previous component.
- .5 Paint the mating surfaces of aluminum and galvanized steel with bituminous or zinc chromate primers. Taping or gasketing with non-absorptive materials or sealants is also acceptable.
- .6 Corners shall be mated with a standing seam joint. Provide a bead of sealant along the inner flange of the seam before crimping tight.
- .7 Use concealed fastenings except where approved before installation.
- .8 Protect material from electrolytic action when dissimilar metals are in contact with one another.

3.2 BUTT JOINT INSTALLATION

- .1 Where flashings connect at a 90° angle with a lower flashing adjoining a higher flashing the following will apply:
 - .1 Cut vertical slots into the higher flashing to match the lower flashing profile, bending the bottom flange out,
 - .2 The lower flashing will have vertical flange fabricated and will be installed on the inside of the higher flashing.

- .3 Provide a sealant joint full length of the mated joint on the lower flashing bedding the top flashing.

3.3 CLEANING

- .1 Daily as the work proceeds and on completion, remove all surplus materials and debris resulting from the foregoing work.
- .2 Remove all stains, caulking or other adhesive from all affected surfaces.

END OF SECTION 07 62 00

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

Section 07 90 00 – Sealant

1. GENERAL

1.1 SECTION INCLUDES:

- .1 Sealant
- .2 Foam Backer Rod

1.2 REFERENCES

- .1 ASTM C 510 Standard Test Method for Staining and Color Change of Single or Multicomponent Joint Sealants.
- .2 ASTM C 661 Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer
- .3 ASTM C 719 Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
- .4 ASTM C 794 Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
- .5 ASTM C 920 Standard Specification for Elastomeric Joint Sealants.
- .6 ASTM C 1330 Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants
- .7 ASTM C 1193 Standard Guide for Use of Joint Sealants.
- .8 ASTM D 2240 Standard Test Method for Rubber Property—Durometer Hardness

1.3 SUBMITTALS

- .1 Two (2) weeks prior to starting the work, the contractor shall submit the following:
 - .1 List of the materials to be provided under this section.
 - .2 Manufacturer's product data and specifications for each material.
 - .3 Sealant manufacturer's written project recommendations.
- .2 At the Consultant's request, submit samples, including available colours, of the materials to be used on the project.

1.4 QUALITY ASSURANCE

- .1 Perform the work in accordance with the manufacturer's written project recommendations.
- .2 Obtain each type of joint sealant through one source from a single manufacturer.

1.5 QUALIFICATIONS

- .1 The installation of the sealant work shall be performed by a recognized specialized applicator, having at least five (5) years of experience, with skilled mechanics, thoroughly trained and competent in all phases of the work.

1.6 MOCK-UP

- .1 Construct mock-ups two (2) weeks prior to commencement of the work to demonstrate all of the joints encountered in this project.
- .2 The mock-ups shall be 1 m in length for each type of sealant and substrate.
- .3 The mock-ups shall demonstrate the surface preparation prior to the sealant installation and the location, size, shape, colour, depth of joints, and adhesion and cohesion, complete with back-up material, primer, and new sealant.
- .4 Upon receipt of written confirmation from the Consultant, the mock-up may remain as part of the finished work.
- .5 The approved mock-up shall be the standard to which all work shall be performed.

1.7 DELIVERY, STORAGE AND PROTECTION

- .1 Deliver all materials to the job-site in their original unopened containers with labels indicating manufacturer, product name and designation, colour, expiration date, pot life, curing time, and mixing instructions for multi-component materials.
- .2 Store all materials in strict accordance with the manufacturer's recommendations.
- .3 Keep the materials dry and protected from the weather, freezing and contamination.
- .4 Ensure that the labels and seals on all materials are intact upon delivery.
- .5 Remove rejected or contaminated materials from the site.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials. Labelling and provision of MSDS sheets shall be acceptable to Labour Canada.
- .2 Ensure that all materials, containers, rags, etc. are disposed of in accordance with the local Waste Management Plan and hazardous material disposal regulations and requirements.

1.9 CONSULTANT REVIEW

- .1 The Contractor shall provide access, permit inspection, correct any defects and obtain written approval to proceed from the Consultant prior to commencing with each phase of work.
- .2 The Consultant's general review during construction are undertaken to inform the Owner of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve the Contractor of contractual responsibility.
- .3 Should additional work and/or visits by the Consultant be required because of the Contractor's failure to perform in accordance with the contract documents, or if additional design or drafting time is required by the Consultant to provide/review corrective measures caused by the Contractor's failure to perform in accordance with the contract documents, the Contractor shall reimburse the Consultant at the rate of direct

personnel expense plus 150% overhead plus travel, equipment and material costs plus H.S.T. where applicable.

2. PRODUCTS

2.1 SEALANT

- .1 Joints in contact with the roof membrane and mastic
 - .1 Sopramastic SP2, by Soprema
 - .2 Dowsil 758, by Dowsil
- .2 SA Waterproofing Membrane Seams and Edges
 - .1 As recommended by the roof membrane system manufacturer.
- .3 Metal to metal joints
 - .1 Spectrem 2 sealant, by Tremco Inc.
 - .2 Dowsil 795, by Dowsil
- .4 Decommissioned boiler vent stack joints (metal to metal joints)
 - .1 Sealant
 - .1 Dowsil 795, by Dow
 - .2 Silicone Membrane Strip
 - .1 Dowsil 123, by Dow
- .5 Commissioned boiler vent stack joints (metal to metal joints)
 - .1 Dowsil 736 Heat Resistant Sealant, by Dowsil

2.2 JOINT BACKING

- .1 Butt Joint and Bridge Joint Applications
 - .1 Cylindrical Sealant Backing, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Material shall be of type that will not adhere to the specified sealant:
 - .1 Open cell material with a surface skin.
 - .2 Where the joint size cannot accommodate foam rod, polyethylene tape or other joint backing material recommended by sealant manufacturer shall be used.
- .2 Fillet Joint Applications
 - .1 Bond breaker tape, polyethylene tape or other plastic tape recommended by the sealant manufacturer shall be used to prevent adhesion to the specified sealant or to the back of joint.

2.3 CLEANING AGENT

- .1 The cleaning material for the surfaces to receive the sealant shall be as recommended by the manufacturer of the sealant.

2.4 MASKING TAPE

- .1 Non-staining, non-absorbent material compatible with joint sealant and surface adjacent to joints.

3. EXECUTION

3.1 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept the work of this section.
- .2 Commencing with the installation means acceptance of the existing substrates by the Contractor.
- .3 Examine the areas and conditions under which the work will be performed. Review the planned operating procedures with the Consultant. Do not proceed with work until any unsatisfactory conditions are corrected in a manner acceptable to both the Owner and the Consultant.
- .4 Verify that the specified environmental conditions exist before commencing with the work.
- .5 The Contractor shall arrange for the sealant Manufacturer's representative to visit the site and review the surface preparation and installation procedures at the start of the work.

3.2 PROTECTION

- .1 The Contractor is responsible for maintaining the work weather tight during the course of the project. At the end of each work day or when stoppage occurs, provide necessary protection to prevent water penetration through the exterior walls.
- .2 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.
- .3 Protect adjacent finished materials from marking or damage during the work.
- .4 Protect completed sealant installation during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes such that sealant is without deterioration or damage at time of substantial completion. If, despite such protection, damage or deterioration occurs, such sealant shall be rectified immediately.

3.3 SURFACE PREPARATION

- .1 Consult and follow the sealant manufacturer's project recommendations.
- .2 Remove the existing sealant around the penetrations without causing damage to the substrates.
- .3 Remove dust, paint, loose mortar and other foreign matter, and dry joint surfaces.
- .4 Where necessary to protect the adjacent surfaces, mask by suitable means prior to priming and sealant installation.

- .5 Report in writing to the Consultant, any conditions which may be detrimental to the proper performance of the work. Proceeding with the work shall be taken as acceptance of the existing surfaces and conditions.
 - .6 The joints shall be clean, dry and free of frost and foreign matter prior to surface application.
 - .7 Butt and Bridge Joint Applications
 - .1 Examine the joint sizes and correct as required to allow for the anticipated movement and to achieve proper width / depth ratio in accordance with the manufacturer's recommendations for the specified sealant unless indicated differently on the drawings, or by the Consultant.
 - .2 Should joint width correction be required, ensure that the correction is distributed appropriately to each side of joint.
 - .8 Fillet Joint Applications
 - .1 Remove oil, grease and other coatings from non-ferrous metals with an approved cleaning solvent or abrasive technique. Obtain approval from the Consultant prior to commencing.
- 3.4 INSTALLATION OF THE BACK-UP MATERIAL
- .1 Cylindrical Sealant Backing
 - .1 Install the backer rod without stretching, twisting, braiding or puncturing the outer skin. Do not leave gaps between ends of sealant backings.
 - .2 Use an approved installation tool that is blunt surfaced and is designed accurately to place the backer rod.
 - .3 Using the approved tool, smoothly and uniformly place the backer rod to the recommended joint depth and rod compression.
 - .4 The minimum compression of the foam backer rod is twenty-five (25) percent. Vary backer rod size as required to achieve specified compression.
 - .2 Bond Breaker Tape
 - .1 Install bond breaker tape without stretching, twisting or puncturing the tape.
 - .2 Use an approved installation tool that is blunt surfaced and is designed accurately to place tape within the joint.
 - .3 Width of bond breaker tape shall fit exactly the width of the joint.
 - .4 Install tape at the back of the joint.
 - .5 Do not leave gaps between ends of bond breaker tape.
 - .3 Three-sided adhesion is not permitted.
 - .4 Foam backer rod shall only be installed in areas that can be sealed in the same working day.

3.5 APPLICATION

- .1 The Contractor shall have a trained representative on site at all times who is responsible for all sealant applications.
- .2 Perform all work in strict accordance with the manufacturer's printed instructions. The Contractor shall provide the Consultant a copy of these instructions prior to commencing with the injection and sealing operations.
- .3 Mix multi-component sealant such that air pocket formation is minimized in accordance with the manufacturer's recommendation.
- .4 The sealant must be applied continuously to ensure that all voids and joints are completely filled.
- .5 Tool the sealant with light pressure immediately after application to ensure positive and complete contact of the sealant to the interface. Only tooling agents that are approved in writing by the sealant manufacturer and that do not discolour sealants or adjacent surfaces shall be used.
- .6 Neatly tool the surface to form a slight concave profile. The surface of the sealant shall be smooth, free from ridges, wrinkles, air pockets and embedded impurities.

3.6 CLEAN UP

- .1 Clean the adjacent surfaces immediately and leave the work area neat and clean. All excess (sealant and primer) and droppings shall be removed using the recommended cleaners as the work progresses.
- .2 All masking shall be removed immediately after tooling the joints. Sealant affected by the masking removal shall be retooled to achieve proper joint configuration.

END OF SECTION 07 90 00