Environment and Climate Change Canada | Environnement et Changement climatique Canada

PWRC Roof Replacement

Specifications & Drawings

Project: PWRC-015 // VR20-092SP-21476

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Canada

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PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 35 23 - Health and Safety

1.2 DEFINITIONS

.1 “Contract" means Contract Documents referred to in Articles of Agreement.

.2 "Contractor", or pronoun in place thereof, means individual, group, corporation identified in Agreement that has undertaken to perform Work.

.3 "Day" means calendar day. "Working day" means days other than Saturdays, Sundays, and holidays which are observed by construction industry at Place of Work.

.4 "Consultant" means IRC Building Sciences Group, entity engaged by Owner to prepare Specification Documents and provide administration of Contract.

.5 "Other Contractor" means any person or firm or corporation employed by or having a Contract directly or indirectly with Owner other than through Contractor.

.6 “Owner" means Environment Canada Real Property Management, Technical Services, person or entity identified as such in Agreement.

.7 "Owner’s Representative" means authorized individual or group, other than Consultant, acting on behalf of Owner.

.8 “Place of Work” means designated location or site where contracted work is to be performed.

.9 "Sub-Contractor" includes any person, firm, or corporation having a contract for execution of a part or parts of Work included in Contract, or a person, firm, or corporation furnishing material called for in Contract and worked to a special design according to Contract Documents but does not include one who merely furnishes materials not so worked.

.10 "Work" includes, subject only to any express stipulations in Contract to contrary, everything that is necessary to be done, furnished, or delivered by Contractor and by those for whom he is responsible, to completely perform Work of Contract.

1.3 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy of following:

.1 Specifications and Drawings,

.2 Addenda,

.3 Approved Work Schedule,

.4 Applicable Construction Permits,

.5 Change Orders and Change Directives,

.6 Supplementary Instructions or Field Orders,

.7 Other modifications to Contract,

.8 Field Observations and Testing Reports.

1.4 OWNERSHIP OF DRAWINGS AND MODELS

.1 All Drawings, Specifications and copies thereof and all models furnished by Consultant are and to remain property of Consultant, and are not to be used on other work. If Consultant so requests, all such Drawings, Specifications and models, except for signed Contract set of Drawings and Specifications, to be returned upon completion of work.

1.5 FEES, TAXES, PERMITS AND CERTIFICATES

.1 Pay applicable Federal, Provincial, and Municipal taxes.

.2 Provide authorities having jurisdiction with information when and as requested.

.3 Pay fees and obtain certificates and permits including building permit.

.4 Furnish certificates and permits when requested.

1.6 SAMPLES

.1 Submit samples for review, in duplicate unless specified otherwise, as requested in respective specification Sections.

.2 Identify name of manufacturer and product.

.3 Deliver samples pre-paid to Consultant's business address.

.4 Notify Consultant in writing at time of submission of deviations in samples from requirements set forth in Contract Documents.

.5 Adjustments of samples made by Consultant are not intended to change Contract Price or Schedule. If adjustments affect value of work, state in writing to Consultant prior to proceeding with performance of work.

.6 Make changes in and to samples as requested by Consultant, consistent with Contract Documents.

.7 Installed work to match reviewed and approved samples.

1.7 WORK SCHEDULE

.1 Provide initial schedule within seven (7) working days after Award of Contract, unless specified otherwise, showing anticipated progress stages and final completion of work.

.2 Interim review of work progress based on work schedule will be conducted as decided by Consultant and schedule updated by Contractor in conjunction with and to approval of Consultant.

.3 Coordinate all schedules with Owner's Representative and/or Consultant to suit Owner's occupancy and usage requirements.

1.8 CONTRACTOR'S USE OF SITE

.1 This is an occupied site and normal operations must be maintained during performance of work. Take proper care to avoid unnecessary noise, or obstruction in corridors, walkways, sidewalks, and roadways. Do not interfere with use or safe passage to and from building and adjacent public sidewalks and roads. Do not unreasonably encumber site with materials or equipment. Where excessive noise or obstruction is in certain instances unavoidable, advise Owner Representative ahead of time and make suitable arrangements..

.2 Hours of Work:

.1 Perform Work between 7:00 AM and 6:00 PM, Monday through Friday, unless otherwise approved by Owner.

.2 Follow municipal or provincial bylaws.

.3 Working times must be coordinated with Owner's Representative prior to commencement of work.

.3 Designated Parking & Office:

.1 A site office may be located on site in area designated by the Owner's Representative. Decision to locate a site office on site is to be pre-arranged prior to tender close.

.2 Limited parking may be provided on site, unless specified otherwise in Instructions to Bidders, at a location acceptable to Owner's Representative. Provide and pay for additional parking, if required.

.4 Access:

.1 Access and egress from work site to be as per prescribed and designated routes only. Provide and arrange for traffic control where necessary for delivery of materials, removal of garbage, etc. as required by Owner's Representative and as required by laws, ordinances, rules and regulations relating to Place of Work.

.2 Ensure that privileges presently accruing to adjacent properties are maintained.

.3 Do not transport materials through building without prior approval from Owner's Representative. Access to building and elevators, storage space for material and tools will be as specified by Owner's Representative.

.5 Storage:

.1 Use of site for storage of materials and equipment will be at a location acceptable to Owner's Representative. Location of site storage provision for removal of debris must be coordinated with Owner and Consultant in advance. Obtain and pay for use of additional storage of work areas needed for operations.

.2 Do not store materials or use trucks, cranes, hoists or other equipment in a manner which would load existing building structure beyond its design capacity.

.3 Provide adequate weather tight sheds or trailers for storage of materials, tools, and equipment which are subject to damage by weather.

.4 Move stored products or equipment which interfere with operations of Owner or other Contractors.

.5 Contractor to prepare and provide a Site Logistics Plan for review by the Owner, indicating project execution goals, location of bins, storage, etc.

.6 Sanitary Facilities:

.1 Provide on-site washroom facilities on ground level only. Contractor will not have access to building washroom facilities.

.2 Maintain Contractor's facilities in good and clean working condition.

.3 Workers will not be permitted to use any other sanitary facilities, intended for use of public or building personnel.

.7 Signage:

.1 No signs or advertisements other than warning signs are permitted on site unless approved by Owner's Representative or Consultant.

.2 Provide sufficient signage to indicate safe access and egress routes around or through the Work, and to ensure public safety.

1.9 COORDINATION AND COOPERATION

.1 Coordinate all construction work with Owner's Representative and Consultant to obtain access to work site areas.

.2 Coordinate all construction work with Sub-Contractors when work is related.

.3 Adhere to approved project schedule as closely as possible so that proper pre-arranged access can be arranged.

.4 Execute work with minimum disturbance to occupants, public and normal use of site and building.

.5 Maintain access to building and exits.

.6 Where security has been reduced by work of contract, provide temporary means to maintain security.

1.10 CODES AND STANDARDS

.1 Conform to all rules and regulations of all Authorities having jurisdiction at Place of Work.

.1 Federal regulations, latest edition including all amendments up to project date.

.2 Provincial regulations, latest edition including all amendments up to project date.

.3 Municipal regulations, latest edition including all amendments up to project date.

.4 WorkSafe BC Workers Compensation Act, OHS Regulations, Policies, Guidelines, WCB Standards, and Other OHS Legislation.

1.11 PROJECT MEETINGS

.1 Hold project meetings as requested by Owner's Representative and/or Consultant.

.2 Notify all concerned parties of meetings.

.3 Record meetings and distribute to all parties within 3 days of meeting. Include in minutes all significant proceedings, decisions and identify action by appropriate party.

1.12 SETTING OUT OF WORK

.1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

.2 Provide devices needed to lay out and construct work.

.3 Supply such devices as straight edges and templates required to facilitate Consultant's observation of work.

1.13 CUTTING, FITTING AND PATCHING

.1 Execute cutting, fitting and patching required to make work fit properly.

.2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.

.3 Obtain Consultant's approval before cutting, boring or sleeving load-bearing members.

.4 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

.5 Fit work airtight to pipes, sleeves, ducts, and conduits.

1.14 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 building operations, pedestrian and vehicular traffic.

.2 Before commencing work, establish location and extent of service lines in area of work and notify Consultant of findings.

.3 Provide 48 hours' notice and submit schedule to, and obtain approval from, Owner's Representative and Consultant for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.

.4 Where unknown services are encountered, immediately advise Owner's Representative and Consultant and confirm findings in writing.

.5 Record locations of maintained, re-routed and abandoned service lines.

1.15 PERFORMANCE OF WORK

.1 Perform Work with least possible interference or disturbance to occupants, public and normal use of premises, roadways, parking areas, sidewalks, alleys, or passageways. Arrange with Consultant to facilitate execution of work. All egress doors providing access to work areas to be controlled. This is to be coordinated with Owner's Representative.

.2 Provide all protection necessary or as required by local by-laws including but not limited to: hoarding, covered walkways, guard rails, barriers, night lights, sidewalk or curb protection and warning notices in locations where renovation and alteration work is adjacent to areas used by building occupants or public.

.3 Take all necessary precautions to keep dust, dirt, and debris to an acceptable level as directed by Owner's Representative and Consultant. Comply with all laws, ordinances, rules and regulations relating to work in connection with above.

.4 Where work is performed adjacent to air intakes, Owner's Representative and Consultant must be notified so that appropriate measures can be taken.

.5 Protect exterior surfaces of building and grounds from debris and damage.

.6 Protect adjacent property and buildings against damage which may occur as a result of work. Make good, to satisfaction of Owner's Representative and Consultant, any damage resulting from work of this Contract.

1.16 SHOP DRAWINGS

.1 'Shop drawings' means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of work.

.2 Shop drawings should indicate method of construction, method of anchorage, fastening, sealing, as well as material type, thickness, finish and other pertinent data.

.3 Cross-reference shop drawing information to applicable portions of Contract Documents.

.4 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of work, state such in writing to Consultant prior to proceeding with work.

.5 Make changes in shop drawings as Consultant may require consistent with Contract Documents. When re-submitting, notify Consultant in writing of any revisions other than those requested.

.6 Submit three (3), unless otherwise specified, copies of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.

.7 Submit three (3), unless otherwise specified, copies of product data sheets or brochures for requirements requested in specification Sections and as Consultant may reasonably request where shop drawings will not be prepared due to standardized manufacture of product.

.8 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copy to be returned and fabrication and installation work may proceed. If shop drawings are rejected, noted copy will be returned and re-submission of corrected shop drawings, through procedures indicated above, to be performed before fabrication and installation work may proceed.

1.17 ADDITIONAL DRAWINGS

.1 Consultant may furnish additional drawings to assist proper execution of work. These drawings to be issued for clarification only. Such drawings to have same meaning and intent as if they were included with plans referred to in Contract documents.

.2 Perform Work in accordance with such additional instructions. Contractor to do no additional work without written instructions from Consultant.

1.18 WASTE DISPOSAL

.1 Provide for storage and removal of garbage as a result of work and obtain approval of storage location(s) from Owner's Representative and Consultant prior to commencement of work.

.2 Disposal of debris and garbage from the roof to be on a daily basis with minimum disturbance to Owner and occupants, unless stockpiling is specifically agreed upon.

.3 Recycling of waste materials when possible and prudent must be arranged by the Contractor, and meet municipal regulations.

.4 Provide Consultant with date each phase of work will begin, 48 hours before commencing work.

.5 Copies of observation and testing reports to be issued to Contractor and Owner.

.6 Contractor to cooperate with Consultant to facilitate observation and documentation of existing substrate and details throughout demolition work.

.1 Correct defects and irregularities of performed work at no additional cost to Owner.

.7 When initial tests and observations reveal work not to contract requirements, Contractor to pay for additional tests and observations required by Consultant for correction of work.

.8 It will not be the responsibility of the Consultant, nor will he have control of construction means, methods, techniques, procedures, safety precautions and programs required for the work in accordance with applicable construction legislation, regulations, or general construction practice. Nor will it be the responsibility of the Consultant for acts of omissions of the Contractor, his Sub-Contractors, employees or other persons performing the work.

1.19 EQUIPMENT AND HOISTING

.1 Provide all required hoisting equipment for removal of debris and for movement and placing of materials and equipment during construction. Debris chutes to be totally enclosed and inclined, with watering down facilities as necessary to control dust, fire hazards, and nuisance factors. Exercise extreme care in disposal of wash water.

.2 Any damage caused by hoisting equipment or operator to be made good to satisfaction of Owner's Representative and Consultant.

.3 Provide and maintain temporary ladders required to perform work. Ladders to be strongly constructed and to comply with all requirements of safety authorities having jurisdiction over work. All ladders to be secured and used only by methods approved by Authorities.

.4 Provide all required scaffolding necessary to perform work. Erect scaffolding independent of walls. Construct, maintain and use scaffolding in accordance with CAN/CSA-S269.2M, Access Scaffolding for Construction Purposes.

1.20 TEMPORARY FACILITIES AND SERVICES

.1 Provide and maintain temporary facilities to carry out work.

.2 Provide and maintain sanitary facilities to be used by Contractor's forces.

.3 Remove temporary facilities and services on completion of work.

1.21 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.

.3 Inform Consultant of impeding installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Consultant.

1.22 FIRE PREVENTION

.1 No open burning to be permitted within any construction at site.

.2 Provide and maintain temporary fire protection equipment during performance of work required by insurance companies having jurisdiction and governing codes, regulations and bylaws. Provide a 20 lb. dry chemical fire extinguisher fully charged and in operable condition at every location where open flames are used.

.3 Keep site free of waste materials, rubbish and debris.

1.23 WELDING AND CUTTING

.1 Safety Provisions

.1 Ensure compliance with following regulations regarding welding and cutting operations and other operations generating flames, sparks, smoke, and heat;

.2 Safety Procedures by Contractor

.1 Contactor shall establish Safety Procedures by task, and document such procedures to meet provincial regulations.

1.24 SMOKING ENVIRONMENT

.1 Comply with smoking restrictions at work site.

1.25 OCCUPATIONAL HEALTH AND SAFETY

.1 Conform to safe work practices in accordance with regulations and authorities having jurisdiction.

.2 Promptly report to Owner and Consultant all accidents or if any claim is made against Contractor or Subcontractor on account of accident.

.3 Provide at site, equipment to supply first aid.

.4 Enforce proper work methods and act immediately on directions regarding safety and work practices given by authorities having jurisdiction or Owner, at no additional cost to Owner.

.5 Failure to comply with verbal or written instructions or orders from Ministry of Labour inspector or other authorities as well as Owner or Consultant regarding safe work practices or provision of specified requirements under Act to be considered non-compliance with Contract.

.6 Maintain on-site a copy of latest edition of Occupational Health and Safety Act and Regulations for Construction Projects.

.7 Ensure that all personnel are adequately equipped to comply with safety regulations and that sufficient safety equipment is available.

1.26 TEMPORARY POWER AND WATER

.1 Coordinate with Consultant and Owner's Representative for use of temporary power and water supply.

.2 If available, Owner will allow usage of typical site utilities such as electrical services and hose bibs.

.3 Provide any necessary special wiring for lights, equipment, etc.

.4 For non-typical uses, provide temporary power distribution wiring to comply with provincial Hydro Electrical Safety Code. Obtain inspection certificates for temporary electrical work from local authorities.

1.27 WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

.1 Contractor to be familiar with WHMIS regulations and be responsible for compliance.

1.28 CLEANING

.1 Maintain project free of accumulated waste and rubbish. Disposal of debris and garbage to be on a per shift basis with minimum disturbance to Owner and tenants. Under no circumstances shall debris be allowed to accumulate on-site.

.2 Final cleaning:

.1 Remove temporary protection.

.2 Remove dust, dirt and foreign matter from surfaces.

.3 Broom clean paved exterior surfaces.

.3 Contractor's parking areas, storage areas, and access routes between work areas and aforementioned areas to be as defined by Owner's Representative and be strictly adhered to.

.4 At end of project, landscaping to be repaired to match pre-existing conditions to satisfaction of Owner's Representative and Consultant.

1.29 CONTRACT CLOSE-OUT

.1 Expedite and complete deficiencies and defects identified by Consultant.

.2 Submit required documentation such as statutory declarations, Workers' Compensation Certificates, warranties, certificates of approval or acceptance from regulating bodies.

.3 Review observation and testing reports to verify conformance to intent of documents and that changes, repairs or replacements have been completed.

.4 Provide on-going review, observation, and attendance to building, call-back, maintenance and repair problems during Warranty periods.

.5 Provide warranties and bonds fully executed and notarized.

.6 Execute transition of Performance of Labour and Materials Payment Bond to warranty period requirements.

.7 Collect and assemble documents executed by Subcontractors, suppliers and manufacturers.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION - 01 00 00

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PART 1 - GENERAL

1.1 DESCRIPTION

.1 Contractor to provide all labour, equipment, and materials necessary to perform to completion Work as described in these Contract Documents for:

.1 Roof Replacement Program 2020 on designated roof areas of:
Pacific Wildlife Research Centre, located at 5421 Robertson Road, Delta, BC, V4K 3N2.

.2 Contract Documents to be reviewed in their entirety with all sections, including Division 1-General Requirements, to be considered interrelated and form part of this section.

1.2 PROJECT SCHEDULE

.1 Substantial Completion of Work to be completed in 10 weeks after Award of Contract.

1.3 EXAMINATION OF DRAWINGS, SPECIFICATIONS, AND WORKSITE

.1 Carefully examine and study all Bid Requirements together with existing site conditions and any other necessary data or conditions that may affect performance of Work in order to determine full extent of Work.

.1 Under no circumstances will any claims be allowed against Owner resulting from failure to ascertain full extent of Work herein described, specified, or implied.

.2 Contractor to verify to own satisfaction that existing site conditions, roof components, and measurements are accurately reported in Bid Requirements. Obtain or check all measurements and dimensions at worksite as may be necessary and required for performance of Work.

.1 Drawings, specifications, and schedules are complementary to each other; what is called for by one to be binding as if called for by all.

.2 Should any discrepancy appear between documents leaving doubt as to intent or meaning, most stringent requirement shall govern unless directed otherwise in writing by Consultant.

.3 Bid submission to be based on products, equipment, and/or suppliers named and identified as approved or accepted in technical specifications and drawings.

.1 Bid Documents constitute acceptable roofing installations.

.2 No deviation from specifications, drawings, or approved shop drawings allowed without prior written approval by Consultant, and if applicable by Manufacturer.

.4 Cost for any hazardous materials encountered during Work that requires specialized handling will be covered by Approved Change Order only.

.5 Weather conditions are considered incidental to Work and will not be considered additional to Bid Price.

1.4 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period for execution of normal operations.

.2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.5 CONTRACTOR USE OF PREMISES

.1 Contractor to limit use of premises for Work, for storage and access.

.2 Coordinate use of premises under direction of Owner and Consultant.

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

1.6 GENERAL SITE REQUIREMENTS

.1 Perform Work between hours of 07:00 to 18:00 hours, Monday through Friday. Consult with Client/Building Owner for special access times.

.2 Temporary Barriers, enclosures and signage will be highly enforced given use of property.

.3 Contractor to ensure safety and proper execution of public routing; ensuring temporary access to fire exits if and when they are affected as part of Work.

.4 Obtain Construction/Building Permit and sidewalk/roadway occupation permits as required by local municipality.

.5 Determine nature and extent of all site services above and below grade prior to commencement of Work.

.6 Coordination of trades will be responsibility of Contractor to ensure work is completed as soon as possible. Provide weather protection and heating as required to perform Work if required and as specified.

.7 Supply, set-up, maintain and remove scaffolding, man-lift platforms and/or swing-stages during performance of Work as required to access work areas. If scaffolding is to be used, Contractor to provide complete shop drawings bearing seal of a Professional Engineer, licensed to practice in Place of Work. Work to include review and approval of installed scaffolding by Designer. Allowance should be made for access to all elevations of building.

.8 No public access to Work area to be allowed. Ensure access to fire exits are maintained and hoarded through Work area. Pedestrian access along sidewalks must be maintained as per Owner's requirements. No areas of access to or around building are to be restricted without approval of Owner.

.9 Sanitary Facilities

.1 Provide on-site washroom facilities on ground level only, secured in a locked compound. The Contractor will not have access to the building washrooms.

.2 Maintain facilities in clean condition.

.3 Workers will not be permitted to use any other sanitary facilities, intended for the use of public or building personnel.

.10 Install temporary protection at all locations of Work, as required to ensure safe, clean, orderly removal and disposal work, and to provide protection for all interior and exterior building components, vehicles, pedestrians and occupants.

.11 Provide temporary support to existing structural and cladding components during performance of work if required.

.12 Install temporary protection for all materials and building components, which have been exposed during demolition/removals as specified.

.13 Dispose of all materials unable or unsuitable for recycling at landfill site authorized by authorities having jurisdiction.

.14 Pay for any additional testing and observations required by Observer for correction of Work, without additional cost to Owner, when initial tests and observations reveal work failing to meet contract requirements and when construction extends beyond the schedule submitted by the contractor.

1.7 PROTECTION OF ROOFS

.1 Protect all roof areas within area of Work and where equipment or materials are stored. Do not store equipment or materials directly on roof surface.

.2 Protect existing roof systems to remain against damage from traffic generated by new Work.

.3 Protection of existing and newly installed roof membranes to use sheets of 25mm (1") expanded polystyrene insulation cover with 13mm (0.5") plywood.

1.8 SCOPE OF WORK: LOW SLOPE MEMBRANE ROOFING

.1 On Roof Areas L–1.1 and L–1.2: Remove existing system components, projection and perimeter flashings, and old appurtenances down to existing plywood deck in preparation for installation of a new waterproofing system in accordance with Section 07 52 00.

.1 Review entire existing roof deck with Consultant to identify damaged areas requiring repair or replacement. Consultant to be notified 48 hours prior to roof deck examination.

.2 Install new compatible deck materials where required to repair and restore existing deck.

.3 Install 1 layer of laminated asphaltic board base sheet support panel, adhered.

.4 Install 1 ply modified bitumen base sheet flashings, adhered.

.5 Install 1 ply granular modified bitumen cap sheet and flashings, adhered.

.6 Install new prefinished metal flashings, hook strips, and trim at all perimeter and projection locations where indicated on drawings and detailed in related technical sections.

1.9 SCOPE OF WORK: STEEP SLOPE CEDAR SHINGLE REPLACEMENT

.1 On Roof Areas L–2.1, L–2.2 and T–1.1: Supply all labour, equipment, and materials to install new cedar wood shingle roof system. New cedar roof system is to be installed per Section 07 31 29 and to include, but not be limited to the following provisions:

.1 Remove down to existing wood sheathing and dispose of existing wood shingles, underlayment roof membrane, projection and perimeter flashings, and old appurtenances to an appropriate site.

.2 Review entire existing roof deck with Consultant to identify areas requiring replacement. Consultant to be notified 48 hours prior to roof deck examination.

.3 Repair and replace all damaged wood siding and fascia. Prime and paint all new and repaired wood siding and fascia remaining exposed and unprotected by new prefinished metal flashings.

.4 Within Attic, supply and install new insulation to increase R value from R 28 to R 50 where applicable.

.5 Install new 9.5mm (0.375") plywood on to of the existing roof deck, mechanically fastened.

.6 Install new metal drip edge flashing where applicable as per Section 07 62 00.

.7 Install new self adhering eave protection membrane along valleys, ridges, eaves, perimeters, at roof penetrations and at the entire roof deck surfaces.

.8 Install cedar shingles in shingle wave pattern with average exposure of 70mm (2.75"). Use wide shingles close to valley centre and feather extra rows to keep exposure consistent. Cedar shingles weave pattern shall have no exposed nails. Use stainless steel fasteners. Use short nails on exposed soffits.

.9 Install cedar shingle at the hip, valley and eve locations in the steam bent fashion to match existing installation.

.10 Supply and install appropriate new vent and exhaust fan flashings where applicable.

.11 Mechanically fasten new three ply, continuous layer of cedar wood shingles saw tooth in fashion.

.12 Provide neat row of overlapping cedar wood ridge shingles at hip and ridge locations.

.13 Preserve existing metal rain gutters and downpipes.

.14 Provide new clear brick sealer to brick chimneys above deck.

.15 Install new prefinished metal flashings, hook strips, and trim at all perimeter and projection locations where indicated on drawings and detailed in related technical sections.

1.10 SCOPE OF WORK: STEEP SLOPE CEDAR SHINGLE REPLACEMENT

.1 On Roof Area A–2.3 and S-2.3: Supply all labour, equipment, and materials to install new cedar wood shingle roof system. New cedar roof system is to be installed per Section 07 31 29 and to include, but not be limited to the following provisions:

.1 Remove down to existing wood sheathing or wood strapping and dispose of existing wood shingles, underlayment roof membrane, projection and perimeter flashings, and old appurtenances to an appropriate site.

.2 Review entire existing roof deck and strapping with Consultant to identify areas requiring replacement. Consultant to be notified 48 hours prior to roof substrate examination.

.3 Repair and replace all damaged wood siding and fascia. Prime and paint all new and repaired wood siding and fascia remaining exposed and unprotected by new prefinished metal flashings.

.4 Within Attic, supply and install new insulation to increase R value from R 28 to R 50 where applicable.

.5 Install new 9.5mm (0.375") plywood on to of the existing roof deck, mechanically fastened.

.6 Install new metal drip edge flashing where applicable as per Section 07 62 00.

.7 Install new self adhering SBS eave protection membrane along valleys, ridges, eaves, perimeters, at roof penetrations and at the entire roof deck surfaces.

.8 Supply and install new metal flashings in valley locations.

.9 Install cedar shingles in shingle wave pattern with average exposure of 70mm (2.75”). Use wide shingles close to valley centre and feather extra rows to keep exposure consistent. Cedar shingles weave pattern shall have no exposed nails. Use stainless steel fasteners. Use short nails on exposed soffits.

.10 Provide neat row of overlapping cedar wood ridge shingles at hip and ridge locations.

.11 Preserve existing metal rain gutters and downpipes.

.12 Supply and install appropriate new vent and exhaust fan flashings where applicable.

.13 Mechanically fasten new three ply, continuous layer of cedar wood shingles saw tooth in fashion.

.14 Provide neat row of overlapping cedar wood ridge shingles at hip and ridge locations.

.15 Preserve existing metal rain gutters and downpipes.

.16 Install new prefinished metal flashings, hook strips, and trim at all perimeter and projection locations where indicated on drawings and detailed in related technical sections.

1.11 SCOPE OF WORK: REMOVAL OF HAZARDOUS MATERIALS

.1 Design Authority has documentation indicating there is no asbestos present in the tested samples in Phase 1.

.1 If any found, Contractor responsible for co-ordination of abatement procedures for all Asbestos Containing Materials (ACM) pertinent to successful performance of Work.

.2 All ACM work to be in compliance with current provincial asbestos abatement regulations for Place of Work.

1.12 MISCELLANEOUS

.1 It shall be the responsibility of the Contractor to verify that all existing conditions and roof system components are accurately reported in these specifications.

.2 All details specified by this Scope of Work constitute acceptable installations. Any deviation from these specifications must first be approved by the Consultant prior to any installation.

.3 All reasonable precautionary measures will be undertaken. It shall be the responsibility of the Contractor to ensure minimal dust and debris contamination of the interior and exterior of the work site.

.4 At the end of each day’s work drag a magnetic bar across all work areas to remove all fasteners from the grounds. All loose debris shall be removed from the designated roof areas and disposed of accordingly.

.5 It shall be the responsibility of the Contractor to arrange and pay for the disconnect and reconnect of all ventilation, mechanical and A/C units as required to execute the Work.

.6 If the removal of any exhaust vents or equipment results with an opening in the deck that cannot be permanently sealed that day, the Contractor shall be responsible for providing overnight security to the building by a company approved by the Consultant.

.7 It shall be the responsibility of the Contractor to ensure that no attachments (wiring, lighting, etc.) are attached to the underside of any deck that is to be removed. The contractor shall notify a representative of the Owner, who will then disconnect any such services, if necessary.

.8 Security fencing shall be provided at all times for equipment and materials at stored at ground level. No materials or equipment shall be left unsecured on the ground. The materials and equipment compound shall be locked when access is not required.

.9 Cover all roof materials properly with suitable tarps to prevent exposure to moisture and sunlight. Manufacturer's packaging does not constitute adequate tarping and protection. All roof materials are to be elevated on appropriate dunnage.

.10 Existing grounds shall be restored to original condition upon completion of project by the Contractor to the satisfaction of the Consultant.

1.13 CLEANING

.1 Perform daily and final clean-up of Work area and surrounding areas of site.

1.14 WARRANTY

.1 Contractor's Workmanship Warranty:

.1 Provide Owner with Contractor's two (2) year Warranty for Workmanship and Materials on Contractor's letterhead.

.2 Manufacturer's System Warranty:

.1 On All Low Slope Roof Replacement Areas: Provide the Owner with a written Twenty (20) Year Membrane Manufacturer's No Dollar Limit System Warranty from the date of Approved Final Review.

.2 On All Steep Slope Roof Replacement Areas: Provide the Owner with a written Thirty (30) Year Shingle Manufacturer's Limited Lifetime System Warranty from the date of Approved Final Review.

.3 RCABC RGC RoofStar Guarantee (On All Low Slope and Steep Slope Roofs):

.1 Provide to the Owner, the RGC RoofStar Ten (10) Year Guarantee. The cost of the RCABC Guarantee administration fee and milestone reviews is to be included in the Tender price.

.4 Cost of all warranties to be included in Tender Price.

.5 Cost of all Field Reviews to be paid directly to the Consultant by the Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION - 01 11 00

PART 1 - GENERAL

1.1 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders [and scaffolding], independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.

.5 Closures: protect work temporarily until permanent enclosures are completed.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to occupants, and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 EXISTING SERVICES

.1 Notify, Departmental Representative utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative [48] hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

1.5 SPECIAL REQUIREMENTS

.1 Carry out noise generating Work Monday to Friday from 18:00 to 07:00 hours and on Saturdays.

.2 Submit schedule in accordance with Section 01 32 16 - Construction Progress Schedule - Bar (GANTT) Chart.

.4 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.5 Keep within limits of work and avenues of ingress and egress.

.6 Deliver materials outside of peak traffic hours 17:00 to 07:00 and 13:00 to 15:00 unless otherwise approved by Departmental Representative.

.7 Prior to cutting or drilling horizontal or vertical surfaces including concrete, concrete block or other structural substrate, determine location of reinforcing, service lines, pipes, conduits or other items by x-ray, ground penetrating radar or other appropriate method. Submit findings to Departmental Representative prior to cutting or drilling.

1.6 SECURITY

.1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

.2 Security clearances:
.1 Obtain requisite clearance, as instructed, for each individual required to enter premises.
.2 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

1.7 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions. Smoking is not permitted within 6m of a door, window or fresh air intake.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

.1 This section includes Applications for Progress Payments, Schedule of Values, and for draws against specified Allowances.

1.2 SUBMITTALS

.1 Application for Progress Payment: One (1) written application to Consultant in accordance with Section 01 33 00 – Submittal Procedures, by courier, fax, or email requesting certification of payment and including all required accompanying forms, letters, and certificates.

1.3 APPLICATIONS FOR PROGRESS PAYMENT

.1 Date applications for payment for last day of each month and ensure amount claimed is for value of Work, proportionate to amount of Contract Price, performed and Products delivered to Place of Work by that date.

.2 Submit to Consultant at least ten (10) working days before first Application for Payment, preliminary Schedule of Values for parts of Work, aggregating total amount of Contract Price, to help facilitate Consultant's evaluation of Contractor's Applications for Payment.

.3 Schedule to follow Contractor's breakdown of Applications for Payment. Item number and descriptions to follow outline as designated in Bid Form.

.4 Application for First Progress Payment to include:

.1 Contractor's dated and numbered invoice; indicating project name and areas included,

.2 Contractor's Schedule of Values,

.3 WorkSafe BC Clearance Letter, certificate dated within ten (10) working days of invoice date.

.5 Application for Subsequent Progress Payments up to and including penultimate to include:

.1 Contractor's dated and numbered invoice; indicating project name and areas included,

.2 Contractor's Schedule of Values,

.3 WorkSafe BC Clearance Letter, certificate dated within ten (10) working days of invoice date,

.6 Application for Final Progress Payment to include:

.1 Contractor's dated and numbered invoice; indicating project name and areas included,

.2 Contractor's Schedule of Values,

.3 WorkSafe BC Clearance Letter, certificate dated within ten (10) working days of invoice date,

1.4 ALLOWANCES

.1 Any allowances that are drawn upon during progress or final payments to be included as follows:

.1 Invoices as supplied to Contractor to be attached to Contractor's Application for Payment. If invoice are not attached, any claim on Contractor's Application for Payment to be deducted from Consultant's Certificate of Payment.

.2 Allowance breakdowns to be included as part of Schedule of Values.

PART 2 - PRODUCTS

.1 Following table represents minimum information required on a submitted Schedule of Values:

Schedule of Values												
Project:									**Date:**			
Areas Included:									**Progress No.:**			
Description			Bid Rate			Actual Quantity			Value			
Item No.	**Item**	**Unit**	**Bid Quantity**	**Unit Rate**	**Amount**	**To Date**	**Previous**	**Current**	**To Date**	**Previous**	**Current**
Bid:												
1	*Sample*	*Lump Sum*	#	*N/A*	*$*	*%*	*%*	*%*	*$*	*$*	*$*
Allowances:												
A1	*Sample*	*/linear ft.*	#	*$/ft.*	*$*	*%*	*%*	*%*	*$*	*$*	*$*
Changes Orders:												
CO1	*Sample*	*/ ft²*	#	*$/ft²*	*$*	*%*	*%*	*%*	*$*	*$*	*$*
Totals:												
Sub-Total:					*Sum Amount*						*Sum Current Value*
G.S.T.:					*Calc GST*						*Calc GST*
Total:					*Sum Amount incl. GST*						*Sum Current Value +GST*

Allowance Breakdown											
Item No.	**Item**	**Quantity**	**Unit**	**Rate**	**Markup**	**Amount**					
A1	Labour 1	#	*Hours*	*$/hr*	*%*	*$*					
	Labour 2		*Hours*								
	Materials		*Kg*								
	Reciept										
	Other										
Total:						*Sum Amount*					

PART 3 - EXECUTION (NOT USED)

END OF SECTION - 01 29 00

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 11 00 – Summary of Work.

.2 Section 01 56 00 – Temporary Barriers and Enclosures

.3 Section 02 41 19 – Selective Demolition and Removal

.4 Section 07 31 29 – Cedar Shingles

.5 Section 07 52 00 – SBS Modified Bitumen Membrane

.6 Section 07 62 00 – Sheet Metal Flashings and Trim

1.2 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to (5) working days, to allow for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit to the Departmental Representative within (5) working days of the contract awarding, a Bar (GANTT) Chart that will serve as the Master plan. The Master plan will be used to plan, monitor, and set dates for progress report submission.

.3 Submit the Project Schedule to the Departmental Representative within (2) working days of the Master Plan final approval.

1.5 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule.

.1 Shop drawing submittal must be complete no later than four weeks of the contract award.

.2 The substantial completion certificate must be delivered no later than twelve weeks of the contract award.

1.6 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 The Departmental Representative and Consultant will review and return revised schedules within (2) working days following review of the Master Plan.

.3 If the Project Schedule is not realistic, review it and submit it no later than (2) working days after reception.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.7 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 The detailed Project Schedule must include the following activities:

.1 Contract award.

.2 Shop drawings and samples.

.3 Permits.

.4 Mobilization.

.5 Hazmat Abatement and installation of vapour retarder / temporary roof.

.6 Installation of the new roofing system.

.7 Sheet Metal Flashing.

.8 Demobilization.

.9 Close-out package.

1.8 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on a weekly basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.9 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION - 01 32 16

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PART 1 - GENERAL

1.1 DESCRIPTION

.1 This section details procedures to be followed for delivery of Submittals identified and required by other specification sections, consisting of but not limited to:

.1 Design Letter

.2 Shop drawings

.3 Samples

.4 Mock-ups

.5 Certificates and transcripts

1.2 GENERAL REQUIREMENTS

.1 Transmittal for Submissions: Accompany all submittals with transmittal letter containing:

.1 Date of transmittal,

.2 Sequential number for tracking of each submission,

.3 Project title and number,

.4 Identification and quantity of each shop drawing, product data sheet, sample, etc,

.5 Contractor's business name and address,

.6 Name of reviewer for Contractor,

.7 Contractor's review stamp: completed, dated, and signed certifying submittal has been reviewed, checked, and approved for compliance with Contract documents.

.2 Delivery: Direct submittals identified and required by individual technical sections to Consultant for review.

.1 All deliveries prepaid by Contractor.

.3 Time and Scheduling:

.1 Deliver submittals with reasonable promptness and in orderly sequence to avoid delay in progress of Work.

.2 Allow up to ten (10) working days for Consultant's review of each submission.

.3 Time for review to begin and be noted upon receipt of submittal by Consultant.

.4 No adjustments to Contract Time or Contract Price allowed due to delay in progress of Work caused by review, rejection, and re-submission process.

.4 Deviations from Contract Requirements: Notify Consultant in writing of any deviations from Contract Document requirements and state reasons for said deviations at time of submission:

.1 Contractor is responsible for errors and omissions in submission and is not relieved by Consultant's review.

.2 Contractor is responsible for deviations in submission from requirements of Contract Documents and is not relieved by Consultant's review.

.5 Review Before Delivery: Contractor to:

.1 Review each submittal for completeness and compliance with Contract Documents.

.2 Ensure that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work.

.3 Verify co-ordination of field measurements and affected adjacent Work.

.6 Incomplete Submissions:

.1 Entire submission package to be returned to Contractor if deemed incomplete during a preliminary review, for reasons including:

.1 Insufficient number of copies provided,

.2 Transmittal for submission incomplete, missing, or unsigned,

.3 Submittal not stamped, completed, signed, dated, or identified to specific project.

.7 Re-submissions:

.1 Use same procedure indicated here and above for re-submission.

.2 Clearly identify each correction or change made to submittal.

.3 Use original submittal number with appended suffix at end to indicate revision number.

.8 Acceptance and Rejection:

.1 Where review by Consultant discovers no errors and omissions or only minor corrections, min. two (2) copies to be returned for fabrication and installation of Work to proceed.

.1 One copy of accepted submission to be retained by Consultant for project record.

.2 If submittals are rejected or require significant modification, noted copies to be returned to Contractor and marked with request for correction and re-submittal.

.1 One copy of rejected submission to be retained by Consultant for project record.

.3 Re-submit corrected submittals using same procedure indicated above and listed in this section. Include required number of copies for subsequent re-submission.

.9 Distribution:

.1 Proceed with Work affected by submittals only after Consultant's review is complete.

.2 Distribute copies of accepted submittals as required. Deliver one copy to Owner or Owner's Representative for project management.

.3 Keep one copy of each reviewed submittal on site during performance of Work.

1.3 ACTION SUBMITTALS

.1 Manufacturer's Design Letter:

.1 Upon award of the work, and prior to loading, the roofing contractor must provide a Design Letter from the shingle manufacturer, which clearly states the specified assembly meets warranty requirements or contains recommended changes to meet specified warranty.

.2 System letter shall include reference to the Specified Wind Uplift Pressures stated Scope of Work.

.3 System Letter shall include a copy of the applicable Roof System Assessment Report of Wind Uplift Resistance (or proprietary equivalent), including specific sizes / gauges / TPI of fasteners, size and shape of insulation or membrane plates, and size of adhesive row(s).

.1 Shop drawings of shingle layout / placement is encouraged from the manufacturer to assist the field forces of the roofing contractor.

.4 Work performed prior to receipt of Design Letter may be rejected if not compliant with the Design Letter.

.2 Shop Drawings:

.1 Definition: "Shop Drawings" to mean drawings, diagrams, illustrations, schedules, performance charts, brochures and other data to illustrate details of a portion of Work.

.2 Number of Copies: Submit three (3) copies of shop drawings for each requirement identified and requested in technical sections, and as many additional copies as Consultant may reasonably request.

.1 Where shop drawings will not be prepared due to standardized manufacture of product, submit copies of product data sheets or brochures.

.3 Identify and Indicate: Products and materials to be used, methods of construction, attachment or anchorage, erection diagrams, connection diagrams, explanatory notes, and any other information necessary for completion of Work.

.1 Where articles or equipment attach to or connect to other articles or equipment, indicate that such items have been coordinated; regardless of Section under which adjacent items to be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Drawings and Diagrams:

.1 Field Measurements: Note critical dimensions established by field measurement and any relationships to other critical features of Work.

.2 Project specific information and dimensions to be drawn accurately to scale.

.3 Manufacturer’s Standard Drawings: Supplement standard information to provide detail specifically applicable to project. Modify to delete information not applicable to project.

.4 Measurements and Units: Present shop drawings, product data, samples, and mock-ups in SI Metric units. Where items or information are not produced in SI Metric units, converted values are acceptable.

.5 Submittals to Include:

.1 Date and revision dates,

.2 Project title and number,

.3 Name and address of Subcontractor, Supplier, and Manufacturer,

.4 Contractor's stamp, signed by authorized representative certifying approval of submissions, verification of field measurements, and compliance with Contract Documents,

.5 Where required, licensed Engineer's signed and dated stamp or seal, valid for Place of Work,

.6 Details for appropriate portions of Work, as applicable including:

.1 Fabrication,

.2 Dimensioned layouts, including field dimensions and clearances,

.3 Setting or erection details,

.4 Capacities,

.5 Performance characteristics,

.6 Standards,

.7 Operating weight,

.8 Wiring diagrams,

.9 Single line and schematic diagrams,

.10 Relationship to adjacent work.

.6 Changes and Adjustments:

.1 Make noted changes to shop drawings as Consultant may require, consistent with Contract Documents. When re-submitting notify Consultant in writing of any revisions other than those requested.

.2 Adjustments to shop drawings made by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.3 Samples:

.1 Number of Copies: Submit duplicate (2) samples for each requirement identified and requested in technical sections, and as many additional sample copies as Consultant may reasonably request.

.2 Identify and Indicate: Label sample's source or manufacture, material, size, model number, and intended usage in Work.

.3 Sample Size:

.1 Full size samples, cured and finished, as indicated in technical sections,

.2 Physically identical to product proposed for use in Work,

.3 Prepared from same materials and methods to be used for installation of Work.

.4 Mount, display, or otherwise package samples in sufficient way to facilitate review of sample for quality.

.5 Where colour, pattern, or texture is criterion, submit full range of samples.

.6 Notify Consultant in writing, at time of submission, of any deviations in samples provided from requirements of Contract Documents.

.7 Changes and Adjustments:

.1 Make noted changes to samples as Consultant may require, consistent with Contract Documents.

.2 Adjustments to samples made by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.8 Do not proceed with any Work associated with samples until each has been reviewed and accepted by Consultant.

.1 Acceptance of samples to be noted in writing by Consultant.

.9 At least one of each accepted sample to be returned to Contractor to store on site.

.10 Reviewed and accepted samples to become standard of workmanship and material referenced for comparison and verification of finished Work.

.4 Mock-ups:

.1 Erect sample mock-ups for each requirement identified and requested in technical sections, and as requested by Consultant.

.2 Mock-ups to be full scale and in section sizes as identified in technical section or as requested by Consultant.

.3 Coordinate location for onsite installation of mock-ups with Consultant.

.4 Deliver one submittal letter noting completion of mock-up installation and requesting on site review by Consultant.

.5 Do not proceed with any Work associated with mock-up until it has been reviewed and accepted by Consultant.

.1 Acceptance of mock-ups to be noted in writing by Consultant.

.6 Accepted mock-up to constitute minimum project standard of workmanship and material to be maintained throughout performance of Work.

.7 Maintain and protect mock-ups on site during progress of Work as reference for comparison and verification of finished Work.

.1 Any Work completed after review not meeting mock-up standard to be removed and reinstalled, at Consultant's discretion, with new materials at no additional cost to Owner.

1.4 INFORMATIONAL SUBMITTALS

.1 General:

.1 Number of Copies: Unless otherwise noted, submit three (3) copies for each requirement identified and requested in technical sections, and as many additional copies as Consultant may reasonably request.

.2 Copy of the Scope appropriate Notice of Project (NOP) filed with WorkSafe BC for Place of Work.

.3 Insurance and Bonds: True copies of transcripts for specified insurance and bonds:

.1 Naming Owner as Additional Insured,

.2 Indicating amount and type of coverage,

.3 Notarized and executed.

.4 Manufacturer's Safety Data Sheets (SDS):

.1 Published or written information documenting physical and chemical characteristics of products to be installed with handling, safety, and first aid guidelines, including:

.1 Manufacturer's name,

.2 Product name and model number,

.3 Current and latest edition.

.5 Trade or Installer Qualifications:

.1 Present accreditation cards or tickets, or true copy of, to QA Observer at start of Work and whenever Observer requests, containing:

.1 Name and photo of qualifying individual,

.2 Identification of training type or certification received,

.3 Date achieved or received, or expiry of certification.

.6 Applications for Payment:

.1 One copy by courier, fax, or email with all required accompanying submittals and documentation in accordance with Section 01 29 00 – Payment Procedures.

.7 Closeout Submittals:

.1 Upon completion and acceptance of Work, deliver copies of submittals in accordance with Section 01 77 00 – Closeout Submittals.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION - 01 33 00

1. SUBMITTALS

1.1 Make Submittals in accordance with Section 01 11 55 "General Instructions".

1.2 Submit a site-specific Health and Safety Plan, within 7 days after Notice to Proceed and prior to commencement of Work. The Health and Safety Plan must include:
- 1.2.0 Site-specific safety hazard assessment.
- 1.2.1 Safety and health risk or hazard analysis for site risks and operation.

1.3 Submit Construction Safety Checklists after completion.

1.4 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.

1.5 Submit copies of incident and accident reports.

1.6 Submit to Engineer with Material Safety Data Sheets (MSDS).

1.7 Personal training requirements including as follows:
- 1.7.1 Names of personnel and alternates responsible for site safety and health, hazards present on site, and use of personal protective equipment.

1.8 The Engineer will review the Contractor's site-specific Health and Safety Plan and provide comments to the Contractor within 7 days after receipt of the plan. Revise the plan as appropriate and resubmit plan to the Engineer within 3 days after receipt of comments from the Engineer.

1.9 Medical Surveillance: Within 7 days after date of the Notice to Proceed and prior to mobilization to the site, submit certification of medical surveillance for site personnel, and submit additional certifications as personnel are sent to the site.

1.10 On-site Contingency and Emergency Response Plan: Address the standard operating procedures to be implemented during emergency situations.

2. FILING OF NOTICE

2.1 File Notice with Provincial authorities prior to commencement of Work.

3. SAFETY ASSESSMENT

3.1 Perform a site-specific safety hazard assessment related to the project.

4. MEETINGS

1.1. Pre-construction meetings: The Contractor shall attend a Pre-Construction Meeting.

5. REGULATORY REQUIREMENTS

5.1 The Contractor shall comply with the specified standards and regulations to ensure safe operations. The latest editions are applicable.

5.5.1. Canada Labour Code Part II
5.5.2. Canada Occupational Safety and Health Regulations
5.5.3. National Building Code Part 8 – Safety Measures at Construction & Demolition Sites
5.5.4. National Fire Code Part 4 – Flammable and Combustible Liquids
5.5.5. National Fire Code Part 5 – Hazardous Process and Operations
5.5.6. Provincial Health and Safety Act and Regulations
5.5.7. Canadian Construction Association COVID-19 Standardized Protocols for All Canadian Construction Sites, Provincial Regulations, and Federal Site Specific COVID-19 Procedures.

6. CONTRACTOR RESPONSIBILITY

6.1 The Contractor shall be responsible for the Health and Safety of persons on site, safety of property on site and for the protection of persons adjacent to the site and environment to the extent that they may be affected by the conduct of Work.

6.2 The Contractor shall comply with and enforce compliance by their employees with the safety requirements of the Contract Documents, applicable federal, provincial, local statutes, regulations, ordinances, and site-specific Health and Safety Plan.
(i.e. Occupational Health and Safety Acts and Regulations for Construction Projects, Canada Labour Code Part II)

7. CONTRACTOR ACCIDENT AND INCIDENT REPORT

7.1 The Contactor shall advise the Engineer of any accident, injury, near-miss incident, fire, explosion, or chemical spill occurring at the Work site and any visit to the site by a governmental enforcement official.

8. UNFORSEEN HAZARDS

8.1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, the Contractor shall immediately stop work and advise the Engineer verbally and in writing.

9. WORK STOPPAGE

9.1 The Engineer and/or designated Health and Safety personnel may stop work for health and safety considerations.

10. CORRECTION OF NON-COMPLIANCE

10.1 The Contractor shall immediately address health and safety non-compliance issues identified by the Engineer and/or other designated Health and Safety personnel.
The Engineer may stop Work if non-compliance of health and safety regulations is not corrected by the Contractor.

11. DISCIPLINARY ACTIONS

11.1 The Contractor's disregard and/or lack of compliance to health and safety measures, procedures and policies shall lead to disciplinary action by the Engineer.

12. SITE HEALTH AND SAFETY POLICIES AND DIRECTIVES

12.1 The Contractor shall comply and follow all prescribed site Health and Safety Policies and Directives including but not limited to the following:

12.1.1 **Worker Profile Sheet:** The Contractor shall submit to the Engineer a completed Worker Profile Sheet c/w all attachments including copies of licenses, certificates and permits for supporting qualifications to perform required work for a given project for each individual worker requiring access to the site. The completed Worker Profile Sheets are required for each individual worker prior to working on site.

12.1.2 **Hot Work Permit**: The Contractor shall submit a completed Hot Work Permit to the Engineer for review and approval. The Engineer's approval is required prior to initiating hot work.

12.1.3 **Hot Tap Permit:** The Contractor shall submit a completed Hot Tap Permit to the Engineer for review and approval. Approval by the Engineer is required prior to initiating hot tap work.

12.1.4 **Lock Out and Tag Out (LOTO) – Isolation Procedures**: The Contractor shall submit a completed LOTO Isolation Form (Zero Energy) to the Engineer for review and approval for all work requiring LOTO. The Engineer's approval of isolation form is required prior to initiating LOTO work.

12.1.5 **Live Work Procedure:** The Contractor shall submit a completed Live Work Procedure Form to the Engineer for review and approval for all work requiring Live Work procedures. The Engineer's approval of the Live Work Form is required prior to initiating Live Work.

12.1.6 **Emergency and Fire Evacuation Route:** The Contractor shall obtain training on procedures of evacuating the site under emergency and/or fire situations. Contractor training and sign-off is required prior to initiating site work.

12.1.7 **Trades Qualifications and Apprenticeship Act:** The Contractor shall sign-off confirming that the Trades Qualifications and Apprenticeship Act shall be observed and followed. Contractor sign-off is required prior to initiating site work.

END OF SECTION

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PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Barriers

.2 Environmental Controls

.3 Fall Arrest

.4 Traffic Controls

.5 Fire Routes

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CGSB 1.189M – Primer, Alkyd, Wood, Exterior

.2 CGSB 1.59 – Alkyd Exterior Gloss Enamel

.2 Canadian Standards Association (CSA)

.1 CSA O121M – Douglas Fir Plywood

.3 Occupational Health and Safety Act and regulations for Construction Projects.

.4 Canadian Standards Association (CSA), CSA S350-M, Code of Practice for Safety in Demolition of Structures.

.5 Comply with National Building Code of Canada, Part 8, “Safety Measures at Construction and Demolition Sites”, and Provincial requirements.

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.4 WORK AREA HOARDING

.1 Erect temporary site enclosures where required using:

.1 38 x 89mm (2” x 4”) construction grade lumber framing at 600mm (2’) centres and 1200 x 2400 x 13mm (4’ x 8’ x .5”) exterior grade fir plywood to CSA O121. Apply plywood panels vertically flush and butt jointed.

.2 1800 mm (6’) high interlocking steel fence, with openings no greater than 38 mm (1.5”)

.2 Where required provide a minimum of one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys.

.3 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.

.4 Paint public side of site enclosure in selected colours with one coat primer to CAN/CGSB 1.189M and one coat exterior paint to CAN/CGSB 1.59. Maintain public side of enclosure in clean condition.

.5 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.5 COVERED HOARDING

.1 Covered hoardings will be required when working over exits that serve as fire exits and locations where entrance or exit is required to remain open during work as stipulated by Owner.

.2 Covered hoardings to be erected from vertical face of exit/entrance a minimum of:

.1 A line from top of work extending on 60° angle from vertical, or

.2 6000mm (20') long.

.3 Covered hoardings to be provided when work occurs overhead of following:

.1 Emergency exits

.2 Safe Areas

.3 Emergency access roads

.4 Entrances and exits determined by Owner to remain open during work

.5 Entrances and exits required to remain open to provide adequate egress in and out of building.

.4 Covered hoardings for pedestrian traffic to be constructed as follows:

.1 Scaffolding frames with X-bracing at 2400mm (8') o/c;

.2 2"x10' planks across top of frames tight together fastened to scaffolding frames;

.3 19 mm (.75") plywood fastened to top of 2"x10' planks;

.4 Minimum 12.7 mm (.5") plywood on 38 x 89 mm framing side walls set inside of overhead framing;

.5 Hoarding to be constructed to provide unobstructed sight lines both into and out of any enclosed spaces, with 203mm (8") open spaces between sheathing. Netting or mesh strips are to be used to cover the openings.

.6 Provide and maintain lighting to a minimum of 50 lux, constructed in a fashion that will mitigate vandalism.

.5 Covered hoardings for Access roads and Safe Areas to be designed by a Professional Engineer licensed in province for Place of Work under guidelines of provincial Occupational Health and Safety Act and with local authorities having jurisdiction.

1.6 WORKING FROM ROOF

.1 If and when work is performed on roof, existing roof composition to be protected by following:

.1 Minimum 25mm (1") rigid insulation;

.2 12.7 mm (.5") plywood sheathing.

1.7 FALL ARREST

.1 Conform to requirements of Occupational Health and Safety Act and regulations for Construction projects. Refer to Section 01 35 23 for additional information.

.2 Any modifications or additions to the building such as guardrails, fall restraint systems, etc. are to be removed from the site at the completion of the work and the work made good.

.1 Any inability to restore the work to an as built condition is to be brought to the attention of the Consultant and Owner for review and discussion.

1.8 WEATHER ENCLOSURES

.1 Weather to be considered incidental to work and to not be claimed as additional.

.2 Applicable standard to be used for materials or building components when enclosures and/or heating is required to complete work.

.3 Provide weather tight closures for, but not limited to:

.1 Unfinished door and window openings;

.2 Openings in floors and roofs;

.3 Openings through walls;

.4 Locations where daily work is not completed in a day's work and components left exposed are sensitive to weather conditions;

.5 Protection of materials used that are sensitive to weather conditions.

.4 Design enclosures to withstand wind pressure, snow loading etc.

1.9 DUST TIGHT SCREENS

.1 Provide dust tight screens to localize dust generating activities, and for protection of workers, finished areas of Work and public.

.2 Maintain and relocate protection until such work is complete.

.3 Provide means for ventilating area if work is to occur in an interior or confined space.

.4 Ventilate work area when it corresponds with areas used by tenants or patrons concurrently for parking or egress. If dust generation will affect tenants or patrons provide sealed enclosure with adequate ventilation for health and safety of workers.

1.10 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

.2 Provide all appropriate signage directing public and building occupants away from work area

.3 Emergency exits: Maintain clear and unobstructed use of all existing exit doors and routes. This may include provision of overhead protection and enclosed exit walkways in case of overhead work. Provide adequate lighting for 24 hour use.

1.11 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.12 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

.2 Provide all required signage to inform emergency vehicles of temporary route for access if modified as part of work.

1.13 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.14 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Consultant locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

END OF SECTION - 01 56 00

PART 1 - GENERAL

1.1 CONSTRUCTION & DEMOLITION WASTE

.1 Carefully deconstruct and source separate materials/equipment and divert, from D&C waste destined for landfill to maximum extent possible. Target for this project is 75% diversion from landfill. Reuse, recycle, compost, anaerobic digest or sell material for reuse except where indicated otherwise. On site sales are not permitted.

.2 Source separate waste and maintain waste audits in accordance with the Environmental Protection Act,
- .1 Provide facilities for collection, handling and storage of source separated wastes.
- .2 Source separate the following waste:
  - .1 Brick and portland cement concrete.
  - .2 Corrugated cardboard.
  - .3 Wood, not including painted or treated wood or laminated wood.
  - .4 Gypsum board, unpainted.
  - .5 Steel.
  - .6 Items indicated in a Deconstruction and Waste Products Workplan Summary.

.3 Submit a waste reduction workplan indicating the materials and quantities of material that will be recycled and diverted from landfill.
- .1 Indicate how material being removed from the site will be reused, recycled, composted or anaerobically digested in a Deconstruction and Waste Products Workplan Summary.

.4 Submit proof that all waste is being disposed of at a licensed land fill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

.1 Not Used.

END OF SECTION

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PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Consideration of Substantial Performance

.2 Review and QA Observations required for applications of Substantial Performance and Total Completion

.3 Closeout Submittals

PART 2 - (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION AND DECLARATION

.1 Contractor and all Subcontractors to conduct a review of Work; identify deficiencies and defects in preparation of list for application of Substantial Performance.

.2 Consultant will schedule date within time allowance of Contract documents for both Consultant and Contractor to perform review of Work and to confirm Work identified on submitted list.

.3 Consultant will within time allowance of Contract documents provide a breakdown of costs associated with deficiencies and defects for Consideration of Substantial Performance.

.4 If Work is deemed incomplete in Consideration of Substantial Performance, complete outstanding items and request additional review following same protocol.

.5 When Contractor is satisfied that Work is completed make application for final review by Consultant. Consultant will within allowances of Contract documents perform final review of Work.

.6 Any deficiencies and defects to be tabulated with associated costing for Consideration of Completion.

.7 If Work is deemed incomplete by Consultant, complete outstanding items and request additional review.

.8 Defective products will be rejected, regardless of previous review and observations. Replace products with new at no expense to Owner.

3.2 MAINTENANCE AND RECORD DOCUMENTS

.1 Following to be submitted to Owner at completion of Work:

.1 Maintenance manuals for, but not limited to, operating instructions, maintenance manuals, record of “as built” drawings, spare parts, maintenance of materials, special tools for completeness.

.2 Record of substantial and project completion correspondence inclusive, but not limited to Contractor lists, Consultant tabulations and certificates.

.3 Compile all shop drawings that have been submitted.

3.3 RECORDING ACTUAL SITE CONDITIONS

.1 Submit Actual Conditions as outlined in following sentences.

.2 Record information on set of Project Specifications provided by Consultant.

.3 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.4 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.5 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:

.1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.2 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.3 Field changes of dimension and detail.

.4 Changes made by change orders.

.5 Details not on original Contract Drawings.

.6 References to related shop drawings and modifications.

.6 Specifications: legibly mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

3.4 WARRANTIES AND BONDS

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after certification of completion.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

3.5 FORMAT

.1 Organize data in form of an instructional manual.

.1 Binders to be vinyl, hard covered, 3 ’D’ ring, loose leaf 219mm x 279mm (8.5” x11”) with spine and face pockets.

.2 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.

.3 Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.4 Arrange content under Section numbers and sequence of Table of Contents.

.5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.6 Manufacturer's printed data, or typewritten data will be accepted.

.7 Drawings to be provided with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

3.6 CONTRACT CLOSE-OUT

.1 Expedite and complete deficiencies and defects identified by Consultants.

.2 Submit required documentation such as statutory declarations, Workers' Compensation Certificates, warranties, certificates of approval or acceptance from regulating bodies.

.3 Review QA Observation and testing reports to verify conformance to intent of documents and that changes, repairs or replacements have been completed.

.4 Provide on-going review, examination and attendance to building, call-back, maintenance and repair problems during Warranty periods.

.5 Provide warranties and bonds fully executed and notarized.

.6 Execute transition of Performance of Labour and Materials Payment Bond to warranty period requirements.

.7 Collect and assemble documents executed by Subcontractors, suppliers and manufacturers.

END OF SECTION - 01 77 00

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PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 11 00 – Summary of Work

.2 Section 01 56 00 – Temporary Barriers and Enclosures

.3 Section 07 52 00 – SBS Modified Bituminous Roofing Membrane

1.2 REFERENCES

.1 Latest edition of all listed references to apply:

.1 Canadian Standards Association CSA S350, Code of Practice for Safety in Demolition of Structures.

.2 National Building Code of Canada, Part 8, “Safety Measures at Construction and Demolition Sites”, and Provincial requirements.

.3 Occupational Health and Safety Act and regulations for Construction Projects.

.4 Canadian Environmental Protection Act (CEPA).

.5 Canadian Environmental Assessment Act (CEAA).

.6 Transportation of Dangerous Goods Act (TDGA).

1.3 ASBESTOS AND DESIGNATED SUBSTANCES

.1 Demolition of spray or trowel applied asbestos can be hazardous to health. Notify Consultant if material resembling spray or trowel applied asbestos is encountered on site. Stop work and do not proceed with further removal until written instructions have been received from Consultant.

.1 Abatement procedures for Asbestos Containing Materials (ACM) pertinent to successful performance of Work to be paid for by Owner, preapproved by Consultant, as an extra cost to Contract.

.2 All ACM work to be in compliance with current provincial asbestos abatement regulations for Place of Work.

1.4 STORAGE AND PROTECTION

.1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Consultant and at no cost to Owner.

.2 In all circumstances, ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.3 Protect trees, plants and foliage on site and adjacent properties where indicated.

1.5 EXISTING CONDITIONS

.1 Prior to start of any demolition work, remove contaminated or hazardous materials from site and dispose of at designated disposal facilities. All metals to be recycled.

.2 Record and discuss with Consultant any deviations from existing assumed conditions as indicated by drawings and/or specifications.

1.6 REGULATORY REQUIREMENTS

.1 Ensure all work is performed in compliance with CEPA, CEAA, TDGA, and all applicable provincial regulations.

1.7 NOTICE

.1 Provide a minimum twenty-four (24) hour notice to Consultant and Owner prior to proceeding with any work that may disrupt building access or services.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

.1 Examine site with Consultant and verify extent and location of items designated for removal, disposal, recycling, salvage and items to remain. Removal of HVAC units require confirmation by Owner's Representative.

.2 Locate and protect utilities where applicable. Notify and obtain approval of utility companies before starting demolition.

.1 Prior to any digging, ensure BC One is contacted at 1-800-474-6886 and confirm locations of gas lines, electrical service lines, or telephone / data lines. Failure to do so may result in repair costs being applied to the Contractor.

3.2 GENERAL PROTECTION

.1 Prevent movement, settlement, or other damage to adjacent structures, utilities, and parts of building to remain in place. Provide engineered bracing and shoring as required.

.2 Minimize noise, dust, and inconvenience to occupants.

.3 Protect existing building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.5 Provide required signage, barricades, hoarding, overhead protection and temporary egress.

.6 Support affected structure or building components and if safety of structure being demolished or adjacent structures or services appears to be endangered, take preventative measures and then cease operations and notify Consultant immediately.

.7 Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.8 Do not dispose of waste or volatile materials such as: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.

.9 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

.10 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.

.11 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.12 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

3.3 DEMOLITION SALVAGE AND DISPOSAL

.1 Remove parts of existing structure or roof system to permit repairs or new installation. Sort materials into appropriate piles for recycling and or reuse.

.2 Scope of work to include all costs to salvage, protect from harm, and re-use following components, unless indicated otherwise elsewhere in specifications:

.1 Existing skylights, mechanical equipment, cladding, stairs and ladders, satellite and communications equipment, electrical lines, and service lines, etc.

.3 Refer to drawings and specifications for items identified for reuse or salvage, if applicable.

.4 Remove items to be reused, store in a protected location, and reinstall under appropriate section of specification.

.5 Trim edges of partially demolished building elements to suit future use.

.6 Include for disposal of removed materials to appropriate landfill and/or recycling facilities, except where specified otherwise, and in accordance with authority having jurisdiction.

.1 Where possible, all existing recyclable materials, gravel, asphalt products, etc. to be transported to an appropriate recycling facility.

.2 Provide location of local facility receiving removed recyclable materials to Owner and Consultant.

.7 Dispose of debris on a continuous basis. Do not stockpile debris in a manner which would overload structure, or impede access around site.

3.4 SEQUENCE OF OPERATION

.1 Removal:

.1 Remove items as indicated in technical sections, including roofing ballast or gravel, metal roofing flashings, roofing membrane and flashings, roofing insulation, and or vapour retarder.

.1 Do not disturb items designated to remain in place.

.2 Restrict roofing demolition work to sections in limited size that will be restored and made watertight by end of working day.

.3 Use extreme caution when performing demolition work around skylights, sloped glazing, and other force and vibration sensitive roof projections.

.2 Removal From Site:

.1 Interim removal of stockpiled material may be required, if it is deemed to interfere with operations of Owner.

.2 Do not overload existing roof structures.

.3 Salvage:

.1 Carefully dismantle items containing materials for salvage and stockpile salvaged materials at locations acceptable to Owner and Consultant.

.4 Disposal of Material:

.1 Dispose of materials not designated for salvage or reuse on site to be hauled to an authorized disposal site and or recycling facilities.

.5 Backfill:

.1 Backfill in areas as indicated.

3.5 ABANDONED AND UNUSED ITEMS

.1 Items of unused and/or abandoned rooftop equipment, units, service lines, cabling, and any related supports which are not operational or in use are to be removed and disposed of.

.2 Existing services for abandoned equipment to be dismantled to below roof deck, and closed off in accordance with local bylaws and Code requirements. Confirm all electrical lockout procedures with Owner's representative.

.3 Existing roof deck openings to be closed using following guidelines:

.1 Openings up to 152mm (6") in diameter or 152mm x 152mm (6" x 6"):

.1 Metal Decking: Install 610mm x 610mm (24" x 24") galvanized steel plate, min. 18ga. secured with 4 screws per side to existing decking.

.2 Openings greater than 152mm (6") in diameter or 152mm x 152mm (6" x 6"):

.1 Wood Planking: Replace with SPF #1 grade boards to match existing thickness. All replacement decking shall have 3 points of bearing. Provide new framing to match original as required.

.2 Plywood Decking: Replace with No.1 construction grade plywood sheathing, Good One Side (G1S), to match existing thickness. All replacement decking shall have 3 points of bearing and installed in logical rectangular shapes. New plywood decking to be supported by at least half thickness of roof joist, truss, or rafter underneath. Provide galv. H-clips to existing decking on unsupported sides.

.3 Steel Decking: Obtain ruling from Engineer whether decking is to be replaced or suitably overlaid with identical decking. Secure all decking with TEK screws at each lower flute bearing point structure; welding is not permitted.

.4 Concrete Deck: Refer to detail drawing.

.3 Openings greater than 915mm x 915mm (3' x 3'):

.1 Consult Structural Engineer for deck review and design of new framing, decking, securement, and any other required support.

3.6 DECK REPAIRS

.1 Wood Decking: Areas of deteriorated wood planking or plywood decking to be cut out and replaced with new to match existing.

.2 Metal Decking: Areas of corroded steel decking not requiring replacement to be cleaned using a wire brush to completely remove all evidence of corrosion. Remove all dust and coat with zinc rich epoxy primer to completely cover all areas where corrosion was evident.

.3 Concrete Decking: Areas of concrete decking with pitted or deteriorated surfaces to be cleaned sufficiently to receive repair material. Repairs to be completed with quick set masonry repair grout trowelled to a smooth even finish, flush with surrounding areas.

3.7 RESTORATION

.1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.

.2 Use only soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.8 CLEANUP

.1 Upon completion of work, remove debris, trim surfaces and leave work site clean.

.2 Use only cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

END OF SECTION - 02 41 19

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PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 11 00 – Scope of Work

.2 Section 01 56 00 – Temporary Barriers and Enclosures

.3 Section 02 41 19 – Selective Demolition and Removal

.4 Section 07 31 29 – Cedar Shingle Roofing

.5 Section 07 52 00 – SBS Modified Bituminous Roofing

.6 Section 07 62 00 – Sheet Metal Flashing and Trim

1.2 REFERENCES

.1 Latest edition of all listed references to apply:

.1 American Lumber Standards Committee (ALSC): Softwood Lumber Standards.

.2 American Plywood Association (APA) Product Guide: Grades and Specifications.

.3 American Wood Preservers Assoc. (AWPA): Timber Products Pressure Treatment.

.4 Canadian Standards Association (CAN/CSA):

.1 CAN/CSA B111: Wire Nails, Spikes and Staples.

.2 CAN/CSA-G164M: Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CAN/CSA O121M: Douglas Fir Plywood.

.4 CAN/CSA-O141-91: Softwood Lumber.

.5 CAN/CSA O151M: Canadian Softwood Plywood.

.6 CAN/CSA-O325.0: Construction Sheathing.

.5 National Forest Products Association (NFPA): Grading Rules.

.6 National Lumber Grades Authority (NLGA): Stnd. Grading Rules, Canadian Lumber.

1.3 QUALITY ASSURANCE

.1 Lumber identification to be by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood identification to be by grade mark in accordance with applicable CSA standards.

.3 Plywood, OSB and wood based composite panel construction sheathing identification to be by grademark in accordance with applicable CSA standards.

.4 At all times during Work, Contractor will have on site a qualified project supervisor. It will be Supervisor's responsibility to ensure that Work is carried out in an efficient manner, according to Plans and Specifications.

.5 Provide shop drawings of carpentry details or interfaces for Consultants review.

.6 Where requested, mock-up of exposed carpentry shall be made available for review of Owner and Consultant. This may be submitted by partial constructed components..

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Protect lumber and other products from dampness both during and after delivery at site.

.2 Pile lumber in stacks in such manner as to provide air circulation around surfaces of each piece.

.3 Stack plywood and other board products so as to prevent warping.

.4 Locate stacks on well drained areas, supported at least 152mm (6") above grade and cover with tarpaulins with sufficient to protect lumber from driving rain.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Set aside damaged wood and dimensional lumber off-cuts for acceptable alternative uses (e.g. bracing, blocking, cripples, bridging, finger-joining, or ties). Store this separated reusable wood waste convenient to cutting station and area of work.

.2 Separate and recycle waste materials in accordance with applicable local, provincial and national regulations. Include for tipping fees associated with landfills and recycling depots

.3 Unused preservatives and fire retardant materials are to be diverted from landfill through disposal at a special wastes depot.

.4 Do not burn scrap at project site.

.5 Fold up metal banding, flatten, and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 LUMBER MATERIALS

.1 Materials to be best merchantable lumber, straight and sized and shaped to correct dimensions from nominal sizes noted on drawings. Lumber to be selected from well seasoned stock, free from loose resinous knots, shakes, waxed edges, splits, dry rot or other defects which would impair strength or durability.

.2 Lumber in accordance with following standards:

.1 CAN/CSA-O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.3 Unless specified otherwise all framing members to be No.1/No.2 SPF.

.4 All materials directly exposed to exterior or concrete surfaces to be pressure treated unless noted otherwise on drawings or elsewhere in specification.

.5 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers to be pressure treated where exposed to exterior or concrete elements.

.6 Moisture Content:

.1 At time of delivery and maintained at site.

.1 Boards and lumber 51mm (2") and less in thickness: 19% or less.

.2 Lumber over 51mm (2") thick: 25% or less.

.7 Preservative Treatment:

.1 All wood exposed to exterior environmental conditions, in contact with concrete or masonry to be treated with roof preservative.

.2 Do not treat Heart Redwood and Western Red Cedar.

.3 Treat wood members and plywood exposed to weather or in contact with plaster, masonry or concrete, including framing of open roofed structures; sills, sole plates, furring, and sleepers that are less than 610mm (24") from ground; nailers, edge strips, blocking, crickets, curbs, cant, vent strips and other members used in connection with roofing and flashing materials.

.4 Treat other members specified as preservative treated (PT).

.5 Preservative treatment by pressure method to ASTM D1760; except any process involving use of prohibited Chromated Copper Arsenate (CCA) or Alkaline Copper Quaternary (ACQ).

2.2 PANEL MATERIALS

.1 Douglas fir plywood (DFP): to CSA O121, standard construction, Good one side (G1S) when in contact with roofing membrane.

.2 Canadian softwood plywood (CSP): to CSA O151, standard construction, Good one side (G1S) when in contact with roofing membrane.

.3 Plywood, OSB and wood based composite panels: to CAN/CSA-O323.

2.3 ACCESSORIES

.1 Bent metal plate: 18ga or 22ga, galvanized metal sheet, formed as required or as indicated on drawings to provide support for wood blocking or roof assembly components.

.2 Anchorage to hollow masonry and gypsum walls: Galvanized toggle bolts.

.3 Anchorage to solid masonry or concrete: Expansion shields and lag bolts:

.1 Rawl mushroom head lead anchors, min 6mm (0.25") diameter for sheathing,

.2 Hilti Kwik-Bolts for structural members.

.4 Anchorage of wood members to sheet steel studs: Corrosion coated screws, min #14 thread, of length to penetrate minimum 19mm (0.75") through material into base.

.5 Nails: Minimum 6d, hot dip galvanized spiral or ring shank nails, length to penetrate through material 38mm (1.5") into base. Common nails are not acceptable.

.6 Anchorage of wood blocking to masonry: Masonry screws, Tapcon anchors of sufficient length to penetrate 32mm (1.25") into masonry surfaces.

.7 Batt Insulation: Stone wool mineral fiber batt insulation, Rockwool by Roxul Inc.

.8 Explosive actuated fastening devices are prohibited for use on this project.

2.4 ACCESSORY FINISHES

.1 Galvanizing: to CAN/CSA-G164:

.1 Galvanized fasteners for all exterior work unless otherwise specified.

.2 Galvanized fasteners for all high interior humid areas unless otherwise specified.

.2 Use stainless steel type 304 where noted on drawings.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Comply with safety regulations and applicable bylaws governing work included in this section. Provide and maintain necessary barriers, guards and rails.

.2 Scope of work includes parapet wall, roof joint, and wall modifications as indicated on drawings or as required to provide a secure, smooth surface to receive the new roof and flashing assembly:

.1 Install wood blocking secured into existing surfaces adequately to resist movement and wind uplift forces as per FMG 1-49, minimum 200 pounds/foot.

.2 Install mineral fiber insulation at all voids and as indicated on drawings.

.3 Install plywood sheathing to drawings.

.3 Complete wood blocking and sheathing to walls, curbs and drains as indicated on drawings.

3.2 SITE APPLIED WOOD TREATMENTS

.1 Treat only wood blocking which will remain exposed to the elements.

.2 Treat ends of site cut surfaces of materials delivered to site with wood preservative.

.3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

.4 Apply wood treatments following manufacturer’s instructions, and handle as per Safety Data Sheet instructions.

3.3 INSTALLATION

.1 Comply with requirements of local Building Codes:

.1 Ensure continuity and completeness of vapour retarder membrane as coinciding with new wood blocking installation.

.2 Provide mineral wool insulation to fill voids at roof deck level or as otherwise required or indicated on detail drawings.

.3 Install furring and blocking as required to space-out and support new walls, window projections and louver extensions, fascia, soffit, siding and other work as required.

.4 Align and plumb faces of furring and blocking to tolerance of 1:600.

.5 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.6 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure with adequate fasteners.

.7 Install sleepers as indicated.

3.4 ERECTION

.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.

END OF SECTION - 06 10 00

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PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Removal of existing and installation of new cedar shingles and associated materials over prepared substrate.

.2 Existing roofing components to be removed, in preparation for installation of a new steep slope roof system, existing system includes but is not limited to:

.1 On All Designated Steep Slope Cedar Roof Areas:

.1 New cedar shingles,

.2 HT self-adhered underlayment,

.3 Accessories, related penetration hardware, and sheet metal flashings,

.4 Prefinished Metal flashings and trims.

.3 Work to be executed to highest standards of workmanship in industry, by fully trained applicators in accordance with RCABC guidelines and the Cedar Shake and Shingle Bureau Roof Construction Manual.

.4 All materials to be new and in perfect condition, free from defects which may impair strength, durability, or appearance.

1.2 RELATED WORK SPECIFIED ELSEWHERE

.1 Section 01 11 00 – Summary of Work

.2 Section 02 41 13 – Selective Demolition

.3 Section 06 10 00 - Rough Carpentry

.4 Section 07 62 00 – Prefinished Sheet Metal Flashing

.5 Section 07 92 00 – Joint Sealants

1.3 SCOPE OF WORK

.1 Supply all labour, materials, and equipment to remove existing roofing components down to existing roof deck and replace with new cedar roof shingles and underlayment. Work to include, but not be limited to:

.1 Remove and dispose of existing wood shingles, underlayment, and all metal flashings, to an approved landfill site or recycling facility, including provision for protection at building walls and windows during removal.

.2 Examine existing wood sheathing, fascia, and soffit. Remove and replace all deteriorated sections with material to match existing in thickness. Contractor to supply and install new components to match existing on a time and material basis

.3 Install specified roofing assembly, including self-adhering membrane, underlayment, cedar shingles, and sheet metal flashings, gutters and downspouts as indicated on drawings.

.4 Perform daily and final clean-up of work area and surrounding areas and site.

1.4 REFERENCES

.1 Latest edition of all listed references; most stringent requirements to govern in conflicts:

.1 American Society for Testing and Materials (ASTM) International:

.1 D1970: Self-Adhering Polymer Mod. Bit. Sheet in Steep Roofing Underlayment.

.2 D3019: Standard Specification for Lap Cement, Asbestos-Free

.3 E108-11: Test Methods for Fire Tests of Roof Coverings (ULC S107)

.4 F1667: Driven Fasteners - Nails, Spikes & Staples, Type I, Style 20.

.2 Canadian Standards Association (CAN/CSA):

.1 A123-3-M1979: Asphalt Saturated Organic Roofing Felt.

.2 B111: Fasteners - Wire Nails, Spikes, and Staples.

.3 CAN2-51.32: Sheathing, Membrane, Breather Type Paper.

.4 0121M: Douglas Fir Plywood.

.5 0151M: Canadian Softwood Plywood.

.3 Canadian General Standards Board (CAN/CGSB):

.1 37.4: Fibrated, Cutback Asphalt, Lap Cement for Asphalt Roofing.

.2 37.5: Cutback Asphalt Plastic Cement

.3 51.32: Sheathing, Membrane, Breather Type.

.4 51.34: Vapour Barrier Polyethylene Sheet, for Use in Building Construction.

.4 Underwriters Laboratories (UL):

.1 790: Exterior Exposure- Test Methods for Fire Tests of Roof Coverings.

.2 997: Wind Resistance of Prepared Roof Covering Materials.

.5 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC).

.1 CCMC, Registry of Product Evaluations.

.6 Roofing Contractors Association of BC (RCABC): Roof Practices Manual, Latest Revision, and includes Technical Updates issued at the time of tender.

.7 Canadian Roofing Contractors Association (CRCA): Roofing and Waterproofing Manual.

1.5 EXTRA MATERIALS

.1 Unused shingles still in factory wrappings shall be provided to the Owner.

1.6 SUBMITTALS

.1 Provide to Quality Assurance Observer, at Prestart Meeting:

.1 Finalized project work schedule listing start date, anticipated number of working days working, and manpower assignments for project.

.2 Safety Data Sheets (SDS) pertaining to all proposed materials to be used on site to perform Work, which can be maintained at site.

.3 Documented abatement procedures for Asbestos Containing Materials (ACM) pertinent to successful performance of Work, and sub-contractor selected to perform this work.

.4 List of "Trained and Carded Membrane Approved Applicators" to work and be present during performance of Work.

1.7 QUALITY ASSURANCE

.1 Perform Work in accordance with Contracts Documents and Manufacturer's written instructions.

.2 Make no deviation from Project Specifications or approved shop drawings without prior written approval by Consultant and, if applicable, Manufacturer.

.3 Upon completion of new installation, provide certification that all work has been done in strict accordance with Contract Documents and to Manufacturer's requirements.

.1 Manufacturers or Guarantors requirements are to be considered as a Minimum Standard, with Design Authority Specified Standards having precedence. If Standards conflict, discuss with Consultant prior to proceeding with work.

.4 Workmanship shall follow RCABC Guarantee Standards for Cedar Shingle Roof Assemblies, 1:3 (4" in 12") or steeper.

1.8 QUALITY ASSURANCE OBSERVATION

.1 IRC Building Sciences Group, hereafter known as "Observer", is an independent Quality Assurance Observation Agency appointed by Owner to observe performance of roof Work:

.1 Arrange Prestart site meeting with Observer no more than three (3) weeks prior to commencement of Work on site. Obtain Observer's instructions and reference procedures to be followed on project.

.2 Provide to Observer date when each phase of work will begin, at least forty-eight (48) hours prior to commencement of Work for phase.

.3 Arrange Final Observation and examination of installed roof with both Observer and Manufacturer's Technical Representative.

.2 Cooperate with Observer and afford all facilities necessary to permit full access for Quality Assurance Observations during performance of Work. Act immediately on instructions given by Observer.

.3 When required, provide roof cut-outs and samples in field where directed by Observer and make good without additional cost to Owner.

.4 When initial tests and observations reveal work failing to meet contract requirements, pay for any additional testing and observations required by Observer or third party testing agency for correction of Work, without additional cost to Owner.

.5 Copies of Q.A. Observation Reports to be issued by Observer to Owner, Prime Contractor, and Roofing Contractor.

1.9 DELIVERY, STORAGE, AND HANDLING

.1 Site storage is limited. Where applicable, location of storage and related facilities to be coordinated with Prime/General Contractor.

.2 All materials to be delivered and stored in their original packaging bearing manufacturers label, grade and product weight, including all other related standards, specifications, and like.

.3 All materials to be adequately protected from inclement weather conditions and stored in a dry, well ventilated and weather protected location. Use only dry materials and apply only during weather that will not introduce moisture into roofing system.

.4 Remove only in quantities required for same day use.

.5 During extreme temperature, materials to be stored in a heated location with a 4.4°C (40°F) minimum temperature and removed only as needed.

.6 All materials in a rolled configuration to be stored on end, elevated off ground, and on a pallet or skid to protect bottom surface from foreign debris and moisture.

.7 Restrict stockpiling of material in one location on roof to prevent exceeding specified deck live load capacity. Avoid point loading that may compromise structural integrity of roof.

.8 Handle and store products in a manner to prevent damage and deterioration.

.9 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.10 ENVIRONMENTAL REQUIREMENTS

.1 Do not apply roofing materials to damp, wet, or frozen deck or substrates.

.2 Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

.3 Only install as much new roofing as can be made weather-tight each day, including all flashing and detail work.

.4 All work to be scheduled and executed without exposing interior building areas to adverse effects of inclement weather. Existing building and its contents to be protected against all risks.

.5 All new and temporary construction, including equipment and accessories, to be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.

.6 Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, provide all necessary protection and barriers to segregate work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over felt or plywood over insulation board to be provided for all new and existing roof areas that receive rooftop traffic during construction.

.7 Prior to and during application, all dirt, debris and dust to be removed from surfaces by vacuuming, sweeping, blowing with compressed air, and/or similar methods.

.8 Follow all safety regulations as required by OHS (Occupational Health and Safety) and any other applicable authority having jurisdiction.

.9 All roofing, flashings and metal work removed during construction to be immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable Local, Provincial, and National requirements.

.10 All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) to be immediately removed from site by Contractor and properly transported to a legal dumping area authorized to receive such material.

.11 Flammable adhesives and primers to not be stored and not be used in vicinity of open flames, sparks and excessive heat.

.12 All rooftop contamination that is anticipated or that is occurring to be reported to manufacturer to determine corrective steps to be taken.

.13 Verify that all roof drain lines, rain gutters, and downspouts are functioning correctly (not clogged or blocked) before starting work. Report any such blockages in writing to Consultant for corrective action prior to installation of roof system.

.14 Immediately stop work if any unusual or concealed condition is discovered and immediately notify Consultant of such condition in writing in order to obtain additional instruction.

.15 Site cleanup, including both interior and exterior building areas that have been affected by construction, to be completed to satisfaction of Consultant.

.16 All landscaped areas damaged by construction activities to be repaired at no cost to Owner.

.17 Take precautions when using adhesives at or near rooftop vents or air intakes. Avoid adhesive odours from entering building. Coordinate operation of vents and air intakes in such a manner as to avoid intake of adhesive odour while ventilating building. Keep lids on unused cans at all times.

1.11 PREPARATORY WORK

.1 Review roof levels and advise Consultant of any deviation from specified tolerances.

.2 Review rain gutters, and downspouts. Advise Consultant of any deviation or alteration from specifications.

.3 Sweep roof deck free of dust or dirt and remove all debris prior to any installation work.

1.12 SAFETY AND PROTECTION

.1 Refer to Section 01 35 23 – Health and Safety.

1.13 WASTE MANAGEMENT AND DISPOSAL

.1 Place materials defined as hazardous or toxic in designated containers.

.2 Ensure emptied containers are sealed and stored safely for disposal away from children.

.3 Use the least toxic sealants, and adhesives necessary to comply with requirements of this section.

.4 Close and seal tightly. Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.5 Place used hazardous sealant tubes and adhesive containers in areas designated for hazardous materials.

1.14 WARRANTY

.1 Roof Replacement Material Warranty:

.1 On All Steep Slope Roof Replacement Areas: Contractor is to supply Owner with Manufacturer's Warranties as specified below:

.1 Limited Lifetime 30 Year System Warranty.

.2 Cost of field reviews / quality assurance observations is to be paid for by Owner.

.3 Cost of all warranties to be included in Contract Price.

PART 2 - PRODUCTS

2.1 GENERAL

.1 All materials listed below must be used on project. Under no circumstances will substitute materials be used unless approval in advance, in writing by Consultant. Use of substitute materials without prior approval may result in complete removal and replacement of non-specified materials at no cost to Owner.

2.2 FASTENERS

.1 Cedar Shingle Fasteners: hot dip galvanized steel or stainless-steel roofing nails (Type 304 or 316), 12 to 14 gauge in thickness, round heads 10mm (0.38") to 12mm (0.44") in diameter. Length to penetrate into solid wood plank decking by min. 25mm (1.0") or penetrate through underside of roof sheathing board by min. 19.05 mm (0.75").

2.3 SHINGLE UNDERLAYMENT

.1 Eave Protection and Underlayment: Self Adhered SBS Modified Rubberized Asphalt, High Temperature, Roofing Underlayment.

.1 Standard of acceptance is to be Platinum HT-SA as manufactured by FT Synthetics or Owner approved equivalent.

2.4 CEDAR SHINGLES

.1 Cedar Shingles: To CSA 0118.1-97 Western Red Cedar Shakes, No. 1 Perfection Shingles, CCA Treated, Blue Label Royals, 457 mm (18") long or Owner approved equivalent.

.1 Treatment: CCA Pressure Preservative Treatment to CSA 080 Series 97 with water based clear preservative to improve fungus, moisture resistance.

2.5 SHINGLE ACCESSORIES

.1 Roof Vents:

.1 Roof Ventilator: On roofs without ridge, contractor to install static air vents to comply with BC Building Code venting requirements. Colour to match shingles or as chosen by Owner.

.1 Standard of acceptance to be Weather PRO Pro50 by Duraflo or Owner approved equivalent.

.2 Plumbing Stack Flashings:

.1 Plumbing Stack Flashings: Lead plumbing stack flashings, slope to match existing roof slope, complete with lead settlement caps.

.3 Concrete Sealer: Apply clear concrete sealer coat to brick chimneys above deck. Fabrishield 761 by Fabrikem or Owner approved equivalent.

.4 Underlayment Primer: Rubber based, compatible with underlayment, Perm-a-Barrier primer, or Owner approved equivalent as recommended by underlayment manufacturer.

.5 Underlayment Mastic: single component, rubber-based mastic, compatible with underlayment, or as recommended by underlayment manufacturer.

.6 Sealants: Sealant shall be a high performance, high movement, single component, medium modulus, low VOC, UV Stable, non-sag material and be of a hybrid nature, utilizing silyl-modified polyurethanes, also identified as an MS Polymer.

.1 Tremco Dymonic 100 or Owner approved alternate equivalent Hybrid Sealants discussed with Consultant. Colour of sealant to be selected to match cladding components.

.2 Primer: As recommended by sealant manufacturer to assure adhesion of compound, to prevent staining of substrate.

.3 Joint Backing: Polyethylene, urethane, neoprene, or vinyl, extruded closed cell foam in circular shape with diameter 25% greater than joint width before installation; joint breaking tape approved by sealant manufacturer where specified.

.4 Cleaning Material: As recommended by sealant manufacturer

.7 Sealing compound: to CAN/CGSB-37.29, for asphalt shingles.

.1 Acceptable material: Polybitume or Owner approved equivalent as dictated by shingle manufacturer.

2.6 METAL FLASHINGS

.1 Prefinished Flashings, Step Flashings, Diverters & Trim: At Eaves, Fascia, Rakes, Valleys, and Dormers:

.1 Compatibility between materials is essential. Use only materials that are known to be compatible when incorporated in a completed assembly.

.2 Prefinished Metal Flashing: 24-gauge (0.026” or 0.66mm) steel with G90 (Z275) zinc coating conforming to ASTM A653A/A653M. Surface with Silicone Modified Polyester (SMP) factory-baked finish. Colour selected by Owner from Manufacturer’s standard colour range.

.3 Valley metal flashings to be broken in a W shape, with a centre line splash diverter as detailed. Install prefinished valley metal flashings in min. widths of 610mm (24”)

.4 Cascadia Metals Inc. and Makin Metals or Owner approved equivalent.

.2 Cleats and Hook Strips Not Otherwise Specified: Two gauges heavier of material matching that of flashing being employed; minimum 22 gauge (0.032" or 0.82mm).

PART 3 - EXECUTION

3.1 GENERAL

.1 Examine site conditions and surfaces to ensure that they are in satisfactory condition for commencement of this section. Prior to starting work, arrange a meeting with Owner to clarify general scope of work.

.2 Examine existing conditions and substrates upon which work of this section is dependent. Report to Owner in writing any unusual or deteriorated construction revealed during removal of existing roofing or siding components. Commencement of work implies acceptance of existing conditions and assuming full responsibility for finished condition of work.

.3 Ensure that no attachment (wiring, lighting, etc.) exists at underside of any deck section that is to be removed. Contractor to notify a representative of Owner, who will then disconnect any such services, if necessary.

3.2 PREPARATION

.1 On All Designated Roof Replacement Areas: The Roofing Contractor is responsible to conduct a pre-construction survey, including photo documentation, of existing interior ceiling and attic spaces to identify existing damage, nail pops in gypsum, organic growth, inadequate ventilation (blocked soffits), etc. prior to the start of work.

.2 All building walls, windows, doors etc. to be protected with wood sheathing in vicinity of work area.

.3 Examine work of other trades for defects and discrepancies and report them to Owner/Consultant in writing. Do not proceed with work until surfaces are satisfactory.

.4 Any rooftop equipment requiring disconnection to be responsibility of Contractor in consultation with Owner unless otherwise specified in this document.

.5 All details supplied with this scope of work package are acceptable installations. Any deviance from these details must first approved by Departmental Representative prior to installation.

.6 Disconnect and reconnect Electrical Services as / if required.

.7 Disconnect and reconnect Mechanical Equipment as / if required.

.8 Replace rotten plywood decking as directed by the consultant. Fill knot holes and surface cracks with latex filler at areas of bonded eave protection. Cover knot holes with sheet metal.

3.3 EXISTING ROOF SYSTEM REMOVAL

.1 On All Designated Roof Replacement Areas: Remove down to existing wood deck and dispose of existing wood shingles, underlayment roof membrane, projection and perimeter flashings, and old appurtenances to an appropriate site.

.2 Review entire existing roof deck to identify damaged areas requiring replacement. Consultant to be notified of any damage or concerns.

.1 Report any anomalies found that may impact soundness and structural integrity of roof system to Consultant and Owner immediately. Areas with damaged decking must be replaced or repaired before any further work may take place on that particular section.

.1 Roofing contractor is to document damage and repairs made for review by the Consultant if physical confirmation cannot be made in a timely fashion.

.3 Prior to installation of underlayment, roof deck and structural members on all designated areas to be reviewed for any deterioration or defect that may impact soundness and structural integrity of new roof sheathing and roof system. Any deficiencies found in decking members are to be reported to Consultant and Owner immediately.

.4 Any wood found to be deteriorated or otherwise not suitable for to its intended function will be replaced with new material to match existing in all aspects of configuration.

.5 Damaged or otherwise deficient structural members must be replaced or repaired before any further work can take place on that particular roof section. Cost to be approved by Departmental Representative covered under Change Order.

.6 Areas with damaged decking must be replaced or repaired before any further work can take place on that particular roof section. Cost to be approved by Departmental Representative covered under Change Order.

.7 Re-secure loose existing strapping, wood deck components with specified fasteners.

.8 Remove all nails and other fasteners used to secure existing wood blocking, slates and flashings. Do not set broken nails and other fasteners. Ensure deck is free of all dirt and loose materials.

.9 Ensure substrate is smooth. Remove sharp edges or protrusions that could impair performance of new underlayment.

.1 In area of eave protection clean surface of deleterious material to ensure proper adhesion as required by product manufacturer.

.2 Ensure roof decks are firm, straight, smooth, dry, free of snow, ice, frost, oils, or other contaminants. Decking must be properly cleaned of any dust and debris prior to proceeding with new installation.

.10 Close in openings of exiting wood roof deck with new material at locations where existing roof vents or abandoned equipment are to be removed.

3.4 CARPENTRY

.1 On All Designated Replacement Roof Areas: Refer to detail drawings for carpentry requirements and install wood blocking, plywood, and cant strips to accommodate required slopes, roofing, and finish sheet metal. Any carpentry alterations will be performed to accepted trade practice.

.2 Replace any seriously damaged or deteriorated wood at perimeters and projections with new wood blocking or exterior grade plywood. Determination of suitability to re-use or replace existing wood to be approved by the Departmental Representative under Change Order.

.1 Ensure existing wood blocking remaining at perimeters and curbs is securely fastened to existing substrate before installing any new blocking.

.3 Wood to wood, wood to metal, wood to masonry or concrete to be secured at 305mm (12”) on center with alternating fasteners staggered.

.1 Avoid protruding fastener heads. Where possible, all fasteners to be flush or slightly sunk with surface of wood blocking being secured.

.4 All wood blocking and plywood is to be considered part of roof, and to be made watertight by end of each working day to eliminate moisture infiltration into roof system.

.5 Cut in appropriate breathing strips for new ridge vents and off-peak vents as appropriate. Do not cut into ridge board or rafters beneath. Do not bring strips within 152mm (6") of rakes or overhang at rakes.

.6 Make good all holes in plywood deck from previous breather vents, which may require removal of additional existing deck to allow repair to be flush with decking and allow attachment into minimum 2 sides of rafters. Install H Clips as needed on adjacent sides.

3.5 UNDERLAYMENT INSTALLATION

.1 On All Roof Replacement Areas: Install specified self-adhering shingle underlayment in accordance to manufacturer's written recommendations. If required due to cold temperature installation or unusual substrate conditions, sheathing is to be primed. Adequate adhesion must be demonstrated to delete application of primer.

.1 The entire roof deck surfaces are to be covered with the same self adhered HT underlayment.

.2 Apply self-adhering membrane in 152mm (6") strip at rake edges (review details for specific rake edges), extending 51mm (2") over edge.

.3 Apply self-adhering membrane in 914mm (36") strip at all valley locations, centered in the valley.

.4 Apply self-adhering membrane in shingle fashion, and square to roof edge, overlapping apron flashings. Install up roof slope to provide coverage minimum 305mm (12") beyond edge of flashing.

.5 Maintain a minimum 100mm (4") side lap and 152mm (6") end lap of self-adhering membrane. Stagger all end laps

.6 At walls and dormers, self-adhering membrane is to be installed as detailed (see typical details). In all cases, self-adhering membrane to be installed in shingle-fashion, starting at lower end of detail and proceeding up slope lapping all lower flashings a minimum 100mm (4") or as detailed.

.7 Ensure continuous adhesion by rolling or brooming membrane. All Wrinkles to be cut out and patched. Perimeters of all patches to be treated with specified mastic.

3.6 STEP & SUPPORT FLASHINGS

.1 On All Designated Roof Replacement Areas: Metal step flashings to be installed at all roof/wall junctions where plane of wall is parallel to roof slope. Install underlayment and/or self-adhering membrane as detailed, prior to beginning step flashing/shingle installation.

.2 Apron flashing shall extend a minimum 125mm (5") up vertical surfaces, 100mm (4") over the roof material and 100 mm (4") around the corners.

.1 On areas that need more than one length of flashing e.g. adjacent walls, only standing seams or 'S' locks can be used to join pieces.

.3 Step flashings to be fabricated from sheet metal stock, 240mm x 200mm (10½" x 9") in size.

.1 Step flashings shall extend a minimum 125mm (5") up vertical surfaces, 100mm (4") between courses of roofing and have a 75mm (3") head lap.

.2 Step flashing shall extend a minimum 75mm (3") beyond the down slope corners and be folded, but not cut.

.3 Step flashing shall be placed flush with the butt edge (bottom) of each cedar shingle course.

.4 Fastening shall be a nail placed 50mm (2") down from the top edge and 25mm (1") in from the outside edge on the deck flange portion of each step flashing

.5 First step flashing at eave edge shall incorporate a diverter fold.

.4 Start installation at base of slope, install first step flashing over starter shingle. Press step flashing into corner of roof/wall junction. Secure step flashing with a nail, driven into roof sheathing at upper edge of step flashing, at corner away from wall. Install new shingle over step flashing. Do not nail shingle at end through step flashing, set nail back from edge of shingle.

.5 Install next section of step flashing over previously installed shingle, ensuring a 75mm (3") overlap with last step flashing installed. Secure as noted above and repeat with each succeeding shingle course.

.6 At masonry walls, ensure a new metal flashing is installed to cover step flashings down to roof surface and terminated into a saw cut into masonry and caulked. At walls clad with siding, step flashings should be installed behind siding and building paper. Remove and reinstall siding as required to install step flashings.

.7 Backpan flashing shall extend a minimum 152mm (6") up vertical surfaces, 450mm (18") up the slope and 100mm (4") beyond the corners.

.1 Corners must be folded, but not cut. If the upstand is more than 750mm (30") wide, a saddle is required.

.2 In lieu of a saddle, a backpan that extends a minimum of one-sixth the width of the upstand but not less than 152mm (6") vertically and up the roof slope to a point equal in height but not less than 450mm (18") must be used.

.3 All back-pan flashings shall incorporate integral capillary tabs to lead water around the corner.

.8 Install sheet metal diverter flashings at all transitions from roof to gutter at rake corner areas. Secure with minimum 2 nails under adjacent course of shingles.

3.7 SHINGLE INSTALLATION

.1 Place shingles in accordance with RCABC and CSSB requirements to produce a saw tooth coursing pattern with 190mm (7.5 inch) weather exposure to produce a triple thickness over the roof area.

.2 Provide a triple course at eaves.

.3 The hips, valleys and eves are to be installed in the steam bent fashion to match existing.

.4 Project first course 38mm (1-1/2 inches) beyond the face of facia boards at eaves and 25mm (1 inch) at rakes and gables. Provide a prefinished metal drip edge along the eave only as per details.

.5 Where roof adjoins walls, cut siding 50mm (2") above finished height of shingles. Apply primer and paint to raw cut edges to match existing.

.6 Contractor to provide a Unit Price to replace rotten siding with new as required and as approved by Departmental Representative under an approved Change Order. New wood siding material to match existing in size and shape and shall be primed/painted to match existing

.7 Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counter flashings.

.8 Complete installation to provide weather tight service.

.9 Aesthetics are considered of paramount importance, and manufacturer's requirements and their specifications for the creation of an aesthetically pleasing system will be enforced. Installations that do not meet appearance standards are subject to rejection and replacement at the contractor's expense.

3.8 MISCELLANEOUS MECHANICAL & ELECTRICAL

.1 Unless stated in writing elsewhere, Contractor responsible for all Mechanical, Electrical Work or telecommunications work required to perform complete installation of new roofing. Any and all costs associated with HVAC disconnection, removal, and reconnection, including modification of gas and conduit lines, to be included in Pricing, unless specified otherwise.

.1 Coordinate any planned disruptions in advance with Owner to minimize inconvenience.

.2 Gas Lines and Conduits: Disconnect, modify, and reconnect all gas lines, electrical lines, and conduits as required to suit new roof installation height and configuration of projection detailing.

.1 All gas line work must be performed by a qualified Gas Fitter and must conform to requirements of CSA B149.1-10.

.2 Re-install gas lines and conduits at a height of 152mm (6") to 200mm (8") above finished roof surface. Secure all loose cabling and conduits off surface of roof membrane.

.3 Ensure that all gas line penetrations are separated from all electrical line penetrations with their own roof flashing supports. Provide any new sleeves, goosenecks, or curbs required using IRC Group approved flashing supports and installation methods.

.4 At threaded gas line piping, which cannot be permanently enclosed or covered, construct new insulated dog house detail with removable lid for periodic thread inspection.

.5 Paint all gas lines on areas of roof work with exterior grade, yellow paint for metal surfaces; Rust Paint by Tremclad or Owner approved equivalent.

.3 Underdeck Securement: Where existing sections of roof decking are to be removed, ensure any cabling, conduits, and attachments (plumbing, electrical wiring, lighting fixtures, etc.) secured to underside are disconnected, removed, and relocated. Notify Owner's Representative, if necessary, to have interior services disconnected, removed, and relocated by Owner.

.4 Temporary Security: Provide overnight security, at no additional cost to Owner, where removal of any venting or HVAC equipment results with an opening in roof deck that cannot be permanently sealed on same day. Security Company must be preapproved by both Owner and Consultant in advance.

3.9 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by asphalt shingles installation.

3.10 METAL FLASHINGS

.1 On All Roof Replacement Areas: After installation of roof membrane and membrane flashings, new perimeter metal and metal flashings to be installed as detailed in Section 07 62 00 and as indicated on detail drawings.

3.11 SEALANTS

.1 On All Roof Replacement Areas: After installation of roof membrane and membrane flashings, install sealants as per Section 07 92 00 – Sealants and as recommended by membrane manufacturer.

3.12 CLEAN-UP

.1 On All Roof Replacement Areas: Clean up and remove from job site on a daily basis, all rubbish and surplus materials resulting from this work.

.2 Drag a magnetic bar across work area and grounds to ensure removal of all discarded fasteners and sharp metal debris.

.3 Final cleaning:

.1 Remove temporary protection.

.2 Remove dust, dirt, and foreign matter from surfaces.

.3 Broom clean paved exterior surfaces rake clean other exterior surfaces.

.4 Ensure that all fasteners have been removed from roof and surrounding site. Clean all gutters and downspouts of debris generated as a result of this work.

.5 Remove full garbage bins immediately. Do not pile debris or garbage on project site.

.6 At end of project, landscaping to be repaired to match original conditions.

END OF SECTION - 07 31 29

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PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Installation of a new roof system over prepared substrate.

.1 Roof Areas L–1.1 and L–1.2: Existing roofing components and related appurtenances to be removed including all unused curbs, sleepers and equipment as noted on the Roof Plan and specified herein in preparation for installation of a new low slope 2ply SBS roof membrane system including but not limited to:

.1 Review existing plywood deck and remove and replace any and all damaged existing plywood decking.

.2 Install new wood blocking and plywood at perimeters as required.

.3 Install 1 layer of laminated asphaltic board base sheet support panel, adhered.

.4 Install 1 ply modified bitumen base sheet flashings, adhered.

.5 Install 1 ply granular modified bitumen cap sheet and flashings, adhered.

.6 Install new metal drip edge flashings, mechanically fastened.

.7 Install new prefinished metal flashings and trim.

1.2 RELATED SECTIONS

.1 Section 01 11 00 – Summary of Work.

.2 Section 01 35 23 – Health and Safety.

.3 Section 01 56 00 – Temporary Barriers & Enclosures.

.4 Section 02 41 19 – Selective Demolition and Removal.

.5 Section 06 10 00 – Rough Carpentry.

.6 Section 07 31 29 – Cedar Shingles.

.7 Section 07 62 00 – Sheet Metal Flashing & Trim.

.8 Section 07 92 00 – Joint Sealants.

1.3 REFERENCES

.1 Latest edition of all listed references; most stringent requirements to govern in conflicts:

.1 American Society for Testing and Materials (ASTM) International:

.1 C578: Rigid, Cellular Polystyrene Thermal Insulation.

.2 C726: Mineral Fibre Roof Insulation Board.

.3 C1177(M): Standard Specification for Glass Mat Gypsum Substrate.

.4 C1289: Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

.5 C1396(M): Standard Specification for Gypsum Board.

.6 D41: Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.

.7 D312: Asphalt Used in Roofing.

.8 D2822: Asphalt Roof Cement.

.9 D4601: Standard for Asphalt Coated Glass Fibre Base Sheet Used in Roofing.

.10 D6162: SBS Mod. Bit. Sheets Using Polyester & Glass Fiber Reinforcements.

.11 D6163: SBS Mod. Bit. Sheets Using Glass Fiber Reinforcements.

.12 D6164: SBS Mod. Bit. Sheets Using Polyester Reinforcements.

.2 Canadian Standards Association (CAN/CSA):

.1 A123.21: Wind Uplift.

.2 A123.2: Asphalt Coated Roofing Sheets.

.3 A123.15: Polymer-Modified Bitumen Sheet, Prefabricated and Reinforced.

.4 A123.16: Asphalt Coated Glass Base Sheets.

.5 A231.1: Precast Concrete Paving Slabs.

.6 0121M: Douglas Fir Plywood.

.7 0151M: Canadian Softwood Plywood.

.3 Canadian General Standards Board (CAN/CGSB):

.1 37.29M: Rubber-Asphalt Sealing Compound

.2 37-GP-9M: Primer, Asphalt, unfilled, for Asphalt Roofing and Waterproofing.

.3 37-GP-15M: Application of Asphalt Primer for Asphalt Roofing & Waterproofing.

.4 37-GP-56M: Membrane, Bituminous, Prefabricated and Reinforced for Roofing.

.5 51.26M: Thermal Insulation, Urethane and Isocyanurate, Boards, Faced.

.6 51.33M: Vapour Barrier Sheet, Excluding Polyethylene, for use in Construction.

.7 51.34M: Vapour Barrier Sheet, Polyethylene Sheet for use in Construction.

.4 Underwriters Laboratories of Canada (CAN/ULC):

.1 S701: Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.2 S702: Thermal Insulation, Mineral Fibre, for Buildings.

.3 S704: Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Fixed.

.5 Roofing Contractors Association of BC (RCABC): Roof Practices Manual, Latest Revision, and includes Technical Updates issued at the time of tender.

.6 Canadian Roofing Contractors Association (CRCA): Roofing and Waterproofing Manual.

1.4 SUBMITTALS

.1 Manufacturer's System Letter:

.1 Upon award of the work, and prior to loading, the roofing contractor must provide a System Letter from the membrane manufacturer, which clearly states the appropriate mechanical fastening and / or adhesive fastening patterns for the specified assembly based upon CSA 123.21-14 Wind Uplift testing.

.2 System letter shall include reference to the Specified Wind Uplift Pressures stated Scope of Work.

.3 System Letter shall include a copy of the applicable Roof System Assessment Report of Wind Uplift Resistance (or proprietary equivalent), including specific sizes / gauges / TPI of fasteners, size and shape of insulation or membrane plates, and size of adhesive row(s).

.1 Shop drawings of required fastener and plate or adhesive row placement is encouraged from the manufacturer to assist the field forces of the roofing contractor.

.4 Work performed prior to receipt of System Letter may be rejected if not compliant with the Design Letter.

.2 Provide to Quality Assurance Observer, within five (5) working days after Notice of Award:

.1 Initial project work schedule showing anticipated progress stages and final completion of work from Start Date. Do not commence Work before project schedule has been provided and reviewed.

.2 Current WorkSafe BC Clearance Letter for Place of Work.

.3 Provide to Quality Assurance Observer, at Prestart Meeting:

.1 Finalized project work schedule listing start date, anticipated number of working days working, and manpower assignments for project.

.2 Safety Data Sheets (SDS) pertaining to all proposed materials to be used on site to perform Work.

.3 Applicable shop drawings for tapered insulation layout and other specified items to be reviewed by Consultant prior to prefabrication and delivery.

.4 Appropriate securement patterns for mechanical fastening of insulation and deck overlay boards, and adhesive pattern for overlay boards as applicable.

.5 List of "Trained Membrane Approved Applicators" to work and be present during performance of Work.

1.5 QUALITY ASSURANCE

.1 Compatibility between components of roofing system and wall system is essential. Provide written declaration to QA Observer stating that materials and components, as assembled in new system will meet this requirement.

.2 Perform Work in accordance with Contracts Documents and Manufacturer's written instructions.

.3 Make no deviation from Project Specifications or approved shop drawings without prior written approval by QA Observer and, if applicable, Manufacturer.

.4 Contractor to arrange for a Technical Representative of Manufacturer to review installed roof system wherever a Standard or System Warranty requirement has been specified.

.1 A mock-up of the cold applied, flameless roof membrane system is to be prepared for the Consultant and the Roof Membrane Manufacturers Rep. Contractor is to provide advance notice to the Consultant and the Membrane Manufacturers Rep prior to the mock-up taking place. Contractor may proceed with the Work once the system mock-up has been reviewed and approved by both the Consultant and the Membrane Manufacturers Rep.

.5 Upon completion of new installation, provide certification that all work has been done in strict accordance with Contract Documents and to Manufacturer's requirements.

1.6 QUALITY ASSURANCE OBSERVATION

.1 A Registered Roof Observer hereafter known as "Observer", has been appointed by to observe performance of roof Work:

.1 Roofing Contractor to arrange Prestart site meeting with Observer no more than three (3) weeks prior to commencement of Work on site. Obtain Observer's instructions and reference procedures to be followed on project.

.2 Provide to Observer date when each phase of work will begin, at least forty-eight (48) hours prior to commencement of Work for phase.

.3 Arrange Final Observation and examination of installed roof with both Observer and Manufacturer's Technical Representative.

.4 Review Section 01 00 00 Item 1.19 Quality Control.

.2 When required, provide roof sampling where directed by Observer and make good without additional cost to Owner.

.3 Copies of Q.A. Observation Reports to be issued by Observer to Owner and Prime Contractor.

.1 Costs of Post Final Field Review(s) or extra field reviews due to Contractor not completing the work by the contractual Completion Date.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Site storage is limited. Where applicable, location of storage and related facilities to be coordinated with Prime/General Contractor.

.2 All materials to be delivered and stored in their original packaging bearing manufacturers label, grade and product weight, including all other related standards, specifications, and like.

.3 All materials to be adequately protected from inclement weather conditions and stored in a dry, well ventilated and weather protected location. Use only dry materials and apply only during weather that will not introduce moisture into roofing system.

.4 Only materials to be installed on same day to be removed from protected location to work site.

.5 During extreme temperature, materials to be stored in a heated location with a 4.4°C (40°F) minimum temperature and removed only as needed.

.6 Modified bitumen rolls to be kept clear of all flames and sparks when not being applied to roof.

.7 All materials in a rolled configuration to be stored on end, elevated off ground, and on a pallet or skid to protect bottom surface from foreign debris and moisture.

.8 Restrict stockpiling of material in one location on roof to prevent exceeding specified deck live load capacity. Avoid point loading that may compromise structural integrity of roof.

.9 Handle and store products in a manner to prevent damage and deterioration.

.10 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Do not apply roofing materials to damp, wet, or frozen deck or substrates.

.2 Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

.3 Only install as much new roofing as can be made weather-tight each day, including all flashing and detail work. All seams to be sealed or heat welded before leaving job site that work day.

.4 All work to be scheduled and executed without exposing interior building areas to effects of inclement weather. Existing building and its contents to be protected against all risks.

.5 All new and temporary construction, including equipment and accessories, to be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.

.6 Uninterrupted water-stops to be installed at end of each day's work and to be completely removed before proceeding with next day's work. Water-stops to not emit dangerous or unsafe fumes and to not remain in contact with finished roof as installation progresses. Contaminated membrane to be replaced at no cost to Owner.

.7 Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, provide all necessary protection and barriers to segregate work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over felt or plywood over insulation board to be provided for all new and existing roof areas that receive rooftop traffic during construction.

.8 Prior to and during application, all dirt, debris and dust to be removed from surfaces by vacuuming, sweeping, blowing with compressed air, and/or similar methods.

.9 Follow all safety regulations as required by OHS (Occupational Health and Safety) and any other applicable authority having jurisdiction.

.10 All roofing, insulation, flashings and metal work removed during construction to be immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable Local, Provincial, and National requirements.

.11 All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) to be immediately removed from site by Contractor and properly transported to a legal dumping area authorized to receive such material.

.12 Take precautions that storage and/or application of materials and/or equipment does not overload roof deck or building structure.

.13 Flammable adhesives and deck primers to not be stored and not be used in vicinity of open flames, sparks and excessive heat.

.14 All rooftop contamination that is anticipated or that is occurring to be reported to manufacturer to determine corrective steps to be taken.

.15 Verify that all roof drain lines are functioning correctly (not clogged or blocked) before starting work. Contractor to report any such blockages in writing to Consultant for corrective action prior to installation of roof system.

.16 Immediately stop work if any unusual or concealed condition is discovered and immediately notify Consultant of such condition in writing in order to obtain additional instruction.

.17 Site cleanup, including both interior and exterior building areas that have been affected by construction, to be completed to satisfaction of Consultant.

.18 All landscaped areas damaged by construction activities to be repaired at no cost to Owner.

.19 Do not install membrane under following conditions without consulting Manufacturer's Technical Department for precautionary steps:

.1 Roof assembly permits interior air to pressurize membrane underside.

.2 Any exterior wall has 10% or more of surface area comprised of opening doors or windows.

.3 Wall to deck intersection permits air entry into wall flashing area.

.20 Take precautions when using adhesives at or near rooftop vents or air intakes. Avoid adhesive odours from entering building. Coordinate operation of vents and air intakes in such a manner as to avoid intake of adhesive odour while ventilating building. Keep lids on unused cans at all times.

.21 Protective wear to be worn when using solvents or adhesives or as required by job conditions.

1.9 PREPARATORY WORK

.1 Review roof levels and advise Consultant of any deviation from specified tolerances.

.2 Review roof drain locations and number. Advise Consultant of any deviation or alteration from specifications.

.3 Sweep roof deck free of dust or dirt and remove all debris prior to any installation work.

.4 When removing vents, skylights, etc, ensure the openings are covered to prevent moisture or odour infiltration into the building. Openings beyond a certain size may require to be identified as a fall hazard and protected appropriately.

1.10 SAFETY AND PROTECTION

.1 Refer to Section 01 35 23 - Health and Safety.

1.11 WIND UPLIFT

.1 A wind load calculation (NRCA Wind Load Calculation for roof covering and add-ons) has been performed on this building. Contractor is required to confirm this calculation and interpretation with the primary membrane manufacturer.

.2 Field area is defined as areas not identified as perimeter or corner zones, and must meet a wind uplift pressure of -1.9kPa (-40psf).

.3 Perimeter area is defined as a 1m (3.3') picture frame at the edge of the building and must meet a wind uplift pressure of -2.7kPa (-57psf).

.4 Corner area is defined as 1m x 1m (3.3'x3.3') and must meet a wind uplift pressure of -4kPa (-83psf).

1.12 WARRANTY

.1 Manufacturer's System Warranty:

.1 Provide a written Twenty (20) Year Membrane Manufacturer's No Dollar Limit System Warranty from the date of Approved Final Inspection. Cost of Manufacturer's Warranty to be included in the Bid price.

.2 RCABC RGC RoofStar Guarantee:

.1 Provide to the Owner, the RGC RoofStar Ten (10) Year Guarantee. The cost of the RCABC Guarantee administration fee and milestone reviews is to be included in the Tender price.

.3 Cost of all Field Reviews to be paid by Owner.

.1 Costs of Post Final Field Review(s) or extra field reviews as per 1.21.3 of Section 01 00 00, if required, shall be charged back to the Contractor.

PART 2 - PRODUCTS

2.1 GENERAL

.1 All system materials are to be sourced from a single manufacturer with accessory products meeting manufacturer's material compatibility requirements to achieve required System Warranty and other specified warranties.

.1 Equivalent systems that meet design intent may be proposed in writing, a minimum 5 days prior to project close. All accessory materials must be supplied and / or approved by the primary membrane manufacturer.

.2 Proposals must include a side by side material comparison table showing both the specified and proposed materials, and must comply fully with the experience and job reference requirements of Section 1.6 Quality Assurance of these specifications. See Section 01 33 00 Submittal Procedures.

.1 Support documents such as Technical Data Sheets shall provide all figures to allow comparisons to base materials requirements.

.2 Support documents shall also indicate CSA 123.21-14 Wind Uplift testing to meet the building use and location.

.3 Equivalent systems shall qualify for all specified warranties.

.2 Components to be used that are other than those supplied or manufactured by membrane manufacturer may be submitted for review and acceptance by membrane manufacturer. Letters of acceptance should be provided for the project record.

.3 Specifications, installation instructions, limitations, and/or restrictions of respective manufacturers must be reviewed by QA Observer for acceptability for intended use with membrane manufacturer's products.

2.2 FASTENERS, PLATES & FASTENING BARS

.1 Where required all fasteners and plates to meet requirements of CSA 123.21 Standard for wind uplift.

.2 Roofing Materials:

.1 Manufacturer to provide design letter with requirements and fastening pattern.

.2 Self-tapping, epoxy coated carbon steel or solid stainless steel deck screws approved by membrane Manufacturer to meet warranty requirements, complete with securement plates in a fastening pattern meeting CSA 123.21-14 requirements:

.1 Soprema #14 MP Fastener or approved equivalent.

.2 Soprema #15 HD Fastener or approved equivalent. Confirm with Manufacturer if upgraded fastener is required.

.3 Size of plate to be determined by membrane manufacturer for 2 7/8" HEX, 3" Round, or 2" Seam Plate.

.3 Wood to Steel: Phillips Modified Truss Head fastener as manufactured by UCAN Fastening Products or Master Driller Wafer Plymetal or Wafer Reamer as manufactured by Leland Industries, or approved equivalent of sufficient length to penetrate into substrate a minimum 6mm (.25"), zinc plated. Install according to manufacturer's instructions.

.1 When Alkaline Copper Quaternary (ACQ) treated wood is present, fasteners shall be upgraded to hot-dipped galvanized steel, stainless steel, silicon bronze, copper or specially coated suitable for use in ACQ such as DT1700.

.4 Wood to Wood: No. 8 screws of a suitable length to penetrate into substrate a minimum 19 mm (0.75"). Install according to manufacturer's instructions.

.1 When Alkaline Copper Quaternary (ACQ) treated wood is present, fasteners shall be upgraded to hot-dipped galvanized steel, stainless steel, silicon bronze, copper or specially coated suitable for use in ACQ such as DT1700.

.5 Steel to Steel: Master Gripper Self-Drilling Screws with wafer head as manufactured by Leland Industries or approved equivalent of sufficient length to penetrate into substrate a minimum 6mm (.25"). Install according to manufacturer's instructions.

.6 Wood/steel to concrete or concrete block: 5/16" Ultracon Fastener as manufactured by Elco Construction Products or equal approved by membrane Manufacturer, to penetrate substrate by 32mm (1.25").

.7 Steel/aluminum to aluminum: 410 Case Hardened Stainless Steel Master Gripper MDP Self-Drilling Screws with wafer head as manufactured by Leland Industries or approved equivalent of sufficient length to penetrate into substrate a minimum 19mm (.75"). Install according to manufacturer's instructions.

.8 Termination bar for membrane:

.1 Extruded aluminum, 1.5mm (0.060") thick x 25mm (1") wide x 3.05m (10') long with 6mm x 9.5mm (.25" x .375") slotted holes on 203mm (8") o/c. Acceptable material: TB-120 aluminum termination bar by Tru-Fast or equal approved by membrane Manufacturer.

.9 Termination bar fastener for wood, steel or aluminum:

.1 Tru-Fast Ultra Solid Stainless Steel fastener to penetrate substrate by 19mm (.75") c/w EPDM galvanized steel sealing washers or Construction Fasteners Inc. Woodgrip #14 screw complete with Sentri coating on threads, Chromagard colour match head and EPDM washer, or equal approved by membrane Manufacturer.

.10 Termination bar fastener for concrete or masonry:

.1 Tru-Fast Tap Grip Truss Head fastener with Perma-Coat Z3 corrosion protection or equal approved by membrane Manufacturer, to penetrate substrate by 32mm (1.25") c/w EPDM galvanized steel sealing washers.

.11 Membrane to wood:

.1 Galvanized round top roofing nails with minimum 25mm (1") diameter heads or plate and head combination, to penetrate substrate a minimum 32mm (1.25").

.12 Wood Sleeper to rooftop condensing unit:

.1 Hanger bolt: Grade 18-8 stainless steel, minimum 9.5mm (.375"{3/8"})-16 diameter, in length suitable to penetrate minimum 51mm (2") into sleeper and extend minimum 51mm (2") above, with 15.9mm (.625"{5/8"}) plain centre.

2.3 DECK OVERLAY BOARD – FOR VERTICAL APPLICATIONS ONLY

.1 Overlay Board: Dimensionally stable, fire resistant, gypsum based roof board with treated core for moisture and mould resistance; size no larger than 1.2m x 1.2m (4'x8'). Roof board to have factory laminated enhanced glass-mat facer meeting ASTM C 1177.

.1 6.35mm (.25") minimum thickness for horizontal applications, 12.7mm (.5") minimum thickness for vertical applications.

.1 Dens Deck Prime Eonic as manufactured by Georgia-Pacific LP or approved equivalent.

2.4 MEMBRANE PRIMER

.1 General Purpose:

.1 Solvent Based Primer: Composed of volatile solvents, synthetic polymers, and/or adhesive enhancing resins to prepare surfaces for torch application:

.1 Elastocol 500 by Soprema Inc. or approved equivalent.

.2 High-tack for Self-Adhered Membranes:

.1 Solvent Based Primer: Composed of volatile solvents, synthetic polymers, and/or adhesive enhancing resins to prepare surfaces for self-adhered membranes:

.1 Elastocol Stick by Soprema Inc. or approved equivalent.

2.5 LAMINATED ASPHALTIC BOARD / BASE SHEET

.1 Laminated Asphaltic Board: Multi-ply, semi-rigid asphaltic roofing recovery board composed of a mineral fortified asphaltic core formed between two asphaltic saturated fibreglass liners with 2.2mm (3/32") factory laminated non-woven polyester reinforced SBS modified bitumen base sheet membrane conforming to CSA 123.21-15. Panel boards to have a membrane duo selvedge edge width of 89mm (3.5") for overlapping onto next board.

.1 7.0mm (9/32") 2-1 Soprasmart Board Sanded as manufactured by Soprema or Owner Approved Equivalent.

2.6 MODIFIED BITUMEN MEMBRANE

.1 Base Sheet Flashing: Install S. A. flashings before base sheet field membrane at combustible perimeters and curbs:

.1 Self-Adhered grade modified bitumen: minimum 3.0mm with composite reinforcement, and conforming to CGSB 37-GP-56M. Top surface covered with thermofusible polyolefin film with self-adhesive bitumen bottom surface.

.1 Sopralene Flam Stick by Soprema Inc. or approved equivalent.

.2 Base Sheet Cover-Strip

.1 Torch grade modified bitumen: Minimum 2.5mm thick and 330mm (13") wide with composite reinforcement and conforming to CGSB 37-GP-56M. Top and bottom surface covered with thermofusible polyolefin film.

.1 SopraLap by Soprema Inc. or approved equivalent.

.3 Cap Sheet Field and Flashing Membrane:

.1 Self-adhered grade modified bitumen; minimum 3.8mm with minimum 250 g/m^2 non-woven polyester scrim, random glass fibre mat, or composite reinforcement, impregnated and coated with SBS modified bitumen, and conforming to CGSB 37-GP-56M. Top surface to have No. 11 ceramic granules and self-adhesive bitumen bottom surface covered with polyolefin or silicone release film. Colour of granules to be chosen by Owner from Contractor supplied samples of standard colours.

.1 Sopralene Stick HR GR by Soprema Inc. or Owner Approved Equivalent.

2.7 LIQUID APPLIED PMMA RESIN FLASHINGS

.1 Catalyzed Acrylic Resin Flashing System: Alsan RS Flashing System by Soprema or approved equivalent consisting of a liquid-applied, fully reinforced, multi-component acrylic membrane installed over a prepared or primed substrate. The flashing system consists of a catalyzed acrylic resin primer, basecoat and topcoat, combined with a non-woven polyester fleece. The resin and catalyst are mixed immediately prior to installation. The use of the specialty flashing system shall be specifically approved in advance by the Membrane Manufacturer for each application.

.1 Alsan RS 230 by Soprema Inc. or Owner approved equivalent.

2.8 ROOFING ACCESSORIES

.1 Roofing accessories to be manufactured from spun aluminum or copper as required, and complete with removable caps where applicable. Unless otherwise designated by Consultant,

pitch pockets are strictly prohibited. Flanges to be primed with rubberized asphalt compatible primer.

.1 Roof Drains or for additional drain installations: 3" Clamp-Tite by Menzies Metal Products. Drain materials must meet CSA-B79 and ASME A112.6.4 standards, and be listed with QAI Laboratories.

.1 Additional drains: refer to Section 3.7.6.1 herein with respect to the evaluation of roof drainage upon completion of the base sheet and before cap sheet is installed.

.2 Drain Seals: Fernco Couplings and associated hose clamps, or Owner Approved Equivalent.

.1 Use of other mechanical seals to be confirmed in advance with the QA Observer.

.1 If and when internal mechanical seals are accepted, seals shall be U-Flow by OMG Roofing Products. Allow for potential delays for ordering.

.3 Plumbing Stack Flashing: Welded Aluminum by Menzies Metal Products or Owner approved equivalent, flashings to have been tested to CSA B272 standard and be marked by way of adhesive label or die stamp.

.4 B-Vent Flashing or similar round duct penetrations: spun Aluminum penetration hardware, or site constructed curbs complete with shop fabricated 'square-to-round' flashings, or approved equivalent complete with 2 caulked storm collars on each "B-Vent" flashing. Top of penetration hardware or curb to be a minimum of 8" above finished roof surface.

.5 Conduit & gas piping supports: fabricated from UV resistant re-cycled rubber complete with 14ga galvanized channel:

.1 C-Port C-Series Roof Blocks as manufactured by Clearline Technologies Inc. or approved equivalent.

.6 Membrane Tools: Use tools, hand rollers, weighted rollers, squeegees, etc. as recommended by membrane Manufacturer for installation of their product to ensure compatibility and avoid damaging of pressure sensitive membranes.

.7 Pourable Sealer: Elastomeric pourable sealer as approved and/or supplied by Soprema or approved equivalent.

.8 Sealing Compound: Rubberized Sealing Compound to CAN/CGSB-37.29, rubber asphalt type as approved and/or supplied by Soprema or approved equivalent.

.9 Spray Urethane foam: One or two component polyurethane spray foam insulation. Use low pressure spray foam insulation at force sensitive areas.

.10 Fire Protection in flame sensitive locations, as determined by the Contractor: 165mm wide tape consisting of a glass fleece reinforcement and SBS modified bitumen: product by Soprema or approved equivalent.

.11 Firestop Sealant: One component, neutral cure silicone sealant meeting ASTM E84 and CAN4-S115M, designed for firestop applications at joints and through-wall penetrations; TREMstop Fyre-Sil silicone sealant (red) by Tremco or approved equal.

.12 Foam Gaskets for mechanical curbs: Self-adhering tape seal made from open polyurethane foam impregnated with water based acrylic. MST by EmSeal LLC or approved equivalent.

.13 Sheet Metal Flashings and Trim: As per Section 07 62 00 and fabricated from SMP coated 24 gauge prepainted steel. Hook strips to be 2 gauges heavier than flashings. Colour to match existing.

.14 Sealants: Per Section 07 92 00. Colour of sealants to match component applied to.

.15 Paint all Roof Hatches to match existing colour. Paint all rusted metal surfaces with rust inhibiting paint. Paint to be Tremclad by Rustoleum.

PART 3 - EXECUTION

3.1 WORKMANSHIP

.1 Perform roofing work which is not specifically covered by these Specifications in accordance with applicable industry standards and good roofing practices of:

.1 Canadian Roofing Contractors Association (CRCA),

.2 Roofing Contractors Association of BC (RCABC): Roof Practices Manual, Latest Revision, and includes Technical Updates issued at the time of tender,

.3 Canadian Modified Bitumen Manufacturer's Association's recommendations,

.4 Manufacturer's preprinted and published technical specifications,

.5 ULC Design No. S-107 criteria,

.6 Factory Mutual Global design criteria FM 1-28 and 1.49, or CSA 123.21-14 testing protocols.

.7 Compliance with local fire insurance requirements,

.8 Compliance with local building codes.

.2 Procedures for application of materials should be in accordance with Manufacturer's printed instructions and recommendations.

.1 Advise Consultant of adjustments to specified roofing procedures recommended by Manufacturer or due to site conditions.

.2 Written approval by Consultant is required to make any adjustments to specified procedures.

.3 All work to be carried out in accordance with drawings, and specifications provided.

.1 All supplied drawings and details constitute acceptable installations. Any deviance from these details must first approved by Consultant prior to installation.

.4 While work is in progress, all steps must be taken to safeguard building from damage due to weather, fire, and structural overloading.

.5 Examine underside of roof deck when installing mechanical fasteners, where possible, to avoid accidental damage to existing services.

.6 Apply each part of roofing system when surfaces are free of moisture for successful application.

.7 Do priming for asphalt roofing in accordance with CAN/CGSB 37-GP-15M and as recommended by membrane manufacturer.

.1 Adhesives or sealants and liquid primers will not be applied until surfaces are dry.

3.2 EXAMINATION OF SITE CONDITIONS

.1 Examine existing site conditions and substrates upon which work of this section is dependent. Report to Consultant in writing any defects or discrepancies. Commencement of work implies acceptance of existing conditions and assumption of full responsibility for finished condition of work.

.2 Defective work resulting from application to unsatisfactory conditions will be considered responsibility of those performing work of this section.

3.3 PROTECTION

.1 Adjacent Buildings and Tenants:

.1 Take care to not damage any adjacent or closely located buildings and all related grounds in vicinity of Work during roofing operations.

.2 Protect against infiltration of dust, debris, and other such contaminants and occurrences.

.3 Locate garbage chutes to minimize exposure to adjacent building, its grounds, and its occupants.

.4 Protect walls by means of tarpaulins where garbage chutes and hoisting equipment are located and operated.

.5 Cover dumpsters and bins to prevent debris from blowing away.

.6 Cover openings in the roof such as curbs for mechanical or skylight, to prevent moisture, dirt / debris, and odour entering the structure.

.7 Do not use spray installation methods on days with significant wind.

.8 Damage to adjacent buildings, grounds, and vehicles to be rectified by Contractor at no additional cost.

.2 Adjacent Roof Areas and Completed Work:

.1 Take care not to damage any previously performed work or existing roofs.

.2 If work area is accessed across existing roof areas, provide protection to existing roof system. Use continuous protection walkways consisting of 12.7mm (0.5”) plywood sheathing over 25mm (1”) expanded polystyrene insulation.

.3 Protect newly installed roof work from traffic and damage using Protection Walkways where warranted by traffic requirements.

.4 Comply with any precautions deemed necessary by Consultant.

.3 Material Storage:

.1 Deliver all materials to site in undamaged condition with original manufacturer's label intact and clearly visible for easy verification of specified materials.

.2 Provide security fencing at all times for equipment and materials stored at ground level.

.3 Protect rolls from flattening by storing on ends on skids.

.4 Whenever possible, store roof materials off roof at designated, protected storage area.

.4 Structural Integrity of Roof:

.1 Use only equipment that will not adversely affect, damage, or alter roof deck.

.2 Do not create point loads that may adversely affect performance of existing deck when storing materials on roof.

.5 Inclement Weather:

.1 Immediately halt work during inclement weather, including but not limited to rain fall, snow, drizzle, fog, and hail. Protect exposed building substrates, open building cavities, and moisture sensitive products.

.2 At end of each work day or when stoppage occurs due to inclement weather, provide suitable protection from elements for completed work and materials out of storage.

.3 Place in to heated storage any temperature sensitive materials such as membranes, adhesives, and sealants when temperature falls below 5 °C (40 °F).

.4 Protect all vents, stacks, drains and related deck openings from inclement weather and contamination from debris.

.6 Roof Safety, Access, and Egress:

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

.2 Access to roof to remain unobstructed.

.3 Keep doorways and fire routes clean and clear of any obstacles.

.4 Protect and safeguard all man-size or larger openings in roof deck with warning flags and suitable temporary barriers or railings.

.7 Damage and / or Defective Work:

.1 Avoid use on roof of any petroleum based and other chemical products that are corrosive and/or damaging to membrane. Provide protection to membrane from any accidental spills or drips. Any damage to roof system caused by non-compatible products to be cut out and replaced at no cost to Owner.

.2 Investigate and examine any damage caused by execution of Work for this contract, and repair or replace with new materials to match original finish. Restoration and repair work to be reviewed and approved by Consultant.

.3 Defective Work resulting from application of material on unsatisfactory surface or substrate to be rectified by Contractor at no additional cost.

.4 Defective Work resulting from improper installation of materials to be rectified by Contractor at no additional cost.

3.4 SURFACE PREPARATION

.1 Preparation:

.1 Examine all roof decks and existing site conditions to ensure that they are in satisfactory condition for commencement of work in this section.

.2 Divide work into logical sections and only tear-off as much existing roof as can be made watertight in same working day to prevent damage to building interior.

.3 Prior to removal of any roof components, all existing openings (drains, vents, air intakes, etc.) to be covered or plugged to prevent any debris or contaminate from entering building below. All such coverings are to be removed at end of each working day and reinstalled prior to next day's start up.

.4 Disconnect and reconnect Electrical Services and Mechanical Equipment as required.

.1 Any roof top equipment requiring disconnection to be responsibility of Contractor in consultation with Owner unless otherwise specified elsewhere in contract documents.

.2 Existing Roof Removal:

.1 At areas designated for roof removal and replacement, remove existing projection and perimeter metal flashings, roof membrane and flashings, and old appurtenances in preparation for installation of new roof system. Dispose removed items to an appropriate site for building material waste.

.2 All unused and abandoned pitch pockets, vents, curbs, sleepers, projections, etc. are to be removed from designated areas and disposed of.

.1 Obtain verification and authorization from Client before removing and disposing of any suspected unused or abandoned projections.

.2 Install new roof decking as required to close off any deck openings before proceeding with new roof system installation.

.3 Substrate Review:

.1 Exposed roof deck surfaces to be reviewed by Contractor with Consultant. Ensure to review entire roof area to satisfy any warranty requirements of Manufacturer of new roof membrane system.

.1 Notify Consultant of review at least forty-eight (48) hours prior to site review.

.2 Report any anomalies found that may impact soundness and structural integrity of roof system to Consultant and Owner immediately. Areas with damaged decking must be replaced or repaired before any further work may take place on that particular section.

.3 Ensure roof decks are firm, straight, smooth, dry, free of snow, ice, frost, oils, or other contaminants. Decking must be properly cleaned of any dust and debris prior to proceeding with new installation. Test whether specified adhesion to deck will be obtained where required.

.1 Verify that roof drains have been installed at proper elevations relative to finished roof surface to allow for sufficient drainage of roof surface.

.4 Review securement of existing projections and equipment (electrical conduit, gas lines, etc.). If inadequate securement is found, inform QA Observer and halt work around that area until situation is rectified.

.5 Review securement of existing plywood sheathing, wood blocking, and cant strips. Do not install new roofing unless such items are adequately secured to withstand stresses imposed by thermal movement of new roofing components.

3.5 CARPENTRY

.1 Refer to detail drawings for carpentry requirements. Install wood blocking, plywood, and cant strips to accommodate required slopes, insulation, roofing membranes, and prefinished sheet metal and trim. Carpentry alterations to be performed to accepted trade practices.

.2 Add new wood blocking as necessary to maintain minimum heights at perimeters and roof curbs.

.1 At Existing Roof Curbs: Minimum height to be 203mm (8”) above finished roof membrane.

.1 At metal roof curbs: Where extension height required is greater than 102mm (4.0”), install new galvanized metal C-Channel, prefab curb extension, prefab curb adapter or reducer to raise curb as required to suit new height.

.2 At Existing Parapets: Minimum height to be 125mm (5") above finished roof membrane, unless otherwise indicated on detail drawings.

.1 If wood cant exists at the base of the wall, install a new reversed cant and mechanically attach to the existing cant, creating solid wood blocking to receive plywood sheathing.

.2 If fibre-cant exists, remove and install blocking to suit to receive new plywood sheathing.

.3 Replace any seriously damaged or deteriorated wood at perimeters and projections with new construction grade SPF wood blocking or exterior grade plywood, good one side, to match existing. Determination of suitability to re-use or replace existing wood to be at discretion QA Observer.

.1 Ensure existing wood blocking remaining at perimeters and curbs is securely fastened to existing substrate before installing new blocking and plywood.

.4 Install wood blocking as required to ensure that all roof curbs and sleepers supporting H.V.A.C. and mechanical equipment are level.

.5 Wood to wood, wood to metal, wood to masonry or concrete to be secured at 305mm (12”) on center with alternating fasteners staggered.

.1 Avoid protruding fastener heads. Where possible, all fasteners to be flush with or slightly sunk below surface of wood blocking being secured.

.6 All wood blocking and plywood is to be considered part of roof, and to be made watertight by end of each work day to eliminate moisture infiltration into roof system.

3.6 LAMINATED ASPHALTIC BOARD / BASE SHEET

.1 Cover Board Adhered Installation:

.1 Install a layer of field cover board panels with joints offset and staggered, adhered over installed insulation as per manufacturer's written instructions and to meet CSA 123.21-14 requirements. Refer to manufacturer's design letter.

.2 Do not install more insulation board than can be covered with membrane by end of work day or before onset of inclement weather.

.3 Do not use wet or damaged cover board panels. Panels must be dry for proper installation.

.4 Determine and mark, as required, areas to receive new cover board installation to avoid over application of quick adhesive.

.5 Custom cut cover board panels at perimeters and projections to suit, dry fitting as necessary. Install cover boards tightly together with no gaps between boards larger than 3mm (0.125").

.1 Cut boards as required to fit snug at all perimeters, walls, and roof projections.

.2 Cut straight lines using proper tools and snap chalk lines.

.3 Cut boards cleanly where slope changes direction. Do not break boards by stepping on them to acquire changes in deck slope.

.6 Install continuous ribbons of polyurethane adhesive in parallel lines to the insulation. Use a blocked "S" pattern over an application area no larger than 3.66m (12') at a time to minimum securement pattern:

.1 Adhesive ribbons to be no less than 1/2" (13mm) to 3/4" (19mm) in width at time of application, or as required by manufacturer.

.2 Ribbons shall be contained within the board size, do not apply adhesive outside of board edges.

.1 Adhesive shall be applied at or near the edge of the board, to correspond to the manufacturer's required application rate. If application rate is 304mm (12") apart, then beads to begin within 152mm (6") of the board edges.

.7 Install cover board panels in parallel rows and butt tightly together with end joints staggered by a half width of panel. Stagger panel end joints with joints of rigid insulation below by minimum 300mm (12").

.1 Do not allow rising foam adhesive to skin over. Place roof board panels immediately into wet adhesive.

.8 Ballast boards immediately after placing them into position.

.1 Do not walk in boards, ballast continuously until adhesive is set.

.2 Do not remove and re-apply board once laid in. If board must be moved, remove any set adhesives and apply new adhesive ribbons.

.9 Where cover board is field primed, allow sufficient time for applied primers to dry and flash-off. Roof board surface must be thoroughly dry before installation of membrane.

3.7 MODIFIED BITUMEN MEMBRANE APPLICATION

.1 Base and cap ply sheets are to be adhered / cold applied.

.1 Contractor is permitted to use self-adhered, blackline adhered, mechanically attached, liquid applied, and accessories materials from the membrane manufacturer's range of products that are equivalent in performance to specified materials. This measure is provided as a means to aid the installers in the safe execution of their duties and not an opportunity for additional costs or downgrading performance. The purpose is to support the required Contractor risk assessment and fire safety measures during the installation of the roofing assembly. Notify the observer of modifications prior to proceeding for record keeping purposes.

.2 Contractor is to have considered order of material application via a risk assessment, and determined if pre-stripping is desired.

.2 All membrane materials are to be supplied by same manufacturer in order to meet material compatibility requirements necessary to achieve required System Warranty.

.3 All membrane installations to conform to membrane manufacturers printed literature, recommendations, guidelines, and instructions.

.4 All membrane and flashing applications to be free of sags, blisters, wrinkles, and fish-mouths.

.5 Base Sheet Flashing, Self-Adhered Installation:

.1 Field measure and cut flashing membrane to length required for flashing at each detail and roll up for installation.

.2 If pre-stripped, install membrane gusset flashing onto substrate in strips one membrane roll wide (40" or 1m) by 200mm (8") to tie base sheet into previously installed base stripping.

.3 Install base sheet flashing centered between the 90° transition from field of roof to vertical area, so that 76mm (3") of gusset extends onto the flat of the roof and 76mm (3") up wall or curb.

.1 Ensure the 90° transition is kept tight and adequately bonded.

.2 Bridging will be directed to be cut out and repaired.

.4 Overlap each preceding flashing sheet by min. 76mm (3") on side laps and align bottom edge to a chalk reference line along base sheet membrane. Lap membrane flashing onto field membrane a minimum 102mm (4").

.5 Membrane gusset reinforcement to be installed using hot air gun or torch application on top of base sheet membrane at all inside and outside corners. Consultant to review gusset installation before installation of cap sheet membrane.

.6 If base flashings were not pre-stripped, refer to Item 3.7.4 for application method.

.7 Where required as determined by the contractors' fire safety risk assessment weld all side and end laps of membrane with hot air gun or torch. Laps to be bonded to the satisfaction of QA Observer.

.6 Cap Sheet Field Membrane, Self-adhered Installation:

.1 Prior to the installation of the cap sheet field membrane installation contact the consultant to review the completed base sheet installation with regards to locating and installing extra spun copper roof drains to enhance and improve drainage. Failure to observe this milestone and proceeding with cap sheet installation before drainage is evaluated will result in any capped areas being fully degranulated and recapped at no expense to the Owner.

.2 Complete installation of base sheet flashing prior to installing membrane cap sheet and cap sheet flashings.

.3 Prime base sheet with specified primer at rate recommended by manufacturer. Avoid pools and heavy areas and allow primer to dry a minimum 30 minutes or until staining does not occur to touch and surface becomes tacky.

.4 Field measure and cut membrane to length of run required and roll up for installation.

.5 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and re-roll from both ends.

.6 Unroll and install cap sheet onto base sheet by removing release paper and discarding. Broom sheet into place to ensure full contact with substrate.

.7 Lap sheets 76mm (3") for side laps and a minimum 152mm (6") for end laps. Turn sheet up at perimeters a minimum of 76mm (3”).

.8 Use metal roller, apply pressure on whole cap sheet to enhance adhesion to base sheet.

.9 All side and end laps of cap sheet to be heat welded with hot air gun to satisfaction of Consultant.

.7 Cap Sheet Flashing, Self-adhered Installation:

.1 Prime base sheet flashing with specified primer at rate recommended by manufacturer. Avoid pools and heavy areas and allow primer to dry a minimum 30 minutes or until staining does not occur to touch and surface becomes tacky.

.1 Ensure complete coverage of primer to both prepared base sheet flashing and to field cap sheet membrane prior to placement of cap sheet flashing.

.2 Install cap sheet flashing onto substrate in 1m (40”) wide strips extending over perimeters as shown on detail drawings.

.3 Set cap sheet to offset base sheet flashing joints by 50% and extend a minimum of 152mm (6”) onto roof. All end lap joints to be a minimum 76mm (3”).

.4 Unroll and install cap sheet flashing onto substrate by removing release paper and discarding.

.5 Using weighted roller as recommended by manufacturer, roll all surfaces of roof membrane to ensure continuous adhesion with membrane to substrate. Firmly press membrane into substrate to ensure proper bond.

.6 Lap cap sheet flashing onto cap sheet membrane a minimum 152mm (6”). Side laps between adjacent sheets to be a minimum of 127mm (5”) wide.

.7 Properly secure flashings to their support, without sags, blisters, fish-mouths or wrinkles with terminations as indicated on drawings and details.

.8 All side and end laps of cap sheet flashing to be heat welded with hot air gun to satisfaction of Observer.

.8 General Requirements for Application:

.1 Tools, Rollers, & Squeegees: Use membrane manufacture's recommended tools and accessories. Keep tools clean during performance of work and frequently replace application roller tips and squeegee heads with new when clogged.

.2 Surface Review: Apply over wood, metal, gypsum board and concrete decks which are clean, smooth, and free of snow, ice, moisture, and debris. Concrete decks must have all holes filled with quick drying cement and rough patches removed.

.3 Application of Primer: Priming is required for all substrates prior to installation. Avoid pooling primer and allow to completely dry before membrane installation. Drying time will vary according to absorptive qualities of material and ambient weather conditions.

.4 First Roll Starting Point: Base sheet to begin at drain level with side lap aligned to centre of drain. Run rolls perpendicular to slope. Cap sheet to be installed over base sheet covering base sheet overlap. Center of cap sheet to align up with centre of drain.

.5 Relaxing of Roll Membrane: All roll membranes are to be fully unrolled and allowed to relax for a min. of 15 minutes prior to installation. Wait longer in cooler temperatures. Trace Z pattern with torch as recommended by manufacturer over membranes that are covered with thermofusible film.

.6 Staggering of Sheets: End laps between base and cap sheets to be offset a min. of 305m (24"). Side laps between base and cap sheets to be offset a min. of 305mm (12"), centered alignment preferred. Laps in same membrane layer to be min. 76mm (3") wide for side laps and min. 305mm (12") wide for end laps. When selvedge side laps of base and cap sheets are unequal, adjust cap roll width occasionally to maintain alignment.

.1 If installing a half sheet to restore stagger, ensure cut edge is straight and true.

.7 Procedure to Seal Voids: Where voids are created by overlapping rolls of membrane, cut off corner of selvedge edge where covered by next roll of material.

.8 Selvedge Edge Protection: Granules along edge of membrane to be primed prior to application of adhesive to provide good adhesion of laps.

.9 Membrane Flashings: Base flashings to extend min. 102mm (4") onto field of roof. Cap flashings to overlap base sheet flashings and extend min. 152mm (6") onto field or roof. Use wider overlap widths where required by manufacturer for warranty requirements.

.10 Compound Flow (bleed out) at Seams: When torch applying membrane, provide consistent, continuous bleed-out along all seams, no less 3mm (.125") and no greater than 6mm (.25") in width.

.11 All Seams: Check all seams in all sheets with a round nosed trowel while work is in progress. Repair found deficiencies immediately and before continuing roof installation.

.12 Base Sheet Seams: Butter all seams and laps. Provide additional bitumen at point of 90° upturns in base sheet flashings. Recheck self-adhered membrane seams left

exposed within forty-eight (48) hours of installation to repair any revealed seam deficiencies with clean, heated trowel.

.13 Cap Sheet Seams: At all end laps and membrane flashing overlaps, degranulate area (embed granules) of surface to be bonded by embedding ceramic granules into bitumen of membrane using clean, heated trowel to push in. Measure and use chalk lines to mark outline of areas requiring degranulation. Achieve a uniform black surface of bitumen across 100% of embedment areas to be overlapped.

.14 Primer Application: Sanded membrane left exposed overnight or longer to be primed before continuing membrane installation to ensure good adhesion.

.15 Torch Application: During windy periods, slow application rate down to ensure good bond with proper level of heat. Stop and periodically check for proper adhesion.

.9 Correction Requirements for Defects and Deficiencies to as per Manufacturers Published directions, with the following exceptions:

.1 Membrane Patches: Cap sheet membrane patches to be installed from seam to seam. Minimum size of membrane patch to be 915 x 915 mm (36” x36”). Smaller sizes are not acceptable. Neatly cut / remove the selvedge edge from cap sheet prior to application, ensuring a straight edge.

.2 Correction of granule loss or degranulated area with primer and granules is not acceptable. If liquid applied membranes and granules are intended by the contractor, discuss first with QA Observer, and ensure all applications are installed straight and with a clean edge, and extended from edge to edge of the membrane being repaired.

.3 The intent of all repairs is to look like the work was intended.

3.8 LIQUID APPLIED PMMA RESIN FLASHINGS

.1 Where specifically indicated in detail drawings and at any junctions where conventional installation of membrane flashings are not feasible, install new liquid applied resin flashing system.

.2 Resin system to be a layered application consisting of two coats of thixotropic catalyzed polymethylmethacrylate (PMMA) resin encapsulating a layer of polyester fleece reinforcement.

.3 Installation of liquid applied flashing system to follow in strict accordance with manufacturer’s written instructions.

.4 Ensure that substrates are free from gross irregularities, loose, unsound or foreign material such as dirt, ice, snow, water, grease, oil, bituminous products, release agents, laitance, paint, loose particles/friable matter, rust or any other material that would be detrimental to adhesion of catalyzed primer and/or resin to substrate.

.1 Some surfaces may require scarification, shot-blasting, or grinding to achieve a suitable substrate. Wipe surfaces with a clean cloth saturated with specified cleaner/solvent to remove grease, oils or dust that may affect adhesion and to cured PMMA surfaces to receive a subsequent coat of resin.

.2 Concrete substrates to receive an application of specified PMMA roofing system to have a maximum moisture content of 6% and a maximum internal relative humidity of 75%.

.5 Preparation/Mixing/Catalyzing Resin Products:

.1 Pour desired quantity of resin into a clean container and using a spiral mixer or mixing paddle, stir liquid for time period specified by resin manufacturer.

.2 Calculate amount of catalyst powder needed using manufacturer's guidelines and add pre-measured catalyst to resin component.

.3 Mix again for time period specified by resin manufacturer, ensuring that product is free from swirls and bubbles.

.4 Ensure that air is not entrained into product during mixing process. To avoid aeration, do not use a spiral mixer unless spiral section of mixer can be fully contained in liquid during mixing process.

.5 Mix only enough products to ensure it can be applied before expiration of resin pot life.

.6 Primer Application:

.1 Apply primer resin using a roller or brush at minimum rate specified by primer manufacturer over poured reinforced concrete substrates.

.2 Apply primer resin using a roller or brush at increased rate specified by primer manufacturer over overlay/ cover board, and granule surfaced membrane substrates.

.3 Increase application rates over other absorbent substrates. Do not let resin pool or pond. Do not under-apply or over-apply primers as this may interfere with proper primer catalyzation.

.4 Make allowances for saturation of roller covers and application equipment.

.7 Paste Application:

.1 Allow primer to set and apply catalyzed preparation paste using a trowel.

.2 Before application of resin over catalyzed paste surface, specified cleaner/solvent, wipe surface of paste using specified cleaner/solvent and allow to dry.

.3 Treat surface again if not followed up by resin application within 60 minutes.

.8 Flashing Membrane Application:

.1 Using masking tape, mask perimeter of area to receive flashing system.

.2 Apply resin primer to substrates requiring additional preparation and allow primer to set.

.3 Pre-cut fleece to ensure a proper fit at transitions and corners prior to membrane application.

.4 Apply an even, generous base coat of flashing resin using a roller at minimum rate specified by resin manufacturer to prepared surfaces requiring flashing coverage.

.5 Work fleece into wet, catalyzed resin using a brush or roller to fully embed fleece in resin and remove trapped air. Back-coat fleece on vertical applications.

.6 Lap fleece layers a minimum of 51mm (2") and apply an additional coat of catalyzed resin between layers of overlapping fleece.

.7 Again using a roller, apply an even top coat of catalyzed resin at minimum rate specified by resin manufacturer immediately following embedment of fleece, ensuring full saturation of fleece.

.8 Ensure that flashing resin is applied to extend a 6mm (0.25") beyond fleece. Remove tape before catalyzed resin sets. Make allowances for saturation of roller covers and application equipment.

.9 Should work be interrupted for more than 12 hours or surface of catalyzed resin becomes dirty or contaminated by elements, wipe surface to be lapped with new flashing resin using specified cleaner/solvent.

.10 Allow surface to dry for a minimum 20 minutes and a maximum 60 minutes before continuing work.

3.9 ROOF PENETRATIONS & ACCESSORIES

.1 Install vent stack flashings, support flashings, and other roof penetration flashings, and seal with roof membrane in accordance with Manufacturer's instructions and as indicated on detail drawings.

.2 Coordinate and cooperate with the supply and installation of fall protection anchors and related accessories / accessories. Ensure all penetrations and installations are sealed and watertight at the end of each day.

.1 Prime all metal flanges with modified bitumen compatible primer, and allow any solvents to flash-off and dry completely prior to installation.

.2 Set metal flange in bed of manufacturer recommended and system compatible roofing cement applied over base sheet membrane, ensuring a positive bond.

.3 Install an additional ply of base sheet membrane flashing over metal flange prior to installing cap sheet membrane. Additional ply of base membrane to extend a minimum of 152mm (6") past all edges of metal flange.

.4 Install cap sheet ply over base flashing ensuring a full bond to base ply membrane.

.5 Apply continuous bead of manufacturer's recommended and system compatible sealant around penetration at point where membrane terminates.

3.10 ROOF DRAINS

.1 General Practice:

.1 Reuse cast roof drains and include for drilling and tapping in new studs and the replacement of clamping rings and screens if the existing ones are damaged or broken. Membrane installation at cast drains to include 915mm x 915mm (36" x 36") lead sheets.

.1 Drain inserts and seals are not approved without prior approval from the consultant.

.2 Ensure existing roof drains, rain gutters, and down pipes are clear of debris and are free flowing prior to installation of new roof system.

.1 Any blockages are to be reported prior to start of Work. Once Work has begun, Contractor assumes responsibility for free flowing drains and clearing blockages at no additional cost to Owner.

.2 Where required for new roof drains and interior plumbing, Contractor to provide interior plumbing and hook-up to existing storm water drainage system and co-ordinate installation of same with Owner.

.3 Prior to installation of new roof, ensure that all drains are located at a height where new roof system is able to clear majority of roof top water caused by rainfall within a seventy-two (72) hour period.

.4 Once work has begun, no roof area to be left overnight without adequate provision for drainage.

.5 Install drains in accordance with detail drawings and as per manufacturer's written instructions and guidelines.

.2 Where applicable, downpipes to be connected to all existing subsurface drains. Fabricate and install a new, fully soldered square to round transition to attach new downpipe to existing sub surface drain as required.

.3 Roof Drain Installation:

.1 Re-use existing cast drain body, install new threaded rod & bolts, clamps and strainers.

.1 Clean drain ring receivers of all contaminants.

.2 If existing threaded rod(s) cannot be removed, tap new threaded holes as necessary to allow installation of new hardware.

.3 Notify Consultant of any concerns with reuse of the existing drains.

.2 Drain Inserts (If required and approved in advance by the Consultant): Menzies Clamp Tite spun copper or aluminum drains. Flange to be secured to substrate with min. four (4) fasteners per drain as required to properly secure drain body.

.1 Affix Fernco connector seal to bottom of drain stem before insert into existing storm drainage pipe.

.2 Set metal flange of drain body into continuous bed of manufacturer recommended and system compatible roofing cement applied over base sheet membrane.

.3 Mechanically secure drain body to deck and substrate with min. four (4) fasteners per drain through drain flange or by underdeck clamping ring.

.3 Additional drains: refer to Section 3.7.6.1 herein with respect to the evaluation of roof drainage upon completion of the base sheet and before cap sheet is installed.

.1 Additional, unit cost, drains where required shall be specified spun copper and installed as noted herein and sealed or covered over to prevent drainage until such time that internal plumbing can be supplied and installed by others.

.4 At all existing roof drains employing control flow weir devices, it is mandatory to reinstate existing devices or provide new control flow devices with equivalent flow rates inside new roof drains.

.5 Install target patch of membrane reinforcement over metal drain flange. Use a square of 1m x 1m (39" x 39") base sheet membrane and install over drain at a 45° angle to direction of base sheet rolls.

.6 Install cap sheet over base sheet membrane with drain in center of roll and without seams in drain area.

.1 All end laps of cap sheet to be min. 915mm (36”) away from drain.

.2 Where seams of cap sheet do not align properly with drain location, install cap sheet over drain area first and picture-frame cap sheet into remainder of roof.

.3 At drain sump areas larger than 1.2m x 1.2m (4’ x 4’), install cap sheet over sump area first without any end laps and picture-frame into remainder of roof.

.7 Place Clamping Ring over raised bolt studs. Install stainless steel self-locking nuts to tighten Clamping Ring against membrane flashings until secure.

.8 Install ballast guard strainer dome and secure with cotterless pin or wing nut screw.

3.11 PLUMBING

.1 Contractor shall reuse if possible, existing cast iron drain bowls, with new bolts, clamping rings and strainers at locations shown on roof plan and as indicated on the details. The new components shall be installed as per manufacturer’s written instructions.

.2 Interior plumbing drain connections where required for the Work shall be the responsibility of the Roofing Contractor and are to be conducted by a certified plumbing contractor.

.3 Contractor shall provide any plumbing hook-up to drains as part of the contract and to co-ordinate the installation of same with the Client.

.4 Test all existing drains to verify that they are free flowing.

3.12 MISCELLANEOUS MECHANICAL & ELECTRICAL

.1 Unless stated in writing elsewhere, Contractor responsible for all Mechanical and Electrical Work required to perform complete installation of new roofing. Any and all costs associated with HVAC disconnection, lifting, removal, and reconnection, including modification of gas and conduit lines, to be included in Bid Pricing, unless specified otherwise on Bid Form.

.1 When lifting mechanical units, remove existing foam gasket and replace with new specified foam gasket. Ensure surface receiving new gasket is clean and dry, with no remnants of the old gasket.

.1 Notify QA Observer if existing mechanical curb is of bolt together type, and has open corners.

.2 Coordinate any planned disruptions 5 working days advance notice with Owner to minimize inconvenience.

.2 The following is a step by step procedure for removal and re-installation of all Mechanical and Electrical Equipment consisting of:

.1 Combined heat/cool units.

.2 Cooling only units.

.3 Split systems (cooling only).

.4 Exhaust Fans.

.5 Removal of units.

.3 Combined heating and cooling units:

.1 Locate power source in store and turn off, lock out or tag.

.2 Check power source at unit on roof and disconnect.

.3 Shut off gas and disconnect gas piping and cap both ends to keep out moisture and dirt.

.4 Disconnect duct work.

.5 Lift unit using slings, spreaders where necessary and A-Frame with wheels and move to neutral area over plywood sheets.

.6 Upon completion of roofing, replace unit.

.7 If unit has been raised; modify duct work, insulation, electrical and gas piping to suit.

.8 Reseal same to make watertight.

.9 Turn power on in store, recheck at unit, restart unit.

.4 Cooling only units:

.1 Locate power source in store and turn off, lock out or tag.

.2 Check power source at unit on roof and disconnect.

.3 Disconnect duct work.

.4 Lift unit using slings, spreaders where necessary and A-Frame with wheels and move to neutral area over plywood sheets.

.5 Upon completion of roofing, replace unit.

.6 If unit has been raised; modify duct work, insulation, electrical piping to suit. Reseal same to make watertight.

.7 Turn power on in store, recheck at unit, restart unit.

.5 Split systems (cooling only):

.1 Check power source in store and turn off, lock out or tag.

.2 Check power at unit and disconnect.

.3 Remove refrigerant into cylinders and store for re-use.

.4 Final removal of refrigerant will be accomplished by using approved reclaimer.

.5 Disconnect and cap refrigerant lines to keep moisture out.

.6 Remove unit using slings, spreaders and A Frame with wheels to a neutral area.

.7 *Recharge only with refrigerant removed and stored; not responsible if unit is short of refrigerant.

.8 Set unit back on sleepers after reroofing.

.9 Reconnect piping and modify as required if unit has been raised.

.10 Leak test and evacuate system and recharge with stored refrigerant only.

.11 Reconnect electrical, turn power on, turn unit on.

.6 Exhaust fans:

.1 Locate power source in store and turn off tag or lock out.

.2 Check power at unit and disconnect electrical and duct work.

.3 Raise and move unit using slings and A Frame with wheels to a neutral area.

.4 Put unit back on sleepers or curb after reroofing.

.5 Reconnect electrical and duct work with modifications as required.

.6 Reseal duct work to provide watertight seal.

.7 Removal:

.1 Locate and disconnect power to unit, tag or lock out.

.2 Remove electrical to below roof level and disconnect electrical at source and make safe.

.3 Tag disconnected line as to location at both ends.

.4 Disconnect and remove duct work to below roof level.

.8 Electrical Instructions:

.1 Contractor shall carry the costs of the following electrical work associated with the roof replacement:

.1 Where existing Roof Top HVAC Units to be raised or relocated temporarily (to replace curbs etc.), these units should be disconnected, existing feeders to be extended to be extended to the temporary location connected. When the necessary work is completed the units will be disconnected at the temporary locations and reconnected at the permanent locations.

.2 Where existing Telephone / Cellular / Cable / Satellite cables run on the existing roof, these cables shall be raised in sections to follow the phasing of the roof replacement and placed back on the new roof. The Contractor to co-ordinate this work with Service Provider.

.9 Remove and dispose of identified and designated abandoned, redundant, and unused HVAC equipment from roof and worksite.

.10 Gas Lines and Conduits: Disconnect, modify, and reconnect all gas lines, electrical lines, and conduits as required to suit new roof installation height and configuration of projection detailing.

.1 All gas line work must be performed by a qualified Gas Fitter and must conform to requirements of CSA B149.1-10.

.2 Re-install gas lines and conduits at a height of 150mm (6”) to 200mm (8”) above finished roof surface. Secure all loose cabling and conduits off surface of roof membrane.

.3 Ensure that all gas line penetrations are separated from all electrical line penetrations with their own roof flashing supports. Provide any new sleeves, goosenecks, or curbs required using Departmental Representative approved flashing supports and installation methods.

.4 At threaded gas line piping, which cannot be permanently enclosed or covered, construct new insulated and waterproof dog house detail with removable lid for periodic thread inspection.

.5 Paint all gas lines on areas of roof work with exterior grade, yellow paint for metal surfaces; Rust Paint by Tremclad or approved equivalent.

.11 Underdeck Securement: Where existing sections of roof decking are to be removed, ensure any cabling, conduits, and attachments (plumbing, electrical wiring, lighting fixtures, etc.) secured to underside are disconnected, removed, and relocated. Notify Owner's Representative, if necessary, to have interior services disconnected, removed, and relocated by Owner.

.12 Temporary Security: Provide overnight security, at no additional cost to Owner, where removal of any venting or HVAC equipment results with an opening in roof deck that cannot be permanently sealed on same day. Security Company must be preapproved by both Owner and Consultant in advance.

3.13 TEMPORARY WATER CUT-OFFS (NIGHT SEALS)

.1 All membrane flashings to be installed concurrently with roof membrane in order to keep roof system watertight during performance of work.

.2 Temporary waterproof seals to be placed on daily work as required. All temporary water-stops to be constructed to provide a one hundred (100) percent watertight seal.

.3 Edge of roof membrane to be sealed in a continuous heavy application of sealant. Temporary seals to be removed and cleaned up before proceeding with remaining work.

.4 When work resumes, cut out and dispose of all contaminated membrane. All sealant, contaminated membrane, insulation fillers, etc. to be removed from work area and properly disposed of offsite. Reuse of these materials in new work is strictly prohibited.

.5 If inclement weather occurs while a temporary water-stop is in place, Contractor to provide all necessary labour required to monitor situation and maintain watertight condition.

.6 If any water is allowed to penetrate under newly completed roofing, then affected area to be cut out, removed, and replaced with new materials at Contractor's own expense.

3.14 METAL FLASHINGS

.1 On All Roof Replacement Areas: After installation of roof membrane and membrane flashings, new perimeter metal and metal flashings to be installed as detailed in Section 07 62 00 and as indicated on detail drawings.

3.15 SEALANTS

.1 On All Roof Replacement Areas: After installation of roof membrane and membrane flashings, install sealants as per Section 07 92 00 – Sealants and as recommended by membrane manufacturer.

3.16 CLEAN-UP

.1 On All Roof Replacement Areas: Clean up and remove from job site on a daily basis, all rubbish and surplus materials resulting from this work.

.2 Drag a magnetic bar across work area and grounds to ensure removal of all discarded fasteners and sharp metal debris.

END OF SECTION - 07 52 00

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PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Supply and installation of new prefinished sheet metal flashings and counter flashings to complete roof system installation. Unless specifically indicated otherwise, all references to Sheet Metal Flashings in specifications and drawings to refer to new pre-painted steel.

.2 Form, break, and install metal flashings to suit perimeter and projection details as specified and as shown on detail drawings.

.3 Coordination of all work in this section with other sections and trades as required to ensure proper installation of specified components.

1.2 RELATED SECTIONS

.1 Section 01 11 00 – Summary of Work

.2 Section 02 41 19 – Selective Demolition & Removal

.3 Section 07 31 29 – Cedar Shingles

.4 Section 07 52 00 – SBS Modified Bituminous Membrane Roofing

.5 Section 07 92 00 – Joint Sealants

1.3 REFERENCES

.1 Latest edition of all listed references; most stringent requirements to govern in conflicts:

.1 American National Standards Institute/Single Ply Roofing Industry (ANSI/SPRI):

.1 ES-1: Wind Design Standard for Edge Systems (Low Slope Roofing).

.2 American Society for Testing and Materials (ASTM).

.1 A606: Steel Sheet, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.

.2 A653/A653M: Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.

.3 A792/A792M: Steel Sheet, 55% Alum.-Zinc Alloy-Coated by Hot-Dip.

.3 Canadian Standards Association (CAN/CSA):

.1 B111: Wire Nails, Spikes and Staples.

.4 Canadian General Standards Board (CAN/CGSB):

.1 51.32M: Sheathing, Membrane, Breather Type.

.2 93.1-M: Sheet, Aluminum Alloy, Prefinished.

.5 Sheet Metal and Air Conditioning Contractors National Association (SMACNA):

.1 Architectural Sheet Metal Manual

.6 Roofing Contractors Association of BC (RCABC): Roof Practices Manual, Latest Revision, and includes Technical Updates issued at the time of tender.

.7 Canadian Roofing Contractors Association (CRCA): Roofing and Waterproofing Manual.

1.4 SUBMITTALS

.1 Mock-ups: Create mock-up sample of irregular metal flashing details and related accessories for review by Consultant. Examples: irregular parapet saddle flashings or gum edge flashings.

.1 Provide any additional mock-up samples as reasonably requested by Consultant.

.2 Mock up must include at least one outside or inside corner.

.3 Finished and approved mock-ups to remain as example of standard to be met, and may remain in place as part of installed and completed work.

.2 Warranty: Upon completion of the project provide Owner with guarantees and warranties listed in Section 1.8 of this specification.

1.5 STORAGE AND HANDLING

.1 Do not store metals in direct contact with earth, road surface, roof deck, or other metals.

.2 Provide protection where sheet metal flashings will be stored on finished roof surfaces.

.3 Place suitable supports or pallets under metal stock upon delivery. Protect metal from scratches, dents, punctures, and moisture.

.4 Store caulking and sealants at +5ºC minimum.

.5 Handle and store products in a manner to prevent damage, oxidization, and deterioration.

.6 Remove and replace damaged products at own expense and to satisfaction of Quality Assurance Observer/Consultant.

.7 Store membranes and related accessory materials in accordance with Manufacturer's recommendations.

1.6 SAFETY AND PROTECTION

.1 References:

.1 CAN/CSA S269.2M: Access Scaffolding for Construction Purposes.

.2 FCC No. 301: Standard for Construction Operations.

.3 Comply with all safety requirements as per current printed edition of applicable health and safety Act, Regulations, and Code applicable in the jurisdiction for the Work, and with RCABC standards.

.2 Solvents, Adhesives and Membranes

.1 Store only enough solvents and adhesives on roof for same day's use.

.2 Manufacturer supplied adhesives should be stored in their overnight containers. Minimum temperature for solvent based adhesives and primers is -5°C.

.3 Hoisting:

.1 Protect walls and roof perimeters where hoisting is required.

.2 Protect roofs from damage due to traffic and material handling until completion of project.

1.7 WARRANTY

.1 Sheet Metal Flashings:

.1 Material Warranty covering sheet metal flashing material for two (2) years on Contractor's letterhead.

1.8 QUALITY ASSURANCE OBSERVATION

.1 IRC Building Sciences Group, hereafter known as "Observer", is an independent Quality Assurance Observation agency appointed by Owner to observe installation of sheet metal flashing Work:

.1 Arrange Prestart site meeting with Observer no more than three (3) weeks prior to commencement of Work on site. Obtain Observer's instructions and reference procedures to be followed on project.

.2 Provide to Observer date when work will begin, at least forty-eight (48) hours prior to commencement of Work for phase.

.3 Arrange Final Review of installed work with QA Observer, and where required with membrane Manufacturer's technical representative.

.2 Cooperate with Observer and afford all facilities necessary to permit full Quality Assurance Observations during performance of Work. Act immediately on instructions given by Observer.

.3 When required, provide cut-outs and samples in field where directed by Observer and make good without additional cost to Owner.

.4 Pay for any additional testing and observations required by Observer for correction of Work, without additional cost to Owner, when initial tests and observations reveal work failing to meet contract requirements and when construction extends beyond the schedule submitted by the contractor.

.5 Copies of Q.A. Observation Reports to be issued by Observer to Owner and Prime Contractor.

1.9 PREPARATORY WORK

.1 Examine drawings and specifications and any other necessary data which may affect installation to determine extent of Work involved in this Section. No additional claims against Owner to be allowed resulting from failure to ascertain full extent of Work required as described or implied.

.2 Prior to application of flashings, review roof perimeters and projections.

.3 Examine installed membrane flashings for any defect of level or construction before proceeding with work.

.4 Advise Consultant of any deficiencies that may affect performance of roof system and any deviations from specified tolerances.

.5 Defective or improper work must be corrected before proceeding with installation of sheet metal flashings.

PART 2 - PRODUCTS

2.1 PRE-FINISHED METAL FLASHINGS

.1 Compatibility between materials is essential. Use only materials that are known to be compatible when incorporated in a completed assembly.

.2 Prefinished Metal Flashing: 24 gauge (0.026" or 0.66mm) steel with G90 (Z275) zinc coating conforming to ASTM A653A/A653M. Surface with Silicone Modified Polyester (SMP) factory-baked finish. Colour selected by Owner from Manufacturer's standard colour range.

.3 Cascadia Metals Inc. and Makin Metals or approved equivalent.

.4 Cleats and Hook Strips Not Otherwise Specified: Two gauges heavier of material matching that of flashing being employed; minimum 22 gauge (0.032" or 0.82mm).

2.2 ACCESSORIES

.1 Underlay: To be specified base sheet and cap sheet membranes unless otherwise detailed. Self-adhered membrane conforming to CSA A123.3M, minimum 1.0mm thick of SBS modified bitumen, with a top surfacing of tri-laminate polyethylene film and an underside with a protective release film.

.2 Joint Filler: Extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 210 kilopascals (20 to 30 psi), 25% to 30% wider than joint to be caulked.

.3 Touch-up paint: As recommended by pre-finished material manufacturer.

.4 Sealants: as per Section 07 92 00.

2.3 FASTENERS

.1 Use galvanized, copper, aluminum, stainless steel or coated screws most compatible with materials being employed. Use fasteners as most generally suitable to not cause a galvanic reaction.

.2 Wood to Wood: No. 8 screws of a suitable length to penetrate into substrate a minimum 19 mm (0.75"). Install according to manufacturer's instructions.

.1 When Alkaline Copper Quaternary (ACQ) treated wood is present, fasteners shall be upgraded to hot-dipped galvanized steel, stainless steel, silicon bronze, copper or specially coated suitable for use in ACQ such as DT1700.

.3 Wood to Steel: Phillips Modified Truss Head fastener Fastening Products or Master Driller Wafer Plymetal or Wafer Reamer or owner approved equal, of sufficient length to penetrate into substrate a minimum 6mm (.25"), zinc plated. Install according to manufacturer's instructions.

.4 Steel to Steel: Master Gripper Self-Drilling Screws with wafer head or owner approved equal, of sufficient length to penetrate into substrate a minimum 6mm (.25"). Install according to manufacturer's instructions.

.5 Steel/aluminum to aluminum: 410 Case Hardened Stainless Steel Master Gripper MDP Self-Drilling Screws with wafer head or owner approved equal, of sufficient length to penetrate into substrate a minimum 19mm (0.75"). Install according to manufacturer's instructions.

.6 Fasteners to Masonry or Concrete: MNA635R Nylon Drive Screw Anchor of suitable length to penetrate into substrate minimum 38mm (1.5" or 5/16") Ultracon Fastener or owner approved

equal, to penetrate substrate by 32mm (1.25"), minimum unless otherwise shown. Install according to manufacturer's instructions.

.1 Drill hole 322mm (.75") deeper than embedment.

.2 Install colour matching plastic cap or paint to match sheet metal flashings.

.7 Exposed Fasteners: UDrill Self-Drilling Screws with hex washer head and bonded EPDM fastener or Owner Approved Equal, of sufficient length to penetrate into substrate a minimum 19mm (.75"). Install according to manufacturer's instructions.

.1 Hex Head and washer assembly are to be powder coated or 2 part epoxy painted to match metal flashings.

.2 Unless otherwise identified in drawings, fasteners are to be case hardened steel.

.3 Fasteners to be #8 or better.

.8 Pop Rivets: 3mm (0.125") shank diameter, all stainless steel, blind pop rivets meeting ASME/ANSI B18.1.1. Head diameter to be 6mm (0.25") and with a grip range of 4.7mm to 6.4mm (0.1875 to 0.25"). Body and mandrel to be constructed from high-shear, 300 series stainless steel.

2.4 FABRICATION

.1 Fabricate all possible work in shop in 3.05m (10') lengths by brake forming, bench cutting, drilling and shaping.

.1 On vertical sections over 300mm (12") and under 1.22m (48") in elevation install metal in 1.52m (5') section as specified and detailed. Profiled metal to include cross or horizontal stiffener breaks.

.2 On high vertical sections over 1.22m (48") in elevation sheet metal coverage shall be considered cladding. Bring to the attention of the Consultant if areas are not previously identified.

.2 On coping or flashing with a horizontal dimension of 508mm (20") or greater, use 25mm (1") lock folded standing seam joints.

.1 Clips for Standing Seams must be a minimum 24 gauge in thickness, 38 mm (1-1/2") wide.

.3 All joints of sheet metal cap flashing or wall flashing shall utilize an s-lock type joint unless impractical, such as at corners.

.1 End joints incorporating standing seam methods shall only be acceptable for corners, coping areas wider than 508mm (20"), or if discussed and agreed to by the Consultant.

.2 Lap joints are not acceptable.

.4 Form bends with straight sharp lines, angles and corners into true planes, free from twists, buckles, dents and other visual distortions.

.5 Double-back exposed metal edges at least 12.7mm (0.5"). Exposed raw edges will not be permitted.

.6 Drip edge flashings that will engage a hook strip shall be hemmed to allow a full 12.7mm (.5") of engagement.

.7 Supply all accessories required for installation of sheet metal work of this Section. Fabricate accessories of same materials to which they will be used.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install sheet metal flashings at copings, walls, joints, roof openings and other components required to protect membrane flashings as shown on drawings, or otherwise required.

.1 Wall flashings shall fully cover exposed vertical surfaces, and shall be on average 25mm (1”) from contact with the primary membrane. Taper panels as necessary to follow sloped insulation.

.2 Install continuous concealed hook strips at all exterior faces. Install cleats as required to protect membrane roofs and flashings from damage at lock joints and as required to permanently hold flashing in place. Secure cleats at 305mm (12”) on center keeping fastener within 32mm (1.25”) of drip edge to a maximum 76mm (3”) away from drip edge. Use of screw type fasteners are required, nails are not acceptable.

.1 No fastening of flashing is permitted within 89mm (3.5") of the roof surface.

.2 Discontinuous clips are not to be used without design authority written approval and the request shall have just cause.

.3 Install in a uniform manner, true to line, free of dents, warping and distortion.

.4 Install sheet metal with concealed fasteners at lock joints. Exposed fastening will be permitted only with approval of Consultant. Space all fasteners evenly in an approved manner. Use of screws are required, nails are not acceptable. Use nylon plugs and screws where fasteners are exposed, otherwise use concrete drive fasteners where metal flashings are installed over concrete or masonry..

.5 Install underlay under sheet metal, installed directly over wood or masonry surfaces. Overlap joints 51mm (2") and turn up 76mm (3") at edges where horizontal surfaces intersect vertical planes.

.6 Join sheet metal by “S” lock seams, or other methods if Consultant approval has been provided. Space joints evenly where exposed. Form inside and outside corners by means of standing seams. Do not use pop rivets.

.1 Lap seams on vertical corners are acceptable only where the vertical run is less than 100 mm (4"). Otherwise corner mating to be completed with a standing seam.

.2 For s-lock applications 1 screw every 200mm (8”) of width is required within the seams.

.3 For standing seam applications at corners or if prior approval has been given, clips must be secured with a minimum 2 screws, and placed a minimum of 1 clip every 200 mm (8”) of width.

.7 Acceptance of a particular seaming method on one project does not create a precedent for future projects. All seaming method decisions are on a project to project basis.

.8 The top surfaces of all walls (parapets, expansion joints, roof dividers, etc) will be constructed to provide a minimum of 2% drainage to the interior of the roof.

.1 All cap flashings shall be fully supported by a rigid substrate, shims are not acceptable

.2 Do not form open joints or cupping that fails to drain water.

.9 Caulk all sheet metal joints.

.10 Where existing reglets cannot be reused, provide new saw cut into substrate sized minimum 25mm (1") deep and to suit site conditions.

.1 Clean saw cuts free of contaminates and dust.

.11 At reglets or sawcuts wider than 10mm (.375”) and deeper than 19mm (.75”) provide polyethylene rod, 25% wider than joint width. Caulk all reglets to provide a continuous waterproof seal. Use colour to match materials. Conform to manufacturer’s latest printed recommendations for use of products being employed.

.12 Gum edge or gum lip flashings (also known as surface reglets) should be avoided in all circumstances. If job conditions allow for no other alternative, written permission from Consultant for use of gum edge flashing must be obtained.

.1 Unless otherwise detailed or stated all surface reglet flashings shall be double gum lip flashings.

.13 Install sheet metal saddle flashings at parapet to wall locations, over membrane flashings, and secure in place. Saddles to direct water flow away from the sensitive vertical to horizontal transition joint.

.1 Punch lock seams are acceptable, however will require appropriate sealants.

.14 Prepare cut sheet and mock-up installations of metal flashing details for approval by QA Observer prior to installation of sheet metal flashings.

.1 If existing substrate conditions are expected to create deflection or oil-canning in the finished flashings, the concern should be brought to the attention of the design authority for discussion prior to installation. Installation of the flashing will indicate the roofing contractors’ acceptance of the existing conditions.

3.2 FINISH

.1 At project’s conclusion, leave surface and adjacent work areas free of damage and clean of debris. Finished surfaces of formed metal flashings to be free of oil canning, dents and be perfectly colour matched.

.2 Changes in colour between sheets and dented or oil canned surfaces that detract from visual appearance of finished product will be rejected. Remove and replace damaged, defaced or defective work.

.3 Paint all exposed metal due to cutting.

.4 After erection touch-up finish surfaces damaged during handling and erection in conformance with manufacturer’s recommendations. Refinish shop applied finishes as approved by Consultant.

.5 Remove deposits or protections and wash metals left unpainted and exposed to view as specified by metal manufacturer.

3.3 CLEAN-UP

.1 Daily as work proceeds and on completion, remove all surplus materials and debris resulting from foregoing work.

.2 Drag a magnetic bar across work area and grounds to ensure removal of all discarded fasteners and sharp metal debris.

.3 Remove all stains, caulking or other adhesive from all affected surfaces.

END OF SECTION - 07 62 00

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 11 00 – Summary of Work

.2 Section 02 41 19 – Selective Demolition and Removal

.3 Section 07 61 13 – Metal Roofing

.4 Section 07 52 00 – SBS Modified Bituminous Roofing Membrane

.5 Section 07 62 00 – Prefinished Sheet Metal Flashing & Trim

1.2 REFERENCES

.1 All codes, standard specifications and by-laws referred to in this section shall be current editions including all revisions, addenda and supplements.

.1 ASTM C719 – Standard Test Method for Adhesion and Cohesion of Elastomeric Sealant Joints Under Cyclic Movement (Hockman Cycle).

.2 ASTM C920 – Standard Specification for Elastomeric Joint Sealants.

.3 ASTM C1193 – Standard Guide for Use of Joint Sealants.

.4 ASTM C1311 – Standard Specification for Solvent Release Sealants.

.5 ASTM C1330 – Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

.6 ASTM C1481 – Standard Guide for Use of Joint Sealants with Exterior Insulation and Finish Systems (EIFS).

.7 CAN/CGSB-19.13-M87 – Sealing Compound, One-component, Elastomeric, Chemical Curing.

.8 CGSB 19-GP-5M – Sealing Compound, One Component, Acrylic Base, Solvent Curing.

.9 CGSB 19-GP-14M – Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

.10 CAN/CGSB-19.17 – One-component Acrylic Emulsion Base Sealing Compound.

.11 CAN/CGSB-19.24 – Multi-component, Chemical Curing Sealing Compound.

.12 SWRI (Sealant, Waterproofing and Restoration Institute) – Sealant and Caulking Guide Specification.

.13 Sealants: The Professionals' Guide, Sealant, Waterproofing and Restoration Institute.

1.3 SUBMITTALS

.1 Section 01 33 00 – Submittal Procedures.

.2 Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, perimeter conditions requiring special attention, and field quality control testing.

1.4 QUALITY ASSURANCE OBSERVATION

.1 Observation of work will be carried out by designated QA Observer.

.2 Prior to mobilizing on site, prepare and install sealant samples for adhesion testing, a minimum of two (2) samples for each substrate combination, according to manufacturer's written guidelines. Test sealant in contact with samples of materials to be caulked to ensure that proper adhesion will be obtained and no staining of material will result. Testing to be completed prior to mobilization on site. Do not proceed with Work until samples have been approved.

.3 Adhesion tests on new sealant will be performed at random locations at discretion of Owner's representative. Any work that is found to be sub-standard, is to be removed and replaced at no cost to Owner. Contractor is to assist with sealant adhesion tests as directed.

.4 Execute Work of this Section by Subcontractors approved by manufacturers of materials incorporated in Work; who has equipment, adequate for Project, and skilled tradesmen to perform it expeditiously; and is known to have been responsible for satisfactory installations similar to that specified during a period of at least immediate past five years.

.5 Remove sealant and re-caulk disapproved joints.

.6 Approved joints will establish minimum acceptable quality of workmanship and will serve as standard by which subsequent Work will be compared for Acceptance.

1.5 MOCK-UP

.1 Construct mock-up with specified sealant types and with other components noted.

.2 Construct mock-up at test area to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant.

.3 Locate where directed.

.4 Mock-up may be part of finished Work.

.5 Allow 48 hours for inspection of mock-up by Consultant before proceeding with Sealant Work.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact.

.2 Protect from freezing, moisture, water and contact with ground or floor.

1.7 ENVIRONMENTAL AND SAFETY REQUIREMENTS

.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 acceptable to local Labour regulations.

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

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Place materials defined as hazardous or toxic waste in designated containers.

.2 Ensure emptied containers are sealed and stored safely for disposal away from children.

.3 Dispose of surplus chemical and finishing materials in accordance with federal regulations.

.4 Fold up metal banding, flatten, and place in designated area for recycling.

.5 Use trigger operated spray nozzles for water hoses.

.6 Return solvent and oil soaked rags for contaminant recovery and laundering or for proper disposal.

.7 Use least toxic sealants, adhesives, sealers, and finishes necessary to comply with requirements of this section.

.8 Close and seal tightly all partly used sealant containers and store protected in well ventilated fire-safe area at moderate temperature.

.9 Place used hazardous sealant tubes and other containers in areas designated for hazardous materials.

PART 2 - PRODUCTS

2.1 SEALANT MATERIALS

.1 Sealant shall be a high performance, high movement, single component, low modulus, low VOC, UV Stable, non-sag hybrid sealant.

.2 Sealants and caulking compounds must:

.1 Meet or exceed all applicable industrial safety and performance standards.

.2 Be manufactured and transported in such a manner that all steps of process, including disposal of waste products arising therefrom, will meet requirements of all applicable governmental acts, by laws and regulations.

.3 Be of a hybrid nature, utilizing silyl-modified polyurethanes, also identified as an MS Polymer.

.3 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.

.4 Caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant to not be used in or near air handling units.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Acceptable single component neutral cure silicone sealants for skylight related work include:

.1 Tremco Dymonic FC or Approved Alternate Hybrid Sealants discussed with Consultant Colour of sealant to be selected to match cladding components.

.2 Primer: As recommended by sealant manufacturer to assure adhesion of compound, to prevent staining of substrate.

.3 Joint Backing: Polyethylene, urethane, neoprene, or vinyl, extruded closed cell foam in circular shape with diameter 25% greater than joint width before installation; joint breaking tape approved by sealant manufacturer where specified.

.4 Cleaning Material: As recommended by sealant manufacturer.

.2 Concealed Sealants: To be Tremco Dymonic FC or Approved Alternate Hybrid Sealants discussed with Consultant.

.3 Butyl (for concealed skylight related sealant joints): Tremco Curtainwall Sealant or approved alternate.

.4 Primers:

.1 TREMprime Silicone Porous Primer for porous surfaces and TREMprime Silicone Metal Primer for metals or plastics, or primers as recommended by sealant manufacturer.

.5 Cleaners:

.1 Acceptable cleaners:

.1 Dow Corning Primer/Surface Prep Solvent or Owner approved equivalent

.2 Methylethylketone (MEK) or Owner approved equivalent

.3 Isopropyl Alcohol or Owner approved equivalent

.2 Surfaces to receive sealants are to not be cleaned with Xylol.

.3 All substrate materials to be cleaned with compatible cleaners.

2.3 PREFORMED COMPRESSIBLE AND NON-COMPRESSIBLE BACK-UP MATERIALS

.1 Polyethylene:

.1 Extruded closed cell foam backer rod.

.2 Size: oversize 30 to 50 %.

.2 Bond Breaker Tape.

.1 Polyethylene bond breaker tape.

.2 Compatibility: All materials in a sealant system to be compatible with each other, with substrate and any coating or waterproofing to be installed. Sealants used with elastomeric coating or waterproofing systems must be approved by coating or waterproofing manufacturer.

2.4 JOINT PRIMER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant. Primer as recommended by sealant manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION

.1 Protect existing facades from staining or contamination.

.2 Protect public from falling debris during installation.

.3 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage. At no time shall unsealed joints be left open. If protection is required, then entire drop/bay to be adequately protected.

3.2 EXAMINATION

.1 Before commencing Work, verify that joint configuration and surfaces have been provided as specified under Work of other Sections to meet intent of sealant Specification, that joint conditions will not adversely affect execution, performance or quality of completed Work and that they can be put into acceptable condition by means of preparation specified in this Section. Verify site conditions together with manufacturer's representative of sealant to be applied.

.2 Examine existing conditions and substrates upon which work of this section is dependent. Report to Consultant in writing any defects or discrepancies. Commencement of work implies acceptance of existing conditions and assuming full responsibility for finished condition of work.

.3 Ascertain that sealers applied to sealant substrates are compatible with sealant used and that full bond between sealant and substrate is attained. Request samples of sealed or coated substrate from their fabricators for testing of compatibility and bond if necessary.

.4 Examine sealant configuration for width and depth. Depth of joint should be 1/2 joint width with a minimum depth of 6mm (0.25") and a maximum depth of 13mm (0.5") unless specified otherwise. For fillet joints, a minimum of 6mm (0.25") adhesion between sealant and substrate must be achieved on both sides of joint unless specified otherwise.

.5 Defective work resulting from application to unsatisfactory joint conditions will be considered responsibility of those performing work of this section.

3.3 SURFACE PREPARATION

.1 Prepare surfaces in accordance with manufacturer's directions.

.2 Before any sealant repairs are made, type of existing sealant to be determined. If uncertain as to type, then a sealant manufacturer technical representative to be contacted to confirm type. Only sealant compatible with existing to be installed as part of repairs. Urethane based sealants are not to be applied over existing silicone sealants.

.3 Where existing, remove sealant completely. In no case shall new sealant be applied over old. In addition:

.1 Remove existing sealants, dust, oil, grease, oxidation, mill scale, coatings and all other loose material by cutting, brushing, scrubbing, scraping and/or grinding. In no case, however, shall components be damaged during surface preparation.

.2 Clean substrates with recommended solvent cleaner. Apply solvent with a clean cloth, pad or soft paper towel. Applicator cloth or towel to not leave fiber residue on substrate surface. Surface should be wiped clean and dried with a second clean cloth to ensure removal of contaminants. If substrate surfaces is still not clean, repeat procedures as needed. Change cloths frequently to prevent depositing contaminants from cloth onto substrate surface.

.3 Use method of surface preparation suitable for substrate, as recommended by sealant manufacturer and that does not damage existing finishes.

.4 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.5 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.6 Ensure joint surfaces are dry and frost free.

.7 Remove loose particles present or resulting from routing by sweeping particles out with a dry brush, blowing out joints with oil free compressed air or by vacuuming joints prior to solvent cleaning.

3.4 PRIMING

.1 Where necessary to prevent staining or for neat appearance, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

.3 Use only primer approved by sealant manufacturer for particular installation, applying in strict accordance with manufacturers printed recommendations.

.4 Always pour primers onto rag or brush, do not dip rag or brush into container.

.5 Prime only as much area that can be packed and caulked in a single day.

.6 Do not apply excess primer, and apply primer only to areas which it will be contacted by sealant.

3.5 BACKUP MATERIAL

.1 Apply bond breaker tape where installation of backer rod is not possible, three point adhesion needs to be eliminated or throat to width ratio needs to be created as per manufacturers recommendations.

.2 When using backing material comprised of tubular or rod stock, avoid lengthwise stretching of material. Do not twist or braid backer material.

.3 Provide a stiff blunt-surfaced wood or plastic installation tool, having shoulders designed to ride on finished surface and a protrusion of required dimensions to assure a uniform depth of backup material below sealant. Do not puncture exterior skin or surface of backer material. A screwdriver is prohibited for use on this project.

.4 Using approved tool, smoothly and uniformly place backup material to depth indicated on drawings or otherwise required, compressing backer material 25% to 50% and securing a positive fit.

.5 Install backing material to a depth to provide a caulked joint meeting depth requirement as set out in sealant manufacturer's specifications.

3.6 MIXING

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

3.7 APPLICATION

.1 Sealant:

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exist to provide neat joint.

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

.5 Ensure that new sealant is adhered to substrates a minimum of 6 to 10 mm at each side of joint.

.6 Use sufficient pressure to fill voids and joints solid.

.7 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.8 Tool exposed surfaces before skinning begins to give slightly concave shape. Tooling to be performed by proper metal or wood tool. Finger tooling joints will not be accepted.

.9 Remove excess compound promptly as work progresses and upon completion.

.2 Curing:

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

3.8 CLEAN-UP

.1 Clean adjacent surfaces immediately and leave work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

END OF SECTION - 07 92 00

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Environment Canada Real Property Management Technical Services

Roof Replacement Program 2020

PACIFIC WILDLIFE RESEARCH CENTRE

WIND UPLIFT CALCULATION

IFT

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National Research Council Canada

Wind load calculation for roof covering and add-ons

Building parameters

Building location: Vancouver Region, Ladner, British Columbia

Building geometry:

- Low-rise building,
- Height (reference height): 30 ft (9 m)
- Width (smaller plan dimension): 17 ft (5 m)
- Length: 18 ft (5 m)

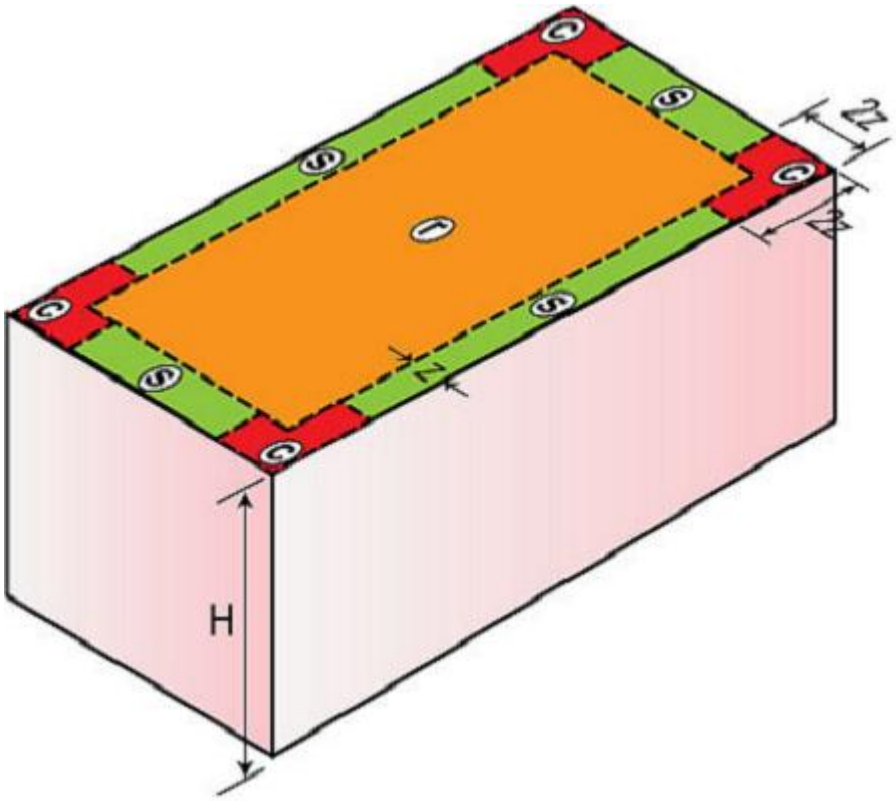
Building exposure: Open

Building openings: Category 2

Building importance: Normal

Wind loads for roof cladding

Roof area	Wind load
End zone width, Z	3.281 ft (1 m)
Corner, Ⓒ	-83 psf (-4 kPa)
Edge, Ⓢ	-57 psf (-2.7 kPa)
Field, ⓡ	-40 psf (-1.9 kPa)



(Conversion Unit: 1 ft = 0.3048 m, 1 psf = 47.88 Pa, 1lb/ft^2 = 4.8824 kg/m^2)

Date modified: 2019-03-28

HAZARDOUS MATERIALS SURVEY

OF

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Delta, BC

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IRC Building Sciences
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PREPARED BY:

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#217 - 2323 Quebec Street
Vancouver, BC
V5T 4S7
604-873-8599

May 16, 2019

IFT

EXECUTIVE SUMMARY

A.C.M. Environmental Corporation (ACM) was retained by IRC Building Sciences (the Client) to provide a Hazardous Materials Survey for the roofs of the Pacific Wildlife Research Centre buildings located at 543 Robertson Road in Delta, BC. The buildings consist of a lodge building, observation tower and a science building.

Objective:

The survey was conducted as part of a pre-renovation project involving the replacement of the roofs on the buildings.

Background:

Exterior finishes consist primarily of cedar shingles underlain with tar paper. Two small areas of torch-on roofing also exist on the lodge building.

Method:

The survey was conducted using both visual and physical assessment techniques, in accordance with WorkSafeBC OH&S Regulation 20.112. Representative samples of materials suspected of containing asbestos and/or lead were collected and were submitted to laboratories for analysis. The surveyed areas were also inspected for possible PCB containing fluorescent light ballasts, mercury containing switches, and other potentially hazardous materials (e.g. mould, potential CFC's, etc.) during the survey.

Limitations:

The scope of this survey is limited to roofs of the lodge building and science building. The roof of the observation tower was not sampled due to height restrictions, although this roof is known to have been installed at the same time as the adjacent roofs, therefore consisting of the same materials.

Results:

Table 1 below summarizes the hazardous materials identified within the scope of work areas.

Table 1: Hazardous Materials Summary

Hazard	Material / Component	Approximate Quantity
Asbestos	Window Glazing Mastic	4 windows
Lead	Plumbing Vent Pipes	5 units
	Paints	20 ft^2.

Recommendations:

Risk assessments and safe work procedures are required prior to disturbing any of the identified hazardous materials. For asbestos and lead containing materials, a Notice of Project (NOP) must also be submitted to WorkSafeBC a minimum of 48 hours prior to impacting said materials. All work impacting the hazardous materials must only be conducted by trained personnel, under a company Exposure Control Plan (ECP) for the specific hazardous materials being impacted.

If any unidentified suspect asbestos or lead containing materials are encountered under the roofing materials during restoration activities, the work in the immediate area must stop and the materials must be inspected by a qualified person as per WorkSafeBC OH&S Regulation 20.112.

Please review Section 3 – Results and Discussion, and Section 4 – Recommendations, for more detailed information.

TABLE OF CONTENTS

FIGURES, TABLES, AND APPENDICES

IFT

1.0 INTRODUCTION

A.C.M. Environmental Corporation (ACM) was retained by IRC Building Sciences (the Client) to provide a Hazardous Materials Survey for the roofs of the Pacific Wildlife Research Centre buildings located at 543 Robertson Road in Delta, BC. The buildings consist of a lodge building, observation tower and a science building.

The survey was conducted as part of a pre-renovation project involving the replacement of the roofs on the buildings. No other interior or exterior areas, including mechanical equipment, of the building were inspected for this survey.

The objective of this assessment was to identify the types, condition and extent of hazardous materials in the areas of the building that may be impacted during the renovation activities.

Exterior finishes consist primarily of cedar shingles underlain with tar paper. Two small areas of torch-on roofing are present on the lodge building.

Figure 1 shows an aerial photograph of the buildings surveyed.

Figure 1: Site Plan

The survey of the buildings was conducted on May 8, 2019 by Jim Williams, Senior Project Manager for ACM.

A total of 17 representative bulk samples of materials suspected of containing asbestos were collected during the survey. Asbestos analytical results are included in Appendix A of this report.

A total of 2 representative paint samples were collected during the survey and submitted to Maxxam Analytics in Burnaby, BC for lead analysis. Lead sample results are included in Appendix B of this report.

The locations of asbestos and lead samples collected during the survey are included in the provided roof plan diagram in Appendix C of this report. Please note that any roof plan within this report may not represent the current state of the building.

Photographs taken during the survey are included in Appendix D of this report.

2.0 METHODOLOGY

The hazardous materials survey was conducted using destructive testing methods. **It must be noted that there is a possibility of asbestos and/or lead containing materials existing under the present roofing materials, as not all areas were opened up during the inspections. Possible asbestos containing materials which may exist in these areas may include, but are not limited to, insulation materials (including vermiculite insulation in the attic spaces), underlying layers of felts, mastics, etc. Possible lead-containing materials which may exist in these areas may include, but are not limited to, paint, electrical wire casings, cast iron piping spigots, etc.**

The U.S. Environmental Protection Agency (USEPA) Guidance Document for Controlling Asbestos Containing Materials in Buildings, was selected for use in this study. The document identifies factors associated with the "condition" and "potential for disturbance or erosion" of asbestos containing materials. These factors help to define the fibre release potential of suspect asbestos containing materials and were used in a qualitative evaluation of materials found in the surveyed areas. Recommendations have been substantiated by additional information utilized from other documentation cited in the Reference Section of this report.

Samples of materials suspected of containing asbestos were collected and analyzed in ACM's laboratory in accordance with the WorkSafeBC Occupational Health and Safety Regulations and Guidelines (G20.112) and National Institute of Occupational Health and Safety (NIOSH) analytical methods.

The OSHA 29 CFR 1926.62 Lead Standard, and the WorkSafeBC publication "Safe Work Practices for Handling Lead" were selected for use in this study. This standard applies to any work involving demolition, removal, encapsulation, restoration, installation, alteration, maintenance, transportation, storage, or disposal of Lead Containing Materials (LCMs).

Samples of paints and coatings, suspected of containing lead, were sent to Maxxam Analytics for analysis of lead content. The samples were digested with acids and analyzed using Inductively Coupled Plasma Spectroscopy–Atomic Emission Spectroscopy.

3.0 RESULTS & DISCUSSION

Each type of hazardous material observed on the roof of the building is described in this section. Assumptions made pertaining to the hazardous materials existing within inaccessible areas (i.e. concealed hazardous materials) are noted.

3.1 ASBESTOS

Details of each building material found to be asbestos containing are provided in the sections below. Laboratory analytical results of the suspect asbestos containing materials are included in Appendix A of this report.

3.1.1 Window Glazing Mastic

Samples of window glazing mastic were collected from the skylight located on the science wing building. Based on the sample results, all window glazing mastic on the skylights of the building must be treated as asbestos containing.

Samples of materials suspected of containing asbestos were collected in accordance with the WorkSafeBC Guideline 20.112. This document provides guidance on recommended sample numbers based on the type and amount of the materials. No other suspect asbestos containing materials were observed during the survey that may be impacted by the roofing project.

Deviations from Sampling Guidelines

Less than the recommended 3 samples of mastics and putties were collected during the survey, as these were considered representative, given the consistency in their appearance and the limited amount of materials to be affected.

3.2 LEAD CONTAINING MATERIALS

WorkSafeBC requires lead exposure risk assessments for any work that may impact any lead containing materials. The associated risk levels for the work depend on the exact nature of the work, from the tools being used, to the condition of the materials.

3.2.1 Paints

A total of 2 samples of paint were collected from the roof of the buildings and analyzed for lead content. The lead concentrations within the sample collected were found to range from 2260 to 2270 milligrams/kilogram (mg/kg). Therefore all paints applied to the roof vents and skylights on the buildings should be considered to be lead containing. The locations and sample results are located in Table 2 below.

Table 2: Lead Concentrations in Paints

Location / Description	Lead Concentration (mg/kg)	Lead Concentration (%)
LP1 –Paint on roof vents	2260	0.23
LP2 – Paint on skylights	2270	0.23

The Canadian Hazardous Products Act considers paints with lead levels above 90 mg/kg or 0.009% to be lead containing. The lead content within the paint applied to the roof vents and skylights is greater than 90 mg/kg and are therefore considered to be lead containing according to the CHPA's definition for lead containing paints.

WorkSafeBC requires a risk assessment for any work activity that may impact materials with lead containing paints/coatings. Risk assessments are also required for lead levels below 90 mg/kg, if the materials are to be welded, torch cut, grinded, or sanded.

Prior to any renovation activities taking place, risk assessment(s) will be required for the lead containing materials. The risk assessment(s) will be based on the nature of the work affecting the lead containing products (e.g. cutting, manual demolition, sanding, grinding, blasting, etc.) and total area of lead-containing materials to be impacted. The assessment(s) will subsequently determine the special lead precautions, such as personal protective equipment for workers and/or dust suppression methods, required for the work.

The risk assessment may also determine if a hazardous materials abatement contractor is needed to perform the work.

Lead removal procedures based upon the risk assessment(s) will be required once all work requirements are identified. The lead procedures can be done in conjunction with the required asbestos procedures. All work impacting the lead containing materials must only be conducted by properly trained personnel under a company lead Exposure Control Plan (ECP).

Leachability testing will be required for any lead painted/coated materials being disposed of at a landfill.

3.2.2 Plumbing Vent Pipes

Lead plumbing vent pipes were observed on the roofs of the buildings and are considered to be a disposal issue only.

3.3 OTHER POTENTIALLY HAZARDOUS MATERIALS

The roof areas were inspected for other potentially hazardous materials. These materials are discussed below in further detail.

3.3.1 Rodent/Avian Feces, Mould

No Rodent/avian feces or mould growth was observed during the survey, although may still exist. During any work activities, if mould or rodent/avian feces are encountered by workers, any workers working within the immediate area must wear the appropriate personal protective equipment (e.g. appropriate respirator, disposable suits) in order to prevent any airborne inhalation exposure to mould or bacteria.

No other hazardous materials were observed on the roof areas that are expected to be impacted by the roofing project.

4.0 RECOMMENDATIONS

All hazardous materials in their current states do not pose a hazard to workers or occupants within the building. Immediate removal of the materials is not required if the materials are left undisturbed. **However, these materials will become hazardous if they are impacted.**

Therefore, prior to any roofing activities taking place which may impinge upon the asbestos or lead containing or other hazardous materials found on the roof of the building, the following must be performed:

1.) A risk assessment will be required prior to the disturbance of any identified asbestos or lead containing materials.

2.) If any unidentified suspect asbestos or lead containing materials are encountered during re-roofing activities, the work in the immediate area must stop and the materials must be inspected by a qualified person as per WorkSafeBC OH&S Regulation 20.112 in order to potentially update the risk assessments if the materials are found to be asbestos or lead containing.

3.) The disturbance of any asbestos or lead containing materials identified in this report, or any other asbestos and/or lead containing materials encountered during restoration, will require a Notice of Project (NOP) with site-specific work procedures (based on the risk assessment) to be submitted to WorkSafeBC a minimum of 48 hours prior to impacting said materials. Copies of the NOP and work procedures must also be posted on site during the course of the work. Any asbestos removal must be done by a competent, trained abatement contractor. All lead work activities must be done by trained personnel under a lead Exposure Control Plan (ECP).

4.) During any work activities, if mould or rodent feces are encountered by workers, any workers working within the immediate area must wear the appropriate personal protective equipment (e.g. appropriate respirator, disposable suits) in order to prevent any airborne inhalation exposure to mould or bacteria.

5.0 STATEMENT OF LIMITATIONS

The A.C.M. Environmental Corporation (ACM) report is intended to direct the Client's attention to recognised environmental conditions and to potential sources of environmental contamination. The findings and conclusion regarding contamination of the property are based solely on the extent of observations and information gathered during the assessment. Nothing in the report is intended to express any legal opinion upon environmental liabilities relating to the site or whether operations legally conformed with relevant legislative requirements.

Furthermore, it must be understood that changing circumstances in the physical environment, the use of the property, as well as the changes in any substances stored, used, handled at the property, could radically alter the conclusions and information contained in this report. Therefore, it is important that the property is periodically re-evaluated and the client kept informed as to developments, which may impact the properties.

ACM makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any properties, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time. ACM accepts no responsibility for consequential financial effects on transactions or property values, or requirements for follow up actions and costs.

The liability of ACM or its staff will be limited to the lesser of the fees paid or actual damages incurred by the client. ACM will not be responsible for any consequential or indirect damages. ACM is only responsible for damages resulting from negligence of ACM.

Information provided by ACM is intended for Client use only. Any use by a third party of reports or documents authored by ACM or any reliance by a third party on or decisions made by a third party based on findings described in said documents is the sole responsibility of such third parties. ACM accepts no responsibility for damages suffered by any third party. **This report is not intended as contract specifications or site specific procedures.**

A.C.M. ENVIRONMENTAL CORPORATION

Jim Williams, Dipl. Tech., ABI
Senior Project Manager

6.0 REFERENCES

1) USEPA. 1985. U.S. Environmental Protection Agency. "Guidance for Controlling Asbestos containing Materials in Buildings". Washington, DC: Office of Toxic Substances, USEPA.

2) Lory EE, Coin DC. 1981. "Management Procedure for Assessment of Friable Asbestos Insulating Material". Port Hueneme, CA: Civil Engineering Laboratory, Naval Construction Battalion Center.

3) OSHA 29 CFR 1926.62, Lead Standard. Occupational Safety & Health Administration, 200 Constitution Avenue, NW Washington, DC 20210

4) WorkSafeBC. Occupational Health and Safety Regulation, including all current amendments and guidelines.

5) 2017 Edition - WorkSafeBC. Safe Work Practices for Handling Asbestos.

6) 2017 Edition - WorkSafeBC. Safe Work Practices for Handling Lead.

7) Google Earth (Version 7.3.1.4507).

APPENDIX A

Asbestos Bulk Sample Results

ACM ENVIRONMENTAL CORPORATION

Asbestos Bulk Sample Results

Client: **IRC Building Sciences Group**

Location: **543 Robertson Road, Delta, BC (Pacific Wildlife Research Centre)**

Submitted By: **Jim Williams (ACM)**

Project #: 6443-18 (Spreadsheet #1)

Date: 16-May-19

Submission Date: 10-May-19

The samples below have been analyzed in accordance with NIOSH Method 9002, Issue 2.

				ASBESTOS RESULT		OTHER FIBRES DETECTED		NON-FIBROUS MATERIALS		
SAMPLE NUMBER	SAMPLE LOCATION & DESCRIPTION	PHASE / LAYER DESCRIPTION	PHASE / LAYER CONTENT % (Vol/Vol)	TYPE	CONTENT % (Vol/Vol)	TYPE	CONTENT % (Vol/Vol)	TYPE	CONTENT % (Vol/Vol)	LAB ANALYST
6443.0207 (Sample 1)	Lodge Lower Vent Putty	1) Soft Grey Putty Compound	100%	None Detected	N/A	None Detected	N/A	Putty Compound	100%	AN
6443.0208 (Sample 2)	Lodge North Roof Felt	1) Multi-Layers of Black Fibrous Felt	100%	None Detected	N/A	Cellulose, Synthetics	40-60%	Tar, Adhesive	40-60%	AN
6443.0209 (Sample 3)	Lodge Chimney Grey and Black Caulking	1) Soft Grey Caulking Compound 2) Soft Black Caulking Compound	60% 40%	None Detected None Detected	N/A N/A	Glass None Detected	1-5% N/A	Caulking Compound Caulking Compound	95-99% 100%	AN
6443.0210 (Sample 4)	Lodge Upper Vent Putty	1) Soft Grey Putty Compound	100%	None Detected	N/A	Glass	1%	Putty Compound	99%	AN
6443.0211 (Sample 5)	Lodge West Roof Membrane & Black/Grey Mastic	1) Small Brown Rocks 2) Soft Black Mastic 3) Black Fibrous Felt 4) Soft Black Mastic 5) Stretchy Clear/Black Material 6) Stretchy Black Vinyl Material 7) Stretchy Black/Grey/Brown Mastic	6% 14% 28% 28% 4% 16% 4%	None Detected None Detected None Detected None Detected None Detected None Detected None Detected	N/A N/A N/A N/A N/A N/A N/A	None Detected None Detected Synthetics None Detected None Detected None Detected Cellulose	N/A N/A 40-60% N/A N/A N/A 1%	Rocks Tar, Adhesive Tar, Adhesive Tar, Adhesive Fillers, Binders Vinyl Tar, Adhesive	100% 100% 40-60% 100% 100% 100% 99%	AN
6443.0212 (Sample 6)	Lodge South Roof Membrane /Shingle	1) Small Black/Dark Grey Rocks 2) Multi-Layers of Soft Black Mastic 3) Multi-Layers of Black Fibrous Felt 4) Soft Black Mastic 5) Stretchy Black Material 6) Soft Black Mastic 7) Stretchy Clear Material	10% 28% 38% 4% 4% 12% 4%	None Detected None Detected None Detected None Detected None Detected None Detected None Detected	N/A N/A N/A N/A N/A N/A N/A	None Detected None Detected Cellulose None Detected None Detected None Detected None Detected	N/A N/A 40-60% N/A N/A N/A N/A	Rocks Tar, Adhesive Tar, Adhesive Tar, Adhesive, Quartz Fillers, Binders Tar, Adhesive Fillers, Binders	100% 100% 40-60% 100% 100% 100% 100%	AN
6443.0213 (Sample 7)	Lodge East Roof Membrane	1) Small Brown Rocks 2) Multi-Layers of Soft Black Mastic 3) Multi-Layers of Black Fibrous Felt 4) Soft Black Mastic 5) Stretchy Black Vinyl Material	10% 26% 34% 26% 4%	None Detected None Detected None Detected None Detected None Detected	N/A N/A N/A N/A N/A	None Detected None Detected Synthetics None Detected None Detected	N/A N/A 40-60% N/A N/A	Rocks Tar, Adhesive Tar, Adhesive Tar, Adhesive Vinyl	100% 100% 40-60% 100% 100%	AN
6443.0214 (Sample 8)	Science Wing South Skylight Window Glazing Mastic	1) Paint 2) Soft Black Mastic	4% 96%	None Detected **Chrysotile**	N/A **1-5%**	None Detected None Detected	N/A N/A	Paint Tar, Adhesive	100% 95-99%	AN
6443.0215 (Sample 9)	Science Wing North Skylight Window Glazing Mastic	1) Paint 2) Soft Black Mastic	4% 96%	None Detected **Chrysotile**	N/A **1-5%**	None Detected None Detected	N/A N/A	Paint Tar, Adhesive	100% 95-99%	AN
6443.0216 (Sample 10)	Science Wing East Flashing Mastic	1) Soft Black/Dark Grey Mastic 2) Soft White/Clear Mastic	60% 40%	None Detected None Detected	N/A N/A	None Detected None Detected	N/A N/A	Adhesive Adhesive	100% 100%	AN
6443.0217 (Sample 11)	Science Wing West Flashing Mastic	1) Stretchy Black Mastic 2) Stretchy Clear Mastic	80% 20%	None Detected None Detected	N/A N/A	None Detected None Detected	N/A N/A	Adhesive Adhesive	100% 100%	PL
6443.0218 (Sample 12)	Science Wing Short Stack White/Grey Putty	1) Paint 2) Hard Grey Putty Compound	4% 96%	None Detected None Detected	N/A N/A	None Detected None Detected	N/A N/A	Paint Putty Compound	100% 100%	PL
6443.0219 (Sample 13)	Science Wing South Skylight Frame Caulking	1) Hard Brown Caulking Compound	100%	None Detected	N/A	None Detected	N/A	Caulking Compound	100%	PL
6443.0220 (Sample 14)	Science Wing Vent Stack White/Black Putty	1) Hard White Putty Compound 2) Soft Black Putty Compound	80% 20%	None Detected None Detected	N/A N/A	None Detected None Detected	N/A N/A	Putty Compound Putty Compound	100% 100%	PL

Proficiency is obtained through the American Industrial Hygiene Association (AIHA) AIHA

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ACM ENVIRONMENTAL CORPORATION

Asbestos Bulk Sample Results

Client: **IRC Building Sciences Group**

Location: **543 Robertson Road, Delta, BC (Pacific Wildlife Research Centre)**

Submitted By: **Jim Williams (ACM)**

Project #: 6443-18 (Spreadsheet #2)

Date: 16-May-19

Submission Date: 10-May-19

The samples below have been analyzed in accordance with NIOSH Method 9002, Issue 2.

				ASBESTOS RESULT		OTHER FIBRES DETECTED		NON-FIBROUS MATERIALS		
SAMPLE NUMBER	SAMPLE LOCATION & DESCRIPTION	PHASE / LAYER DESCRIPTION	PHASE / LAYER CONTENT % (Vol/Vol)	TYPE	CONTENT % (Vol/Vol)	TYPE	CONTENT % (Vol/Vol)	TYPE	CONTENT % (Vol/Vol)	LAB ANALYST
6443.0221 (Sample 15)	Science Wing Upper Roof Felt	1) Black Fibrous Felt	100%	None Detected	N/A	Cellulose	85%	Tar, Adhesive	15%	PL
6443.0222 (Sample 16)	Science Wing Lower Roof Felt	1) Black Fibrous Felt	100%	None Detected	N/A	Cellulose	85%	Tar, Adhesive	15%	PL
6443.0223 (Sample 17)	Science Wing North Skylight Frame Caulking	1) Stretchy Brown Caulking 2) Wood	70% 30%	None Detected None Detected	N/A N/A	Noen Detected Noen Detected	N/A N/A	Glass, Caulking Compound Wood	100% 100%	PL

Proficiency is obtained through the American Industrial Hygiene Association (AIHA) AIHA

IFT

APPENDIX B

Lead Paint Bulk Sample Results

Maxxam
A Bureau Veritas Group Company

Your Project #: 6443-18
Your C.O.C. #: 08470282

Attention: Jim Williams

ACM Environmental
217 - 2323 Quebec St
Vancouver, BC
Canada V5T 4S7

Report Date: 2019/05/15
Report #: R2722933
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B935787
Received: 2019/05/10, 15:48

Sample Matrix: Paint
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Elements by ICP-AES (acid extr. solid)	2	2019/05/14	2019/05/14	BBY7SOP-00018	EPA 6010c R3 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

IFT

Your Project #: 6443-18
Your C.O.C. #: 08470282

Attention: Jim Williams
ACM Environmental
217 - 2323 Quebec St
Vancouver, BC
Canada V5T 4S7

Report Date: 2019/05/15
Report #: R2722933
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B935787
Received: 2019/05/10, 15:48

Encryption Key

Maxxam
15 May 2019 10:43:26

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Customer Solutions, Western Canada Customer Experience Team
Email: CustomerService@maxxam.ca
Phone# (604) 734 7276
==========
This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

IFT

Maxxam Job #: B935787
Report Date: 2019/05/15

ACM Environmental
Client Project #: 6443-18

ELEMENTS BY ATOMIC SPECTROSCOPY (PAINT)

Maxxam ID		VR1117	VR1118		
Sampling Date		2019/05/08	2019/05/08		
COC Number		08470282	08470282		
	UNITS	LODGE ROOF VENT PAINT	SCIENCE WING SKYLIGHT PAINT	RDL	QC Batch
Total Metals by ICP					
Total Lead (Pb)	mg/kg	2260	2270	8.0	9416793
RDL = Reportable Detection Limit					

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

IFT

Maxxam Job #: B935787
Report Date: 2019/05/15

ACM Environmental
Client Project #: 6443-18

GENERAL COMMENTS

ELEMENTS BY ATOMIC SPECTROSCOPY (PAINT) Comments
Sample VR1117 [LODGE ROOF VENT PAINT] Elements by ICP-AES (acid extr. solid): Detection limits raised due to insufficient sample volume.
Sample VR1118 [SCIENCE WING SKYLIGHT PAINT] Elements by ICP-AES (acid extr. solid): Detection limits raised due to insufficient sample volume.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

IFT

Maxxam Job #: B935787
Report Date: 2019/05/15

QUALITY ASSURANCE REPORT

ACM Environmental
Client Project #: 6443-18

			Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9416793	Total Lead (Pb)	2019/05/14	<2.0	mg/kg	30	40	88	70 - 130

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

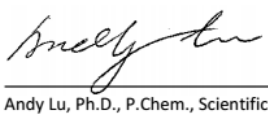
IFT

Maxxam Job #: B935787
Report Date: 2019/05/15

ACM Environmental
Client Project #: 6443-18

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Ph.D., P.Chem., Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Vancity, May 10th, 2019

Maxxam
A Bureau Veritas Group Company

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

CHAIN OF CUSTODY RE

COC #: 08470282

BBY FCD-00077/05
Page 1 of 1

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: ACM Environmental Corporation	Company Name:	Quotation #:	☑ Regular TAT 5 days (Most analyses)
Contact Name: Rosemary Fett-Johnston	Contact Name: Jim Williams	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 217 - 2323 Quebec Street	Address:	Project #: 6443-18	Rush TAT (Surcharges will be applied)
Vancouver, BC PC: V5T 4S7	PC:	Site Location:	☐ Same Day ☐ 2 Days
Phone: 604-873-8599	Phone: 604-562-1874	Site #:	☐ 1 Day ☐ 3 Days
Email: admin@acmenvironmental.com	Email: jim@acmenvironmental.com	Sampled By:	Date Required:

Regulatory Criteria	Special Instructions
☐ BC CSR Soil ☐ BC CSR Water	☐ Return Cooler
☐ CCME (Specify) ☐ Other (Specify)	☐ Ship Sample Bottles (Please Specify)
☐ Drinking Water ☐ BC Water Quality	

Rush Confirmation #:

Analysis Requested: VOC/VPH, MTBE, BTEX/VPH, TEH, EPH, LEPH/HEPH, PAH, F2 - F4, BTEX/F1, CCME-PHC, Preserved?, Filtered?, Dissolved Metals, Preserved?, Filtered?, Dissolved Mercury, Field Preserved?, Total Metals, Field Preserved?, Total Mercury, Sulphate, Fluoride, Chloride, COD, BOD, TDS, TSS, Alkalinity, Conductivity, pH, Ammonia, Nitrate, Nitrite, Lead (Pb), Lead Leachate

LABORATORY USE ONLY

CUSTODY SEAL Y / N: Present	Intact	COOLER TEMPERATURES
N	N	N/A

COOLING MEDIA PRESENT Y / N

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

	Sample Identification	Lab Identification	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	Lead (Pb)	Lead Leachate	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	COMMENTS
1	Lodge roof vent paint		2019/05/08		paint chips	X		1		
2	science wing skylight paint		2019/05/08		paint chips	X		1		
3										
4										
5										
6										
7										
8										
9										
10										

B935787_COC

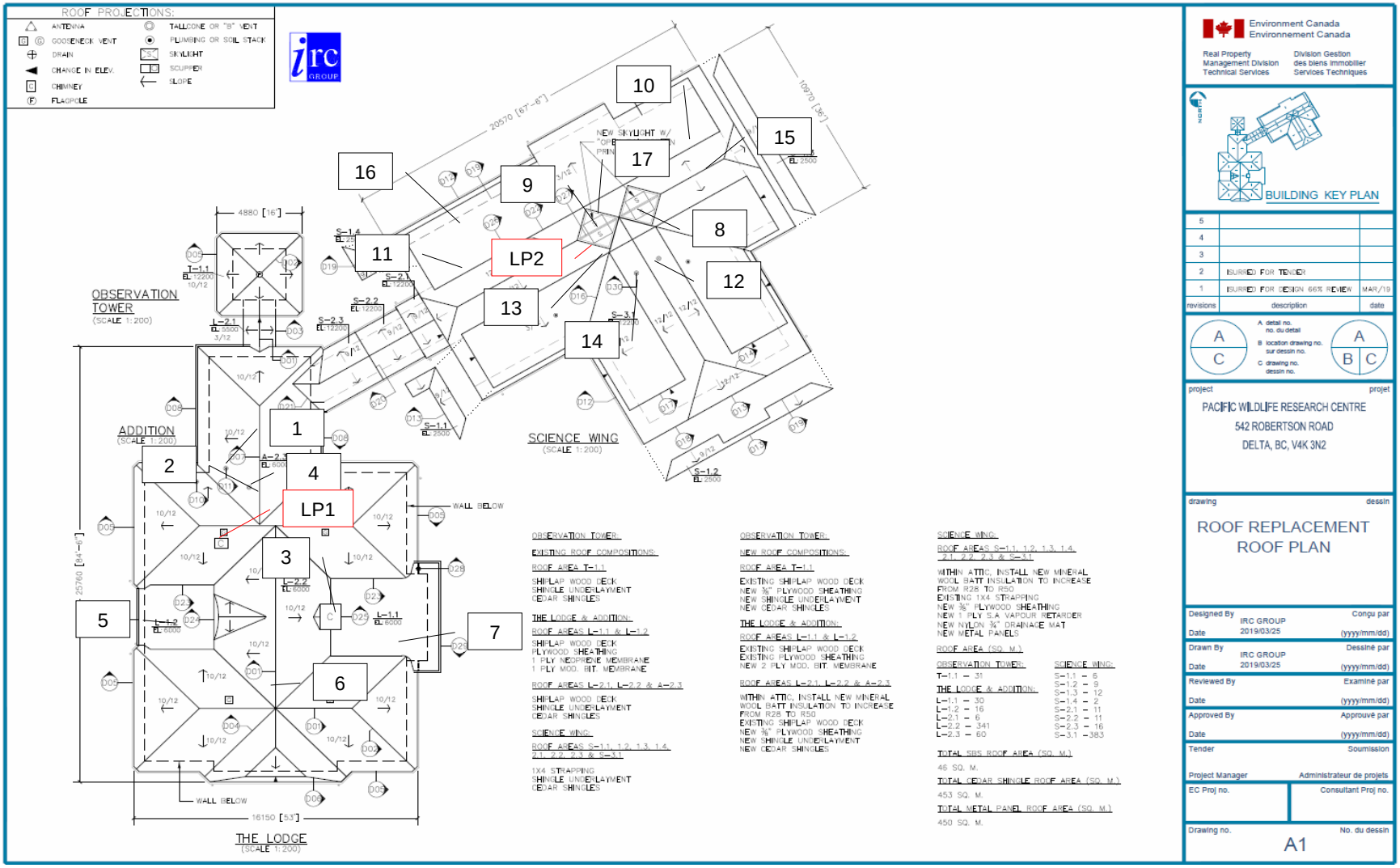
RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	MAXXAM JOB #
JW [signature]	2019/05/10	1024	[signature] BRITTANY BURLONE	2019/05/10	15:38 48 BB	[signature]

IFT

APPENDIX C

Sample Location Diagram

Roof Plan and Sample Locations



APPENDIX D

Site Photographs

View of Science Building.

Science Building - Non-asbestos felt beneath cedar shingles.

Lodge building roof and observation tower in background.

Lodge Building - Lead vent pipe

Lodge Building - Non-asbestos caulking on roof vents.

Lodge Building - Non-asbestos felt beneath cedar shingles.

Lodge Building - Brown lead containing paint on roof vent.

Lodge Building – Grey and black caulking around chimney.

Environment Canada Real Property Management Technical Services

Roof Replacement Program 2020

PACIFIC WILDLIFE RESEARCH CENTRE

DRAWINGS & DETAILS

IFT

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ISSUED FOR RETENDER DRAWING
SEPT./04/2019

Environment Canada
Environnement Canada

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE PHASE I
542 ROBERTSON ROAD DELTA, BC

LIST OF ARCHITECTURAL DRAWINGS

irc GROUP

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39857

OCT 0 5 2020

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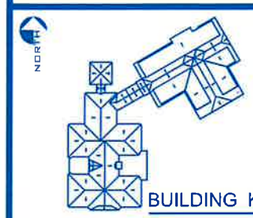
Environnement Canada

Real Property Management Division Technical Services
Division Gestion des biens immobilier Services Techniques



BUILDING KEY PLAN

revisions	description	date
5		
4	ISSUED FOR RETENDER	SEPT./2020
3	ISSUED FOR ADDENDUM 01	OCT./2019
2	ISSUED FOR TENDER	MAY/2019
1	ISSUED FOR DESIGN 66% REVIEW	MAR/2019

A detail no. no. du detail
B location drawing no. sur dessin no.
C drawing no. dessin no.

project / projet

PACIFIC WILDLIFE RESEARCH CENTRE
542 ROBERTSON ROAD
DELTA, BC, V4K 3N2

drawing / dessin

COVER PAGE

Designed By / Conçu par	IRC GROUP	
Date	2019/03/25	(yyyy/mm/dd)
Drawn By / Dessiné par	IRC GROUP	
Date	2019/03/25	(yyyy/mm/dd)
Reviewed By / Examiné par		
Date		(yyyy/mm/dd)
Approved By / Approuvé par		
Date		(yyyy/mm/dd)
Tender / Soumission		
Project Manager / Administrateur de projets		
EC Proj no.	Consultant Proj no.	
Drawing no. / No. du dessin	A0	

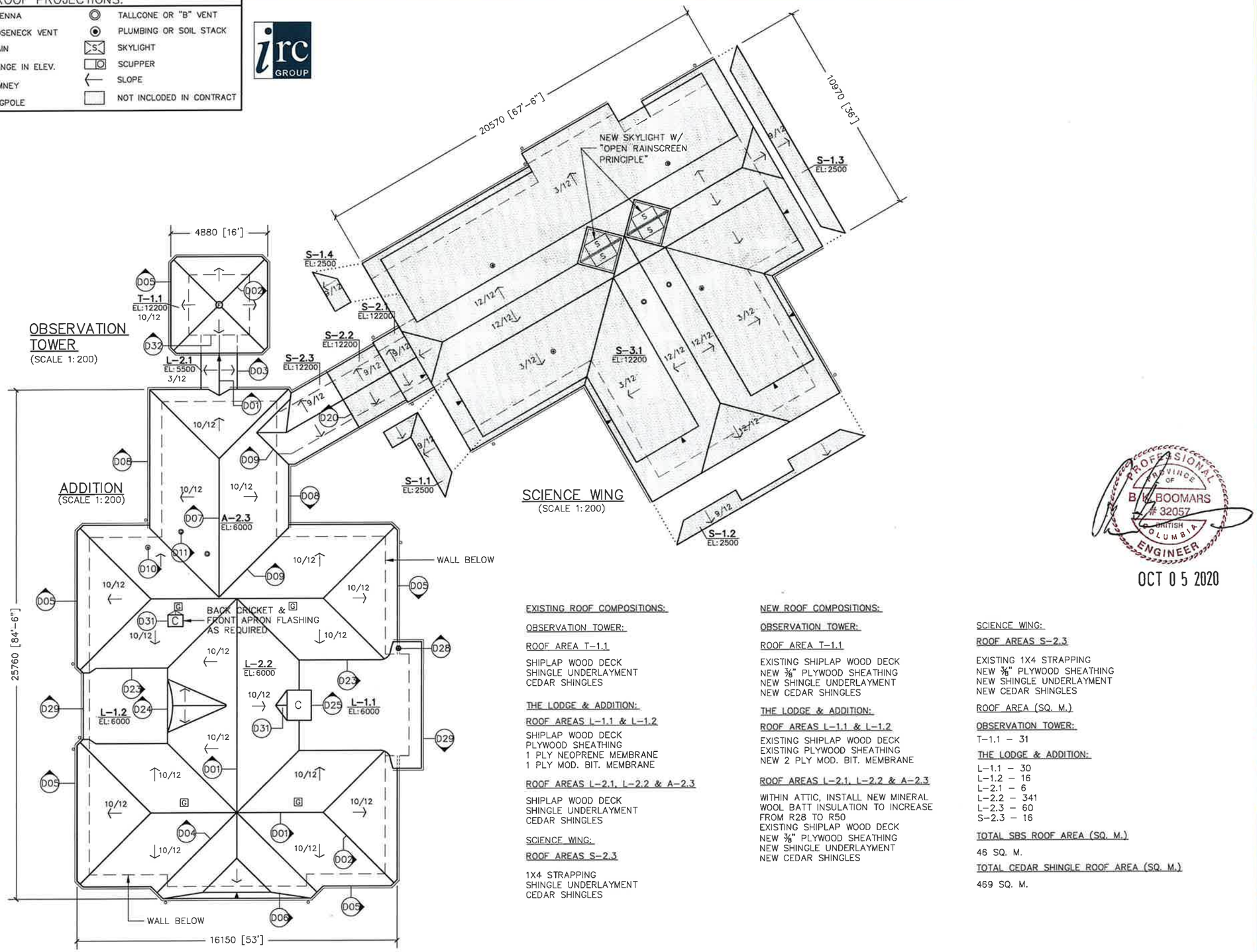
Plotted by: bwang Oct 02, 2020 - 3:39pm

PWGSC 11X17 (431x279)

ROOF PROJECTIONS:

△	ANTENNA	◎	TALLCONE OR "B" VENT
G Ⓖ	GOOSENECK VENT	⊙	PLUMBING OR SOIL STACK
⊕	DRAIN	S	SKYLIGHT
◀	CHANGE IN ELEV.		SCUPPER
C	CHIMNEY	←	SLOPE
Ⓕ	FLAGPOLE		NOT INCLODED IN CONTRACT

irc GROUP



EXISTING ROOF COMPOSITIONS:

OBSERVATION TOWER:

ROOF AREA T-1.1

SHIPLAP WOOD DECK
SHINGLE UNDERLAYMENT
CEDAR SHINGLES

THE LODGE & ADDITION:

ROOF AREAS L-1.1 & L-1.2

SHIPLAP WOOD DECK
PLYWOOD SHEATHING
1 PLY NEOPRENE MEMBRANE
1 PLY MOD. BIT. MEMBRANE

ROOF AREAS L-2.1, L-2.2 & A-2.3

SHIPLAP WOOD DECK
SHINGLE UNDERLAYMENT
CEDAR SHINGLES

SCIENCE WING:

ROOF AREAS S-2.3

1X4 STRAPPING
SHINGLE UNDERLAYMENT
CEDAR SHINGLES

NEW ROOF COMPOSITIONS:

OBSERVATION TOWER:

ROOF AREA T-1.1

EXISTING SHIPLAP WOOD DECK
NEW ⅜" PLYWOOD SHEATHING
NEW SHINGLE UNDERLAYMENT
NEW CEDAR SHINGLES

THE LODGE & ADDITION:

ROOF AREAS L-1.1 & L-1.2

EXISTING SHIPLAP WOOD DECK
EXISTING PLYWOOD SHEATHING
NEW 2 PLY MOD. BIT. MEMBRANE

ROOF AREAS L-2.1, L-2.2 & A-2.3

WITHIN ATTIC, INSTALL NEW MINERAL WOOL BATT INSULATION TO INCREASE FROM R28 TO R50
EXISTING SHIPLAP WOOD DECK
NEW ⅜" PLYWOOD SHEATHING
NEW SHINGLE UNDERLAYMENT
NEW CEDAR SHINGLES

SCIENCE WING:

ROOF AREAS S-2.3

EXISTING 1X4 STRAPPING
NEW ⅜" PLYWOOD SHEATHING
NEW SHINGLE UNDERLAYMENT
NEW CEDAR SHINGLES

ROOF AREA (SQ. M.)

OBSERVATION TOWER:

T-1.1 – 31

THE LODGE & ADDITION:

L-1.1 – 30
L-1.2 – 16
L-2.1 – 6
L-2.2 – 341
L-2.3 – 60
S-2.3 – 16

TOTAL SBS ROOF AREA (SQ. M.)

46 SQ. M.

TOTAL CEDAR SHINGLE ROOF AREA (SQ. M.)

469 SQ. M.

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NORTH

BUILDING KEY PLAN

revisions	description	date
5		
4	ISSUED FOR RETENDER	SEPT./2020
3	ISSUED FOR ADDENDUM 01	OCT./2019
2	ISSUED FOR TENDER	MAY/2019
1	ISSUED FOR DESIGN 66% REVIEW	MAR/2019

A detail no. no. du detail
B location drawing no. sur dessin no.
C drawing no. dessin no.

project / projet

PACIFIC WILDLIFE RESEARCH CENTRE
542 ROBERTSON ROAD
DELTA, BC, V4K 3N2

drawing / dessin

ROOF REPLACEMENT
ROOF PLAN

Designed By	IRC GROUP	Conçu par
Date	2019/03/25	(yyyy/mm/dd)
Drawn By	IRC GROUP	Dessiné par
Date	2019/03/25	(yyyy/mm/dd)
Reviewed By		Examiné par
Date		(yyyy/mm/dd)
Approved By		Approuvé par
Date		(yyyy/mm/dd)
Tender		Soumission
Project Manager		Administrateur de projets
EC Proj no.		Consultant Proj no.

Drawing no. / No. du dessin: A1

Plotted by: bwang Oct 02, 2020 - 3:32pm

PWGSC 11X17 (431x279)

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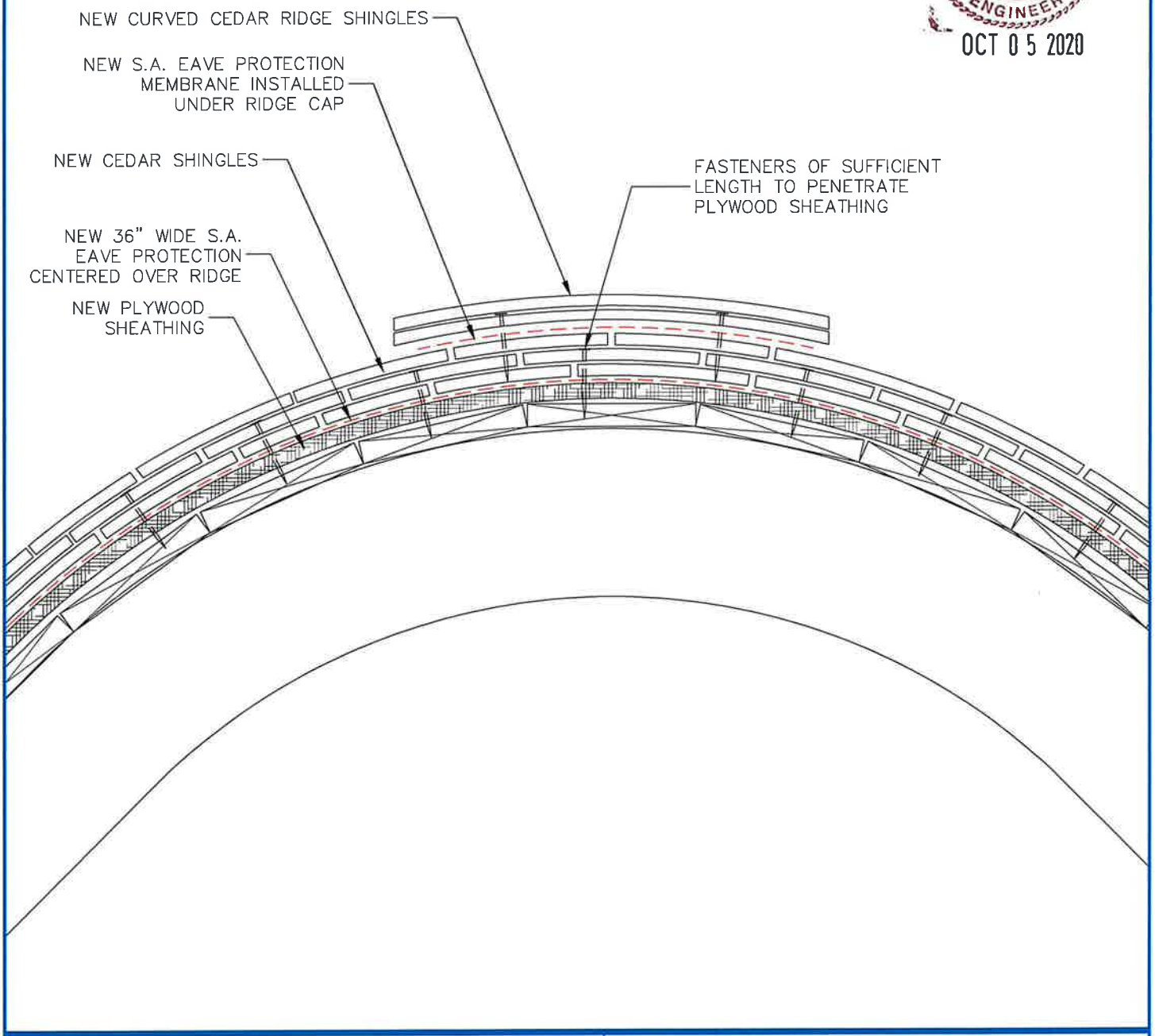
OCT 05 2020



Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

CURVED RIDGE DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: MAR 29/19	
Reviewed By / Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D01	Revision/ Revision: 0

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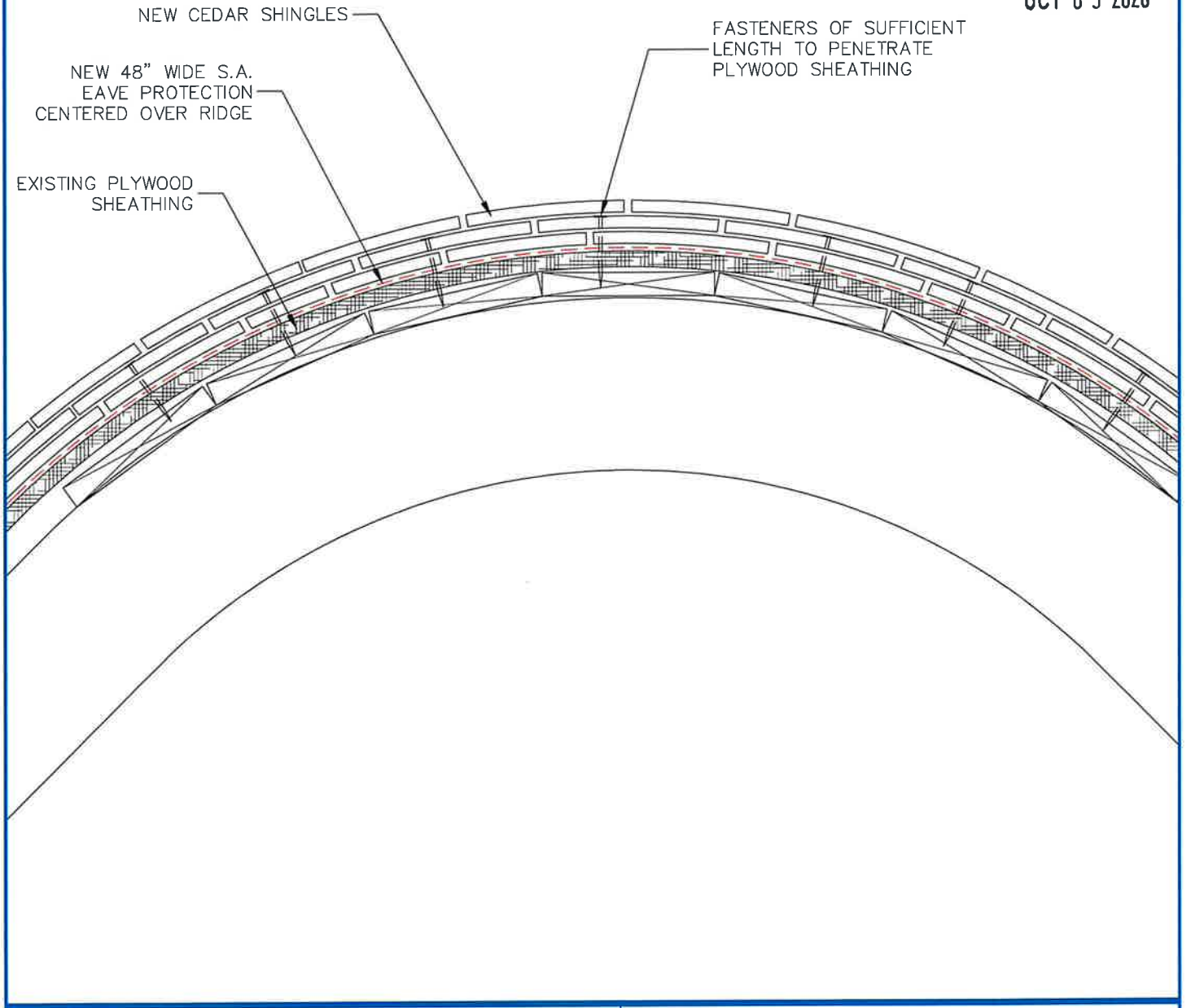

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

CURVED HIP DETAIL

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Drawn By: IRC GROUP	Tender / Project Manager		Date: MAR 29/19	
Reviewed By / Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D02	Revision/Revision: 0

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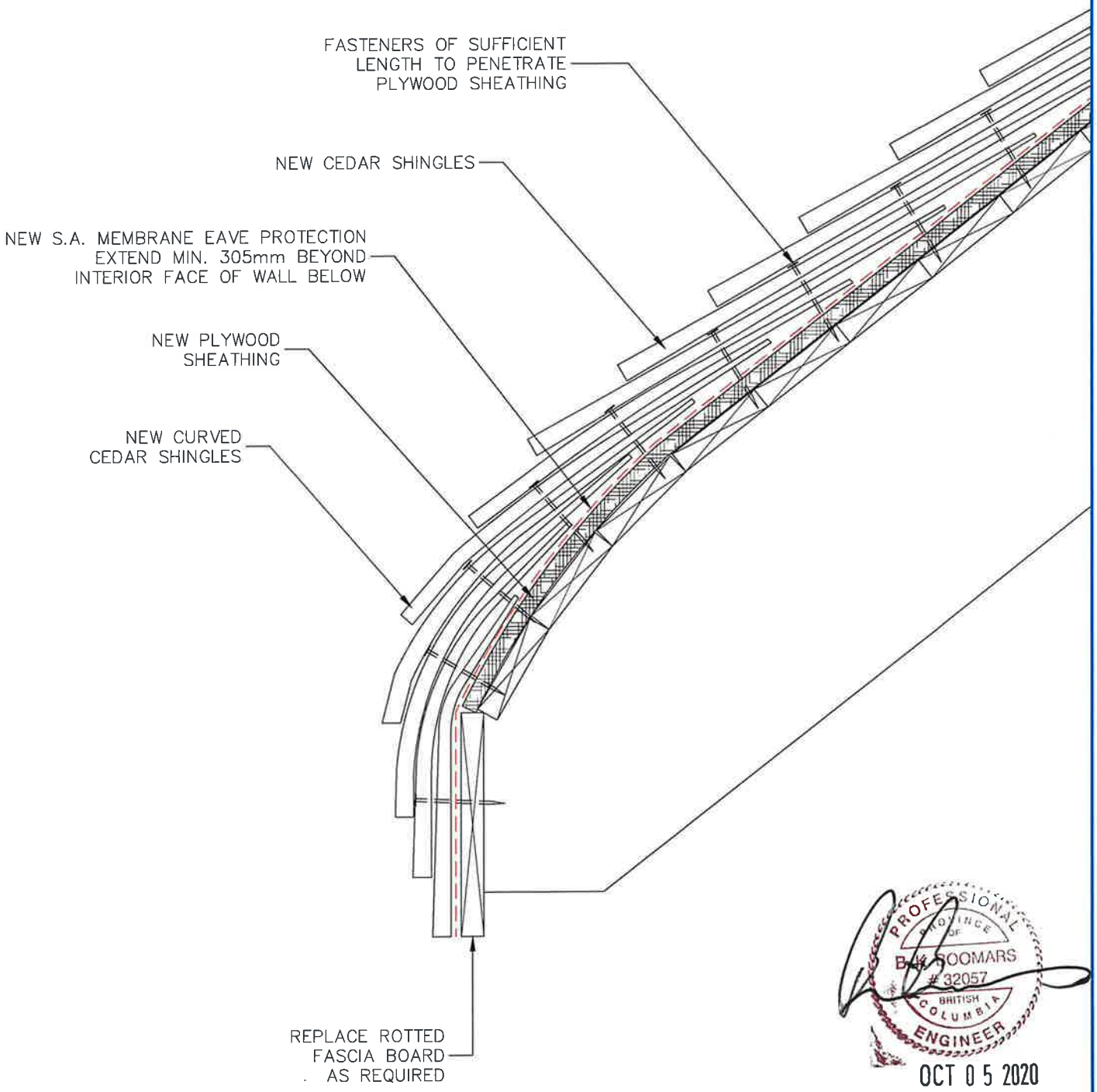

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Project Title: **ROOF REPLACEMENT** **PACIFIC WILDLIFE RESEARCH CENTRE** **5241 ROBERTSON ROAD, DELTA, BC**			Drawing title: **CURVED EAVE DETAIL**	
Designed By: **IRC GROUP**	Approved By Date		Scale: **1:5**	
Drawn By: **IRC GROUP**	Tender Project Manager		Date: **MAR 29/19**	
Reviewed By Date	EC Project no.	Consultant Project No.: **VR18-117SP-21476**	Drawing no.: **D03**	Revision/ Revision: **0**

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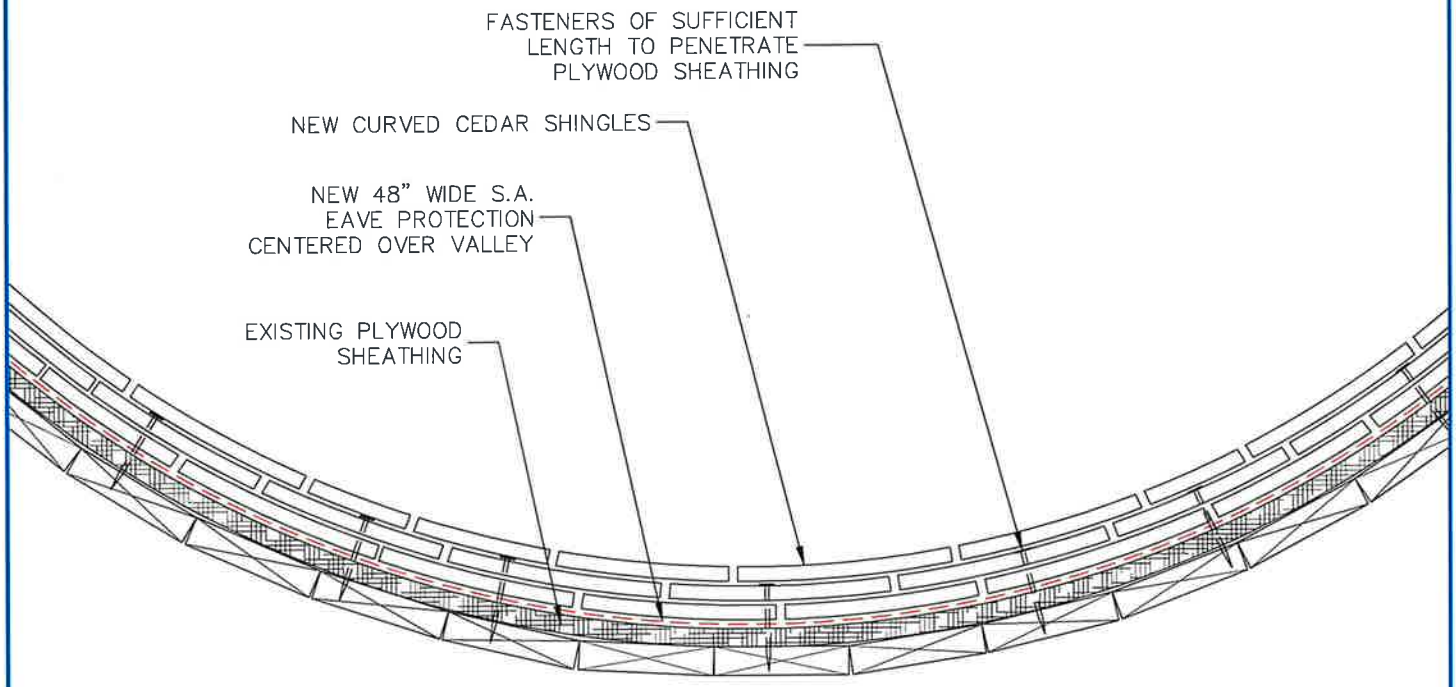

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Project Title **ROOF REPLACEMENT** **PACIFIC WILDLIFE RESEARCH CENTRE** **5241 ROBERTSON ROAD, DELTA, BC**			Drawing title **ROOF VALLEY DETAIL**	
Designed By IRC GROUP	Approved By Date		Scale 1:5	
Drawn By IRC GROUP	Tender Project Manager		Date MAR 29/19	
Reviewed By Date	EC Project no.	Consultant Project No. VR18-117SP-21476	Drawing no. D04	Revision/ Revision 0

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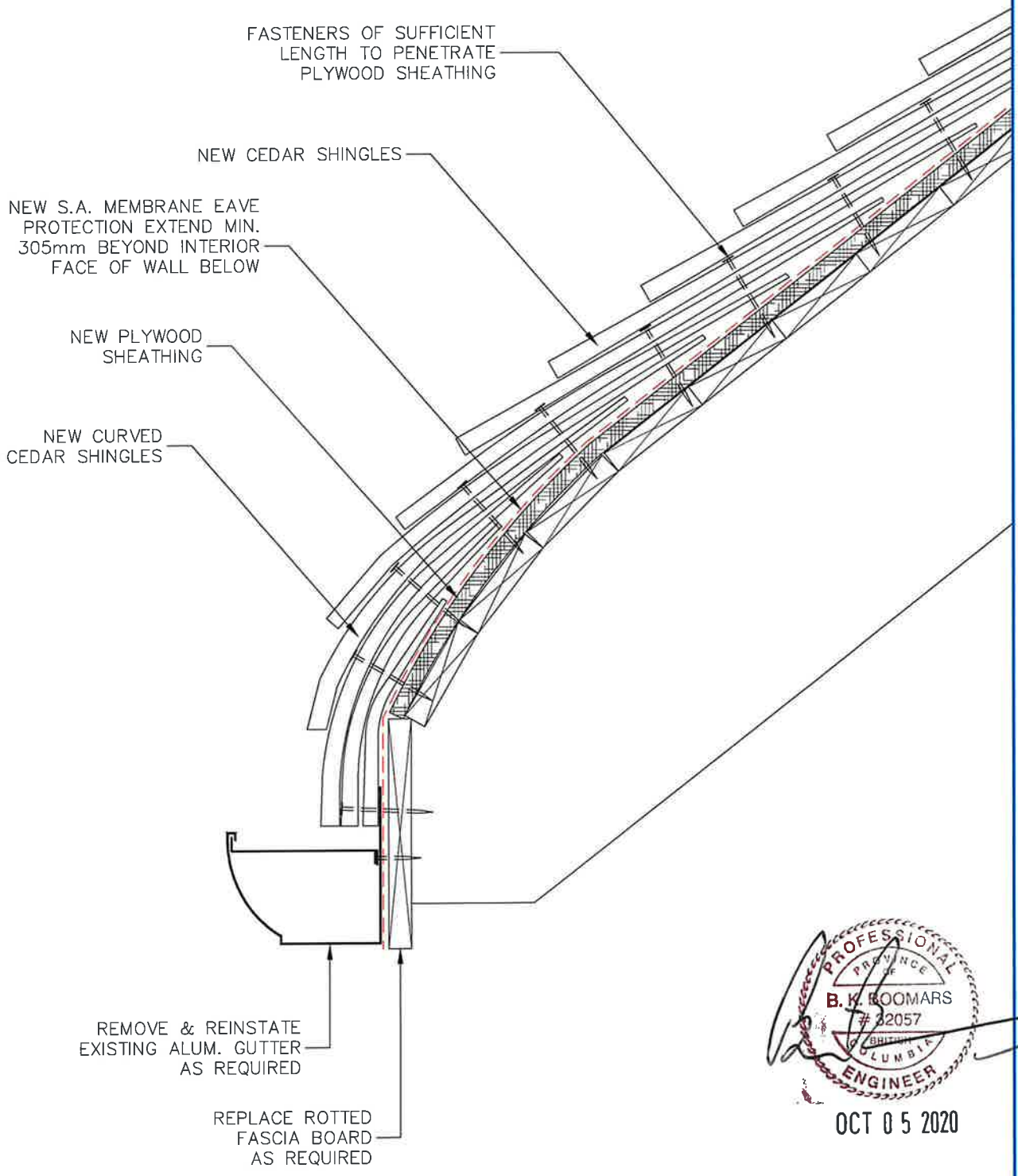

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Project Title: **ROOF REPLACEMENT** **PACIFIC WILDLIFE RESEARCH CENTRE** **5241 ROBERTSON ROAD, DELTA, BC**			Drawing title: **CURVED EAVE WITH GUTTER DETAIL**	
Designed By: IRC GROUP	Approved By Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender Project Manager		Date: MAR 29/19	
Reviewed By Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D05	Revision/ Revision: 0

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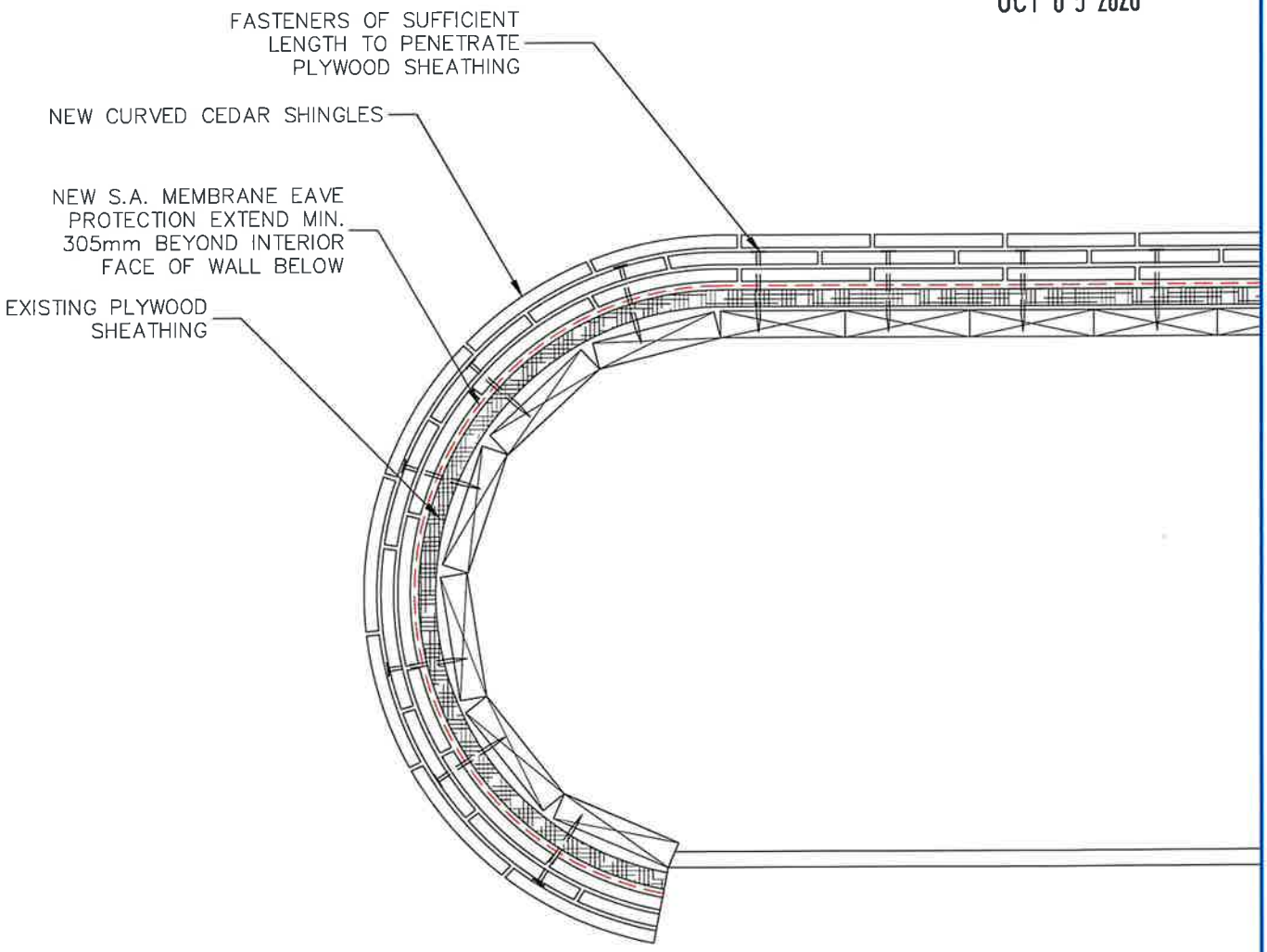

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

CURVED RAKE DETAIL

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Drawn By: IRC GROUP	Tender / Project Manager		Date: MAR 29/19	
Reviewed By / Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D06	Revision/Revision: 0

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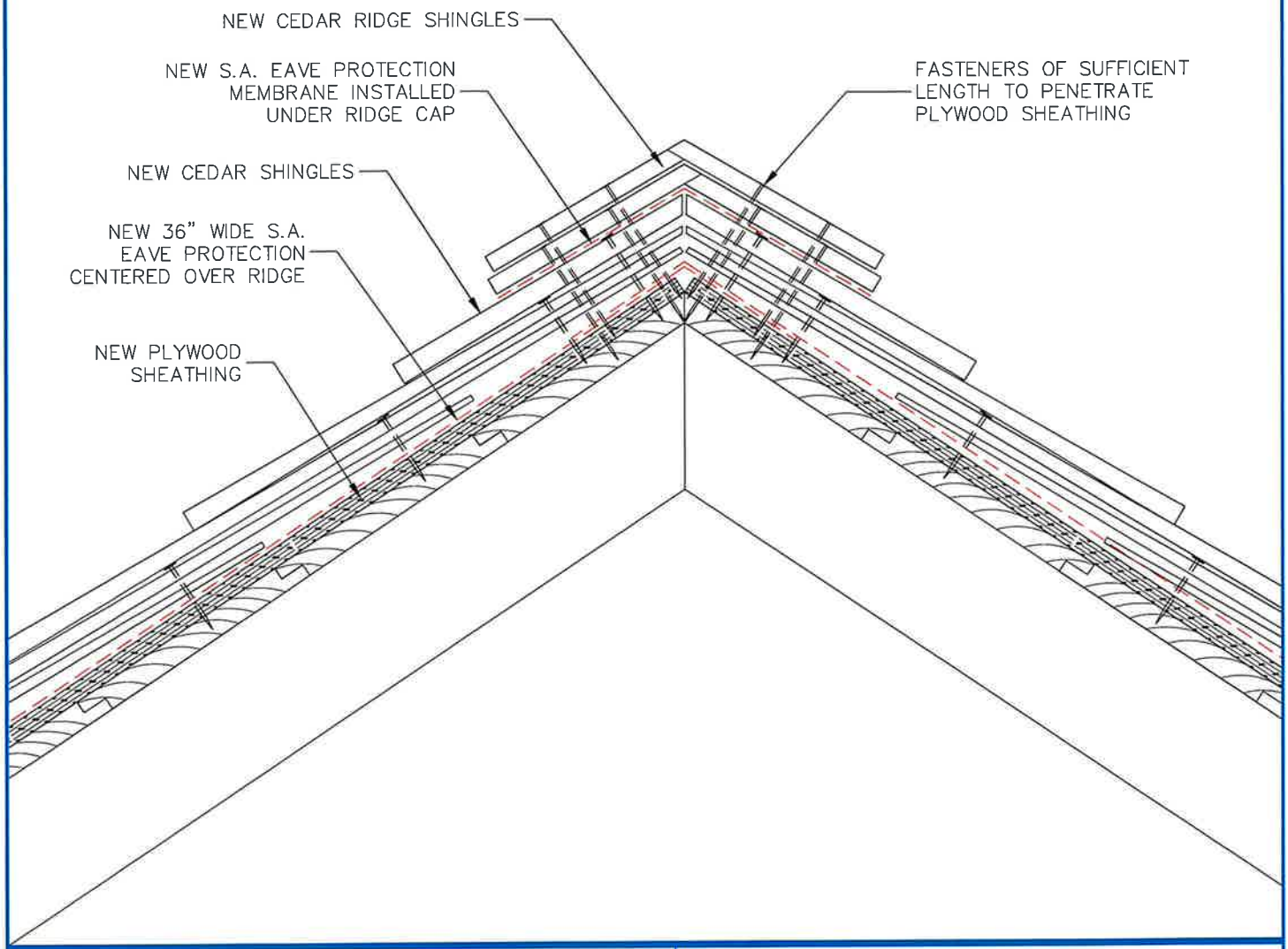

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

RIDGE DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: MAR 29/19	
Reviewed By / Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D07	Revision/Revision: 0

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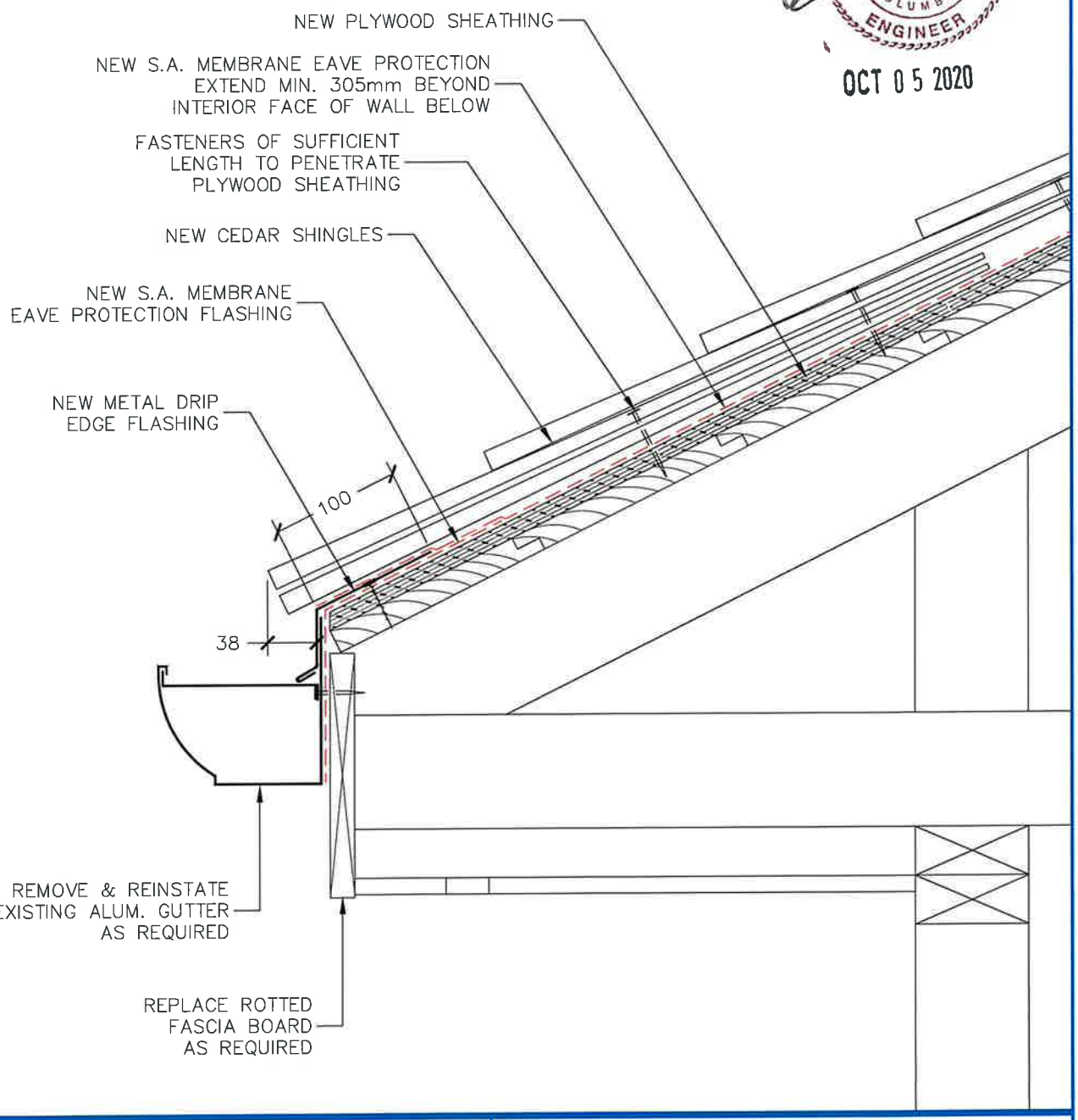

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

EAVE WITH GUTTER DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: MAR 29/19	
Reviewed By / Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D08	Revision/ Revision: 0

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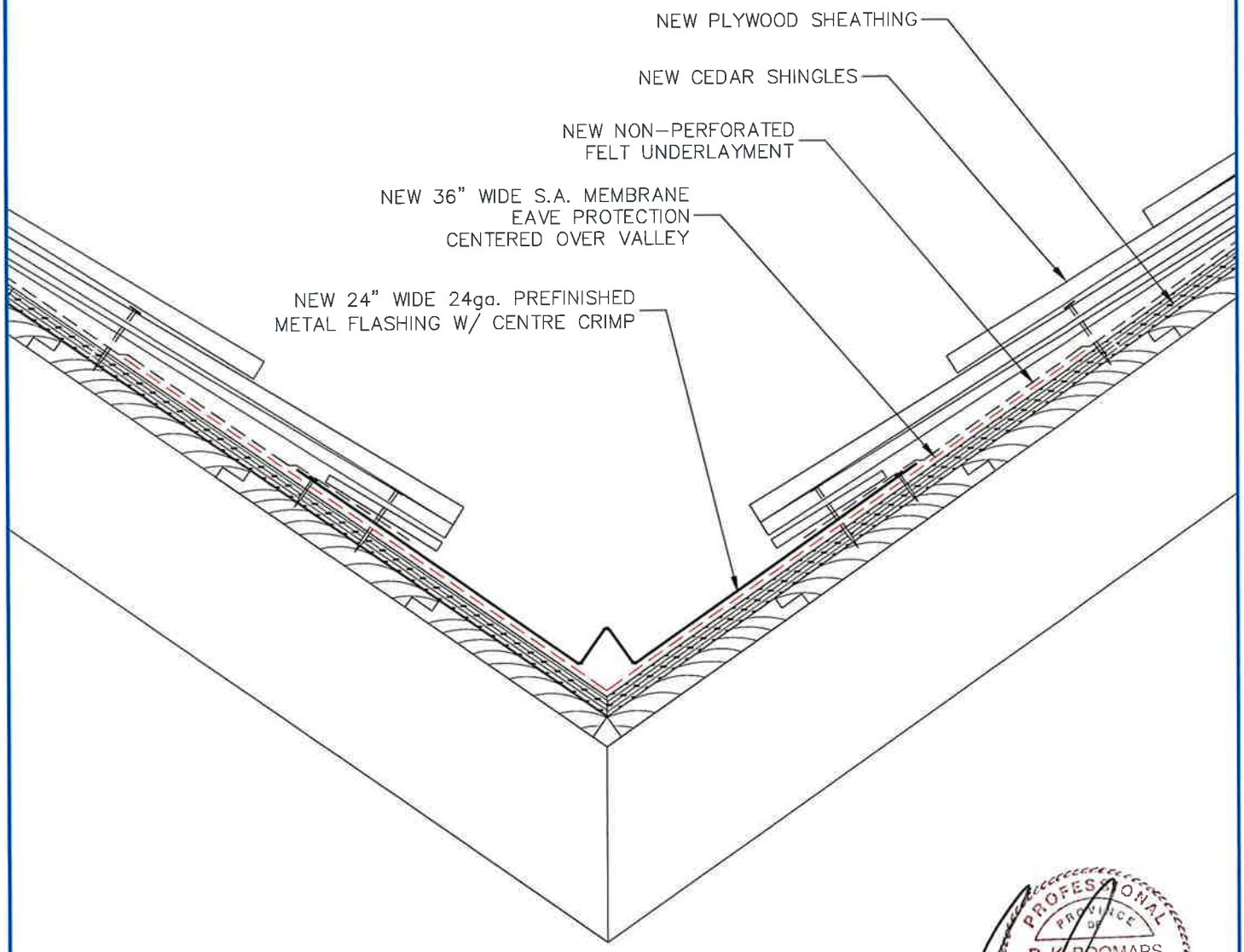

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B. K. BOOMARS
#32057

OCT 0 5 2020

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

VALLEY DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: MAR 29/19	
Reviewed By / Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D09	Revision/ Revision: 0

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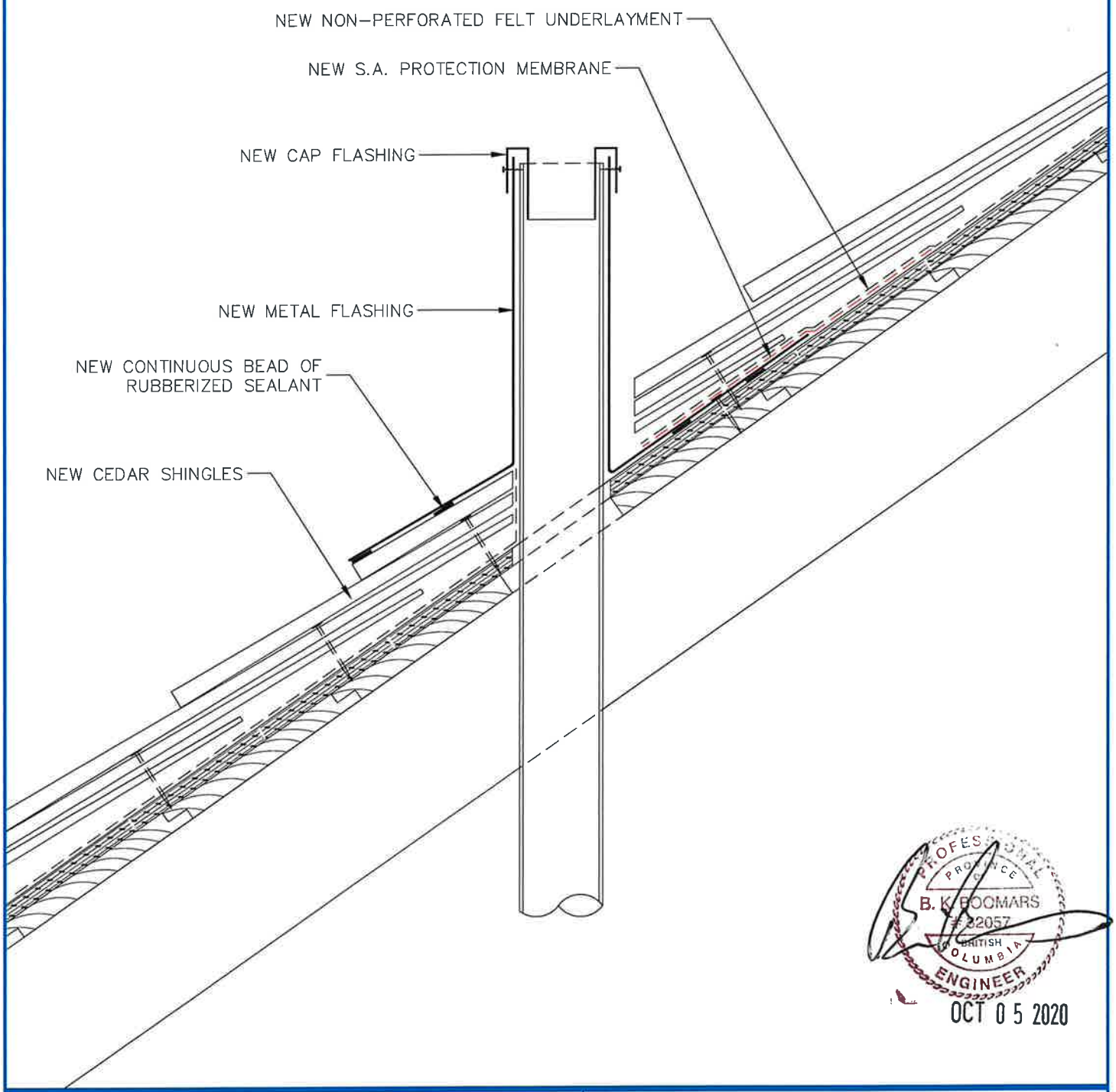

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Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

PLUMBING STACK DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: MAR 29/19	
Reviewed By / Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D10	Revision / Revision: 0

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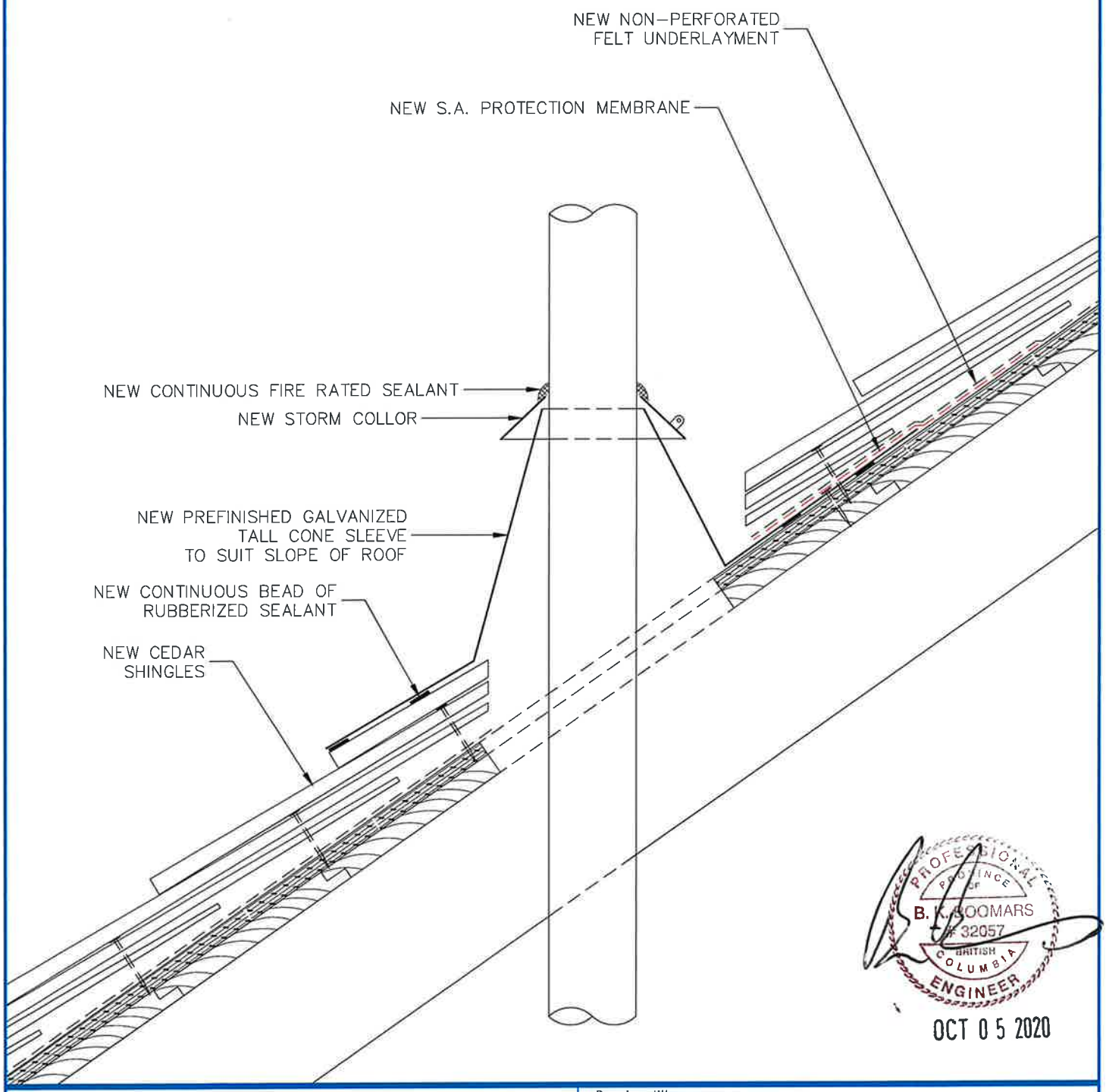

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OCT 0 5 2020

Project Title: **ROOF REPLACEMENT** **PACIFIC WILDLIFE RESEARCH CENTRE** **5241 ROBERTSON ROAD, DELTA, BC**			Drawing title: **B-VENT DETAIL**	
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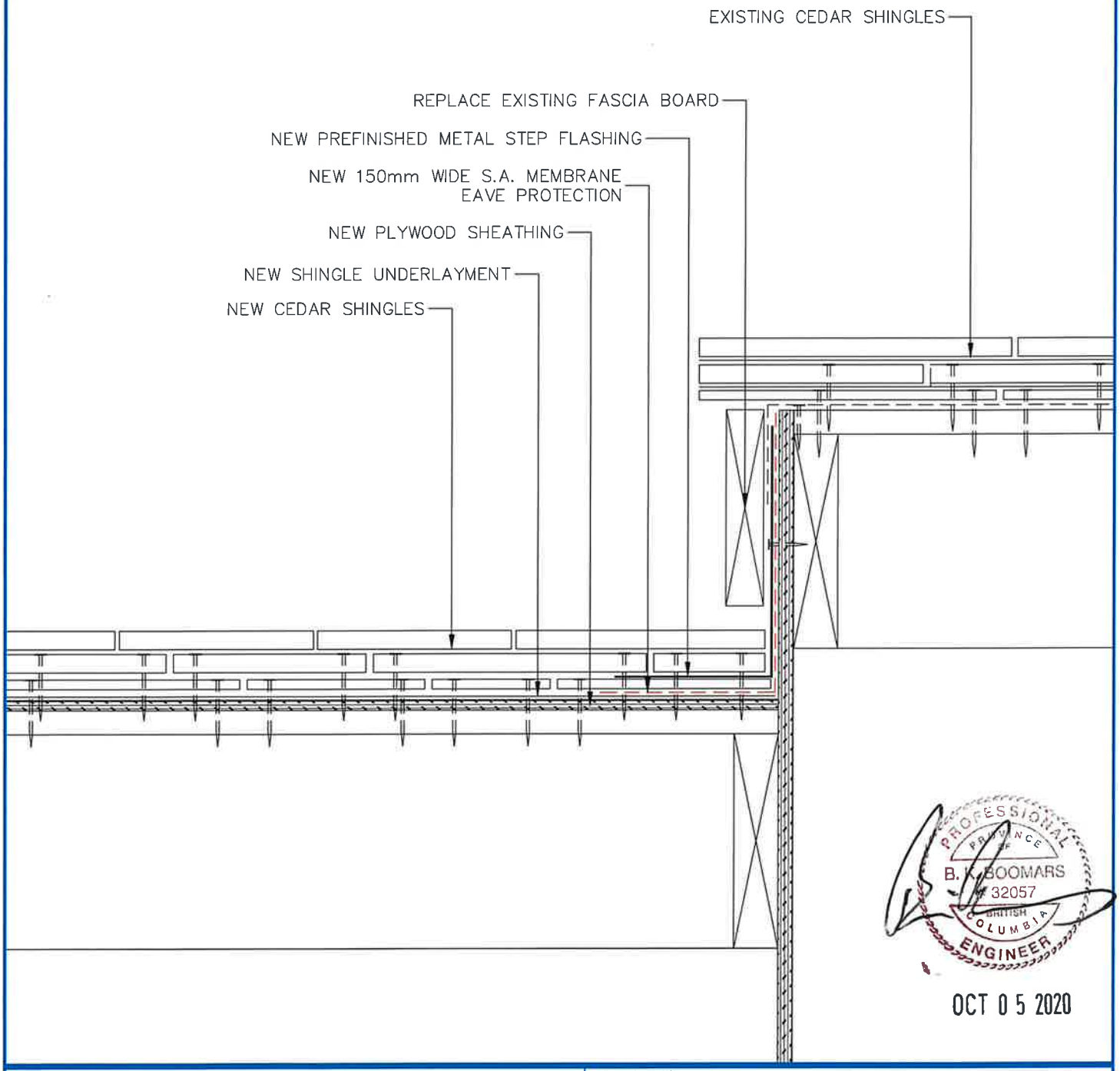
Reviewed By Date	EC Project no.	Consultant Project No.: **VR18-117SP-21476**	Drawing no.: **D11**	Revision/ Revision: **0**



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OCT 0 5 2020

Project Title **ROOF REPLACEMENT** **PACIFIC WILDLIFE RESEARCH CENTRE** **5241 ROBERTSON ROAD, DELTA, BC**		Drawing title **STEP DETAIL**		
Designed By IRC GROUP	Approved By Date		Scale 1:5	
Drawn By IRC GROUP	Tender Project Manager		Date OCT 09/19	
Reviewed By Date	EC Project no.	Consultant Project No. VR18-117SP-21476	Drawing no. D20	Revision/ Revision 0

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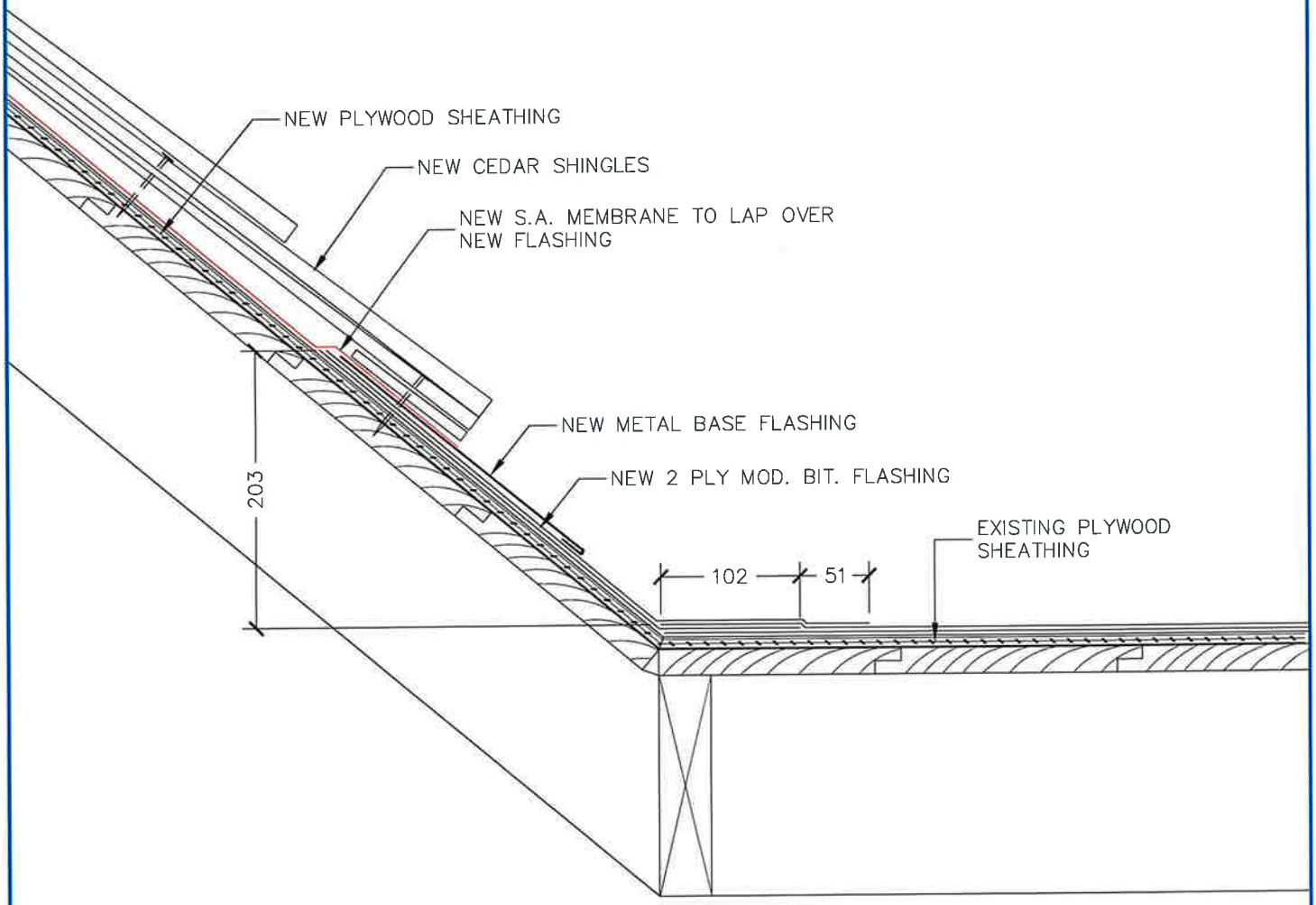

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OCT 05 2020

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

TRANSITION DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: MAR 29/19	
Reviewed By / Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D23	Revision/Revision: 0

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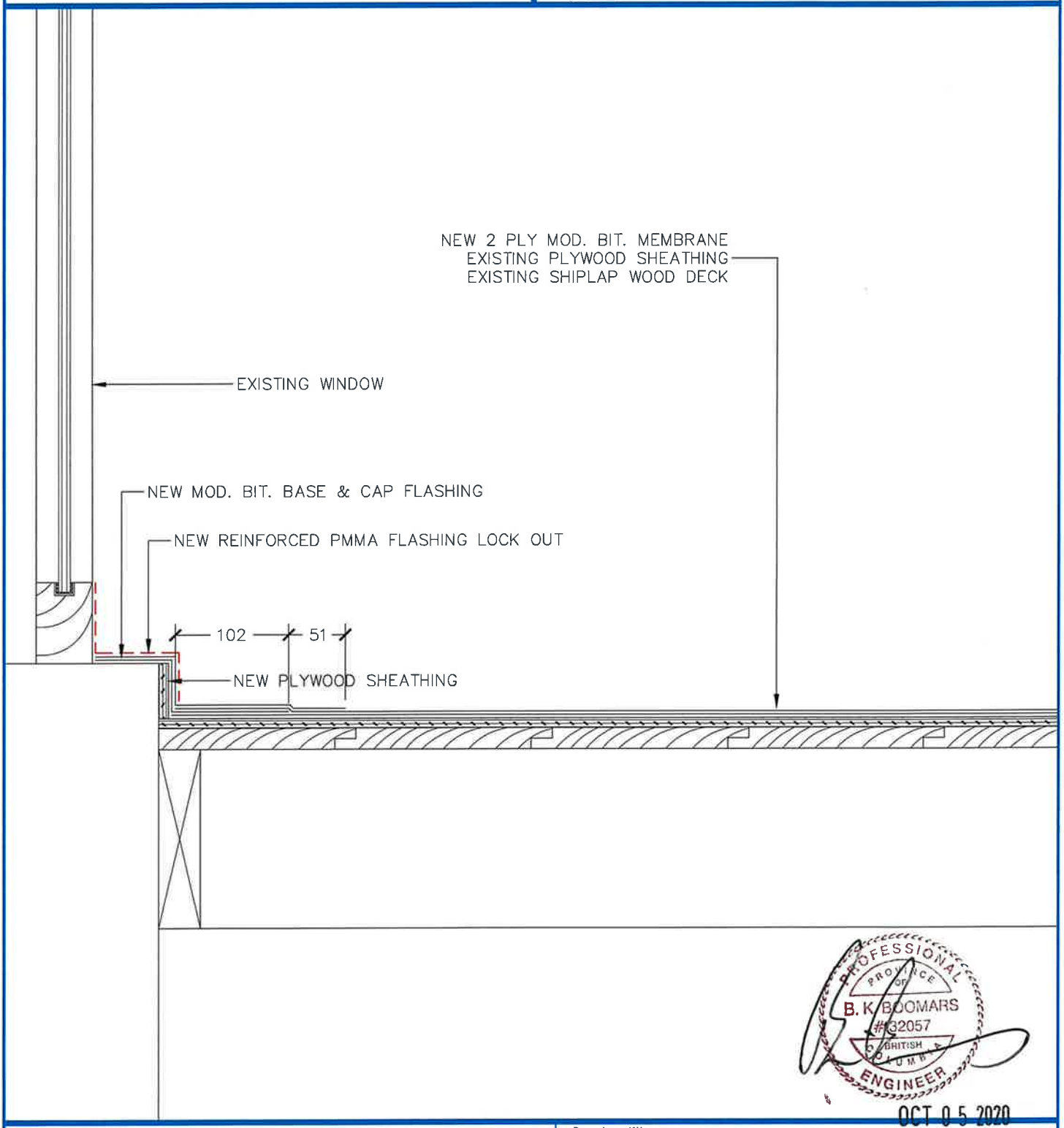

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PROVINCE OF BRITISH COLUMBIA
B. K. BOOMARS
#32057

OCT 0 5 2020

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

WINDOW SILL DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: MAR 29/19	
Reviewed By / Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D24	Revision / Revision: 0

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Environnement Canada

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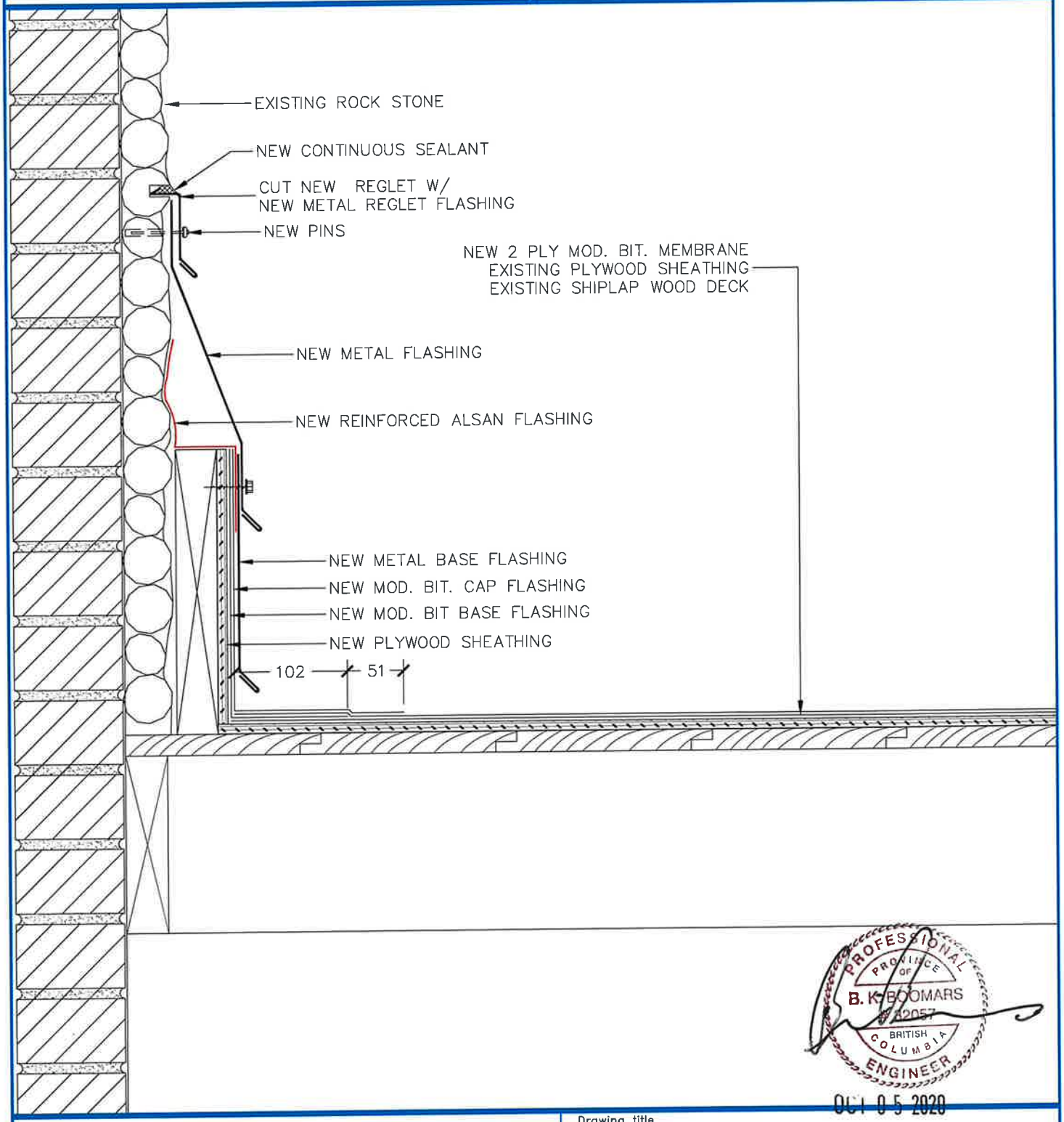
Le Groupe IRC



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B. K. BOOMARS
#22057

OCT 05 2020

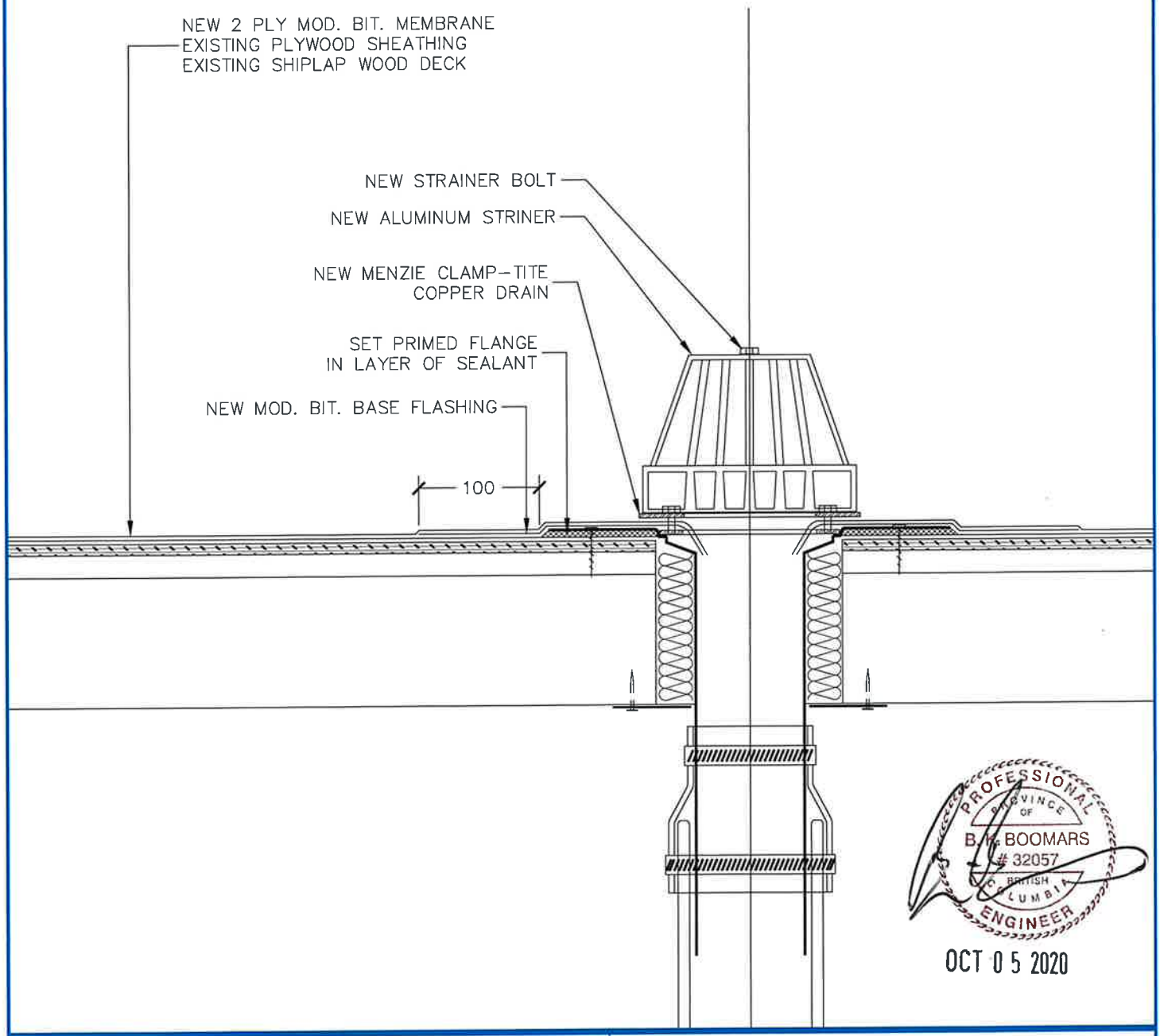
Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

CHIMNEY DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: MAR 29/19	
Reviewed By / Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D25	Revision/ Revision: 0



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PROVINCE OF BRITISH COLUMBIA
B. W. BOOMARS
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OCT 0 5 2020

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

DRAIN DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: MAR 29/19	
Reviewed By / Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D28	Revision/ Revision: 0

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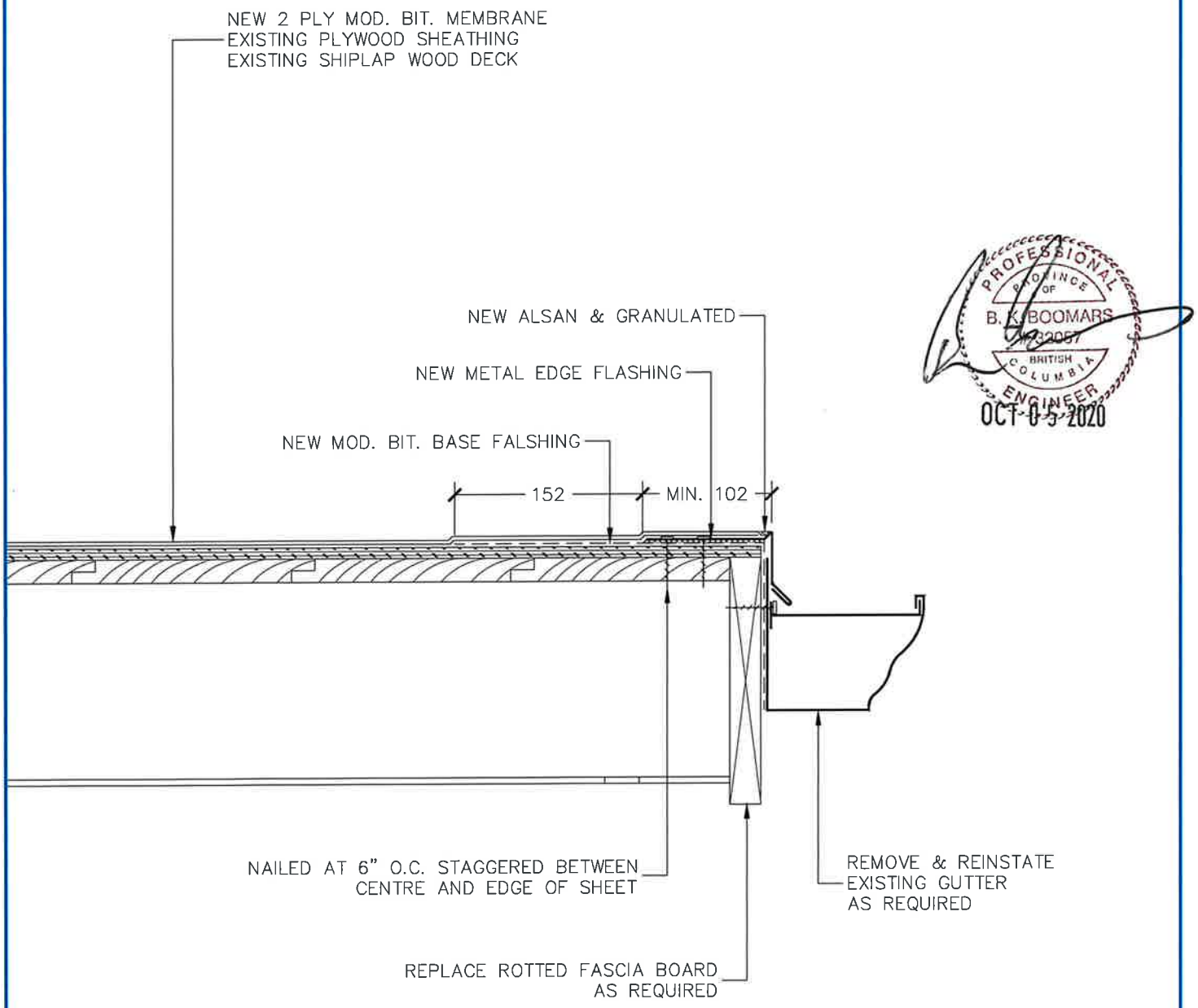

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OCT 05 2020

Project Title: **ROOF REPLACEMENT** **PACIFIC WILDLIFE RESEARCH CENTRE** **5241 ROBERTSON ROAD, DELTA, BC**			Drawing title: **ROOF EDGE WITH GUTTER DETAIL**	
Designed By: IRC GROUP	Approved By Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender Project Manager		Date: MAR 29/19	
Reviewed By Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D29	Revision/ Revision: 0

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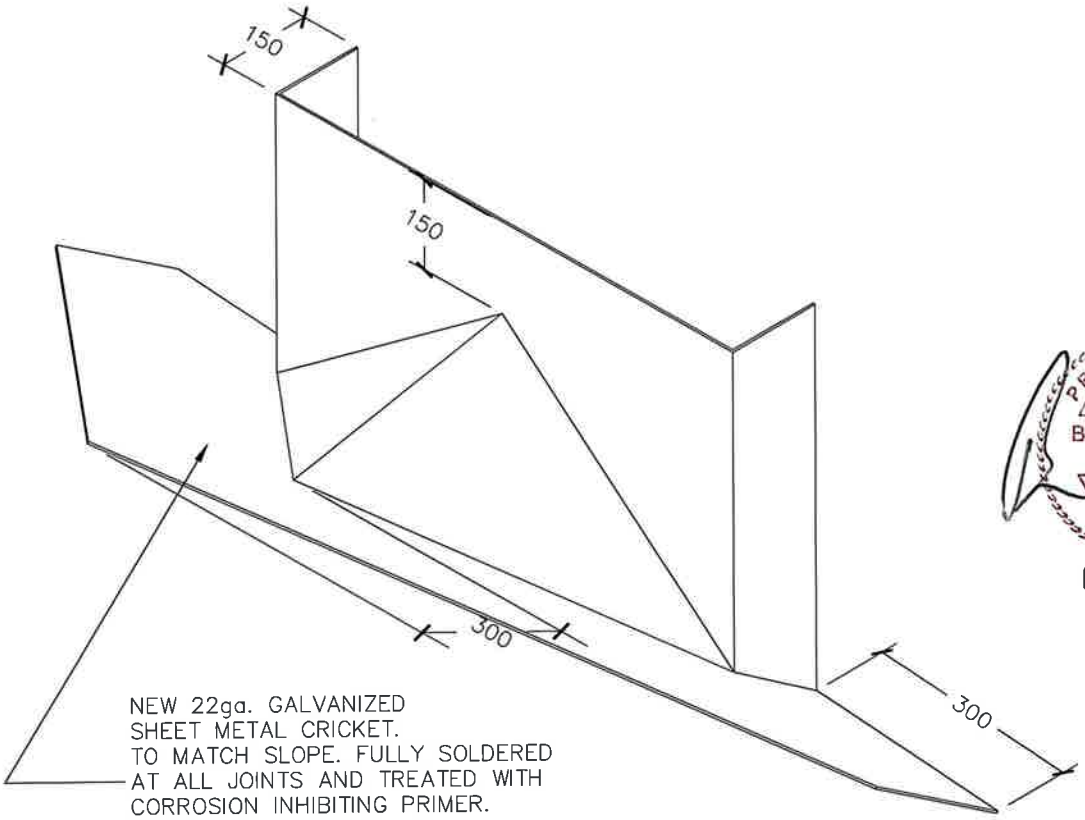

NEW 22ga. GALVANIZED SHEET METAL CRICKET. TO MATCH SLOPE. FULLY SOLDERED AT ALL JOINTS AND TREATED WITH CORROSION INHIBITING PRIMER. PAINTED WITH CORROSION INHIBITING ENAMEL PAINT

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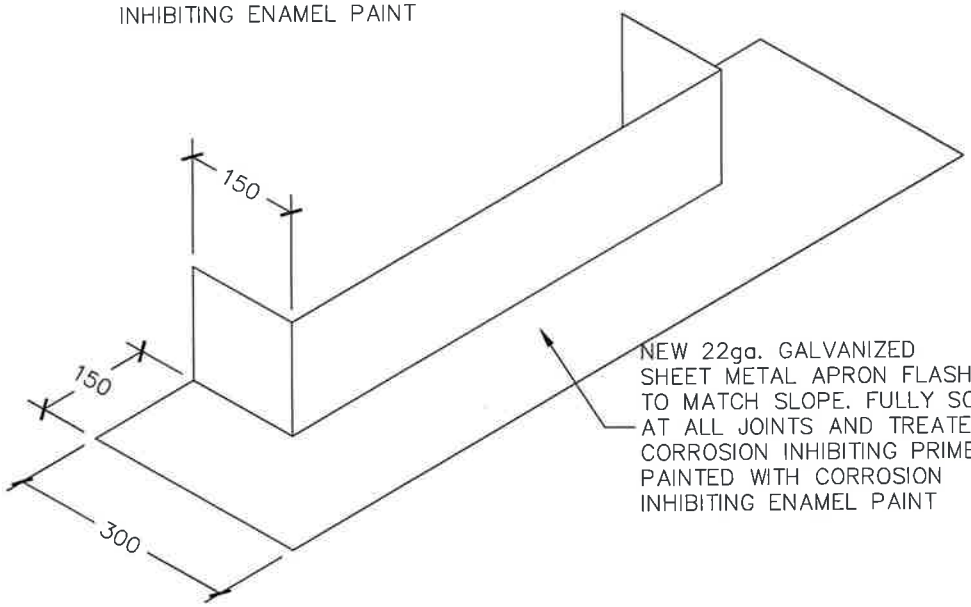

NEW 22ga. GALVANIZED SHEET METAL APRON FLASHING TO MATCH SLOPE. FULLY SOLDERED AT ALL JOINTS AND TREATED WITH CORROSION INHIBITING PRIMER. PAINTED WITH CORROSION INHIBITING ENAMEL PAINT

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

TYPICAL CHIMNEY CRICKET & APRON DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
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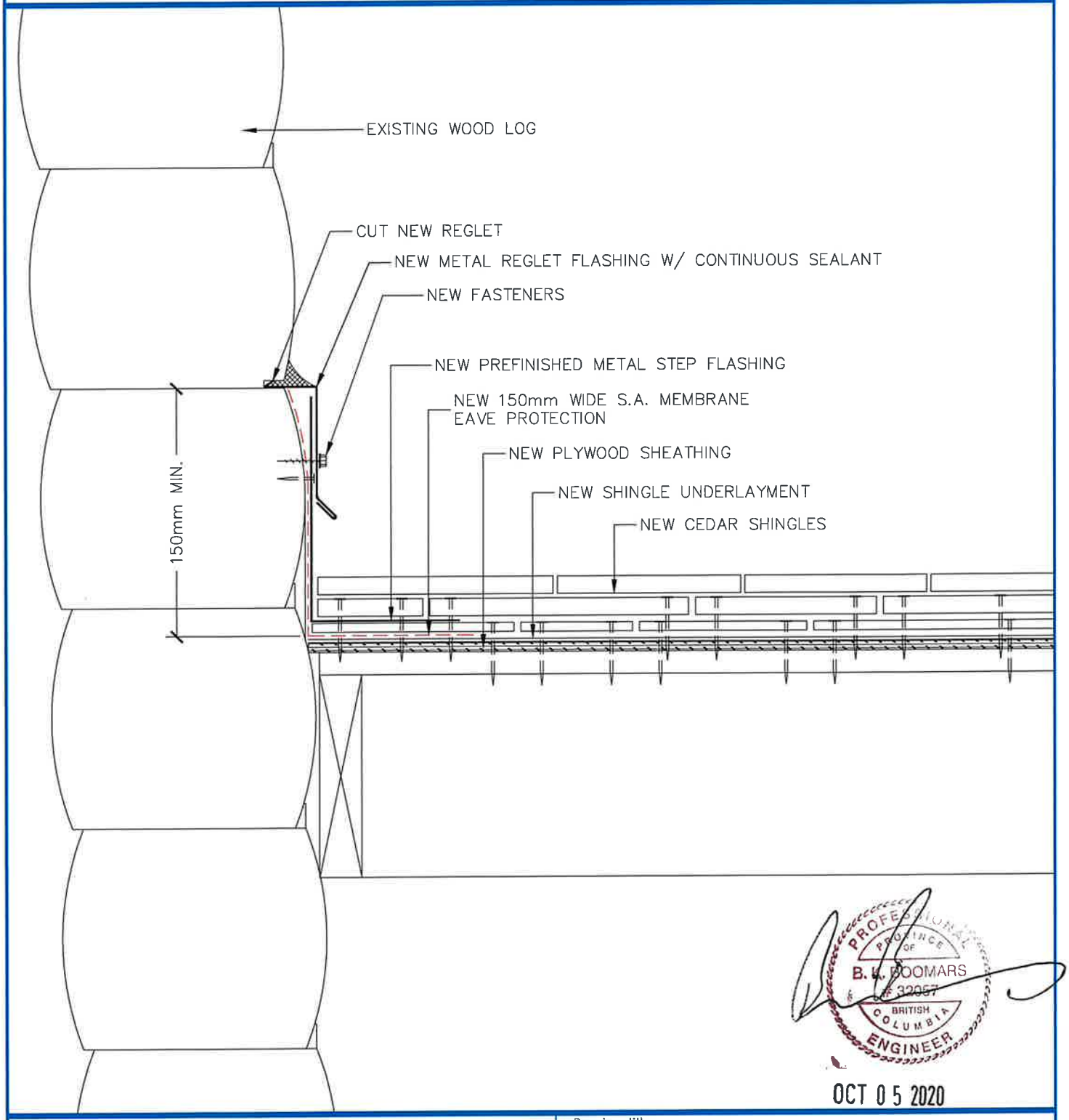

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Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

STEP FLASHING DETAIL

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Drawn By: IRC GROUP	Tender / Project Manager		Date: MAR 29/19	
Reviewed By / Date	EC Project no.	Consultant Project No.: VR18-117SP-21476	Drawing no.: D32	Revision/ Revision: 0