

Specifications

**CENTRE FOR AQUACULTURE AND ENVIRONMENTAL
RESEARCH ROOF REPLACEMENT**

WEST VANCOUVER, BC

Project #5437

**ISSUED FOR TENDER
DECEMBER 2015**

TABLE OF CONTENTS

SECTION		NO. OF PAGES
Division 1	General Requirements	
01100	General Requirements	6
01330	Submittals	2
01355	Waste Management & Disposal	2
01410	Testing Laboratory Services	1
01500	Temporary Facilities	1
01575	Environmental Protection	4
01600	Materials and Equipment	2
01705	Health and Safety	6
01770	Closeout Procedures	4
01780	Project Record Documents	1
01830	Operations and Maintenance	1
Division 2	Site Construction	
Division 3	Concrete	
Division 4	Masonry	
Division 5	Metals	
05120	Structural Steel	3
05500	Miscellaneous Metals	2
05520	Guardrails and Handrails	2
Division 6	Wood and Plastics	
06100	Rough Carpentry and Framing	4
Division 7	Thermal and Moisture Protection	
07410	Metal Roofing	4
07540	SBS Modified Bitumen Membrane	13
07600	Flashings and Sheet Metal	1
Division 8	Doors and Windows	
08580	Aluminum Curtainwall	4
08800	Glazing	2
Division 9	Finishes	
Division 10	Specialties	
Division 12	Furnishings	
Division 15	Mechanical	
Division 16	Electrical	

LIST OF DRAWINGS

Architectural

- A101 Cover Page, Assemblies & General Notes
- A201 Main Laboratory – Roof Plan
- A202 Pump House – Roof Plan and Details
- A301 Main Laboratory – Details
- A302 Main Laboratory – Details

Structural

- S1.1 General Notes, Keyplan and Details

- 1.0 General**
- .1 The requirements of the Instructions to Bidders, General Conditions, Supplementary General Conditions, all Sections of these specifications, Drawings, Addenda, and Revisions shall govern the entire work. They form a part of each Contract, Section and Division and shall be consulted in detail for instructions pertaining to the work.
 - .2 All work shall be carried out in accordance with the British Columbia Building Code, current edition, and all other provincial and local codes, standards or bylaws applicable to this project.
- 2.0 Contractor's Use of Site**
- .1 Do not unreasonably encumber site with materials or equipment.
 - .2 Move stored products or equipment which interfere with operations of Engineer or other contractors.
 - .3 Obtain and pay for use of additional storage or work areas needed for operations.
 - .4 Maintain reasonable access.
- 3.0 Codes and Standards**
- .1 Perform work in accordance with British Columbia Building Code current edition, and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
 - .2 Meet or exceed requirements of specified standards, codes and referenced documents.
- 4.0 Scope of Work**
- .1 The Main Laboratory and Office building comprises 14 different roofs and skylights including a large flat green roof which has exceeded its 20 year service life. The scope of work includes the replacement of several roofs and skylights, several repairs and the installation of guardrails and security screens around the perimeter of accessible roofs.
- 5.0 Setting out the Work**
- .1 Verify dimensions, elevations, grades boundaries shown on drawings and required by the work, and report any errors and inconsistencies to the Consultant before starting work; starting work shall imply that the Contractor has verified them and found them to be correct, and any additional costs arising out of any rectifications shall be borne by the Contractor.
 - .2 All other grade lines, levels and bench marks shall be established and maintained by Contractor who shall be responsible for same.
 - .3 The building, grid lines and elevations shall be set out by a qualified surveyor.
 - .4 As work progresses, layout walls, partitions, ceilings and openings as a guide to all trades.
- 6.0 Existing Conditions**
- .1 Inspect surfaces and conditions (including temperature and moisture) before commencing work and report defects to the

- Consultant. No work to commence until conditions are acceptable. Commencement of work will indicate acceptance of surfaces and conditions.
- 7.0 Location of Equipment and Fixtures**
- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
 - .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- 8.0 Concealed Services**
- .1 Ensure that pipes, conduits, service lines and ducts in finished areas, are concealed in chases behind furring, in floor and ceiling spaces, concrete, or below grade, or as otherwise approved by the Consultant.
 - .2 An inspector is required to be onsite for all underground utility works. Provide a minimum of three (3) working days' notice to the Consultant before backfilling underground utilities to coordinate inspection services. Provide regular updated schedules to the Consultant to assist in planning inspections.
- 9.0 Existing Services**
- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to pedestrian and vehicular traffic.
 - .2 Before commencing work establish location and extent of services in the area of work and notify Consultant of findings.
 - .3 Submit and obtain approval from Consultant for any shutdown or closure of active service of facility. Adhere to approved schedule and provide notice to affected parties.
 - .4 Where unknown services are encountered immediately advise Consultant and confirm findings in writing.
 - .5 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by the Consultant.
 - .6 Record locations of maintained, re-routed and abandoned service lines.
- 10.0 Protection of Work and Property**
- .1 The Contractor and their Subcontractors shall adequately protect their work and adjoining work at all stages of the operations and shall maintain the protection until their work is completed. They shall remove and replace at their own expense any work and materials damaged due to inadequate protection being provided.
 - .2 The Contractor and their Subcontractors shall protect surfaces of completed Work exposed to view from staining, disfigurement and all other damage by restriction of access or

- by use of physical means suitable to the material and surface location.
- .3 The Contractor and their Subcontractors shall give constant close supervision to roofing and waterproofing membranes following their installation, during the time they are temporarily protected or exposed, to ensure that no damage occurs to them before completion of the building.
 - .4 During construction, the Contractor will, where necessary, provide warning signs, lighting, railings and barricades for the protection of all workers, consultants and the owner.
 - .5 The Contractor will, where necessary, provide barricades to protect trees, shrubs and landscaping from construction activities.
 - .6 Ensure no part of structure or building component is overloaded during construction such that elastic strength limits might be exceeded or concealed damage may occur. Any damage and any claims resulting from such overload shall be made good at the expense of the Contractor or Subcontractor involved. No load-bearing member shall be cut, drilled or sleeved without the consent of the Consultant.
 - .7 Weather protection: At all times provide protection against weather, rain, wind, storms, or heat to maintain all work, materials, apparatus and fixtures free from injury or damage. Remove all snow, ice and frost as may be required for the proper protection and/or prosecution of work. At end of day's work, all areas likely to be damaged shall be protected. Take all necessary precautions to allow continuous work throughout contract period.
 - .8 Protection against fire: Take special precautions against fire and comply fully with requirements of Authorities having Jurisdiction and Insurance Authorities. Maintain and enforce all regulations imposed and required to secure such protection. Maintain clear emergency exit paths for personnel at all times.
 - .9 Combustible building refuse: All broken forms or other combustible refuse shall be removed from building and disposed of daily. Packing cases shall be immediately removed from building. Open fires within structure are prohibited. No combustible materials or supplies shall be stored in areas where combustible forms are in place. Building material storage should be limited to completely fireproof areas. No fires or burning of construction refuse, or burying, shall be allowed on site without prior permission of the owner, and when applicable, only under permit from the local Fire Prevention Authorities.
 - .10 Free burning gas flares shall not be used within building or temporary enclosures around work areas. Temporary heat shall be provided by approved construction heating devices with completely enclosed combustion chambers vented to exterior and carefully located clear of all combustible materials.

- .11 Welding, cutting, plumber's torches, tar kettles, etc., or use of other devices of open flame type shall be used only under strict supervision after all combustible material adjacent has been removed or safely covered. During welding or cutting, a watchman with an extinguisher shall be posted for the duration of work and thirty minutes after to guard against fire by spark or hot metal. All glass adjacent to weld or cutting areas shall be protected to avoid scar by spark.
- .12 Gasoline, oils and other volatile liquids must be kept outside, to be brought into the building in quantities as needed. Such storage shall be in a well-ventilated location, well removed from all open heating and lighting devices. Particular attention must be given to housekeeping in oil storage locations to eliminate spillage and accumulation of oily wastes. Provide approved waste and safety cans and dispensing pumps. Store paint and/or oil covered rags in covered metal containers.
- .13 Provide adequate ventilation for paint spray operations, or other applications using volatile or toxic materials or gasses. Open flame and smoking must be prohibited in these areas. Protective masks, clothing, eye protection must be worn where required by operations or regulations.
- .14 Smoking shall be prohibited inside the workplace.
- .15 Maintain fire extinguishers throughout all accessible locations and where available provide water and hose facilities keeping pace with the construction. Access for heavy fire fighting equipment to the building site shall be provided at the start of construction and maintained to completion. Access to available street fire hydrants, temporary or permanent stand pipes and other such fire fighting equipment must be maintained at all times to the satisfaction of the authorities having jurisdiction.
- .16 Disposal of waste or volatile materials such as oil, paint thinners or mineral spirits into waterways or sewers not permitted.
- .17 As building is enclosed there is inclination to use available areas for storage. Obtain prior approval from the Consultant, observe all reasonable precautions in arranging storage and provide maximum protection possible.

11.0 Site Meetings

- .1 In order to ensure progress of the work on and off the site, in accordance with the construction progress schedule, the Contractor or the consultant, shall periodically call project meetings. Subcontractors may attend meetings as required. The Contractor shall give 72 hours notice of any meeting requiring the Consultants and/or Owners presence.
- .2 The Contractor shall establish a location for the project meetings of sufficient size and comfort to accommodate all parties concerned.

- .3 The Contractor shall record minutes of meetings, and distribute to all parties within seven (7) days of meeting.
- 12.0 Site Safety Committee**
- .1 The Contractor will establish and chair the site safety committee in accordance with WCB regulations and requirements.
 - .2 All Subcontractors shall provide to the Site Safety Committee, copies of WHMIS 'material safety data sheets' for any 'controlled product' in accordance with WCB regulations. This information shall be provided prior to the product being used on site.
 - .3 The Subcontractor intending to use a controlled product shall be responsible for worker education, training, product labeling, etc. in accordance with WCB regulations.
 - .4 All Subcontractors shall immediately notify the Contractor if any safety hazard or accident, apparent or suspected whether or not related to the work of this Contract.
- 13.0 Reference Documents**
- .1 The Contractor shall provide at the site, one (1) copy of each of the following documents for general reference:
 - .1 Contract Drawings
 - .2 Specifications
 - .3 Addenda
 - .4 Reviewed Shop Drawings
 - .5 Change Orders
 - .6 Other Modifications to the Contract
 - .7 Field Test Reports and Inspection Reports
 - .8 Approved Samples
 - .9 British Columbia Building Code current edition, B.C. and National Plumbing Codes, B.C. and Canadian Electrical Codes, together with all supplements, and Occupational Environment Regulations.
 - .10 WCB of BC Accident Prevention Regulations
 - .11 Copy of all permits issued to the Owner and the Contractor
 - .2 Maintain documents in clean, dry, legible condition.
 - .3 Make documents available at all times for inspection by Consultant.
- 14.0 Daily Diary**
- .1 The Contractor shall, from the date of commencement of the Work, maintain a careful daily record of the progress of the Work using standard diary form, with all applicable Subcontractors listed. This record shall be open for the Consultant's review at all reasonable times.
 - .2 The diary shall record all pertinent data such as:
 - .1 Daily weather conditions, including maximum and minimum temperatures.
 - .2 Subsurface conditions encountered during excavation.
 - .3 Commencement, progress and completion of various portions of the work.

- .4 Dates of visits or inspections by the Owner, government, authorities, inspectors, testing agencies, utility companies and any other visitors to the site.
- .5 Record of work force employed.
- .6 Information required by Contractor or Subcontractors
- .7 Materials or information causing delay.
- .8 Actions or events causing delay.
- .9 Clarifications or questions, and answers given.

15.0 Permits and Regulatory Requirements

- .1 Refer to General Condition 10.2.
- .2 A building Permit is not required.
- .3 The Contractor shall obtain and pay for all other permits, licenses or certificates and pay all monthly fees in connection with the permits required for the Work.
- .4 Notify the appropriate authorities of intention to carry out operations in the vicinity of a utility or structure at least one week prior to the commencement of such operation and obtain approval for access to any operations carried out on adjacent public and private property.

END of SECTION

PART 1 - GENERAL

- 1.1 General** .1 The “General Conditions” and “Supplementary General Conditions shall form part of their section.
- 1.2 Shop Drawings** .1 The term “shop drawings” means drawings, diagrams, illustrations, schedules, performance charts, brochures and other product data which are to be provided by the Contractor to illustrate details of a portion of the Work.
- .2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of the Section under which the adjacent items will be supplied and installed. Indicate cross-references to design drawings and specifications.
- .3 Adjustments made on shop drawings by the Consultant are not intended to change the Contract Price. If adjustments affect the Value of Work, state such in writing to the Consultant prior to proceeding with the Work.
- .4 The Contractor shall review all Shop Drawings prior to submission to the Consultant.
- .5 The Contractor shall be responsible for verifying all site dimensions and field conditions.
- .6 All units of measurement are to be metric.

PART 2 – SUBMITTAL

- 2.1 Submittals** .1 Submit six (6) sets of shop drawings and product data sheets for each requirement requested in this Section and other specification Sections or as the Consultant may reasonably request with date, revision number, project name, supplier and all applicable standards.
- .2 Submit samples and colour charts as required or as directed by the Consultant. The samples and colour charts shall be examples of the manufactures latest products and in their standard colour range, unless specifically noted.
- .3 If upon review by the Consultant, no errors or omissions are discovered or if only minor corrections are made, four (4) copies of shop drawings or product data sheets will be returned to the Contractor and fabrication and installation of work may proceed. If shop drawings are rejected, a noted copy will be returned and resubmission of corrected shop drawings, through the same procedure indicated above, shall be performed before fabrication and installation of work may proceed.
- .3 Make changes in shop drawings as the Consultant may require, consistent with Contract Documents. When resubmitting, notify the Consultant in writing of any revisions other than those requested.

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- .4 The Contractor's responsibility for errors and omissions and for deviations in submission is not relieved by the Consultant's review of the submission.
 - .5 Submit shop drawings and/or product information including, but limited to, the following items and other items as the Consultant may reasonably require:
 - .1 Structural Steel
 - .2 Miscellaneous Metals
 - .3 Flashing and Sheet Metals
 - .4 SBS Roofing System
 - .5 EPDM Roofing System
 - .6 Metal Roofing System
 - .7 Guardrails and Security Screen
 - .8 Glazing
 - .9 Windows/Skylights
 - .6 In addition to the above noted items submit shop drawings and/or product information as required by the Sub-Consultants Drawings and Specifications.
 - .7 In addition to the above noted items submit material samples as required elsewhere.
- 2.2 Field Review Items**
- .1 The Contractor shall request a Field Review by the Consultant including, but not limited to, the following and other items as the Consultant may reasonably require prior to concealment:
 - .1 Insulation
 - .2 Vapour Barrier
 - .2 In addition to the above noted items, request Field Reviews prior to concealment as required by the Sub-Consultants Drawings and Specifications.
- 2.3 Samples & Mock-Ups**
- .1 The Contractor shall prepare field samples and mock-ups including, but limited to, the following items:
 - .1 -
 - .2 Construct field samples mock-ups at locations acceptable to the Consultant.
 - .3 Generally, field samples mock-ups shall be constructed to form part of the finished work.
 - .4 Construct each sample or mock-up to include the work of all trades required to finish work.
 - .5 Reviewed samples or mock-ups will become standard workmanship and material against which installed work will be checked on project.
 - .6 All samples or mock-ups which will not become part of the finished work shall be retained on-site for use as directed by the Consultant, to test construction or cleaning procedures, etc., until completion of the Work.
 - .7 Where applicable, samples will be returned to the Contractor upon completion of the Work.
- END OF SECTION

PART 1 - GENERAL

- 1.1 General** .1 The “General Conditions” and “Supplementary General Conditions shall form part of their section.
- 1.2 Related Work** .1 Refer to every technical section for waste management and disposal.
- 1.3 Definitions** .1 Waste Audit (WA): relates to projected waste generation. Involves controlled separation of waste.
 .2 Waste Reduction Workplan (WRW): a written report, which addresses opportunities for reduction, re-use or recycling of materials.
 .3 Materials Source Separation Program (MSSP): consists of a series of ongoing activities to separate re-usable and recyclable waste material into material categories from other types of waste at point of generation.

PART 2 - MATERIALS

- 2.1 Materials** .1 Before project start-up, prepare Materials Source Separation Program and provide containers to deposit re-usable and/or recyclable materials of the following:
 .1 Gypsum board
 .2 Metals
 .3 Wood
 .4 Roofing Material
 .5 Plastics
 .6 Other materials as indicated in technical sections

PART 3 - EXECUTION

- 3.1 Materials Source Separation** .1 Implement Materials Source Separation Program for waste generated on project in compliance with approved methods and as approved by Consultant.
 .2 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
 .3 Locate separated materials in areas that minimize material damage.
- 3.2 Diversion of Materials** .1 Create a list of materials to be separate from the general waste stream and stockpiled in separate containers, to the approval of the Consultant and consistent with applicable fire regulations.
 .2 Clearly indicate materials in each container.
 .3 Provide instructions on disposal practices.
- 3.3 Storage, Handling and Application** .1 Do work in compliance with Waste Reduction Workplan.
 .2 Handle waste materials not re-used, salvaged, or recycled in accordance with appropriate regulations and codes.

- .3 Materials in separated condition: collect, handle, store on site, and transport off-site to an approved and authorized recycling facility.
- .4 Materials must be immediately separated into required categories for re-use or recycling.
- .5 Provide Consultant with receipts indicating quantity and type of material sent for recycling.
- .6 Provide Consultant with receipts indicating quantity of material delivered to landfill.
- .7 Unless specified otherwise, materials for removal become the Contractor's property.
- .8 On-site sale of salvaged/recyclable material is not permitted.

END of SECTION

ART 1 - GENERAL

- 1.1 General** .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
- 1.2 Related Requirements Specified Elsewhere** .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Consultant are specified under various Sections.
- 1.3 Appointment and Payment** .1 The Consultant will appoint and pay for services of testing except for the following:
- .1 Inspection and testing required by laws, ordinances, rules, regulations, or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor under the supervision of Consultant.
- .2 Where tests or inspections by designated testing laboratory reveal work not in accordance with Contract requirements, Contractor shall pay costs for additional tests or inspections as Consultant may require to verify acceptability of corrected work.
- 1.4 Contractor's Responsibilities** .1 Furnish labour and facilities to:
- .1 Provide access to work to be inspected and tested.
 - .2 Facilitate inspections and tests.
 - .3 Make good work disturbed by inspection and test.
 - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .2 Notify Consultant sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .3 Where materials are specified to be tested deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Consultant.

END OF SECTION

PART 1 - GENERAL

- 1.1 **General** .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
- 1.2 **Access**
 - .1 Provide and maintain adequate access to project site.
 - .2 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.
- 1.3 **Engineer's Site Office** .1 Not Required.
- 1.4 **Storage Sheds** .1 Provide adequate weather tight sheds with raised floors, for storage of materials, tools, and equipment that are subject to damage by weather.
- 1.5 **Sanitary Facilities**
 - .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
 - .2 Post notices and take such precautions as required by local health authorities. Keep areas and premises in sanitary condition.
- 1.6 **Power** .1 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.
- 1.7 **Water Supply** .1 Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.
- 1.8 **Heating and Ventilating**
 - .1 Maintain minimum temperature of 10°C or higher where specified as soon as finishing work is commenced and maintained until acceptance of structure by Engineer.
 - .2 Maintain ambient temperature and humidity levels as required for comfort of office personnel.
- 1.9 **Temporary fencing** .1 Temporary security fencing shall be provided during construction around the site conforming to insurance policies. Contractor to coordinate with the Owner for temporary fencing locations.
- 1.10 **Security** .1 The Contractor shall be responsible for the security of all sites and materials during the course of the work. The Contractor shall provide adequate barricades and lighting around and adjacent to any open excavation or other potentially dangerous location and of other locations specifically designated by the Owner.

END OF SECTION

PART 1 - GENERAL

- 1.1 General**
- .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
 - .2 The Environmental Assessment for this project is attached to the Contract Documents. The mitigative measures identified shall be completed by the Contractor.
- 1.2 Fires**
- .1 Fires and burning of rubbish on site permitted only when approved by the Environmental Monitor.
 - .2 If applicable, permits for burning must be obtained from the Province and implemented.
 - .3 Where fires or burning permitted, prevent staining or smoke damage to structure or materials or vegetation which is to be preserved. Restore, clean and return to new condition stained or damaged work.
 - .4 Where burning is permitted, fires shall be no closer than 100 m from any building.
 - .5 Provide supervision, attendance and fire protection measures, including fire fighting equipment and water truck, as required by permit.
- 1.4 Hazardous Materials Handling and Storage**
- .1 Hazardous materials including, but not limited to, fuels, bitumens, cement, paints, solvents, cleaners, dust suppressants, used fuel and oil filters, and other construction materials shall be stored and handled to minimise loss and to allow containment and recovery in the event of a spill.
 - .2 The Contractor shall designate area(s) for the transfer and temporary storage of hazardous materials and wastes. The designated area(s) shall be used by the Contractor as a transfer and temporary storage area for potentially hazardous materials and wastes. The area(s) shall be clearly labelled and appropriately controlled.
 - .3 The Contractor shall maintain proper Workplace Hazardous Material Information Systems (WHMIS) labels and Material Safety Data Sheets (MSDS) for all hazardous materials used and stored on site.
 - .4 Discharge of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers is prohibited.
 - .5 Discharge of water containing chlorine or other chemical compounds into waterways is prohibited.
- 1.5 Special and General Waste, Rubbish and Garbage**
- .1 Special Waste generated in the course of the construction activities shall be handled and disposed of in compliance with the British Columbia Special Waste Regulation. As defined by these regulations, Special Wastes include, but are not limited

to, such things as waste asbestos, oils, greases, lubricants, solvents, batteries, polychlorinated biphenyls (PCBs), paints and used spill cleanup materials.

- .2 When handling, storing, and removing Special Wastes, the Contractor shall maintain the following records: Inventories of types and quantities of Special Wastes generated, stored, or removed; manifests identifying Special Waste haulers and disposal destinations; MSDS and disposal certification documents.
- .3 Non-hazardous solid wastes, such as but not limited to, waste wood, asphalt, concrete, and metals shall be disposed of at an approved and licensed disposal facility in compliance with the British Columbia Waste Management Act.
- .4 The Contractor shall establish regular clean up and disposal programs so as to prevent the unnecessary accumulation of excessive solid waste and contain all garbage related to the project.

1.6 Drainage

- .1 The Contractor shall provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Pumping of water containing silt in suspension into ditches, watercourses, and sewer and storm water systems is prohibited.
- .3 The contractor shall control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Federal, Provincial and Municipal requirements.

1.7 Site Clearing and Plant Protection

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 Minimize stripping of topsoil and vegetation.
- .3 Contractor shall provide protective fencing at limits of clearing and maintain it through the construction process.
- .4 For the protection of the aquatic habitat provide Leave Strip to the limits shown on the drawings. Do not clear, grub, or alter grades in the proposed leave area. Feather and round grades immediately outside the leave area to meet existing adjacent grade.
- .5 Restrict tree removal to those areas designated by Engineer.
- .6 Revegetation within and adjacent to Leave Areas should be with native species appropriate to the site.

1.8 Equipment Operation

- .1 The Contractor shall maintain construction equipment in good condition and free of excess oil and grease.
- .2 Maintenance of equipment shall be confined to specific areas such that spills can be contained and collected before contaminants reach ditches, watercourses, and storm water systems.

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- .3 There shall be no discharge of wash water to ditches, watercourses or storm water systems from trucks and equipment related to concrete supply, pumping, or placing equipment.
 - .4 Waste oils and other materials related to equipment shall be removed from the site upon completion of project.
 - .5 Equipment operation shall be limited to hours acceptable to the community.
 - .6 Contractor shall have fuel absorbents on site and shall deal with any spills which should occur immediately.
- 1.9 Work Adjacent to Drainage Courses and Waterways**
- .1 The Contractor must develop and implement an Erosion and Sediment Control Plan and have this plan reviewed by the Engineer prior to site preparation and construction of works involving excavation and fill placement. These facilities must be maintained by the Contractor and be working effectively to control discharges from the site.
 - .2 Construction and excavation wastes, overburden, soil, or other substances deleterious to aquatic life must be disposed of or placed in such a manner so as to prevent their entry into any ditch, watercourse, or storm water system.
 - .3 All excavated material is to be side-cast as far as possible from ditches, trenches, or storm water systems to prevent its re-entry into the watercourse. Spoil must be removed offsite or spread out, levelled and seeded to promote re-vegetation and reduce surface erosion.
 - .4 Operation of construction equipment in waterways without Engineer's approval and approval of Fisheries authorities is prohibited.
- 1.10 Revegetation and Site Restoration**
- .1 Disturbed areas adjacent to ditches, watercourses and storm water systems shall be re-seeded to prevent surface erosion and/or downstream water quality impacts.
 - .2 Ditches and newly constructed diversion channels shall be seeded and planted with grasses and/or native vegetation, to reduce surface erosion.
- 1.11 Spill Prevention and Emergency Response**
- .1 The Contractor shall develop a Spill Prevention and Emergency Response Plan and distribute it to the Consultant and Owners of the project prior to commencing any work.
 - .2 The Contractor shall complete a daily visual inspection of all hazardous material and equipment for signs of leakage. Daily visual inspection will include, among other things ensuring that all personal protective equipment and other emergency response equipment is in its place.
 - .3 The Contractor shall maintain a readily available supply of spill emergency response material and equipment on site at all

times in effective working condition appropriate to the scale of the project.

- .4 The Contractor shall deal with any spills which occur immediately.
- .5 The Contractor shall report any environmental incident or spill/release of a substance to the Engineer and to the Provincial Emergency Program of the Ministry of Attorney General in accordance with the Spill Reporting Regulations of the Waste Management Act.

END OF SECTION

- 1.0 General**
- .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
 - .2 Use new material and equipment unless otherwise specified.
 - .3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.
 - .4 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.
- 2.0 Manufacturers' Instructions**
- .1 Unless otherwise specified, comply with manufacturers' latest printed instructions for materials and installation methods.
 - .2 Notify Consultant in writing of any conflict between these Specifications and manufacturers' instructions. Consultant will designate which document is to be followed.
- 3.0 Delivery and Storage**
- .1 Deliver, store, and maintain package material and equipment with manufacturers' seals and labels intact.
 - .2 Prevent damage, adulteration and soiling of material and equipment during delivery, handling and storage. Immediately remove rejected material and equipment from site.
 - .3 Store material and equipment in accordance with supplier's instructions.
 - .4 Touch-up damaged factory-finished surfaces to Consultant's satisfaction. Use primer or enamel to match original. Do not paint over nameplates.
- 4.0 Contractor's Options for Selection of Products for Tendering**
- .1 When a material or equipment is specified by Prescriptive or Performance specifications, select any product that meets or exceeds the specification.
 - .2 When a product is specified by Reference standard, select any product that meets or exceeds the reference standard.
 - .3 When a product is referenced under 'Acceptable Products', select any 1 of the indicated manufacturers, or any other manufacturer meeting or exceeding the prescriptive specification.
- 5.0 Substitution**
- .1 Proposals for substitution may be submitted only after award of Contract. Such requests must include statements of respective costs of items originally specified and proposed substitutions.
 - .2 Proposals will be considered by Consultant if:
 - .1 Products selected by Tenderer from those specified are not available; or
 - .2 Delivery date of products selected from those specified would unduly delay completion of Contract; or
 - .3 Alternative products to those specified, which are brought to attention of, and considered by Consultant as

equivalent to those specified and will result in credit of Contract amount.

- .3 Should proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on project. Pay for drawing changes required as result of substitution.
- .4 All credits arising from approval of substitutions will be credited to Contract in such amounts as may be determined by Consultant and Contract price will be adjusted accordingly. No substitutions will be permitted without prior written approval of Consultant.

END of SECTION

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- 1.0 Construction Safety Measures**
- .1 Observe and enforce construction safety measures required by Canadian Construction Safety Code, Provincial Government, Workmen's Compensation Board, Workplace Hazardous Materials Information System Requirements, including training of all workers on the job site, and municipal status and authorities.
 - .2 In event of conflict between any provisions of above authorities the most stringent provision will apply.
- 2.0 References**
- .1 Canada Labour Code, Canada Occupational Safety and Health Regulations.
 - .2 American National Standards Institute (ANSI):
 - .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
 - .3 Canadian Standards Association (CSA):
 - .1 CSA S269.1-1975 (R1998), Falsework for Construction Purposes.
 - .2 CSA S269.2-M87 (R1998), Access Scaffolding for Construction Purposes.
 - .4 Fire Commissioner of Canada (FCC):
 - .1 FCC No. 301-1982, Standard for Construction Operations.
 - .2 FCC No. 302-1982, Standard for Welding and Cutting.
 - .5 British Columbia Building Code, current edition:
 - .1 Part 8, Safety Measures at Construction and Demolition Sites.
 - .6 Province of British Columbia:
 - .1 Workers Compensation Act (Occupational Health & Safety), Amendment Act, B.C. Reg. 185/99, herein referred to as the Workers Compensation Act (WCA).
- 3.0 Related Sections**
- .1 Refer to the following sections as required:
 - .1 Submittals procedures: Section 01330
- 4.0 Workers' Compensation Board Coverage**
- .1 Comply fully with the Worker's Compensation Act, Regulations and orders made pursuant thereto, and any amendments up to the completion of the work.
 - .2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.
- 5.0 Compliance with Regulations**
- .1 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

- 6.0 Submittals**
- .1 Perform submittals in accordance with Section 01330.
 - .2 Submit the following:
 - .1 Health and Safety Plan.
 - .2 Copies of reports or directions by federal and provincial health and safety inspectors.
 - .3 Copies of incident and accident reports.
 - .4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials information System (WHMIS) requirements.
 - .5 Emergency procedures.
 - .3 The Consultant will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 10 days after receipt of the plan. Revise the plan as appropriate and resubmit to Consultant for review upon request.
 - .4 Submission of the Health and Safety Plan, and any revised version, to the Consultant are for information and reference purposes only. It shall not:
 - .1 Be construed to imply approval by the Consultant.
 - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
 - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.
- 7.0 Responsibility**
- .1 Be responsible for:
 - .1 The safety of persons and property on site; and
 - .2 The protection of persons off site, and the environment to the extent that they may be affected by the conduct of the work.
- 8.0 Regulatory Requirements**
- .1 Comply with specified codes, acts, bylaws, standards, and regulations to ensure safe operations at site.
 - .2 In event of conflict between any provisions of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Consultant will advise on the course of action to be followed.
- 9.0 Filing of Notice**
- .1 The Prime Contractor is to complete and submit a Notice of Project as required by provincial authorities.
- 10.0 Health and Safety Plan**
- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.

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- .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 General safety rules for project.
 - .5 Job-specific safe work, procedures.
 - .6 Inspection policy and procedures.
 - .7 Incident reporting and investigation policy and procedures.
 - .8 Occupational Health and Safety Committee/Representative procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and record keeping procedures.
 - .3 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
 - .4 List hazardous materials to be brought on site as required by work.
 - .1 Indicate Consultation and administrative control measures to be implemented at the site for managing identified risks and hazards.
 - .2 Identify personal protective equipment (PPE) to be used by workers.
 - .3 Identify personnel and alternates responsible for site safety and health.
 - .4 Identify personnel training requirements and training plan, including site orientation for new workers.
 - .5 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of sub-contractors are included in the hazard assessment and are reflected in the plan.
 - .6 Revise and update Health and Safety Plan as required, and resubmit to the Consultant.
- 11.0 Emergency Procedures**
- .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. name/telephone numbers) of:
 - .1 Designated personnel from own company.
 - .2 Regulatory agencies applicable to work and as per legislated regulations.
 - .3 Local emergency resources.
 - .2 Include the following provisions in the emergency procedures:
 - .1 Notify workers and the first aid attendant, of the nature and location of the emergency.
 - .2 Evacuate all workers safely.
 - .3 Check and confirm the safe evacuation of all workers.

- .4 Notify the fire department or other emergency responders.
 - .5 Notify adjacent workplaces or buildings which may be affected if the risk extends beyond the workplace.
 - .6 Notify Consultant.
 - .3 Revise and update emergency procedures as required, and resubmit to the Consultant.
 - .4 Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.
- 12.0 Monitoring**
 - .1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Consultant.
- 13.0 Hazardous Products**
 - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labeling and provision of Material Safety Data Sheets (MSDS) acceptable to the Consultant and in accordance with the Canada Labour Code.
 - .2 Where use of hazardous and toxic products cannot be avoided:
 - .1 Advise Consultant beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as indicated.
 - .2 Provide adequate means of ventilation in accordance with Section 01500.
- 14.0 Electrical Safety Requirements**
 - .1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.
 - .1 Before undertaking any work, co-ordinate required energizing and de-energizing of new and existing circuits with the Consultant.
 - .2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.
- 15.0 Electrical Lock-Out**
 - .1 Develop, implement and enforce use of established procedures to provide electrical lock-out and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.
 - .2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have the procedures available for review upon request by the Consultant.

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- .3 Keep the documents and lockout tags at the site and list in a logbook for the full duration of the Contract. Upon request, make such data available for viewing by Consultant or by any authorized safety representative.
- 16.0 Overloading** .1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.
- 17.0 Falsework** .1 Design and construct falsework in accordance with CSA S269.1.
- 18.0 Scaffolding** .1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CAN/CSA S269.2.
- 19.0 Powder-Actuated Devices** .1 The floor slabs are reinforced concrete. Use powder-actuated devices to core new holes in accordance with ANSI A10.3 only after receipt of written permission from the Consultant.
- 20.0 Fire Safety and Hot Work** .1 Obtain Consultant's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- 21.0 Fire Safety Requirements**
- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
- 22.0 Fire Protection and Alarm Systems**
- .1 Fire protection and alarm systems shall not be:
- .1 Obstructed.
- .2 Shut off.
- .3 Left inactive at the end of a working day or shift.
- .2 Do not use fire hydrants, standpipes and hose systems for purposes other than fire fighting.
- .3 Be responsible/liable for costs incurred from the fire department and the building owner (and tenants), resulting from false alarms.
- 23.0 Unforeseen Hazards** .1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Consultant verbally and in writing.

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- 24.0 Posted Documents**
- .1 Post legible versions of the following documents on site:
 - .1 Health and Safety Plan.
 - .2 Sequence of work.
 - .3 Emergency procedures.
 - .4 Site drawing showing project layout, locations of the first aid station, evacuation route and marshalling station, and the emergency transportation provisions.
 - .5 Notice of Project.
 - .6 Floor plan(s).
 - .7 Notice as to where a copy of the Worker's Compensation Act and Regulations are available on the work site for review by employees and workers.
 - .8 Workplace Hazardous Materials Information System (WHMIS) documents.
 - .9 Material Safety Data Sheets (MSDS).
 - .10 Names of Joint Health and Safety Committee members, or Health and Safety Representatives, as applicable.
 - .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupiers areas.
- 25.0 Correction of Non-Compliance**
- .1 Immediately address health and safety non-compliance issues identified by the Consultant.
 - .2 Provide Consultant with written report of action taken to correct non-compliance with health and safety issues identified.
 - .3 The Consultant may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The Prime Contractor/sub-contractors will be responsible for any costs arising from such a "stop work order".

END of SECTION

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- 1.0 Requirements Included**
- .1 Final Cleaning
 - .2 Systems demonstration
 - .3 Document submission
 - .4 Project commissioning
 - .5 Inspection and takeover procedure
- 2.0 Related Requirements**
- .1 Submittals
 - .2 General Conditions of the Contract: Fiscal provisions, legal submittals, and other administrative requirements.
- 3.0 Final Cleaning**
- .1 Refer to GC 3.14
 - .2 When the work is Substantially Completed, remove surplus products, tools construction and equipment not required for the performance of the remaining work.
 - .3 Remove waste products and debris and leave the work clean and suitable for occupancy by Owner.
 - .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
 - .5 Leave the work broom clean before the inspection process commences.
 - .6 Clean and polish glass, mirrors, hardware, wall tile, chrome, baked enamel, plastic laminate, mechanical, plumbing and electrical fixtures. Replace broken, scratched or disfigured glass.
 - .7 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors, ceilings, fixtures and equipment.
 - .8 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
 - .9 Wax, seal, shampoo or prepare floors finishes, as recommended by the manufacturer.
 - .10 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
 - .11 Broom clean and wash exterior walks, steps and surfaces.
 - .12 Remove dirt and other disfigurations from exterior surfaces.
 - .13 Clean, sweep roofs and clean around roof drains. Clean gutters, downspouts and drainage systems.
 - .14 Sweep and wash clean site paved areas.
 - .15 Clean equipment and plumbing fixtures to a sanitary condition. Clean or replace filters of mechanical equipment.
- 4.0 Systems Demonstration**
- .1 Prior to final inspection, demonstrate operation of each system to the Owner's Representative. Provide Owner with video recording of the demonstration.
 - .2 Instruct personnel in operation, adjustment and maintenance of equipment and systems, using provided operation and maintenance data as the basis for instruction.

5.0 Project Commissioning

- .1 Expedite and complete deficiencies and defects identified by the Consultant.
- .2 Review maintenance and manual contents, operating, maintenance instructions, record drawings, spare parts, materials for completeness.
- .3 Submit required documentation such as statutory declarations, Worker's Compensation certificates, warranties, and certificates of approval or acceptance from regulating bodies.
- .4 Attend end-of-work testing and break-in or start-up demonstration.
- .5 Review inspection and testing reports to verify conformance to the intent of the documents and that changes, repairs or replacements have been completed.
- .6 Meet with other Consultants (mechanical and electrical), to coordinate completion, testing approvals if and when required by Consultant.
- .7 Review condition of equipment heating system which may have been used in the course of the work to ensure turning over at completion in "as new condition" with warranties, dated and certified from time of Substantial Completion of the Work.
- .8 Arrange of coordinate instruction of Owner's staff in care, maintenance and operation of building systems and finishes by Suppliers or Subcontractors.
- .9 When partial occupancy of uncompleted project is required by the Owner, coordinate Owner's uses, requirements and access with Contractor's requirements to complete project.
- .10 Coordinate Owner's moving in of furnishings and equipment with building accessibility, traffic and Contractor's and Subcontractor's cleaning-up and completion activities all to suite Owner's work schedule.
- .11 Provide on-going review, inspection and attendance to building callback, maintenance and repair problems during the warranty period.

6.0 Substantial Performance

- .1 Submit written notice to the Consultant indicating when project is Substantially Complete. Attach a list major items to be completed or corrected, and state the time required to perform the Work and the proposed completion date.
- .2 Allow for the consultant and together with the Owner's Inspector and Contractor to make an Inspection with seven (7) days after receipt of Contractor's Notice of Substantial Performance.
- .3 Before Substantial Performance is declared, the Consultant will prepare and submit to the Contractor a deficiency list of items to be completed or corrected, and the time in which the Contractor shall be required to complete or correct the Work listed. As determined by the review the Consultant will also

submit recommendation for deficiency holdback amount consideration and date schedule submission by Contractor for same, refer to General Condition GC5.

- .4 After Substantial Performance is declared, the Consultant will prepare and issue a Certificate of Substantial Performance stating the date of Substantial Performance and a list of items to be completed or corrected.
- .5 The Contractor shall complete Work listed for completion or correction within the agreed to designated time schedule.
- .6 The Consultant will immediately notify the Contractor, in writing, of Work not substantially performed, stating his reasons.
- .7 The Contractor shall complete the Work and send second written notice to the Consultant, advising that the Work is substantially completed.
- .8 The Consultant will re-review the Work for a second time.
- .9 Additional reviews of the Work required by the Consultant will be at the expense of the Contractor.

7.0 Final Submittals

- .1 Provide project closeout submittals as specified in Section 01300 – submittals as directed by the Consultant form supplied list within forty-five (45) days of the date of Substantial Completion.

8.0 Final Review

- .1 Submit written notice to the Consultant indicating:
 - .1 Contract Documents have been reviewed.
 - .2 Work has been inspected for compliance with the Contract Documents.
 - .3 Work has been completed in accordance with the Contract Documents.
 - .4 Work is completed and ready for final inspection.
- .2 Allow for the Consultant to make final inspection with seven (7) days after the receipt of the notice, after which time he will advise the date on which the inspection will be made and designate those parties required to participate.
- .3 During the inspection a list of all items not in accordance with Drawings and Specifications will be compiled by the Consultant and supplied to the Contractor for distribution.
- .4 The Contractor shall then proceed to correct the deficiencies and complete the work in a satisfactory manner.
- .5 When the contractor is satisfied that all deficiencies have been corrected, he shall formally request a takeover inspection by the Consultant.
- .6 After it has been agreed that the work is acceptable, the Owner will take possession.

9.0 Follow-up Review – Completion

- .1 Advise the Consultant when all deficiencies have been corrected, and formally request for a follow-up inspection.
- .2 Forty-five (45) days after Substantial Performance has been declared, all deficiencies and outstanding work, all warranties and contract closeout documentation requested under the terms of the contract shall be completed by the General Contractor and Subcontractors. Failure to adhere to these conditions will result in the Owner retaining sufficient funds from the final payment at the time of substantial completion and engaging another Contractor to complete the outstanding items.
- .3 Obtain a declaration of Completion upon completion of all deficiencies and required corrective Work from the Consultant. Formally request specified follow-up re-inspection until Completion has been declared.

10.0 Certificate of Completion

- .1 The Consultant considers that Completion of Work is achieved, when the following items are effected:
 - .1 Physical completion of building and all related work.
 - .2 Occupancy permit has been obtained.
 - .3 Submission of all warranties specified.
 - .4 Submission of Record Drawings.
 - .5 Maintenance manuals and materials are delivered and received by the Owner.

11.0 Final Accounting

- .1 Submit final statement of accounts to the Consultant reflecting all adjustments and the following:
 - .2 Original Contract Sum.
 - .3 Additions and deductions resulting from:
 - .1 Change Orders
 - .2 Unit Prices
 - .3 Other adjustments
 - .4 Deductions from uncorrected
 - .5 Reconciliation of all cash allowance items
 - .4 Total Contract Sum as adjusted
 - .5 Previous payments
- .6 Sum remaining due. Final payment shall only be made by the Owner after all deficiencies have been corrected and all submittals specified have been delivered to the Owners.

END of SECTION

- 1.0 General**
- .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
- 2.0 Record Drawings**
- .1 Contractor to provide to Consultant two (2) sets of full sized "as built" drawings, and a digital copy (on cd) of the "as built" drawings, specifications, and all approved shop drawings.
- .2 Maintain project record drawings and record accurately significant deviations, including out of sight deviations, from Contract Documents caused by site conditions and changes ordered by Consultant.
- .3 Mark record changes in red.
- .4 Record following information:
- .1 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
- .2 Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
- .3 Field changes of dimension and detail.
- .4 Changes made by Change Order or Field Order.
- .5 At completion of project and prior to final inspection, neatly transfer record notations to second set and submit both sets to Consultant.

END of SECTION

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- 1.0 General** .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
- 2.0 Maintenance Manual** .1 On completion of project, submit to Consultant four (4) copies of Operations Data + Maintenance Manual in English and 1 digital copy (on CD):
- .1 Bind data in vinyl hard covered, 3-ring loose leaf binder for 215 x 280 mm size paper.
 - .2 Title sheet labeled "Operation Data and Maintenance Manual", project name, date, and list of contents.
 - .3 Organize contents into applicable Sections of work to parallel project specification break-down. Mark each Section by labeled tabs protected with celluloid covers fastened to hard paper dividing sheets.
- .2 Include following information plus data specified.
- .1 Maintenance instruction for finished surface + materials.
 - .2 Description, operation and maintenance instructions for equipment and systems, including complete list of equipment and parts list. Indicate nameplate information such as make, size, capacity, and serial number.
 - .3 Names, addresses and phone numbers of sub-contractors and suppliers.
 - .4 Guarantees, warranties and bonds showing:
 - .1 Name and address of projects.
 - .2 Guarantee commencement date of Final Certificate of Completion.
 - .3 Duration of guarantee.
 - .4 Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.
 - .5 Signature and seal of Contractor.
 - .6 Additional material used in project listed under various Sections showing name of manufacturer and source of supply.
- .3 Neatly type lists and notes. Use clear Drawings, diagrams or manufacturers' literature.
- .4 Include one complete set of final shop Drawings bound separately indicating corrections and changes made during fabrication and installation.
- 3.0 Maintenance Materials** .1 Where supply of maintenance materials is specified, deliver to Owner as follows:
- .1 Materials in unbroken cartons, or if not supplied in cartons, they shall be strongly packaged.
 - .2 Clearly mark as to content.
 - .3 If applicable give colour, room number or area where material used.

END OF SECTION

PART 1 - GENERAL

- 1.1 General** .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
- 1.2 Reference Standards** .1 See Structural Notes.
- 1.3 Testing** .1 Testing of structural steel, welding, and bolting shall be performed at Engineer's request at the Contractor's expense.
 .2 Testing of structural steel shall take into account both mechanical properties and chemical composition and shall meet type and grade as specified on drawings and shall be performed in accordance with reference standards.
 .3 Performed by a testing agency approved by Engineer.
- 1.4 Field Review** .1 Contractor shall give Engineer 72 hours notice for field review of structural steel prior to covering up.
 .2 Inspection of structural steel fabrication, welding, and bolting shall be performed at Engineer's request.
 .3 Welding inspection shall be performed by an inspection agency approved by Engineer and certified under CSA-W178.1 and CSA-W178.2.
- 1.5 Shop and Erection Drawings** .1 See Structural Notes.
- 1.6 Structural Member Design** .1 All structural steel member connections shall be designed by a Professional Engineer (B.C. Registered) retained by the Structural Steel Supplier.

PART 2 - PRODUCTS

- 2.1 Materials** .1 See Structural Notes and drawings for details.
 .2 All steel shall be new unless otherwise indicated and of sizes and shapes listed in current C.I.S.C. handbook and as indicated on the drawings.
- 2.2 Finishes** .1 Shop paint: CISC/CPMA 1-73b.
 .2 Shop primer: CISC/CPMA 2-75.
 .3 Exterior metal work to be hot dip galvanized to CSA G164, 21 oz/3.2 s.f.
 .4 Exterior metal work to receive one shop coat of paint after galvanized. Colour to be confirmed by Consultant.

PART 3 - EXECUTION

- 3.1 Examination** .1 Verify location of all site concrete bases, anchor bolts and embedded steel items and ensure that work prepared by other trades is at proper elevation, level and true. Advise Consultant in writing of all discrepancies prior to commencement of work. Where possible, verification shall be completed prior to steel

- fabrication so that changes, if required and approved by Consultant, may be made to fit site conditions.
- 3.2 Storage and Handling**
- .1 Contractor shall protect all steelwork during fabrication, shipping, storage and construction. All bends and damages shall be reported to Consultant for review. Contractor shall, at no cost to the owner, replace steel work which is bent, broken or otherwise damaged.
 - .2 Contractor shall schedule delivery and erection of in accordance with the construction schedule.
- 3.3 Co-ordination**
- .1 Supply all necessary instructions, drawings and structural steel items to other trades for setting bearing plates, anchor bolts, and other members that are required by other trades. Supply necessary materials to meet construction schedule.
- 3.4 Fabrication**
- .1 All fabricated units shall be in accordance with Consultant's reviewed shop drawings.
 - .2 All hollows structural sections shall be closed airtight with end plates sealed with welds.
 - .3 All steel shall be thoroughly cleaned of all loose mill scale, loose rust, oil or dirt.
 - .4 All plates and shapes shall be inspected visually for laminations. Replace plates or shapes that contain lamination without cost to the Owner.
- 3.5 Cleaning and Painting**
- .1 Surfaces of structural steel encased in concrete, requiring weld connection, and utilized in slip-critical connection shall not be painted or primed; all other steel surface shall have one coat of shop primer or paint as required by manufacturer's standard.
 - .2 Cleaning of surfaces before priming or painting shall be in accordance with S.S. P. C. SP-3.
 - .3 After erection and connections are complete, provide a field touch-up coat of paint to all surfaces that have been scraped or chipped. Surfaces receiving a finish coat shall be prepared and maintained in a condition acceptable to the finish painting contractor.
- 3.6 Erection**
- .1 Supervise setting of bases, anchor bolts, etc. Cutting at base plates to accommodate anchor bolts shall be cause for rejection of base plates.
 - .2 Contractor shall install all temporary bracing that is required to stabilize the work against construction and erection loads.
 - .3 As erection progresses, the work shall be securely bolted to take care of all dead loads and erection stresses. Any failure to make proper and adequate provisions for stresses during erection shall be entirely at sole risk and responsibility of Contractor.

- .4 Structural steel erector shall be responsible for the design of all hooks, erection, connections and handling gear.
- .5 Wherever piles of materials, erection equipment or other loads are carried during erection, proper provision shall be made to take care of stresses resulting from same.
- .6 All structural steel shall be assembled and erected in accordance with the approved erection drawings and specified reference standards.
- .7 Structural steel work shall be carefully located at the proper grade and rigidly secured in place, using steel shims. All spaces under the steel shall then be filled with non-shrink pre-mix grout.
- .8 Plumb, level and align individual members of steel work to reference standard tolerances.

3.7 Welding

- .1 Submit welding procedures prepared and sealed by a Professional Engineer (BC registered) to the Engineer for his examination and comments. Welding procedures shall be Canadian Welding Bureau approved.
- .2 Welding consumables for all processes shall be fully approved by Canadian Welding Bureau and certified by the manufacturers as complying with the requirements of this specification. Such certificates shall be not more than two years old.

3.8 Protection and Clean-up

- .1 Protect the work of other sections from damage resulting from the work of this section.
- .2 As the work proceeds and on completion, remove from the premises all surplus materials and debris resulting from the work of this section.

END OF SECTION

PART 1 – GENERAL

- 1.1 General**
- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.
 - .2 All work and materials shall meet requirements of Canadian Standards Association, American Society for Testing and Material, General Conditions, Supplementary General Conditions and specific requirements outlined in following sub-sections.
- 1.2 Shop Drawings**
- .1 Submit shop drawings to requirements of Section 01330 prior to commencement of fabrication.
 - .2 Indicate sizes, details and material specifications.
 - .3 Submit samples of metal finishes and fabrication to the Consultant for approval.
 - .4 See also Structural Notes.
- 1.3 Quality Assurance**
- .1 All work of this section shall be performed by a contractor experienced in the fabrication and working of metals, including cutting, bending, forming and finishing, using personnel with a minimum of two (2) years proven experience.
 - .2 Workmanship for exposed work to be of the highest quality for exposed architectural metalwork.
- 1.4 Product Delivery, Storage and Handling**
- .1 Exercise care in storing, handling and erecting all material and support properly at all times so that no piece will be bent, twisted or otherwise damaged structurally or visually.
 - .2 Correct damaged material, if deemed irreparable by the Consultant, replace affected item at no additional expense to the Owner.
 - .3 Fabricate large assemblies so they can be safely and easily handled to their place of installation.
 - .4 Store assemblies above ground.

PART 2 – PRODUCTS

- 2.1 Materials**
- .1 All materials shall be as specified on drawings.
 - .2 Metals shall be new and free from defects which may impair their strength, durability or appearance, and shall be alloys of the best commercial quality suitable for the intended use.
 - .3 Metals shall be free of excessive rust, mill scale and discoloration.

- 2.2 Fabrication**
- .1 Work to be carried out by fabricators qualified under C.S.A. requirements.
 - .2 Fabricate to size and shape required with sharp lines, smooth surfaces and neat joints.
 - .3 Connections to be securely welded, bolted or riveted.
 - .4 Fully seal weld exposed exterior work continuously to provide proper weathering. Joints exposed to weather to be watertight (spot welding not acceptable). Grind smooth welds where exposed to view.
 - .5 Fabricate curved work to smooth, uniform constant radii as detailed.

- 2.3 Finish**
- .1 Exterior metal work to be hot dip galvanized to CSA G164, 21 oz/3.2 s.f.
 - .2 Exterior metal work to receive one shop coat of paint after galvanized. Colour to be confirmed by Consultant.

PART 3 – EXECUTION

- 3.1 Installation**
- .1 Inspect the work of other sections upon which the work of this section depends. Proceed only after deficiencies, if any, in the work of other sections has been corrected.
 - .2 Install all work according to CAN3-516.1.
 - .3 Set plumb and true with temporary bracing as required.
 - .4 Install required inserts, anchors, bolts, and screws to secure work.
 - .5 Joints shall be accurately fitted and rigidly secured to hairline contacts.

- 3.2 Protection and Clean-up**
- .1 Protect work of other sections from damage resulting from work of this section.
 - .2 As work proceeds and on completion, remove from premises all surplus materials and debris resulting from work of this section.
 - .3 Protect metal against galvanic corrosion where dissimilar metals touch or a flow of water is from one to the other.
 - .4 Isolate metals from corrosive agents such as fresh concrete or masonry mortar, plaster, stucco and lumber not fully seasoned.

END OF SECTION

PART 1 - GENERAL

- 1.1 General**
- .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
 - .2 Supply all labour, materials and equipment necessary for the fabrication and installation of all guardrails and handrails where shown on drawings, details, and as specified herein.
 - .3 Design and fabricate guardrails and handrails in accordance with current British Columbia Building Code requirements.
 - .4 Submit shop drawings for all fabricated railings in accordance with Section 01340 to the Consultant for review prior to fabrication.
 - .1 Provide detail plans of all different handrail layouts, locations, indicating attachment details to building components and concrete walls.
 - .2 Indicate each type of guardrail, pipe and post sizes, profiles, extrusions, method of assembly and anchoring. Indicate hardware, location and sizes of fasteners and finishes. Confirm all dimensions on site.
 - .3 Shop drawings shall be sealed and signed by a Professional Structural Engineer registered in the Province of BC. Refer to drawings for specific design requirements.
 - .4 Upon completion of installation of Guardrails and Handrails, Contractor to supply Letter(s) of Assurance, signed and sealed by a Professional Structural Engineer, registered in the Province of BC, indicating compliance of all Guardrails and Handrails and their installation with current NBC.
 - .5 Submit Colour Samples (min 150mm x 300mm) for approval by Consultant prior to painting/installation of guards.
- 1.2 Reference Standards**
- .1 British Columbia Building Code, current edition.

PART 2 - PRODUCTS

- 2.1 Materials**
- .1 Handrails: shall be continuously graspable along their entire length and shall have a circular cross-section with an outside diameter as indicated on the drawings.
 - .2 Guardrails, handrails, security screens, and vertical posts and tubes, sizes and profiles as indicated in drawings.
 - .3 Aluminum work to be anodized.
 - .4 Non-aluminum work to receive one shop coat of primer after fabrication and to receive paint finish on site as per Section 09999 of these specifications.

PART 3 - EXECUTION

- 3.1 Fabrication**
- .1 Fabricate Guardrails, Handrails, Security Screens, and infill panels in accordance with details and reviewed shop drawings; square, true, straight, and accurate to required size, mitre all tube rail corners and reinforce with concealed attachments.
- 3.2 Installation**
- .1 Install closure pieces into ends of tube Handrails.
 - .2 Where possible, work to be fitted and shop assembled, ready for site erection.
 - .3 Exposed welds to be continuous for length of each joint. File or grind exposed welds smooth and flush.
 - .4 Overlapping sleeves used to fasten separate tube handrails sections together will be rejected.
 - .5 Install Guardrails and Handrails plumb, level, straight and true, accurately fitted with tight joints and intersections.
 - .6 Securely fasten railing posts to structure, countersink all screw heads and touch up paint to match railing finish. Visible pop rivets will be rejected.
 - .7 Install glazing infill panels with continuous resilient gaskets in channels as detailed.
 - .8 Upon completed installation, touch up all abrasions and clean all glass panels.

END OF SECTION

PART 1 - GENERAL

- 1.1 General**
- .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
 - .2 Contractor to refer to Structural Note Sheet.
- 1.2 Reference Standard**
- .1 Do carpentry work in accordance to CSA-O86 and Part 9 of British Columbia Building Code, latest editions, for residential construction, other associated supplements, and as indicated or required.
 - .2 Provide Douglas Fir Plywood Grades CSA O121-M, CSA O151-M Western Softwood Plywood Grades, and Council of Forest Industries of BC 78-276 and 75-227.
 - .3 Wood preservation shall be in accordance with CSA-O80-M standards.

PART 2 - PRODUCTS

- 2.1 Materials**
- .1 See General Structural Notes in structural drawings.
 - .2 Damp course shall be 20 kg asphalt felts to CSA A123.3. or 6 mm (1/4") x wall thickness.
 - .3 Building Paper shall be as specified under Section 07670.
 - .4 Vapour Barrier shall be as specified under Section 07270.
 - .5 Floor sheathing adhesive shall be PL-400 as manufactured by BF Goodrich, or approved equal.
 - .6 Nails shall be to current NBC and Residential Standards. Galvanized nails shall be used for exterior and exposed area application. Nail size and spacing shall be as shown on Drawings.
 - .7 Protection board shall be Vibreflex type 70 waterproof protection board.
 - .8 Floor underlayment shall be 9 mm (3/8") particle board such as K3 board by MacMillan Bloedel or equivalent.
 - .9 Wall board and underlayment under ceramic tile to be 12 mm (1/2") Wonderboard as supplied by Cerco Industries.
- 2.2 Pressure Treatment**
- .1 Pressure treated wood shall conform to CSA O322-02 Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood.
 - .2 Wood preservative shall conform to CSA O80 series of Wood Preservation Standards.
 - .3 All pressure treating to be a copper-based waterborne preservative either: ACQ-C or ACQ-D (Alkaline Copper Quaternary) or CA-B (Copper azole). CCA (Chromated Copper Arsenate) pressure treating shall not be used.
 - .4 Metals used in contact with ACQ pressure treated wood shall be copper, stainless steel (types 304 or 316), hot dip galvanized conforming to ASTM A153. Carbon steel, aluminum, red brass and bronze shall not be used in contact with ACQ pressure treated wood.

- .5 Fasteners used with ACQ pressure treated wood shall be copper, stainless steel (types 304 or 316) or hot dip galvanized connectors should be manufactured from steel either galvanized in accordance with ASTM A653, G185 designation, or be galvanized after manufacture in accordance with ASTM A123.
- 2.3 Storage & Handling** .1 See General Structural Notes.
- 2.4 Finishes** .1 See Section 09999 Colour and Finish Schedule.
- PART 3 - EXECUTION**
- 3.1 Framing**
- .1 Framing to be cut square, closely fitted and accurately set to all lines and levels, and set plumb.
- .2 Lumber in contact with concrete shall be preservative treated and laid on dampcourse to width of plates.
- .3 Framing members to be framed, anchored, fastened, tied, braced together providing strength and rigidity necessary for use.
- .4 All columns, posts shall be anchored with steel connections to resist uplift and lateral movement.
- .5 Notching, drilling of framing members will not be allowed without approval by the Consultant, except as indicated on the drawings.
- .6 Nails shall be long enough that half their length penetrates second member. Stagger nails in direction of grain, keep nails well in from edges.
- .7 Beams shall have at least 100 mm (4") bearing at end supports.
- .8 Framing under built-up beams shall have studs or cripples for support, equal in number to the built-up beam or as indicated.
- 3.2 Floor Joists**
- .1 Set joists with crown up and reject twisted joists. Provide minimum 50 mm (2") bearing on plates, beams or joist hangers.
- .2 Provide blocking for end supports and bridging as indicated. Framing to openings shall be as noted on the Drawings. Joists to be bridged at intervals of 2.1 m (7') maximum.
- 3.3 Wall Studs**
- .1 Wall studs shall not be spliced unless indicated or approved by Consultant.
- .2 Do not notch or drill through load-bearing studs without prior approval from the engineer.
- .4 Wall framing shall have corners and intersections framed with three studs; other openings to be framed with double studs. Wall plates shall be the same size as studs, unless otherwise indicated, and will include one bottom plate and two top plates, except where wall contains a continuous lintel or wall is non load-bearing. Joints in wall top plates to be staggered at least one stud space. Top plates in load-bearing walls shall not be

- notched, drilled, or reduced in depth to less than 50 mm (2") unless suitably reinforced.
- 3.4 Sheathing**
- .1 Roof and wall sheathing shall be applied to structural members using nails and minimum spacing as shown on drawings.
 - .2 Floor sheathing shall be glued and nailed using continuous glue bead on all joists and ring nails. Install sheathing face grain at right angles to floor joists. Nail plywood using nails with minimum nailing as shown on drawings.
 - .3 Underlayment to be installed at right angles to plywood sub-floor.
- 3.5 Strapping**
- .1 Provide solid strapping at points for fastening other finishes, joints, equipment, and fixtures as required.
 - .2 Finished strapping surfaces to be plumb, level, square, and true, measured with 2100 mm (7') long straight edge, wedge as required. Block edges of all panel surfaces around all projections.
- 3.6 Lintels**
- .1 Lintels to be two or more pieces of 38 mm x 235 mm (2" x 10") lumber separated with spacers to width of studs, and nailed together as one unit. Bear minimum 30 mm (1 1/4") on cripples.
- 3.7 Furring and Blocking**
- .1 Services, piping, ductwork, and other items projecting from finished surfaces shall be furred out as required. Furring to be a minimum of 38 mm x 38 mm (2" x 2") at 400 mm (16") centres.
 - .2 Install furring and blocking as required to space-out and support casework, cabinets, bumper rails, wood doors and frames, coat hook, mirrors, grab bars, washroom accessories, toilet partitions, handrails, chalk and tackboards, facings, wall and ceiling finishes, fascia, soffit, siding and other work as required. Refer to drawings for additional blocking and furring.
 - .3 Align and plumb faces of furring and blocking to tolerance of 1:600.
 - .4 Install rough bucks, nailers and linings to grounds and rough openings as required to provide backing for frames and other work.
- 3.8 Building Paper**
- .1 Cover exterior wall sheathing with specified Building Paper. Refer to Section 07260.
- 3.9 Vapour Barrier**
- .1 Install Vapour Barrier as per Section 07270.
- 3.10 Protection Board**
- .1 Install over waterproofing membranes, butt boards tight and stagger joints.
- 3.11 Cants, Curbs,**

- Nailers Backing** .1 Install wood cants, wood backing, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
- 3.12 Sleepers** .1 Install sleepers as indicated on the drawings.
- 3.13 Fasteners** .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
.2 Countersink bolts where necessary to provide clearance for other work.
- 3.14 Electrical Equipment Backboard** .1 Provide backboards for mounting electrical equipment as indicated. Use 19 mm thick plywood on 19 x 38 mm furring around perimeter and at maximum 300 mm intermediate spacing.
- 3.15 Poly Plate** .1 Install strips of 6 mil Polyethylene Vapour Barrier (see Section 07270) over, under or around all framing members as necessary. Provide minimum 150 mm (6") flap to ensure continuity of final Vapour Barrier installation.

END OF SECTION

PART 1 - GENERAL

- 1.1 General** .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
- 1.2 Reference Standards** .1 Conform to the RCABC Current Standards and to the appropriate CCMC, CSA, CGSB, FM and ASTM Standards for the materials used in the roofing system specified; materials to be listed on RCABC Accepted Materials List (Section 2.2, Roofing Practices Manual).
 .2 Design of cladding system in accordance to the latest edition of CSA-S136 for the design of Cold Formed Steel Structural Members.
- 1.3 Submittals** .1 Submit shop drawings in accordance with Section 01340.
 .1 Indicate arrangement of roofing, including dimensions, location of joints, profiles, types and locations of supports, fasteners, flashing, closures and all metal components related to the cladding installation.
 .2 Submit samples of prefinished metal cladding for review by the consultant, prior to fabrication.
- 1.4 Delivery, Storage and Handling** .1 Deliver and store materials in original containers with manufacturer's labels and seals intact.
 .2 Store cladding products in accordance with manufacturer's recommendations, and protected from elements.
 .3 Store bundles on wood blocks, clear of the ground and slightly tilted to ensure water run off. Do not allow materials to become twisted or distorted during handling operations. Protect cladding materials against discoloration.
 .4 Exercise care in storing, handling and placing the metal cladding to prevent damage likely to impair the adequacy or appearance of the cladding.
- 1.5 Inspection and Warranty** .1 Provide a manufacturer's written warranty covering failure of factory-applied exterior finish within the warranty period of 20 years after date of Substantial Completion.
 .2 Perform using an independent inspection company acceptable to RCABC.
 .3 Inspection costs paid for directly by the Roofing Contractor.
 .4 Provide to the Owner the "Roofing System Record" and "Material Safety Data Sheets" upon completion of this contract.
 .5 Roofing Contractor to provide a ten (10) year RCABC Guarantee.

PART 2 - PRODUCTS**2.1 Materials**

- .1 Standing Seam Metal Roof Cladding:
 - .1 LMC Manufacturing Ltd, profile: Lam Nu-Tech 450 with ribs @ 450 o.c., Thickness: .024" (0.61mm) 24 ga., rib height 1 7/16", Prefinished, Consultant to confirm colour from manufacturer's standard colour range.
 - .2 Tradition 150-4 by Vicwest. Profile: Tradition 150-4 with ribs @ 400o.c., Thickness: .024" (0.61mm) 24 ga., rib height 1 1/2", Prefinished, Consultant to confirm colour from manufacturer's standard colour range.
 - .3 New Tech Machinery Panel Machine: Standing Seam Metal Roof System (Mechanical Lock and Seam Lock) SS100 and SS150 Panels with ribs @ 450 o/c. Thickness: .024" (0.61mm) 24 ga., rib height 1 1/2", Prefinished, Consultant to confirm colour from manufacturer's standard colour range.
 - .4 Or approved alternate.
- .2 Roofing Membranes and Underlayments:
 - .1 Self Adhesive Air/Vapour Barrier under insulation: Lastobond Shield HT by Soprema, or approved alternate.
 - .2 Slip Sheet: InterWrap Titanium UDL – 30, or approved alternate.
 - .3 Store membranes and underlayment in accordance with manufacturer's recommendations; dry and protected from the elements.
 - .4 Prepare roof deck in accordance with manufacturer's requirements
- .3 Roof Insulation:
 - .1 Polyisocyanurate Insulation: Closed cell polyisocyanurate rigid board, both faces finished with glass reinforcing mat, staggered. Minimum R-20, 2 layers of 50mm Sopralso Plus by Soprema, or approval alternate.
- .4 Fasteners with Bearing Plates: 18ga galvanized steel, with exposed fasteners colour matched to cladding. Fasteners and bearing plates to resist wind uplift, drag, and sliding snow forces.
- .5 Flashing, Trim and Closures: Fabricate to profiles indicated on shop drawings, or as required to meet performance requirements. Use pre-formed corner pieces only. Double back exposed edges. Material to match cladding in exposed locations, galvanized material in concealed locations. See also Flashings and Sheet Metal Section 07600.
- .6 Sealants:
 - .1 Concealed: Tape or compound, non-skinning, non-drying, butyl rubber.

- .2 Exposed: (Acrylic co-polymer to CGSB 19GP-5M) (One part silicone to CGSB CAN2-19.13).
- .3 See also Sealants and Caulking Section 07920.
- .7 All components and accessories shall be acceptable to the manufacturer.
- .8 Refer to Materials and Equipment 01600 for procedures and submission requirements for substitutions.
- .9 Fabrication:
 - .1 Fabricate roof components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including fascia and soffit panels and all companion flashing.
 - .1 Fabricate all components of the system in the factory, ready for field installation.
 - .2 Provide roof sheet and all accessories in longest practicable length to minimize field lapping of joints.

PART 3 - EXECUTION

3.1 Preparation

- .1 Ensure substrate is rigid, dry, smooth, compatible, free of fins and sharp edges, and clean of all debris and foreign matter.
- .2 Ensure all openings, walls, projections through the roof are firmly affixed and cant strips, reglets and nailing strips are in place.
- .3 Satisfy the manufacturer's specifications for substrate preparation prior to system's application.

3.2 Installation

- .1 Installation shall be in strict accordance with manufacturer's specifications and details.
- .2 Support clips and bearing plates are to be applied as per manufacturer's standard. Provide all fastenings to completely install cladding system. Note: Fastening methods must be adequate to withstand all wind uplift pressures, drag, and snow forces.
- .3 Install cladding with provisions for expansion and contraction.
- .4 Install exterior prefinished roof panels on panel support clips and bearing plates, using manufacturer's proper construction procedure. Ensure batten is positively locked for full length of roof. Close interlocking side joints by using a purpose-made seaming machine, as supplied by the manufacturer.
- .5 Where indicated on approved shop drawings, secure the end-lap of metal roofing sheets in accordance with the manufacturers specifications and details to provide a weather-tight seal. Exposed fasteners to match colour of the roof sheet.

- .6 Provide notched and formed closures, sealed against weather penetration, at changes in pitch, and at ridges and eaves, where required.
- .7 Install all companion flashing gutters as shown on the shop drawings. Use concealed fasteners when possible. Exposed fasteners to match colour of roof sheet.
- .8 Cut and flash all roof penetrations such as plumbing, vents, B-Vents, exhaust ducts, etc to provide watertight installation.
- .9 Finish appearance to be free of oil canning or distorted appearance.

3.3 Clean-Up

- .1 Remove protective film from panels.
- .2 Clean exposed panel surfaces in accordance with manufacturer's instructions.
- .3 Repair and touch up with colour matching high grade enamel minor surface damage, only where permitted by the Consultant and only where appearance after touch-up is acceptable to Consultant.
- .4 Replace damaged panels and components that, in opinion of the Consultant, cannot be satisfactorily repaired.
- .5 Carefully collect all roofing debris and dispose of in accordance with Section 01355.

END of SECTION

PART 1 - GENERAL**1.1 GENERAL**

- .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
- .2 Employ skilled applicators approved by membrane manufacturer.

1.2 REFERENCE STANDARDS

- .1 Roofing and sheet metal work will be performed in conformance with the roofing manufacturer's written recommendations as well as the requirements of the ULC.
- .2 Submit a document issued by the CSA certifying that the roofing system offered meets the requirements of CAN/ULC-S107-03 "Standard Methods of Fire Tests of Roof Coverings Class C
- .3 CSA A123.4-04, Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
- .4 Prefabricated membrane, complies with CAN/CGSB 37-GP-56M (9th draft)-1985, Membrane Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
- .5 CAN/ULC-S702-97 Thermal Insulation, Mineral Fibre, Boards for Buildings.
- .6 CAN/ULC-S704-2001 Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Fixed.
- .7 All membrane roofing systems installed shall conform to the CSA A123.21-14 Standard test method for the dynamic wind uplift resistance of membrane roofing systems.
- .8 Conform to the latest "Minimum Standards" of the Roofing Contractors Association of British Columbia (RCABC) as published in the "RCABC Roofing Practices Manual" for a ten (10) year guarantee. Conform to the appropriate CCMC, CSA, CGSB, FM and ASTM Standards for the materials used in the roofing system specified; materials to be listed on RCABC Accepted Materials List (Section 2.2, Roofing Practices Manual) Submit a report, issued by a certified materials testing laboratory, attesting that the specified roofing system was tested in accordance with CSA A123.21-14, *Standard test method for the dynamic wind uplift resistance of membrane-roofing systems*.

1.3 COMPATIBILITY

- .1 All waterproofing materials will be provided by the same manufacturer.

1.4 INSPECTION AND GUARANTEE

- .1 Perform using an independent inspection company acceptable to RCABC and Roofing Manufacturer.
- .2 Inspection costs paid for directly by the Roofing Contractor.
- .3 Provide to the Owner the "RCABC Roofing System Record" upon completion of this contract.
- .4 Provide the standard Roofing Contractors Association of British Columbia (RCABC) ten (10) year guarantee.

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- .5 The product manufacturer to issue a written and signed document in the owner's name, certifying that the roofing membranes are free of manufacturing defects for a period of ten (10) years, starting from the date of acceptance. This warranty will cover the removal and replacement of defective roof membrane products, including labour. The warranty must remain a full warranty for the duration of the period specified. No letter amending the manufacturer's standard warranty will be accepted and the warranty certificate must reflect these requirements.
- 1.5 SHOP DRAWINGS**
- .1 Submit shop drawings in conformance with Section 01330 requirements.
- .2 Provide details of flashing, penetration, parapet wall, and around atrium walls.
- .3 Submit drawings locating and identifying sloped insulation blocks.
- 1.6 CONTRACTOR QUALIFICATION**
- .1 Roofing contractors and sub-contractors must, when tendering or performing work, possess a roofing contractor operating license.
- .2 Only qualified, certified installers employed by a company with the appropriate equipment may execute the roofing work.
- .3 Roofing contractors and sub-contractors must also be members of RCABC and provide the architect with a certificate to this effect before beginning any roofing work.
- 1.7 MANUFACTURER'S REPRESENTATIVE**
- .1 The roofing product manufacturer can delegate a representative to visit the work site at the start of roofing installation.
- .2 The contractor must at all times enable and facilitate access to the work site by said representative.
- 1.8 STORAGE AND DELIVERY**
- .1 All materials will be delivered and stored in conformance with the requirements described in the manufacturer's manual; they must remain in their original packaging, displaying the manufacturer's name, product name, weight, and reference standards, as well as all other indications or references considered standard.
- .2 At all times, materials will be adequately protected and stored in a dry and properly ventilated area, away from any welding flame or spark and sheltered from the elements or any harmful substance. Only materials destined for same-day use can be removed from this storage area. In cold weather, these materials should be stored in a heated area at a minimum temperature of +100C and removed prior to application. If rolls

cannot be stored in a heated environment, they may be pre-conditioned before installation. For precise description, please consult manufacturer's "Roofers' Guide" on membrane application procedures.

- .3 Store adhesives and emulsion-based waterproofing mastics at a minimum +50C. Store adhesives and solvent-based mastics at sufficient temperatures to ensure ease of application.
- .4 Materials delivered in rolls will be carefully stored upright; flashing will be stored to avoid creasing, buckling, scratches or any other possible damage.
- .5 Avoid material overloads which may affect the structural integrity of specific roof areas.

1.9 FIRE PROTECTION

- .1 Prior to the start of work, conduct a site inspection to establish safe working practices and make sure that all procedures and proposed changes are approved to minimize the risk of fires.
- .2 Respect safety measures described in the manufacturer's Specifications Manual as well as R.C.A.B.C. recommendations.
- .3 At the end of each workday, use a heat detector gun to spot any smouldering or concealed fire. Job planning must be organized to ensure workers are still on location at least one hour after torch application.
- .4 Never apply the torch directly to old and wood surfaces.
- .5 Throughout roofing installation, maintain a clean site and have one approved ABC fire extinguisher within 6 metres of each roofing torch. Respect all safety measures described in technical data sheets. Torches must never be placed near combustible or flammable products. Torches should never be used where the flame is not visible or cannot be easily controlled.

PART 2 - PRODUCTS

2.1 INSULATION

- .1 Extruded Polystyrene Insulation Minimum R-20:
 - .1 Description: Type IV extruded polystyrene foam insulation board, staggered, in conformance with CAN/ULC-S701-11.
 - .2 Specified product: 2 layers of 51mm STYROFOAM ROOFMATE by DOW or approved equal extruded polystyrene.

2.2 MEMBRANES

- .1 Roof membrane Base Sheet:
 - .1 Description: Roofing membrane with heavy-duty polyester reinforcement covered by ASTM 6164. Both the top and bottom surfaces have a thermofusible plastic film.
 - .2 Prefabricated membrane, complies with CAN/CGSB 37.56-M (9th draft).
 - .3 Specified product: SOPRALENE FLAM 180 by SOPREMA or approved alternate.

- .2 Roof membrane base sheet flashing / parapet:
 - .1 Description: Roofing membrane with glass reinforcement and SBS modified bitumen covered by ASTM 6163. The top face is covered with a thermofusible plastic film. The underface is self-adhesive. The top face must be marked with three (3) distinctive chalk lines to ensure proper roll alignment.
 - .2 Prefabricated membrane, complies with CAN/CGSB 37.56-M (9th draft).
 - .3 Specified products: SOPRAFLASH FLAM STICK by SOPREMA or approved alternate.
- .3 Roofing membrane Cap Sheet, Cap Sheet Stripping, Parapet Cap Sheet:
 - .1 Description: Roofing membrane with heavy-duty polyester reinforcement covered by ASTM 6164. The top face is protected by coloured granules. The under face is covered with a thermofusible plastic film.
 - .2 Specified product: SOPRALENE FLAM 180GR by SOPREMA or approved alternate.
 - .3 Prefabricated membrane, complies with CAN/CGSB 37.56-M (9th draft).
 - .4 ULC certifications, Class C.
- .4 Gutters:
 - .1 Description: Non-woven, polyester fabric coated with a two-component (PMMA) methyl methacrylate-based liquid membrane.
 - .2 Specified product: ALSAN RS FLEECE and ALSAN RS 230 FLASH
- .5 Colour choices:
 - .1 Roofing membrane granular finishes will be of the following colour(s): For regular surfaces: grey.

2.3 ACCESSORY MEMBRANES

- .1 Reinforcement membrane:
 - .1 SOPRALENE FLAM 180 by SOPREMA or approved alternate.

2.4 PRIMER

- .1 Primer for heat welded membranes:
 - .1 Description: A blend of elastomeric bitumen, volatile solvents and adhesive enhancing additives used to prime concrete or metal substrates to enhance the adhesion of torch-applied waterproofing membranes.
 - .2 Specified product: ELASTOCOL 500 by SOPREMA or approved alternate.
- .2 Primer for self-adhesive membranes
 - .1 Description: ELASTOCOL STICK: Composed of SBS synthetic rubber, volatile solvents, adhesive enhancing resins and volatile solvent used to prime porous substrates and non-porous substrates such as wood, concrete or

- metal to enhance the adhesion of self-adhesive membranes at temperatures above - 10°C.
- .2 Specified product: ELASTOCOL STICK by SOPREMA or approved alternate.
- 2.5 FLAME-STOP MEMBRANE**
- .1 Description: Self-adhesive membrane composed of a reinforced glass mat and SBS modified bitumen designed to prevent flames from penetrating into empty spaces and openings while installing heat-welded membranes.
- .2 Specified products: SOPRAGUARD tape by SOPREMA or approved alternate.
- 2.6 COMPLEMENTARY WATERPROOFING PRODUCTS**
- .1 Waterproofing mastic:
- .1 Description: Mastic made of synthetic rubbers, plasticized with bitumen and solvents. Aluminum pigments are added to SOPRAMASTIC ALU to provide greater resistance to U.-V.
- .2 Specified product: SOPRAMASTIC [ALU] by SOPREMA or approved alternate.
- .2 Pitch pocket filler:
- .1 Description: An aluminum coloured solvent-based mastic containing superior grade bitumen modified with SBS synthetic rubber and fibres. Designed for pitch box filling.
- .2 Specified product: INTERCLIP SYSTEM by SOPREMA or approved alternate.
- .3 Sealing product
- .1 Description: Composed of a bitumen/polyurethane waterproofing mono-component and polyester reinforcements. Designed to finish upstands and details. (no-flame installation).
- .2 Specified product: ALSAN RS 230 by SOPREMA or approved alternate.
- 2.7 SUPPORT PANEL:**
- .1 Description: 12.7mm fiberglass mat faced gypsum support panel with water-resistant core.
- .2 Specified Product: ½" DENSDECK ROOF BOARD by GEORGIA PACIFIC or approved equal.
- 2.8 DRAIN MAT**
- .1 Description: High-strength drainage panel consisting of a polypropylene core with a factory-laminated geotextile.
- .2 Specified product: SOPRADRAIN 10G by SOPREMA or approved alternate.
- 2.9 GRAVEL BALLAST**
- .1 Gravel minimum 16 mm to maximum 35 mm diameter. Gravel shall be round, washed, and exempt of dust, humidity, ice, snow, and foreign objects.

- .2 Thickness: 1 layer (to be confirmed by Contractor) intended to hold down drain mat and insulation layers. Thickness/weight of gravel ballast must be installed as required by CSA A123.21-14, standard test method for dynamic wind uplift resistance of membrane roofing systems.

2.10 ROOF GUARD

- .1 See section 05520 Guardrails and Handrails.

**2.11 CONCRETE RESTORATION
(ROOF ASSEMBLY R4)**

- .1 Waterproofing for existing concrete canopy (R4):
 - .1 Description: A waterproofing one-component polyurethane / bitumen resin. Reinforcement mesh approved by manufacturer required for repair of cracks in existing concrete canopy.
 - .2 Specified product: ALSAN FLASHING by SOPREMA or approved alternate.

PART 3 – EXECUTION**3.1 SURFACE EXAMINATION
AND PREPARATION**

- .1 Surface examination and preparation must be completed in conformance with recommendations in the SOPREMA Specifications Manual, particularly for fire safety precautions.
- .2 Before roofing work begins, the owner's representative and roofing foreman will inspect and approve deck conditions (including slopes and wood blocking) as well as upstands and parapets, construction joints, roof drains, plumbing vents, ventilation outlets and others. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be made. The start of roofing work will mean roofing conditions are acceptable for work completion.
- .3 Do not begin any work before surfaces are smooth, dry, and free of ice and debris. Use of calcium or salt is forbidden for ice or snow removal.
- .4 Be sure plumbing, carpentry and all other work has been duly completed.
- .5 No materials will be installed during rain or snowfall.

**3.2 METHOD OF
INSTALLATION**

- .1 Prepare surfaces and complete waterproofing work in conformance with SOPREMA'S requirements, and the "Roofers' Guide"
- .2 Install roofing elements on clean and dry surfaces, in conformance with manufacturer's instructions and recommendations.
- .3 Roofing work must be completed in a continuous fashion as surfaces are readied and weather conditions permit.
- .4 It's preferable to seal all seams that are not covered by a cap sheet membrane in the same day. The cap sheet cannot be installed if any moisture is present at/in the base sheet seams.
- .5 Whenever membranes are torch-applied, a continuous and even bead of molten bitumen must be visible as the membrane is unrolled and torched.
- .6 Ensure waterproofing conditions for roofs at all times, including protection during installation work by other trades and progressive protection as work is completed (e.g. vents, drains, etc.).

3.3 SITE PROTECTION

- .1 Protect finished work to avoid damage during roof installation and material transportation. Install protective boardwalks over installed roofing materials to enable passage of people and products. Assume full responsibility for any damage.

3.4 CLEANING

- .1 The work site must be routinely cleared of rubbish and other materials which may hinder roof installation, performance, or present a fire hazard.

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- .2 Carefully collect all roofing debris and dispose of in accordance with Section 01355
- 3.5 EQUIPMENT FOR WORK EXECUTION**
- .1 Maintain all roofing equipment and tools in good working order.
- .2 Use torches recommended by SOPREMA
- 3.6 PREPARATION WORK CONCRETE DECK**
- .1 Prepare surfaces according to [manufacturer's] [local authorities'] recommendations. Surfaces to be waterproofed with elastomeric bitumen membrane must have a Concrete Surface Profile (CSP) of 3 to 6 (CSP as per the International Concrete Repair Institute).
- 3.7 PREPARATION WORK METAL DECK**
- .1 Prepare surfaces according to [manufacturer's] [local authorities'] recommendations.
- 3.8 APPLICATION PRIMER**
- .1 Roofing substrates of wood, metal, concrete, masonry or gypsum board surfaces will receive a coat of asphalt primer at manufacturer approved rate. (none required for factory-painted metals). 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 (same day coverage for self-adhesive membranes). [Application temperature limit of +5°C for ELASTOCOL STICK.]
- 3.10 INSTALLATION OF SUPPORT PANEL**
- .1 Support Panels to be mechanically fastened to steel decking as per manufacturer's recommendations to meet CSA A123.21-14, Standard test method for the dynamic wind uplift resistance of membrane-roofing systems.
- .2 All boards must be in perfect connection, without any significant variances in level, and must be completely adhered to the surface.
- .3 [All vertical joints between [flat boards and sloped modules] [the two rows of insulation boards] will be staggered.
- .4 Install only as much insulation as can be covered in the same day.
- 3.11 INSTALLATION OF FLAME-STOP MEMBRANES**
- .1 [Adhere the membrane directly onto an approved substrate by peeling back the silicone release film. SOPRAGUARD TAPE is designed to prevent flames from penetrating into empty spaces and openings while installing heat-welded membranes.]

- .2 [Unroll the flame-stop membrane onto the insulation without adhering, being careful to overlap adjacent strips to ensure that the flame will not come in contact with the insulation.]

3.12 INSTALLATION OF TORCH-APPLIED BASE SHEET

- .1 Concrete/support panel surfaces to be primed with Elastocol 500 prior to installation of torch applied base sheet.
- .2 Dry unroll the flame-stop membrane onto the concrete/support panel, being careful to overlap adjacent selvages to ensure that the flame will not penetrate the decking.
- .2 Dry unroll the base sheet membrane on the substrate, taking care to align the edge of the first selvedge with the centre of the drain (parallel to the edge of the roof).
- .3 Base sheet to be torched applied (fully heat welded) to concrete/support panel. Base sheet must be installed as required by CSA A123.21-14, standard test method for dynamic wind uplift resistance of membrane roofing systems. Corners and perimeters must be installed as per manufacturer's requirements.
- .4 Each selvedge should overlap the previous one along the lines provided for this purpose.
- .5 Adhere the first 60 mm (2.5 in) of the self-adhesive side laps using a roller, then heat-weld the last 40 mm (1.5 in) (combined self-adhesive and heat-welded side laps). Heat weld 100mm (4 in) of side laps.
- .6 Seal end laps by welding a 330-mm (13-in) wide protection strip centered on the joint. End laps to be staggered, cover strips are not required.
- .7 Avoid the formation of wrinkles, swellings or fishmouths.

3.13 INSTALLATION OF REINFORCED GUSSETS

- .1 Install gussets at every angle, on inside and outside corners.
- .2 [Heat-weld the gussets in place after installing the thermofusible base sheet membrane.]
- .3 [Install the thermofusible gussets after installing the self-adhesive base sheet membrane.]
- .4 [Install the self-adhesive gussets before installing the self-adhesive base sheet membrane.]

3.14 BASE SHEET FLASHING / PARAPET INSTALLATION (SELF ADHERED)

- .1 Apply base sheet flashing only after primer coat is dry.
- .2 Before applying membranes, always remove the plastic film on the section to be covered if there is an overlap (inside and outside corners and field surface). For sanded base sheet membranes, apply ELASTOCOL STICK to the area to be covered at the foot of the parapets.

- .3 Position the pre-cut membrane piece. Peel back 100 to 150 mm. (4 to 6 in.) of the silicone release paper to hold the membrane in place at the top of the parapet.
- .4 Then, gradually peel back the remaining silicone release paper, pressing down on the membrane with an aluminum applicator to ensure good adhesion. Use the aluminum applicator to ensure a perfect transition between the upstand and the field surface. Smooth the entire membrane surface with a roller for full adhesion.
- .5 Cut off corners at end laps to be covered by the next roll.
- .6 Install a reinforcing gusset in all inside and outside corners.
- .7 Always seal overlaps at the end of the workday.

3.15 ROOFING CAP SHEET INSTALLATION (TORCH-APPLIED MEMBRANE)

- .1 Once base sheet is applied and no defects are apparent, proceed with cap sheet installation.
- .2 Begin with double-selvage starter roll. If starter roll is not used, side laps covered in granules must be degranulated by embedding side laps in torch-heated bitumen over a 75 mm. width.
- .3 Unroll cap sheet at drain. Carefully align first side lap (parallel to roof edge).
- .4 Weld cap sheet onto base sheet with torch recommended by membrane manufacturer. During application, simultaneously melt both designated contact surfaces so a bead of bitumen is apparent as cap sheet unrolls.
- .5 Avoid overheating.
- .6 Make sure joints between the two layers are staggered by at least 300 mm.
- .7 Overlap cap sheet side laps by 75 mm. and end laps by 150 mm. Cut off corners at end laps to be covered by next roll. All overlap surfaces must be degranulated.
- .8 Complete perfect welds between two membranes. Leave no zone unwelded. In cold weather, adjust welding time to obtain homogenous seam (it may be necessary to slow down in certain cases.)
- .9 Once cap sheet is installed, carefully check all overlapped joints.
- 10 [During installation, take care to avoid excessive bitumen bleed-out at joints.]

3.16 INSTALLATION OF CAP SHEETS ON UPSTANDS AND PARAPETS (HEAT-WELDED)

- .1 This cap sheet must be installed in one-metre-wide strips. The side joints must overlap by [75] - [100] mm. and must be staggered by at least 100 mm. with respect to the joints of the cap sheet on the field surface, to avoid areas of excessive

- membrane thickness. The overlaps on the field surface must be 50 mm. wider than those of the base sheet membrane on the upstands and parapets. At end laps, angle-cut the corners that will be covered by the following roll.
- .2 Use a chalk line to draw a straight line on the field surface 150 mm. from the upstands and parapets.
 - .3 Use a propane torch and round-nose trowel to embed the surface granules in the layer of hot bitumen [starting from the chalk line on the field surface to the bottom edge of the upstand or parapet as well as] on the granulated vertical surfaces that are to be overlapped.
 - .4 This cap sheet will be heat-welded directly to the base sheet membrane, proceeding from bottom to top. This technique softens both membranes in order to obtain even, continuous weld.
 - .5 [During installation, be careful not to overheat the membrane or to create [excessive] [bitumen] bleeding at the joints.]

3.17 INSULATION INSTALLATION

- .1 Loose lay insulation on roofing membranes.
- .2 All vertical joints between two rows of insulation board will be staggered.
- .3 Install only as much insulation as can be covered in the same

3.16 INSTALLATION OF DRAIN MAT

- .1 Place drain mat on insulation, staggered.

3.17 INSTALLATION OF GRAVEL BALLAST

- .1 Once drain mat is installed, spread gravel in a uniform fashion in conformance with manufacturers requirements listed in PLPDS 1-29. Thickness: 1 layer (to be confirmed by Contractor) intended to hold down drain mat and insulation layers. Thickness/weight of gravel ballast must be installed as required by CSA A123.21-14, standard test method for dynamic wind uplift resistance of membrane roofing systems.

**3.18 WATERPROOFING
FOR VARIOUS DETAILS**

- .1 Install waterproofing membranes in conformance with various roofing details illustrated in the manufacturer's manual.

**3.19 INSTALLATION OF
WATERPROOFING FOR
CONCRETE RESTORATION
(ROOF ASSEMBLY R4)**

- .1 Prepare existing concrete canopy as per manufacturer's recommendations.
- .2 Fill cracks with waterproofing one-component polyurethane/bitumen resin (1 layer) with reinforcement mesh. This layer must be thick enough to completely immerse the reinforcement. Reinforcement to be immediately covered with a second layer of waterproofing resin until saturation. Third layer of waterproofing resin to be applied when the second layer is dry and tack free.
- .3 Apply waterproofing resin in two layers to existing concrete surfaces.

END OF SECTION

PART 1 - GENERAL

- 1.1 General** .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
- 1.2 Standards** .1 British Columbia Building Code, current edition.
.2 Perform all work in accordance with the RCABC "Roofing Practices Manual".

PART 2 - PRODUCTS

- 2.1 Products** .1 Prefinished Metal Flashings + Trim: 24 ga. prefinished galvalume steel.
.2 Fasteners: Concealed unless approved by Consultant.
.3 Solder and Flux: type recommended for materials in use.
.4 Sealant: Dymeric by Tremco, PRC Rubber Caulk 5000. Colour to be approved by Consultant.
.5 Colour to match existing and approved by Consultant.

PART 3 - EXECUTION

- 3.1 Execution** .1 Fabricate flashings in maximum lengths on bending brake. Shape and trim in shop as far as practical. Hem all exposed edges. Allow for expansion/contraction.
.2 Construct flashing joints using flat 'S' lock seam, caulked. Fabricate corners minimum 18"x18" (450 mm x 450 mm), mitred and soldered, sealed as one piece.
.3 Form and install flashings square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
.4 Backpaint flashings in contact with cementitious materials or dissimilar metals with bituminous paint.
.5 Paint the underside of all flashings to match flashing colour.
.6 Flash all locations where there is a horizontal joint in siding materials without any overlap.
.7 Do not join sections of flashing at less than 24" from the end of the run/length of flashing.
.8 Straighten, repair and clean all flashings at the end of the project.

END OF SECTION

PART 1 - GENERAL

- 1.1 General** .1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this section.
- 1.2 References** .1 British Columbia Building Code, current edition.
.2 CAN/CSA-A-440-00
- 1.3 System Description** .1 General: Commercial Grade Architectural Aluminum Windows, including glass and glazing, metal panels, perimeter trims, sills and stools, window installation hardware and accessories, shims and anchors, and perimeter sealing of window units.
- 1.4 Submittals** .1 Submit shop drawings in accordance with Section 01330.
.2 Product Data: For each product specified, include details of construction relative to materials, dimensions of individual components, profiles, and finishes.
.3 Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components, provisions for expansion and contraction, glazing details, and attachments to other work.
.4 Samples: Provide samples of each type of product section and exposed finish required in manufacturer's standard sizes.
.5 Test Reports: Submit certified test reports showing compliance with specified performance characteristics.
- 1.5 Quality Assurance** .1 Installer Qualifications: Installer experienced five (5) years to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
.2 Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.
.3 Contractor to conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.
- 1.6 Delivery, Storage Handling** .1 Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
.2 Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
.3 Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle materials and components to avoid damage. Protect materials against damage from elements, construction activities, and other hazards before, during and after installation.

PART 2 - PRODUCTS

- 2.1 Materials**
- .1 Skylights: Thermally broken aluminum sloped glazing to be Alumicor Skyview 2300 Series.
Accepted Alternates: Kawneer 1600 Sloped Glazing Series, Kawneer 2000 Skylight Series, or approved equal.
 - .2 Screws, nuts, bolts, washers, etc. - stainless steel or plated with material not harmful to aluminum.
 - .3 Glazing bead - Snap-in aluminum extruded type.
 - .4 Caulking – Tremco:
 - i) General: Monolastomeric
 - ii) Couplings: Small joint sealer clear
 - iii) Heel Bead: Monolastomeric
- 2.2 Shop Drawings**
- .1 Submit shop drawings showing details and dimensions required for the fabrication and erection of the works. Verify rough opening dimension with site.
- 2.3 Aluminum Windows**
- .1 Aluminum (Skylights, Windows, and Components): Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.
 - .1 Extruded Material Standard: ASTM B 221, 6063-T6 alloy and temper.
 - .2 Steel Reinforcement: Complying with ASTM A 36/ A 36M for structural shapes, plates and bars; ASTM A 611 for cold-rolled sheet and strip or ASTM A 570/ A 570M for hot-rolled sheet and strip.
 - .3 Weather-stripping: Ventilators shall be weather-stripped with extruded EPDM in accordance with ASTM C864.
 - .4 Glazing Gaskets: Dry glazing gaskets shall be an extruded EPDM in accordance with ASTM C864.
 - .5 Glazing and Curtain Wall Sealant: Wet glazing material shall be a 100 percent silicone, neutral-cure sealant in accordance with AAMA 805.2-94, Group A.
 - .6 Fasteners: Where exposed, shall match frames.
 - .7 Thermal Barrier: The thermal barrier shall be extruded of a silicone compatible elastomer that provides for silicone adhesion.
- 2.4 Accessories**
- .1 Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard permanent, nonmigrating types in hardness recommended by manufacturer, compatible with sealants, and suitable for system performance requirements.
 - .2 Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.
 - .3 Sealants and joint fillers for joints at perimeter of window system and curtain wall system as specified in Section 07920 – Sealants and Caulking.

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- .4 Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
 - .5 Optional Muntin Grids: Extruded aluminum profiles, 6063-T6 alloy and temper and as follows:
 - .1 True muntins.
 - .2 Between the glass muntins.
 - .6 Glazing: Site Glazing as required and specified in Section 08800.
 - .7 Optional Perimeters and Trims: Extruded aluminum, 6063-T5 alloy and temper, extruded to profiles and details indicated. Seal exterior joints with manufacturer's standard sealant to assure water-tight joints.
 - .8 Coupling Mullions: Shall be extruded aluminum of 6063-T6 alloy and temper of profile and dimensions indicated on drawings. Mullions shall provide structural properties to resist wind pressure required by performance criteria and standards.
- 2.5 Fabrication**
- .1 General: Fabricate components as per manufacturer's installation instructions. When assembled, components shall be accurately fitted joints to produce hairline joints.
 - .2 Window Frame Joinery: Mitred and mechanically clipped and/or staked.
 - .3 Factory sealed frame and vent corner joints.
- 2.4 Air Infiltration**
- .1 Air infiltration measured in cubic feet per minute per feet of crack length when window subject to static air pressure equal to pressure exerted by wind at velocity of 40 km/h.
- 2.6 Finish**
- .1 All frames to be clear anodized aluminum – approved by Consultant.
- 2.7 Quality Control**
- .1 Include qualifications from established independent testing agency that windows will meet required CAN/CSA-A440 classification ratings.

PART 3 – EXECUTION

- 3.1 Installation**
- .1 Erect in prepared openings by experienced workmen.
 - .2 Set plumb and true, properly aligned and securely anchored.
 - .3 Caulk joints at mullions, between connecting windows, contacts with windows and sills. Caulk perimeter. Caulking to match frames.
- 3.2 Anchors**
- .1 Standard anchors, clips or lugs as required.
 - .2 Galvanized steel or aluminum.
- 3.4 Glazing**
- .1 Apply 3mm x 10mm (1/8" x 3/8") butyl tape to glazing legs of frame and lap glass upon tape. Maintain minimum clearance of 3mm (1/8") at edges of glass
 - .2 Apply setting blocks under lower edge of glass.
 - .3 Install heel bead at glass perimeter.
 - .4 Snap glazing bead in place and roll in vinyl between head and glass.

END OF SECTION

PART 1 - GENERAL

- 1.1. General** .1 The "General Conditions" and "Supplementary General Conditions" shall form part of this section.
- 1.2. References** .1 British Columbia Building Code, current edition.
.2 CSA. standard A440-00.
- 1.3 Warranty** .1 Provide a written guarantee, signed and issued in the name of the Owner, stating that the hermetically sealed glass units described in this Section are guaranteed against interpane dusting or misting for a period of (5) years from the date of Substantial Performance and that any defective units will be replaced, including making good of adjacent glazing frame, without cost to the Owner, during the one year Building Guarantee Period. After that period, replacement units will be supplied to the Owner for installation by him.
- 1.4 Submittals** .1 Submit shop drawings in accordance with Section 01330.
.2 Product Data: For each product specified, include details of construction relative to materials, dimensions of individual components, profiles, and finishes.
.3 Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components, provisions for expansion and contraction, glazing details, and attachments to other work.
.4 Samples: Provide samples of each type of product section and exposed finish required in manufacturer's standard sizes.
.5 Test Reports: Submit certified test reports showing compliance with specified performance characteristics.

PART 2 - PRODUCTS

- 2.1 Materials** .1 Float Glass: Glazing quality, conforming to CAN/CGSB 12.3-M91, minimum thickness as indicated or as required by Code.
.2 Safety glass:
.1 Laminated: to CAN/CGSB-12.1-M90 Type 1, Class A 6mm thick.
.2 Tempered: to CAN/CGSB 12.11-M90 Type 2, tempered; Class B, float or plate glass, clear.
.3 Exterior Glazing: All exterior glazing to be double glazed sealed units in pre-manufactured aluminum windows.
.1 Exterior Glazing
.1 Outer lite minimum 6 mm thick, (Clear) with Low-E hardcoat coating on No.2 surface, and to be fully tempered glass unless noted otherwise on the drawings.
.2 Inner lite minimum (6 mm) to be fully tempered glass unless noted otherwise on the drawings.
.3 Air space to be 1/2" (12 mm)

- .4 Performance of the sealed units shall meet or exceed:
 - a. U – Value 0.38
 - b. Visible Light Transmittance: 70%
 - c. Visible Reflectance: 11%
 - d. Shading Coefficient: 0.44
 - e. Solar Heat Gain Coefficient: 0.38
- .5 It is the responsibility of the glazing contractor to meet the wind load
- .6 Mirrors: 6mm thick to CAN2- 12-12.5 M76, backed with silver copper paint, fastened with adhesive, tape or concealed clips. Mirror per drawings and Washroom Accessories 10800.
- .7 Joint Fillers and Setting Blocks:
 - .1 General: Compatible with primers and sealants, out sized 30% to 50%.
 - .2 Neoprene or Vinyl: Extruded closed cell foam, shore A hardness 70 - 90, tensile strength 20 - 30 psi.
- .8 Glazing Compounds: Oil type to CGSB 19-GP-6 gun grease. Sealant: Silicone base, one component, to CGSB 19-GP-9 of colour to match framing. Dow-Corning 781 or approved equal.
- .9 Glazing Tape: of pre-formed butyl tape, 10-15 durometer hardness, paper release, 3 mm thick x width of glazing stop. Tremco #440 or approved alternate. Colour to match framing.

PART 3 - EXECUTION

3.1 Glazing

- .1 All glass shall be new material, the best of its kind, and shall be free from cracks, flaws, or other defects. Each individual piece of glass shall bear a label by the manufacturer, giving the manufacturer's name and trademark, the quality of glass, thickness designation, direction of draw, if required, and country of manufacture. All labels shall be left on the glass until removal is authorized by the Consultant.
- .2 All glazing shall be installed in accordance with the standards of the Flat Glass Jobbers Association Glazing Manual.
- .3 No glazing shall be performed in temperatures below 4.5°C, nor before all surfaces, where required, are back-painted.

3.2 Protection

- .1 Mark installed glass with whiting or labels and take necessary precautions to protect installed work against damage.
- .2 Remove and replace damaged, scratched or cracked glass prior to acceptance of building.

3.3 Cleanup

- .1 On completion, clean up whiting, labels, excess glazing compound finger marks, etc., and leave glass clean.
- .2 Remove all excess material and debris from site.

END OF SECTION