Environment and Climate Change Canada | Environnement et Changement climatique Canada

PWRC Roof Replacement

Specifications & Drawings

Project: PWRC-015 // VR21-078SP-21476

Issued For Tender
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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

.7 Services, person or entity identified as such in Agreement.

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

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

.10 "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.

.11 "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. All access to work area is to be from the exterior of the building, unless permission is given by the Owner or Owners Representative to access the work site from the interior of the building.

.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 CHANGES TO DESIGN AND SCOPE

.1 Design Authority: IRC Building Sciences Group

.2 All changes in the design or materials must be pre-approved by the Design Authority.

.3 Contractor initiated design or material changes and submissions post contract award require extra time for the Design Authority to review. The Contractor will be responsible for supplying all information necessary for evaluation of the submission, plus the Consultant fees for the extra work associated with the review based on their standard hourly fee schedule.

.4 Contractor initiated design changes need to account for all impacts for the requested change. The costs of any extra work related to any consequential impact of the approval of Contractor requested changes shall be born by the Contractor.

1.20 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.

1.21 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.

1.22 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.

1.23 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.

1.24 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.

1.25 SMOKING ENVIRONMENT

.1 Comply with smoking restrictions at work site.

1.26 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.

1.27 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.

1.28 WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

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

1.29 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.

1.30 COVID DELAYS

.1 Contractor is to follow all Covid-19 Regulations as part of this Contract, and as such financial remuneration cannot be claimed due to changes in the Regulations set out by Authorities having Jurisdiction. Duration of Contract (Schedule) can be negotiated with no financial changes to Contract.

1.31 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

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 6 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 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: STEEP SLOPE METAL ROOFING

.1 On Roof Areas S–1.2, S–1.3 and S–3.1: Include in Base Price, all costs associated with the supply and installation of all labour and materials to install new insulated metal panel roof system over existing wood roof deck. New roof system to be in accordance with Section 07 61 13 and to include, but not limited to:

.1 Remove down to existing plywood deck and dispose of existing cedar 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 damaged areas requiring repair or replacement. Consultant to be notified 48 hours prior to roof deck examination.

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

.4 Close in openings of existing roof deck with new material.

.5 Within Attic, supply and install new blown-in insulation to increase R value from R28 to R50 where applicable.

.6 Install new 9.52mm (3/8") plywood cover board over the existing wood deck, mechanically fastened.

.7 Supply and install new self-adhering vapour retarder. Vapour retarder to be high temperature where directly beneath metal panels,

.8 Install new self-adhering eave protection membrane along valleys, ridges, eaves, perimeters, and at roof penetrations.

.9 Over top of new vapour retarder, supply and install new nylon 19.05mm (3/4") ventilation layer, mechanically fastened. The ventilation / drainage mat is only to be installed at roofs with slopes less than 4/12.

.10 Over top of drainage mat, supply and install new metal panel roofing with bearing plates and clips. System to include all appropriate membrane and metal flashings.

.11 Install new prefinished metal flashings as indicated on detail drawings.

.1 Along all soffit locations, drip flashings and along bottom of eave locations,

.2 Along all rake edge locations,

.3 Centered along all valley locations,

.4 At metal roof vent ridge locations.

.12 Work includes removal and reinstatement of existing gutters, and installation of new aluminum gutters, downspouts and associated components as indicated in Roof Plan.

.13 Contractor is to supply and install new B-Vent flashing caps.

1.9 SCOPE OF WORK: STEEP SLOPE CEDAR SHINGLE REPLACEMENT

.1 On Roof Areas S–1.1, S–1.4, S–2.1 and S–2.2: 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 the attic, supply and install new blown-in insulation to increase R-value from R28 to R50, where applicable.

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

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

.7 Install 26-gauge metal flashings at every 3rd row of shingles with 12” wide ice & water interlay sheets.

.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. Mechanically fasten using stainless steel fasteners. Use short nails on exposed soffits.

.9 Install cedar shingle at the hip, valley, and eave locations to match existing installation.

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

.11 Preserve existing metal rain gutters and downpipes.

.12 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.

.13 Contractor is to apply an end-cut preservative treatment to all exposed sides of the shingles that have been split, cut, or sawn. Contractor is to carefully brush two (2) coats of a preservative treatment to all exposed cut ends and ensure that the exposed ends of the shingles are protected. Coating should be applied in a manner so that the preservative is contained to the ends of the shingles and does not drip or run onto the top surface of the shingles, same if field applied. Allow for protection of the existing building components as needed in order to protect from drips and spills of the treatment, if field applied.

1.10 SCOPE OF WORK: SKYLIGHT REPLACEMENT

.1 On Roof Area S-3.1: Remove and dispose existing skylights, and supply and install new skylight system in accordance with Section 08 63 00 Metal Framed Skylights.

.2 New Skylights are to be designed to suit the existing structural supports. Contractor to verify and expose connections prior to any shop drawings preparation / procurement. Provide new steel brackets, if required, to support the new skylight systems.

.1 Review condition of existing structural supports and replace any deteriorated structural framing.

.2 Contractor to request IRC to check the main structural supports and connection details prior to installing the new skylight system.

.3 Please advise IRC at least 24 hours of the requested review.

.3 Metal Framed Skylight: New metal framed skylights shall be fabricated and installed in accordance with the IRC specifications and drawings provided. Contractor to provide engineered shop drawings, stamped by a Professional Engineer registered in BC, for review and approval by the Consultant and the Owner's Representative. Contractor to submit colour and material samples for approval by the Consultant prior to any fabrication start.

.4 Water Test: Contractor to arrange for third party water infiltration testing for the new skylight systems. Testing will be coordinated and scheduled by the contractor prior to submission of Substantial Completion invoice.

.5 Sheet Metal Flashings and Accessories: Remove and replace related sheet metal flashings and accessories in accordance with IRC drawings provided. New sheet metal flashings shall be fabricated and installed in accordance with the IRC drawings and specifications. Contractor to submit colour samples for approval by the Consultant prior to facilitate proper installation of the new skylight and its accessories. Any damage as a result of the work will be repaired to the satisfaction of the Owner at the expense of the Contractor.

.6 Roof Tie in: Contractor to provide necessary roof tie-in to insure proper drainage and function of the new skylight in relation to the existing roof. This will include but not limited to two-ply roof membrane, insulation, etc. all in accordance with IRC drawings provided.

.7 Interior Repairs: Care shall be taken not to damage the interiors during demolition. Any damage will be repaired to the satisfaction of the Owner at the expense of the Contractor. This will include installation of finishes located on skylight openings to match existing.

.1 Contractor to provide proper interior scaffolding protection under the skylight area to allow for normal building operations and occupant access within the duration of the skylight replacement.

.8 Existing lightings and accessories: Contractor to remove and reinstate existing lightings, cables and accessories to facilitate proper installation of the new skylight systems.

.9 Work to include modifying existing curbs to meet the minimum height requirement above finish roof surface levels, and all associated costs. Contractor to submit shop drawings for approval prior to installation.

.10 Miscellaneous Repairs: Contractor shall be able to identify other repairs not specifically mentioned on these specifications but are deemed to be necessary for the proper execution and completion of the skylight replacement.

1.11 SCOPE OF WORK: REMOVAL OF HAZARDOUS MATERIALS

.1 Design Authority has documentation indicating the presence of asbestos on window glazing mastics, and presence of lead on roof vents and skylights. Refer to Pre-renovation Hazardous Materials Survey provided for records and use.

.2 Contractor is to review the Pre-construction Hazmat Survey Report and prepare Safe Work Procedures to include all temporary protection, abatement and disposal of materials impacted by the Scope of Work of the project. Procedures must conform to the WorkSafeBC requirements as a minimum. Contactor is to submit the Safe Work procedures plan to the Consultant prior to start of Work; however, the Consultant will not review the plan for conformance to WorkSafeBC requirements as this obligation remains entirely with the Contractor.

.1 ACM and lead containing coatings or materials Work is to be in compliance with current standards, rules and regulations of all Authorities having jurisdiction 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 Steep Slope Material Warranty:

.1 Provide the Owner with a Manufacturer's 30 Year Limited Lifetime Material Warranty.

.3 RCABC RGC RoofStar Guarantee or pre-approved equivalent (On All Steep Slope Roofs):

.1 Provide to the Owner a Ten (10) Year Guarantee. The cost of the 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

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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.*	#	*$/ft.*	*$*	*%*	*%*	*%*	*$*	*$*	*$*
Changes Orders:												
CO1	*Sample*	*/ ft^2*	#	*$/$ ft^2*	*$*	*%*	*%*	*%*	*$*	*$*	*$*
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 – Prefinished 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 System Letter from the standing seam metal roof 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 metal roof layout / placement, required fastener 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 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 including;

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 62 10 – Prefinished Sheet Metal Flashing and Trim

.4 Section 07 62 13 – Prefinished Gutters and Aluminum Downspouts

.5 Section 07 92 00 – Joint Sealants

.6 Section 08 63 00 – Metal Framed Skylights

.7 Section 08 80 00 - Glazing

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).

.7 WorkSafe BC.

1.3 ASBESTOS AND DESIGNATED SUBSTANCES

.1 Owner has documentation indicating the presence of Asbestos and lead in the tested samples.

.2 Contractor is to review the Pre-construction Hazmat Survey Report and prepare Safe Work Procedures to include all temporary protection, abatement and disposal of materials impacted by the Scope of Work of the project. Procedures must conform to the WorkSafeBC requirements as a minimum. Contactor is to submit the Safe Work procedures plan to the Consultant prior to start of Work; however, the Consultant will not review the plan for conformance to WorkSafeBC requirements as this obligation remains entirely with the Contractor.

.1 ACM and lead containing coatings or materials Work is to be in compliance with current standards, rules and regulations of all Authorities having jurisdiction for Place of Work.

.3 Demolition and / or cutting of concrete can be hazardous to health.

.1 As per WSBC Risk Advisory RA 2015-06, cutting, breaking, crushing, drilling, grinding, or blasting concrete or stone releases silica dust.

.2 The Contractor is responsible for following guidelines laid out in Section 5.57 of the WSBC OHS Regulation and Guidelines, and implement an Exposure Control Plan (ECP). The ECP should incorporate protection for the public.

.1 WSBC Guidance Document for developing an ECP can be found here: https://www.worksafebc.com/en/resources/health-safety/exposure-control-plans/exposure-control-plan-developing-a-silica?lang=en

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.

.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 WSBC, 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 Carry 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 152x152mm (6"x6"):

.1 Metal Decking: Install 610x610mm (24”x24”) galvanized steel plate, min. 18ga. secured with 4 screws per side to existing decking.

.2 Openings greater than 152mm (6”) in diameter or 152x152mm (6”x6”):

.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 915x915mm (3’x3’):

.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 61 13 – Standing Seam Sheet Metal Roofing

.5 Section 07 62 00 – Prefinished Sheet Metal Flashing and Trim

.6 Section 08 63 00 – Metal Framed Skylights

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 SCOPE OF WORK

.1 On Roof Areas S–1.1, S–1.4, S–2.1and S–2.2: Existing roofing components to be removed, in preparation for installation of a new steep slope cedar shingles roof system and associated materials over prepared substrate.

.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 is to supply and install new components to match existing.

.3 Install specified roofing assembly, including eave protection membrane/ underlayment, new cedar shingles, accessories, related penetration hardware, sheet metal flashings, prefinished metal flashings and trims, and as indicated within the Project Documents.

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

.2 Work is 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.

1.2 BIDDER / INSTALLER QUALIFICATIONS:

.1 Bidders / installers interested in performance of specified Work must:

.1 Have a minimum ten (10) years' of successful work experience with the application of products, materials, systems and assemblies specified or similar comparable products,

.2 Be a member in good standing with Roofing Contractors Association of BC (RCABC) or bonded with an alternate equivalent guarantor per Section 1.2.2 Guarantee,

.3 Fully competent with the standards, methods and techniques required by the Guarantee specified below in Section 1.2.2 Guarantee,

.4 Installer must be pre-approved, trained and certified by the product manufacturer for the specified materials and installation type,

.1 Installers supervisor / foreman shall be a ticketed journeyman having minimum of (10) years' work experience in low slope SBS membrane and cedar roof replacement.

.5 Have a WorkSafeBC account number and WorkSafeBC clearance letter,

.6 Contractor's employees and Subcontractors must be WHMIS certified.

.7 Owner reserves the right to reject any proposed Subcontractor for reasonable cause.

.8 And be licensed and insured at the Place of Work.

.2 Guarantee:

.1 Provide a full-system roofing guarantee provided by the RCABC Guarantee Corp., or a pre-approved alternate equivalent. Proof of an equivalent guarantee must be submitted to the Owner prior to the Tender Close. The Guarantee must:

.1 be underwritten by an industry recognized Guarantor,

.2 who is financially independent of the installer or the material or system manufacturer.

.3 with no fewer than twenty years' experience underwriting roofing and waterproofing assemblies.

.2 be issued for a ten (10) year guarantee period.

.3 cover materials and workmanship, without penalty for depreciation.

.4 extend coverage for the project up to the full original value of the contract, for the duration of the Guarantee period.

.2 The Guarantee must

.1 provide written assurance to a building Owner against leaks arising from the failure of materials, or against the failure of workmanship performed by the bonded installer.

.2 furnish the Owner with an established claims process by which claims for material for workmanship failure may be duly processed and expedited.

.3 be issued through an established quality assurance program (QA Program) offered by the Guarantor. The QA Program must include

.1 installers who

.1 subscribe to a common set of ethical standards and membership requirements.

.2 furnish performance bonds to the Guarantor.

.3 employ trade-qualified installers for each guaranteed project.

.2 pre-qualified materials supported by bonds that are furnished to the Guarantor by each material manufacturer.

.3 widely recognized material, installation and performance standards and best practices published by the Guarantor.

.4 nationally recognized training for trade-qualified installers.

.5 independent reviews, provided by independently qualified observers, that include

.1 frequent course-of-construction field reviews.

.2 a 2-year post-construction performance review.

.3 periodic, scheduled performance reviews that identify performance and maintenance issues for the building owner such as at year 5 and 8.

.1 Costs for scheduled performance reviews are to be held in trust for the Owner.

.3 Warranty:

.1 Warrant the work of this Section against defects and/or deficiencies in accordance with General Conditions of the Contract as amended to include:

.1 Provide to Owner a written certificate issued by a Guarantor, as described herein, for a period of ten (10) years.

.2 Provide a true certificate from the Guarantor of a pending guarantee, as proof of the trade contractor's ability to deliver the guarantee described above.

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

1.3 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

1.4 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 C (C): 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 Material Warranty.

.2 RCABC RGC RoofStar Guarantee or pre-approved equivalent:

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

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

.4 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: Stainless-steel round head ringed nails (Type 304 or 316), 13 to 14 gauge in thickness, 2.4mm (0.092") x max. 51mm (2") long.

2.3 SHINGLE UNDERLAYMENT

.1 Eave Protection and Underlayment: Self Adhered SBS Modified Rubberized Asphalt, High Temperature, and 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 Treatment for split, cut, or sawn ends: Two (2) Coats of Copper Napthenate preservative.

2.5 SHINGLE ACCESSORIES

.1 Gooseneck and Static Roof Vents:

.1 Custom made copper gooseneck and static roof vents to comply with BC Building Code venting requirements, minimum 75 sq inch for 400 sq feet of roof area. Goosenecks are to be custom-made copper and are to match existing in size and profile. Static roof vent dimensions are to be determined by the Contractor prior to installation and to suit the installation of the new cedar shingles. Roof vent flange is to be minimum 4 inches wide.

.2 Roof Gable Vents:

.1 76mm (3") round stainless-steel gable vents.

.3 Plumbing Stack Flashings:

.1 Plumbing Stack Flashings: Custom aluminum stack flashings with slope to match existing roof slope, complete with settlement caps.

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

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

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

.7 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

.8 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 shingle wave pattern with 70mm (2.75") weather exposure to produce a layered 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 RELATED SECTIONS

.1 Section 01 11 00 – Summary of Work.

.2 Section 02 41 19 – Selective Demolition & Removal.

.3 Section 06 10 00 – Rough Carpentry.

.4 Section 07 62 00 – Prefinished Sheet Metal Flashing & Trim.

.5 Section 07 92 00 – Joint Sealants.

.6 Section 08 63 00 – Metal Framed Skylights

1.2 REFERENCES

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

.1 ASTM A446 (Latest Edition), “Steel Sheet, Zinc Coated (Galvanized) by the Hot Dipped Process, Structural (Physical) Quality.”

.2 ASTM A525-M-80, “Steel Sheet, Zinc Coated (Galvanized) by the Hot Dipped Process, General Requirements”

.3 ASTM A591/A 591 M-[89(1994)], Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.

.4 ASTM A606-[91a(1993)], Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.

.5 CAN3-S136.1-M84, "Cold Formed Steel Structures Members".

.6 CGSB 93-GP-3M, “Sheet Steel, Galvanized Prefinished, 1985.

.7 CSSBI B9-83, “Canadian Sheet Steel Building Institute Bulletin”

.8 National Research Council, Institute for Research in Construction reports No. B1040-1, B1040-2 and B1040-3.

.9 SMACNA Architectural Sheet Metal Manual.

.10 RCABC Roof Practices Manual, Architectural Sheet Metal (ASM)

1.3 EXAMINATION

.1 Examine drawings and specifications to determine extent of work involved, together with other data affecting work. Under no circumstances will any claims against Owner be allowed resulting from failure to ascertain extent of such work shown herein, described or implied.

1.4 DESIGN PRINCIPLE

.1 Design, fabricate and install metal roof system including associated components such as gaskets, baffles, overlaps and seals as required to provide a rain barrier to prevent water infiltration into building.

1.5 REQUIREMENTS OF SUPPORTING MEMBERS

.1 Design and fabricate brackets and anchorage devices so that when installed they will:

.1 Compensate for unevenness and dimensional differences in structure to which they are secured;

.2 Allow full expansion and contraction of framing members without causing undue stress within assembly which may result in buckling, joint failures and other detrimental effects, as a result of thermal expansion and contraction;

.3 Adequately sustain themselves during superimposed wind, rain and snow loads without exceeding deflection requirements as set forth.

1.6 SUBMITTALS

.1 Samples

.1 Upon award of Contract, submit samples of materials, with their respective finishes and colours. Samples to fully represent physical and chemical properties of materials to be supplied and installed.

.2 Manufacturer's Technical Data:

.1 Upon award of Contract, submit all technical data from material manufacturer.

.3 Structural Design Load Calculations:

.1 Upon request submit for review all structural design calculations, certified by a Professional Engineer licensed to practice in province at Place of Work, upon award of contract and prior to commencing installation.

.4 Shop Drawings:

.1 Upon award of Contract and prior to commencing installation, submit Shop Drawings stamped by a Professional Engineer licensed to practice in the province of BC detailing all component members and method of attachment for approval by Owner and Consultant.

.2 Shop Drawings to detail all component members and method of attachment of metal cladding system, including but not limited to:

.1 Sheet metal profile,

.2 Trim, flashings, and closures,

.3 Method of sealing,

.4 Method of anchorage,

.5 Type of fasteners and spacing,

.6 Type of material, thickness and finishes.

1.7 SAMPLE PANEL (MOCK UP)

.1 Construct full size sample including typical components, complete with flashings and fixing to substrate, in accordance with requirements of the Specifications.

.2 Mock-up to be reviewed by Consultant and Owner and if accepted form base standard for work. Accepted mock-up may form a part of work.

1.8 PERFORMANCE CRITERIA

.1 Positive and negative design wind loads to be in accordance with Provincial Building Code, based on a 1 in 50 year probability of occurrence.

.2 No water shall penetrate into building under design wind loads.

.3 Water infiltration through preformed metal roof assembly to drain to exterior at plane of drainage layer.

.4 Deflection of members to not exceed L/180 unless more stringent requirements are dictated for other reasons.

1.9 DELIVERY AND STORAGE

.1 Deliver and store materials to manufacturer's instructions and CSSBI guidelines.

.2 Do not store materials on roof.

.3 Store materials under cover on elevated platforms.

.4 Remove and replace damaged material.

1.10 WARRANTY

.1 Manufacturer's Material Warranty:

.1 Provide a written Thirty (30) Year Silicone Modified Polyester (SMP) Limited Conditional Warranty from the date of Approved Final Inspection. Cost of Manufacturer's Warranty to be included in the contract price.

.2 RCABC RGC RoofStar Guarantee or pre-approved equivalent (On All Steep Slope Roofs):

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

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

.1 Costs of Post Final Field Review(s) or extra field reviews due to Contractor not completing the work by the contractual Completion Date, if required, shall be charged back to the Contractor.

PART 2 - PRODUCTS

2.1 DESIGN REQUIREMENTS

.1 Design system to accommodate and withstand the following without permanent deformation or damage to, or failure of, roofing system or building structure:

.1 Roofing system dead loads, snow loads, ice loads, and wind loads, and combinations thereof, in accordance with the building code.

.1 Design wind loads shall be as indicated in building code and greater values as required, and to maximum allowable deflection without permanent deformation.

.2 Prevent infiltration of water and snow into roof system. Provide adequate drainage of water from rain screen cavity.

.2 Design system in accordance with CSA-S136 for the design of cold formed steel structural members.

.3 Structural loads: Resist all expected live and dead loads including positive and negative wind pressures expected in this geographical area with a maximum allowable deflection of 1/240 of the span.

.1 Deflection of roof system due to uniformly distributed specified loads shall not exceed L/180 of the span for roofs.

.2 Components shall not vibrate or rattle when subjected to the effects of wind.

.4 Wind uplift: Manufacturer to ensure conformance to NRC/IRC Client Report No. B1040-3 Wind Uplift Resistance of Metal Roofing, and confirm minimum panel wind resistance rating of 3.58kPa (52psf).

.5 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

.1 Temperature Change (Range): 20 deg C, ambient; 40 deg C, material surfaces.

2.2 GENERAL

.1 Prevent water from entering building and roofing assembly through roofing system.

.2 All materials are to be supplied by the Contractor, meeting manufacturer's respective material compatibility requirements to achieve required System Warranty.

.3 Components to be used that are other than those supplied or manufactured by metal roof manufacturer may be submitted for review and acceptance by metal roof manufacturer.

.4 Roofing manufacturer's acceptance of any other product is only for a determination of compatibility with products and not for inclusion in manufacturer's warranty.

.5 Specifications, installation instructions, limitations, and/or restrictions of respective manufacturers must be reviewed by Consultant for acceptability for intended use with metal roof manufacturer's products.

2.3 UNDERLAYMENT MEMBRANE

.1 Roof underlayment membrane: Self Adhered modified asphalt membrane. Acceptable Products with related primer:

.1 Titanium PSU 30 as manufactured by InterWrap or approved equal.

2.4 VENTILATION LAYER – ONLY FOR ROOF AREAS WITH SLOPES LESS THAN 4/12

.1 Nylon Drainage Mat: Three-dimensional multi-use mat, made of continuous nylon filaments fused at their intersections. Fire resistant to meeting ASTM E84-11a, Thickness 19.05mm (0.75") meeting ASTM D5199

.1 Enkamat ASV 7020 as manufactured by Bonar or approved equal.

2.5 PREFINISHED METAL ROOFING PANELS

.1 Prefinished sheet steel panels: Cold roll-formed metal cladding panels made from Zinc coated sheet steel to ASTM A653/A653M and with coating designation Z275 (G90) to ASTM A924/A924M.

.1 Preformed metal thickness: Not less than 0.61mm (24 gauge) nominal steel thickness.

.2 Panels to be to 457mm (16") wide with two intermediate ribs and to match existing roof panels.

.3 Standing seam area to be minimum 44.4mm tall (1.75").

.1 Standing Seam Metal Roof System - Snap Lok II 675 panel or approved equivalent, approval to be in writing prior to award.

.4 Drag load requirements to be determined by the manufacturer and to include for additional snow guard load.

.1 Include data in Shop Drawing submission to Consultant.

.5 Finish: Silicone Modified Polyester (SMP):

.6 Colour: Colour to be selected from the standard range of SMP colours, with written confirmation to be garnered from the Owner.

2.6 SHEET MATERIALS

.1 Conform to the RGC Guarantee Standards and to the appropriate CSA, CGSB, ULC and ASTM Standards used in the roofing system specified; materials to be listed in the RGC Accepted Materials.

.2 Sheet steel roofing and flashing shall be formed of steel conforming to the following material specification:

.1 24 gauge galvanized sheet steel, conforming to ASTM A653/A653M-06 SS Grade 33, Z275 (G90) coating. Thickness tolerance as per ASTM A924/A924M-06 + / - 0.003" for sheet widths not exceeding 60".

.3 Prefinished sheet steel, in addition to meeting the requirements as applicable, shall be coated by one of the following factory applied, heat cured paint systems.

.1 Silicone Modified Polyester (SMP) 2-coat system. Standard ordering practice is a 5 micron (0.2 mil) primer plus a 20 micron (0.8 mil) top coat. Top side dry film thickness to be a minimum 20 microns (0.8 mil).

.4 Colour: Selected from the standard range of SMP colours, by the owner.

.5 Fastener Clips and Screws:

.1 Proprietary metal panel clips must be listed as acceptable by the metal panel machine manufacturer for use with the metal roofing systems, one piece assembly, No. 22 MSG min thick, 87.5 mm (3-1/2") wide, 47.6 mm (1-7/8") high.

.1 Clips to be minimum UL Classified 1-15/16" SnapLock clip in 18ga galvanized steel as supplied by AMSI Supply or Owner approved equivalent, approval to be in writing prior to award.

.2 Proprietary fasteners: Fasteners used to attach panel clips to steel to be No. 10-16 by 25 mm (1") long cadmium plated pancake head No. 2 Phillips drive, No. 3 self-drilling point steel screws. Two screws per clip inserted through 6.25 mm (1/4") diameter guide holes.

.6 Bearing Plates:

.1 Proprietary bearing plates must be listed as acceptable by the metal panel machine manufacturer for use with the metal roofing systems SnapLock Clip.

.1 Clips to be minimum UL Classified 1-15/16” SnapLock clip in 18ga galvanized steel as supplied by AMSI Supply or Owner approved equivalent, approval to be in writing prior to award.

.7 Neoprene Gaskets:

.1 High density neoprene pad for use under bearing plates to maintain the air space beneath the roofing panels:

.1 4 -3/4” W x 6 -3/4” L RECT PAD Material: 3/8” CG 285 Neoprene, 60 Duro (3/4” bigger in each direction than the bearing plate)

.8 Closures: Weatherproof, laminated, semi-rigid, cross-linked polyethylene foam, tightly fit to panel profile.

.9 Sealant Options:

.1 Caulking being gunnable grade, single component urethane caulk.

.2 Sealant: Butyl tape sealant.

.3 Or as identified in Section 07 92 00.

2.7 PANEL FORMING MACHINES

.1 Metal roof panels formed on portable or fixed panel forming machines must be accepted by current construction standards.

2.8 ACCESSORIES

.1 Snow guards: Snow guards to be attached without penetrations through the panels. Standard of acceptance to be Clamp On Snow Fence by Snow Management Systems or approved equal. Submit shop drawings to Consultant for review. Snow guards to be powder coated, colour to match metal cladding panel colour.

.2 Accessories and hardware: Zinc coated steel to meet specified requirements of CAN/CSA-G164, hot dip galvanized after fabrication.

.3 Adjustable rubber boot: Master Flash EPDM by Leland Industries Inc. or approved equal.

.4 Closures: Foam and metal closures to suit profiles selected, to manufacturer’s recommendations and to match colour of prefinished metal roof.

.5 Sealant: non-skinning butyl, to manufacturer’s standard.

.6 Clip and sub-girts: Thermally responsive flush mount clip system, fabricated from 1.22 mm (18 gauge) minimum base steel, with minimum Z275 galvanized coating.

.1 Z-girts when necessary shall be pre-painted black for added corrosion resistance.

.7 Metal Flashing: As per Section 07 62 00. Flashings to be custom fabricated to suit architectural details as required.

.8 Rivets: Stainless steel with pan heads painted after installation.

.9 Isolation Coating: alkali resistant bituminous paint meeting CGSB1-108C-Type 2.

.10 Exposed sealants: in accordance with Section 07 92 00.

.11 Rafter Baffles: Extruded polystyrene baffles to provide a depth of 50mm (2") x 560mm (23") x 1,216mm (48") opening.

.1 Raft-r-mate by Owens Corning or approved equal.

2.9 FASTENERS

.1 All fasteners and plates to meet requirements of Factory Mutual Global 4470 Standard for wind uplift and corrosion resistance in roofing.

.2 Exposed Fasteners: minimum 3/16" diameter self-drilling, hex head with nylon coating, c/w with attached and integrated neoprene washers.

.1 A304 stainless steel sheet metal screws self-drilling, by Fabco Fastening Systems, Atlas, Perma-Grip, or approved equivalent.

.2 Colour to match prefinished metal panels in exposed locations

.3 Hidden fasteners: Self-tapping metal screws as specified by panel manufacturer, to resist wind uplift to NRC/IRC Client Report No. B1040-3 standards and sliding snow forces.

.4 Anchors for Cladding Framing: Stainless Steel or as noted on drawings.

2.10 FABRICATION

.1 Allow for structural movements within the systems, and to accommodate thermal expansion and contraction between panels and structural members.

.2 Ensure that metal panels are free of steel contamination from rollers.

.3 Fabricate siding panel systems to prevent entry of water into building and from collection within system assembly.

.4 Join intersecting parts together to provide tight, accurately fitted joints with adjoining surfaces in true planes.

.5 Cooperate with applicable sections to ensure coordination required for proper installation of work of this section in conjunction with and incorporated with other work.

.6 Prefinished metal panel terminations shall not have a raw metal edge or exposed fasteners. Panel ends for non-corrugated panels shall be folded.

.7 Use competent mechanics and work accurately to details indicated and as specified herein.

.8 Verify all dimensions on site prior to fabrication.

.9 Fabricate sheet metal flashings to the size and shape indicated for drip flashings; termination flashings, starter strips and all other flashings, closures and trim as required according to site measurements.

.10 Fabricate wall, drip and sill flashings to provide a minimum 2% slope outward. End joints of adjacent lengths of metal flashing shall be made using an "S-lock" joint.

.11 All edges to be hemmed a minimum 0.5” (13mm) for appearance and stiffness.

.12 Incorporate for concealed anchorage of flashing and means for adjustment of level during installation.

.13 End joints where adjacent lengths of metal flashing meet shall be made in accordance with jointing method specified hereinafter.

.1 End joints incorporating standing seam methods shall only be acceptable for corners, coping areas wider than 406mm (16”), or if discussed and agreed to by the Consultant.

.2 Lap joints are not acceptable.

.14 Form to profile, free of oil canning.

.15 Damaged or bent sheets shall be rejected.

2.11 METAL FLASHINGS

.1 Prefinished Sheet Metal Gutters, 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). Colour selected by Owner from Manufacturer’s standard colour range.

.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 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 Manufacturer’s preprinted and published technical specifications,

.3 CAN/ULC Design No. S-107 criteria,

.4 Factory Mutual Global design criteria FM 1-28 and 1.49,

.5 Compliance with local fire insurance requirements,

.6 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 Apply each part of roofing system when surfaces are free of moisture for successful application.

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 Verify that existing construction is aligned for proper installation of prefinished metal roofing system before commencing erection.

.3 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 Do not use spray installation methods on days with significant wind.

.7 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 19mm (0.75") plywood sheathing over 38mm (1.5") extruded 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 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 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 Defective Work:

.1 Avoid use on roof of any petroleum based and other chemical products that are corrosive and/or damaging to roofing system. 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 PREPARATION

.1 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 Contractor to review the underside of deck areas for potential electrical service conduits which may be present. Mark locations on the deck and avoid installing fasteners in those areas. Bring to the attention of the QA Observer and Owner's Representative.

.3 No work is to begin until metal roof colour has been approved by Owner.

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

.5 At areas designated for removal and replacement, existing shingles, underlayment's, projection and perimeter flashings, and old appurtenances are to be removed and disposed to an approved landfill site. Metal should be recycled if facilities exist.

.1 Shingles are understood to be bonded to the felt underlayment's, which in turn has become spot bonded to the wood sheathing.

.6 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 system. Any deficiencies found in decking materials are to be reported to Consultant and Owner immediately.

.7 Any wood blocking 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 as per Section 06 10 00 Rough Carpentry.

.8 Damaged or otherwise deficient structural members must be replaced or repaired before any further work can take place on that particular roof section. Contractor to supply and install new structural members to match existing on a time and material basis.

.9 Areas with damaged decking must be replaced or repaired before any further work can take place on that particular roof section. Contractor to provide a Unit Price per square foot on Bid form to supply and install new steel decking to match existing as per Section 05 01 30 Steel Roof Deck Rehabilitation.

.10 Re-secure loose existing deck components with specified fasteners.

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

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

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

.14 Horizontal siding to be cut to facilitate new roofing.

.15 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.

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

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

.18 Disconnect and reconnect Electrical and Mechanical Services as / if required, by Owner. Contractor to provide minimum 48 hours' notice to Owner's Representative.

.19 Miscellaneous Supports: Install sub-framing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.5 UNDERLAYMENT INSTALLATION

.1 Install one (1) ply self adhered synthetic roof underlayment as per Manufacturer's written guidelines. Installation to be free of blisters, wrinkles and fish-mouths.

.1 Roof underlayment must be installed on same day as primer application.

.2 Do not install when it is raining or snowing, on wet/humid surfaces, or when inclement weather is expected shortly.

.3 Substrate must be clean, dry, and free of dirt, dust, grease, or other contaminants.

.2 Primer Installation:

.1 Prime substrates and install membrane in accordance with membrane manufacturer's written installation instructions.

.2 Prime exposed surfaces to receive membrane. Apply primer to clean and dry surfaces with a paint brush, roller or sprayer at temperatures 0°C (31°F) and above.

.3 Apply primer at a coverage rate between of 0.1 to 0.5 L/m^2 (0.25 to 1.22 gallon/100 ft^2) as recommended by membrane manufacturer for surface type.

.4 Provide minimum of 50 mm (2") side laps and 75 mm (3") end laps.

.5 Cut to manageable lengths, position membrane for alignment, remove protective poly-film and firmly apply pressure to assure adhesion.

.6 Eliminate wrinkles or gaps, roll entire membrane surface (including seams) with a counter top or "J-roller" to ensure full contact and adhesion.

.7 Ensure all substrates are fully covered with primer leaving no areas bare and avoid pooling.

.8 Allow primer to dry completely prior to installation of roof underlayment membrane.

.3 Membrane Installation:

.1 Begin application at bottom of roof slope. Position membrane rolls for alignment and unroll to apply membrane perpendicular to deck slope. Do not immediately remove release sheet on self-adhering membranes until satisfied with alignment.

.2 Overlap each preceding row of membrane sheet by min. 76mm (3") on side laps and by a min. 152mm (6") at end laps. Stagger end laps of adjacent rows by at least 305mm (12").

.3 Use a 34kg (75lbs) roller to press membrane down onto substrate including laps. Finish by aligning edge of roller with lower end of side laps and rolling up membrane.

.1 Do not cut membrane to remove trapped air bubbles. Squeeze out air bubbles by pushing roller to edge of laps.

.4 Carry roof underlayment up all vertical surfaces at parapets and projections a minimum of 152mm (6") to allow for encapsulating of new insulation with roof membrane as indicated on detail drawings.

.5 Apply mastic to joints that may be subject to water intrusion.

.6 Carefully review membrane surface daily for damage / holes caused by construction traffic. Patch with new membrane only, patch to provide 2" x 2" coverage past edges of hole.

.1 It is recommended, but not required, for a single ply of membrane to be applied over seismic plate fasteners prior to the installation of the field sheet, to reduce damage from fastener heads and reduce the contractors need to repair the membrane.

.7 Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 07 62 00 Sheet Metal Flashing and Trim.

3.6 EXAMINATION

.1 Certified installer shall examine substrates, areas, and conditions, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

.1 Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.

.2 Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.

.3 Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

.2 Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

.1 Proceed with installation only after unsatisfactory conditions have been corrected.

3.7 DEAD VALLEYS

.1 Identify dead valleys on Roof Plan.

.2 Install 3 plies of SBS modified bituminous membrane and 1 ply of reinforced PMMA liquid applied membrane as detailed in these areas.

.1 Materials are to be as per Section 07 52 00 SBS Modified Bituminous Membrane Roofing for gutters, with base ply adhered and subsequent plies torch applied.

3.8 PREPARATION

.1 Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.9 VENTILATION LAYER

.1 Ventilation layer to be installed over the protection membrane and to be attached with corrosive resistant staples or roofing nails.

.2 At ridge areas, top piece should overlap the ridge a minimum of 152mm (6").

.3 At end joints, butt two (2) pieces of ventilation layer together. Do not overlap entangled filament mats.

.4 Around all penetrations, such as pipes, vents, conduits or similar elements, trim away ventilation layer as not to damage the underlayment membrane.

3.10 METAL PANEL INSTALLATION

.1 General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

.2 Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.

.1 Locate and space fastenings in uniform vertical and horizontal alignment.

.2 Two panel weather stops must be installed at up-slope terminations. Weather stops may be any combination of foam closures, metal Z-closures, metal flashing turned down between panel ribs to close off openings and / or turned up (bread panned) panel ends.

.3 Metal panel ends turned up (bread panned) must be turned up to a height equal to the panel ribs or standing seams. Turned up corners (dog ears) are not to be cut.

.3 Metal Z-closures must be sealed weather tight with caulking and / or sealant tape.

.4 Install flashing and trim as metal panel work proceeds.

.5 Align bottoms of metal panels and fasten with self-tapping screws. Fasten flashings and trim around openings and similar elements with rivets and self-tapping screws.

.6 Fasteners:

.1 Steel Panels: Use painted galvanized-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

.7 Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

.8 Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

.9 Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.

.1 Install clips to supports with recommended fasteners.

.2 Install bearing plates at locations indicated in manufacturer's written installation instructions.

.3 Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging.

.4 Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip and metal roof panel are completely engaged.

.10 Perimeter Edge Securement

.1 Metal panels with low intermediate stiffening ribs must be installed using a perimeter hook strip.

.2 Trapezoidal and intermediate rib standing seam metal roof panel perimeter eave securement must be installed according to the manufacturer's printed instructions and RoofStar Guarantee Standards. Exposed fasteners are not to be used.

.11 Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

.1 Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.

.2 Metal roof panel penetrations, e.g. plumbing, venting, flashings, etc., must have a minimum 300 mm (12") clearance from all other roof projections to permit proper flashing.

.3 Metal roof flexible pipe penetration flashings must be located so as not to interfere with standing seams or panel ribs. If interference is unavoidable, roof curbs or a split sheet detail must be used.

.12 Metal Valleys

.1 Metal valley overlaps must be a minimum of 254 mm (10") with two rows of approved caulking or sealant tape.

.2 Metal valley drag load fastening (top edge of valley sections) shall be 75 mm (3") o/c. Drag load fastening is mandatory on unhooked valleys but may not be required on hooked valleys.

.3 Valley dividers are required and must be a minimum of 25 mm (1") high.

.4 Exposed valley widths must be a minimum 125 mm (5") from divider to metal roof panel on each side of the divider. Increased width is recommended in heavy snow load areas.

.5 Unhooked metal valley sections must be returned 25 mm (1") and secured with minimum 50 mm (2") wide metal clips, fastened with two fasteners each. Bend metal clips back over fasteners to protect the metal panels. Metal roof panels must overlap unhooked metal valleys a minimum of 275 mm (11") and be sealed with two rows of preformed foam closures adhered with approved sealant tape.

.6 Hooked metal valley, metal roof panel overlaps must be a minimum of 125 mm (5") wide with a one-piece built-in hook strip. Fasteners must be 200 mm (8") o/c and covered with approved self-adhered modified bituminous membrane sealed to the valley protection membrane.

.13 Metal Cap / Hip Flashing

.1 Metal cap / hip flashing must extend a minimum of 254 mm (10") over metal roof panels on each side of the ridge / hip.

.2 Standard cap / hip flashing must be hooked to metal Z closures which are set in sealant tape and fastened through the metal roof panel into the deck or fastened to each standing rib with manufacturer-approved, colour matched, high domed gasketed fasteners and preformed foam closures installed as a weather seal.

.3 Notched cap / hip flashing must be fastened on each panel rib and preformed foam closures installed as a weather seal. Only manufacturer-approved, colour matched, high domed gasketed fasteners may be used

.14 Roof Curbs: Install flashing around bases where they meet metal roof panels.

.15 Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

.16 Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.

.17 Additional inspections, at Contractor's expense and when discussed, may be performed to determine compliance of replaced or additional work with specified requirements.

3.11 MISCELLANEOUS MECHANICAL & ELECTRICAL

.1 Co-ordinate roofing work with General, if applicable and other Sub-Contractor trades that may be present on roof.

.2 Unless stated in writing elsewhere, Contractor responsible to:

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

.2 Modify existing sleepers, curbs, and supports as required to suit new roof system installation and configuration as detailed. Ensure modified sleepers, curbs, and supports are made watertight with new roof system and flashings as required.

.3 Provide overnight security, at no additional cost to Owner, where removal of any material 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.

.3 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.

3.12 METAL FLASHINGS

.1 After installation of metal roof, new perimeter metal and metal flashings are to be installed as detailed in Section 07620 and as indicated on detail drawings.

.2 Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

.1 Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.

.2 Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 3m (10') with no joints allowed within 610mm (24") of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 25mm (1") deep, filled with mastic sealant (concealed within joints).

3.13 CLEANING AND PROTECTION

.1 Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

.2 Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touch-up or similar minor repair procedures.

3.14 SEALANTS

.1 After installation of metal roof, install sealants as per Section 07 92 00 – Sealants and as recommended by metal roof manufacturer.

3.15 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.

END OF SECTION – 07 61 00

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 06 10 00 – Rough Carpentry

.4 Section 07 61 13 – Standing Seam Sheet Metal Roofing

.5 Section 07 62 13 – Prefinished Gutters and Downspouts

.6 Section 07 92 00 – Joint Sealants

.7 Section 08 63 00 – Metal Framed Skylights

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 C (C): 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 C 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) or Polymerizing VinyliDenediFluoride (PVDF) 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 406mm (16") 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 reglet or sawcut locations 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 SECTION INCLUDES

.1 Gutters and downspouts.

.2 Accessories.

1.2 RELATED SECTIONS

.1 Section 00 60 00 – General Conditions.

.2 Section 01 00 00 – General Requirements.

.3 Section 01 11 00 – Summary of Work.

.4 Section 07 61 13 – Standing Seam Sheet Metal Roofing

.5 Section 07 62 00 – Prefinished Sheet Metal Flashing and Trim.

.6 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 C (C): 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 Shop Drawings: Submit shop drawings with profile(s) for review by consultant prior to fabrication.

.2 Samples: Provide nominal 305mm (12") sample of gutter profile and 305mm (12") length of rainwater leader for review by Owner and Consultant.

1.5 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Manufacturer shall have a minimum of five (5) years' experience in the production of sheet metal gutters and downspouts.

.2 Fabricator Qualifications: Shall be approved by manufacturer for fabrication of gutters and downspouts.

1.6 STORAGE AND HANDLING

.1 Do not store metals in direct contact with the earth, road surface, or roof deck. Place suitable supports under the metal upon delivery to protect it from scratching or puncturing membrane, membrane flashing or absorbing moisture from the surrounding terrain or deck.

.2 Store all materials in waterproof covered trailers.

.3 Store caulking at +5ºC minimum.

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

.5 Remove and replace damaged products at own expense and to the satisfaction of the Quality Observer and Consultant.

.6 Maintain fire watch for two hours after each day where soldering operations were in use and examine all flashings with an infrared thermal fire scanner prior to departing from the site.

.7 Apply materials in accordance with the manufacturer's recommendations.

.8 Prepare and submit for approval shop drawings showing layout of new gutters, including but not limited to:

.1 Material thicknesses,

.2 Forming,

.3 Slopes,

.4 Seam, joint and connection layout,

.5 Securement details.

1.7 WARRANTY

.1 The Contractor shall supply the Owner with a 2 year material warranty on Contractor 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 gutters and downspouts Work:

PART 2 - PRODUCTS

2.1 MANUFACTURER

.1 Contractor supplied roll forming machine, as pre-approved at the point of Tender with Consultant.

2.2 GUTTERS

.1 Materials:

.1 Aluminum Coil Stock: Formed and coated aluminum coil stock; 3105 H24 aluminum.

.2 Box Gutter Fabrication:

.1 Size: 127mm (5”), minimum 82.6mm (3.25”) at base.

.2 Length: Continuous.

.3 Profile: ‘K’ style or Ogee

.4 Material Thickness: .813mm (0.032”).

.3 Gutter Corner Fabrication:

.1 Provide mitered corners, lapped, sealed and riveted. Corners shall extend a minimum of 19mm (¾”) from the corner in each direction. Lap joint and sealant where connecting to continuous gutter.

.2 Match material, shape and finish of gutter.

2.3 DOWNSPOUTS

.1 Rectangular downspout fabrication:

.1 Size: 51mm x 76mm (2’ by 3’).

.2 Length: 3,048mm (Standard 10’).

.3 Profile: Corrugated.

.4 Material Thickness: .610mm (0.024”).

.5 Colour:

.1 Downspouts to match wall colour at wall mount locations.

.2 Downspouts to match metal roofing colour at roof locations.

2.4 ACCESSORIES

.1 Gutters:

.1 End Caps: Match material, shape and finish of gutter.

.2 Drop Outlet Tubes: Match material and shape of downspout.

.2 Gutter Support:

.1 Hidden Gutter Hanger: Manufacturer’s standard steel hidden hanger.

.3 Downspouts:

.1 Downspout Support:

.1 Exposed strap.

.2 Colour: Match Downspout.

.4 Miscellaneous downspout components: Provide all necessary elbows, downspout offset sections, and pop rivets as required for a complete installation. All miscellaneous components shall match downspouts.

.5 Fasteners:

.1 Stainless steel fasteners of sufficient length to penetrate minimum 1 inch into substrate.

.6 Flashing: As per Section 07 62 00 Prefinished Sheet Metal Flashing and Trim.

.7 Sealants: As per Section 07 92 00 Joint Sealants.

.8 Downspout Strainer: Steel wire-ball downspout strainer.

.9 Downspout Clean-out to fit and match downspouts' profile and colour.

.10 Precast Concrete 11" x 24" Splash Blocks.

2.5 FINISH

.1 Exterior Coating:

.1 As per Section 07 62 00 Flashing and Trim.

.2 Colour: As selected from manufacturer's standard color line.

.1 Owner to approve colour.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Verify that substrates are in place and ready for installation of gutters and downspouts.

3.2 INSTALLATION

.1 General: Install Work securely in place and provide for expansion and contraction of components using lapped and sealed joints

.1 Do not install damaged components.

.2 Separate dissimilar metals to prevent galvanic action through the use of bituminous coating or other permanent separation recommended by SMACNA.

.3 Space expansion joints in gutters at a maximum of 21,336mm (70') centers.

.4 Rivet joints where required for strength, exposed rivet shall be stainless steel and match gutter or downspout color.

.5 Torch cutting of components is not allowed.

3.3 GUTTERS:

.1 Install gutter supports at no less than 406mm (16”) on center.

.2 Slope gutters evenly to downspouts; provide end caps at gutter ends and seal watertight per manufacturer’s instructions.

.3 Install aluminum outlet tubes at all downspout locations, seal watertight.

.4 Apply joint sealants at gutter joints per manufacturer’s installation instructions and to meet the requirements of Section 07 92 00 – Joint Sealants.

.5 Gutters shall have a net positive slope of 1/8" per foot between high point and downspouts.

3.4 DOWNSPOUTS:

.1 Install downspouts, provide elbows and offsets, and secure downspouts to wall construction using downspout supports spaced no more than 3,048mm (10’) on center. Maximum distance of downspout support from top or bottom of downspout shall be 610mm (2’). Tie into existing building perimeter drainage system (BPDS). If no BPDS is in place, notify the Consultant.

.1 Where downspout connects to building perimeter drainage system, lap downspout and perimeter drainage pipe a minimum of 76mm (3”).

.2 Gutter clean-out shall be installed 24” from entrance to BPDS.

.3 Fabricate and install a new, fully soldered square to round transition to attach new downpipe to existing sub surface drain as required.

.4 Install downspouts from upper roofs across lower roofs, and exhaust into lower roof gutters.

.1 Install 90° elbow to direct water into lower roof gutter.

.2 Colour to closely match metal roofing colour. Review on site with Consultant.

3.5 CLEANING AND PROTECTION

.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 62 13

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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 – Standing Seam Sheet Metal Roofing

.4 Section 07 62 00 – Prefinished Sheet Metal flashings and Trim

.5 Section 07 62 13 – Prefinished Gutters and Downspouts

.6 Section 08 63 00 – Metal Framed Skylights

.7 Section 08 80 00 - Glazing

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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PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 02 41 19 – Selective Demolition & Removal

.2 Section 07 61 13 – Standing Seam Sheet Metal Roofing

.3 Section 07 62 00 – Sheet Metal Flashings and Trims

.4 Section 07 92 00 – Joint Sealants

.5 Section 08 80 00 - Glazing

1.2 SUMMARY

.1 Provide labour, materials and equipment necessary to complete work of this section. This is a performance specification and is issued in conjunction with the drawings which indicate the general arrangement of work, the dimensions, structural system, and the major elements of the construction. As performance documents, the drawings and specifications do not necessarily indicate or describe all items required for the full design, performance and completion of work of this section.

.2 Completion of this work to be performed in conjunction with the roof replacement on roof area S-3.1 in accordance with Section 07 61 13 Standing Seam Sheet Metal Roofing.

.3 The Skylight Contractor Scope of Work will include but not limited to the following:

.1 Verify the existing condition of skylights supports on site prior to shop drawings preparation. Any additional structural supports needed to complete the skylight installation should be included in the scope of work.

.2 Engineering, design, shop-drawings preparation, supply and installation of Metal-Framed Skylight system, including aluminum framing, integral closures, trim, perimeter flashings and surface reglets.

.3 Fasteners, anchors and related reinforcement of framing system as required to resist design loads.

.4 Field water testing: Contractor to include for a third party water infiltration testing for the new skylight systems. Testing will be paid, coordinated and scheduled by the Contractor prior to submission of Substantial Completion invoice.

1.3 REFERENCES

.1 BC Building Code (Latest edition)

.2 CAN/CSA 3-S157.20-M83 Strength Design in Aluminum

.3 CAN/CGSB-12.20-M89 Structural Design of Glass for Buildings

.4 British Columbia Energy Efficiency Act Information Circular (Windows, Glazing, Doors and Skylights)

1.4 SYSTEM DESCRIPTION

.1 Performance Requirements: Provide metal-framed skylights which have been manufactured, fabricated and installed to withstand loading required by current BC Building Code. Provide performance criteria required by these specifications without defects, damage or failure.

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.2 Energy Efficiency Requirements: The system must meet the maximum heat transfer rate (U-Value) performance standard of 2.40 watts per square meter of product area per degree Kelvin.

.3 The skylight system shall be designed in accordance with the following standards:

.1 BC Energy Efficiency Act Information Circular

.2 NAFS08

.3 CSA A440.2-04, Energy Performance of Windows and Other Fenestration Systems

.4 Skylight systems must have adequate resistance to pressure differentials.

.5 Skylight systems must have adequate provision for thermal movement without thermal fractures of framing members, glazing and/or sealants.

.6 Skylight systems must have adequate provision for live, dead, wind, snow and rain loads without failures, distortion or fracture.

.7 Skylight systems must have adequate support and anchorage of components taking into consideration all loading factors and combination.

.8 Skylight systems must have a water and weather-tight installation with gaskets, seals, and sealants to effectively prevent water entry into building.

.9 Skylight system must conform with the "open rainscreen principle" (i.e., be pressure-equalized and self-drained to the exterior). Provide pressure equalized and self-drained vents at exterior frame members without causing air flow around glazing.

.10 Skylight system must have continuous air and vapour seals to control transfer of moisture vapour into system of insulated glass units.

.11 Skylight systems shall conform, meet or exceed the following ratings:

.1 Air Tightness:

.1 Fixed – 0.2 L/(s.m^2) of crack length (as per Fixed Rating).

.2 Water Tightness:

.1 Skylight water tightness shall meet B5 rating with no water infiltration at 500 Pa when tested in accordance with CSA A440-00 and ASTM E1105.

.2 No water shall penetrate the assembly and cause wetting of the interior room surfaces.

1.5 SUBMITTALS

.1 Product Data: Submit product data, including manufacturer’s product literature for specified system.

.2 Samples: Submit selection and verification samples for finishes, colours and textures.

.1 Aluminum Finish: Submit 2 sets colour charts or range samples for initial color selection. Submit finished sample of color selected for use.

.2 Glazing Materials: Submit 2 pieces verification sample 12” square, of the specified glass, including any integral tints, coatings as specified.

.3 Submit standard sealant colours for selection and approval.

.3 **Engineer-Stamped Shop drawings**: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colours, patterns and textures. Submit shop drawings for review and approval by the Owner/Consultant prior to fabrication. Include detailed plans, elevations, details of framing members, glazing infill materials (if any), sealants, fasteners, anchors and thicknesses and types of formed flashing and closures and relationship with adjacent materials. Indicate maximum horizontal and vertical forces at rafter anchors.

.1 Do not proceed with the work until shop drawings are acceptable to the Owner.

.4 Submit Letters of Assurance by a Professional Engineer registered with the Association of Professional Engineers and Geoscientists of BC.

.5 Upon request, submit verification of Skylight System U-Value certified by a Professional Engineer registered with the Association of Professional Engineers and Geoscientists of BC.

.6 Quality Assurance / Test Reports: Include manufacturer's air and water resistance test reports showing compliance with specified performance requirements.

.1 Certification for Structural Sealant: Submit written documentation from sealant manufacturer stating that the sealant selected has been tested for adhesion and compatibility on representative samples of metal, glass and other glazing components, and that the sealant joint design and application procedures shown on the shop drawings are suitable for this project.

.7 Close Out Submittals:

.1 Provide Operations and Maintenance Manual to be submitted to the Consultant with the following documents included:

.2 Include the following information:

.1 Maintenance instruction for materials, finishes, operation and cleaning.

.2 Parts list indicating make, size, serial number, manufacturer, telephone number and address of the suppliers.

.3 Arrange with and demonstrate to the Consultant, cleaning, reglazing and general maintenance procedures.

.3 Warranty: Submit warranty documents specified herein.

1.6 QUALITY ASSURANCE

.1 Skylight System Manufacturer shall have a minimum Ten (10) years experience in the fabrication and installation of custom architectural metal-framed skylights. Manufacturer shall be capable of providing structural calculations, applicable independent product test reports, installation instructions, review of the application methods, customer approval, and periodic field service representation during construction.

.2 Skylight System Installer shall have a minimum Ten (10) years experience in glazing and installation of metal-framed skylights. Installer shall be experienced to perform work of this section and has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.

.3 **The Contractor, in the presence of the Consultant and the Owner, will perform field water testing after installation of the skylight framing and glazing, but prior to the installation of**

the exterior beauty caps. The testing shall be deemed fail if any water enters into the building or past the drainage channels during or after the testing.

.4 Skylights failing to perform to the required test levels will be modified such that they pass and re-testing will be conducted by the Consultant at the Contractor's expense.

.5 The inspection and testing service does not relieve the Contractor of his responsibility for quality control of production and for subsequent mistakes.

1.7 FIELD TESTING

.1 Water Test: Contractor to conduct a third party water infiltration testing for the new skylight systems. Testing will be coordinated, paid for and scheduled by the Contractor prior to submission of Substantial Completion invoice.

.2 Field Water testing will be conducted using the following procedures:

.1 Latest edition of ASTM Standard E1105, Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

.3 In situ testing will be conducted on the sample installation for compliance with the following ratings:

.1 Air Tightness:

.1 Fixed – 0.2 L/(s.m^2) of crack length (as per Fixed Rating).

.2 Water Tightness:

.1 Skylight water tightness shall meet B5 rating or

.2 No water infiltration at 500 Pa when tested in accordance with CSA A440-00 and ASTM E1105.

.3 No water shall penetrate the window assembly and cause wetting of the interior room surfaces.

.4 Failure to perform to the required test levels will mean modification such that they pass and re-testing will be conducted by the Owner, at the Contractor's expense.

.5 Sealant Adhesion Test: Contractor to arrange for sealant representative to be on site during installation of Mock-up. Sealant representative to return after curing period has elapsed and perform pull test, providing report to Owner, Consultant and Contractor.

.6 The inspection and testing service does not relieve the Contractor of his responsibility for quality control of production and for subsequent mistakes.

1.8 PROJECT SITE CONDITIONS

.1 Field Measurements: Verify actual measurements / openings by taking field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

.2 Field-verify existing dimension against approved submittal drawings and advise Consultant of any deviations prior to commencing installation.

1.9 STORAGE AND HANDLING

.1 Deliver materials with identification labels and in unopened, undamaged containers.

.2 Store materials protected from exposure to harmful weather conditions, temperature, and humidity. Handle skylight material and components to avoid damage. Protect skylight material against damage from sunlight, weather, excessive temperatures, construction activities, and other hazards.

1.10 WARRANTY

.1 Contractor's Obligation: The contractor must submit a signed written warranty to the Consultant for the installation of work specified in this Section covering for a period of Two (2) Years from date of the Certificate for Substantial Completion.

.2 Contractor must submit ten (10) years Manufacturer's Material Warranty.

.3 Skylight: The work included in this section shall be fully guaranteed by written certification for a period of two (2) years from the date of Substantial Performance of the Project against any defects in design, materials and workmanship, and that it shall remain a weather-tight and watertight installation, and that any defect will be made good at no additional cost to the Owner. This guarantee shall include all glass and glazing, gaskets, tapes and sealants.

.4 In addition to the above, provide a two (2) year written guarantee on the following:

.1 Aluminum: Guarantee against the following:

.1 Excessive Non-Uniformity: Any non-uniform fading during guarantee period.

.2 Pitting or Corrosion: No pitting or other type of corrosion resulting from natural elements in local atmosphere.

.2 Sealants: Guarantee shall state that installed sealants are guaranteed against:

.1 Adhesive, cohesive or shear failure of joints.

.2 Staining of surfaces adjacent to joints by sealant or primer by migration through building materials in contact with them.

.3 Chalking or visible colour change on surface of the cured sealant materials.

.3 Glass: Guarantee to remove and replace at the Subcontractor's expense any and all glass lights that fail to meet the design and performance requirements. Insulated sealed double glazing units shall be guaranteed against obstruction of vision as a result of dust or firm formation on the inner glass surfaces for a period of ten (10) years from the date of Substantial Performance. Any units failing to comply with this guarantee shall be replaced without cost to the Owner.

.5 Defective work shall be removed and replaced with acceptable work at no cost to the Owner, and at such times as designated by the Owner.

.6 The cost of all warranties shall be included in the Contract price.

PART 2 - PRODUCTS

2.1 METAL FRAMED SKYLIGHTS

.1 On Roof Area S-31: Acceptable Manufacturers/Products: Columbia glazing, Velux or other approved equal that will meet or exceed the specifications. Contractor must submit a request for approval of equal system, complete with brochures and technical data, at least 7 days to tender closing.

.2 New Skylight System is to be designed to suit the existing structural supports.

2.2 MATERIALS

.1 All skylight materials are to be sourced out from a single manufacturer with accessory products meeting manufacturer's material compatibility requirements to achieve required System Warranty and other specified warranties.

.2 Standard of Acceptance: Kawneer 2000 System

.3 Extrusions: Extrusions to be designed in accordance with CAN/CSA-S157.

.1 Extruded aluminum: Aluminum Association Alloy AA6063-T5 with minimum yield strength 110 MPa for thickness up to 12.7 mm.

.2 Sheet Steel: Stainless steel or hot-dipped zinc coating at least equal to ASTM A525M coating designated Z275 and with sufficient ductility to permit necessary forming operation.

.3 Exposed Aluminum Sheet and Plate: AA1100-H14, alloy and temper. Minimum thickness of flashings shall be 1.0 mm (0.040") for exposed flashings and 0.6mm (0.024") for interior or concealed flashings.

.4 The main frame depth shall be not less than 62mm (2-1/2") complete with frame extension if necessary (confirm existing conditions).

.4 Aluminum Finish: Anodized / Powder coated to match standing seam sheet metal roofing colour. Submit colour samples for approval to the Owner.

.1 Finish aluminum components in accordance with "Aluminum Association Designation System for Aluminum Finishes – AAC22A31

.2 Anodized to attain a Type II (Class 1 for exterior) and (Class 2 for interior) anodic coating; exterior coating not less than 0.7mil (18 microns); interior coating not less than 0.4 mil (10 microns).

.3 Coating mass when tested to ASTM B137; Class 2, density shall not be less than 24.0 g/m2 except for interior trim which shall have a minimum coating area density of 12.0 g/m2.

.4 Exposure to Salt Spray to ASTM B117: Class 2, capable of withstanding 250h of exposure without pitting; interior trim Class 3, minimum time exposure of 100h without pitting.

.5 General Configuration:

.1 Skylight shall incorporate internal drainage systems.

.2 Glazing shall be fixed with external pressure plates at both the purlins and rafters.

.3 Purlins to incorporate a structural sealant joint with no exposed pressure plates.

.4 Rafter pressure plates shall be provided with a snap cap.

.5 Silicone sealant needle bead shall be installed at all of the up slope sides of the purlin pressure plates and extended a minimum of 150mm (6") up the adjacent rafters.

.6 Both purlins and rafters shall be provided with internal condensate gutters.

.7 All joints between purlins and rafters shall be fully sealed with butyl tape.

.6 Glass: Sealed Insulating Glass Units, IGMAC certified to meet specified requirements of CAN/CGSB-12.8 with a dual perimeter edge seal, 13mm air space and glass which meets the specified requirements of CAN/CGSB-12.3. Spacer shall be stainless steel. Glass thickness to meet BC Building Code and CAN/CGSB-12.20 requirements but not less than 6 mm (1/4") thick for each lite. Glass and glazing materials to meet specified requirements of Section 08 80 00.

.7 Sealants: Refer to Section 07 92 00 Sealants.

.8 Isolating Coating: Alkali resistant bituminous enamel paint conforming to CGSB 1-GP-108M to prevent deterioration due to corrosion or electrolytic action, as recommended by manufacturer. Isolate aluminum from following components:

.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.

.2 Concrete, mortar and masonry.

.3 Wood.

.9 Perimeter Insulation: Non-shrinking, low expansion (25%), closed cell, no CFC, single component polyurethane foam, complying with CAN/CGSB 51-GP-23M. Minimum R-5 per inch.

.10 Fasteners: Screws, nuts, bolts, etc. to be of 300/400 series stainless steel where exposed to dampness and moisture. Cadmium plated steel may be used where fastenings are not exposed to dampness and moisture.

.11 Thermal Break: Continuous high density polyurethane. As recommended by the Skylight Manufacturer.

.12 Glazing Gaskets: As recommended by Skylight Manufacturer.

.13 Exterior Sealant: As recommended by Skylight Manufacturer and conforms to applicable CGSB-19-GP Series.

2.3 FABRICATION

.1 Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

.2 Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof.

.3 Dimensions shown on drawings are diagrammatic only. Field measurements of rough skylight opening shall be performed by contractor and shown on submitted shop drawings. Maintain sight lines indicated and clearances to other construction components.

.4 Aluminum Flashings:

.1 Fabricate flashings and starter strips to dimensions and profiles indicated on reviewed shop drawings and to meet specified requirements. Determine dimensions from site measurements.

.2 Provide required joint covers and concealed anchoring devices. Do not use exposed fasteners or anchors except these indicated on reviewed shop drawings.

.3 Hem all exposed edges a minimum of 13 mm for appearance and stiffening.

.5 Fastenings:

.1 Where fastenings are exposed, use Series 300 stainless steel for steel-to-steel, aluminum for aluminum-to-aluminum.

.2 Where fastenings are not exposed to dampness or moisture, cadmium plated steel may additionally be used for all combinations of metal noted in preceding subparagraphs.

.6 Thermal Movement: Fabricate units and assemblies to provide for expansion and contraction of component members and between units when subjected to surface temperatures from -34ºC to 82ºC.

.7 Anchors:

.1 Incorporate anchorage to structure as required by the reviewed Shop Drawings.

.2 Allow for complete adjustment in anchorage for levelling and positioning of units during installation.

.8 Place manufacturers and identification name plates in semi-concealed location.

2.4 FINISHES

.1 Submit colour samples for approval by the Owner prior to any fabrication start.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install Skylights plumb and level, and true to line, without warp or rack of frames with manufacturer's prescribed tolerances and installation instructions. Provide support and anchor in place.

.2 Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion action contact points.

.3 Glazing: Glass shall be outside glazed and held in place with extruded aluminum pressure plates anchored to the rafters using stainless steel fasteners.

.4 Water Drainage: Water shall be typically diverted to the rafters and exit to the exterior of the building through weeps in the baffle and gutter. Typical horizontal covers and pressure plates will not require weep holes.

.5 Comply with manufacturer's product data, including product technical bulletins, product erection / installation instructions, and product carton instructions for installation.

3.2 FIELD QUALITY CONTROL

.1 Mock-up test is required.

.2 In-situ testing is not required, however, if testing is conducted by the Owner or an agency employed by the Owner, and the installed system fails to meet the specifications, the Contractor shall repair or replace the system and re-test the system at no cost to the Owner.

.3 Verify that substrate conditions are acceptable for product installation in accordance with manufacturer's instructions.

.4 Should testing be required, testing shall be performed per AAMA 503 by a qualified independent testing agency.

3.3 PROTECTION AND CLEANING

.1 Protect installed product's finish surfaces from damage during construction. Protect aluminum skylight system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.

.2 Cleaning: Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

.3 Final cleaning of skylight installation shall be performed by the Contractor.

END OF SECTION - 08 63 00

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PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 11 00 – Summary of Work

.2 Section 07 61 13 – Standing Seam Sheet Metal Roofing

.3 Section 07 92 00 – Joint Sealants

.4 Section 08 63 00 – Metal-Framed Skylights

1.2 APPLICABLE PUBLICATIONS

.1 CAN/CGSB-12.1, Tempered or Laminated Safety Glass

.2 CAN/CGSB-12.3, Flat, Clear Float Glass

.3 CAN/CGSB-12.8, Insulating Glass Units

.4 CAN/CGSB-12.9, Spandrel Glass

.5 CAN/CGSB-12.10, Glass, Light and Heat Reflecting

.6 CAN/CGSB-12.20, Structural Design of Glass for Buildings

.7 CAN/CGSB-19-GP-14M, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing

.8 British Columbia Building Code Latest Edition

.9 Energy Efficiency Act (EEA)

1.3 SUBMITTALS

.1 Submit to the Owner and Consultant:

.1 Submit 2 pcs of 12” square samples of each type of glass indicated in this specification to the Owner/Consultant for approval.

.2 Submit technical data including written installation recommendations from the manufacturer for each product which will be used in this section.

.2 Provide to the Consultant, written confirmation from the manufacturer as to the compatibility of all materials to be used.

.3 Insulated Glass Units (IGUs) must bear the IGMAC stamp. IGUs without a stamp will be rejected and will require replacement at no additional cost to the Owner or Consultant.

1.4 JOB CONDITIONS

.1 Before commencing work each day, ensure that all surfaces to receive glazing tapes, sealants or primers are clean and dry.

.2 Apply glazing tapes and sealants at air and substrate temperatures not less than the minimum recommended by the material manufacturer. Work shall not be carried out during inclement weather conditions.

.3 Proceed with glazing only when glazing surfaces are accumulating no moisture from rain, mist or condensation.

.4 Obtain approval from the manufacturer, when temperature of glazing surfaces is below 4°C, for the glazing methods and protective measures which will be used during glazing operations.

1.5 WARRANTY

.1 Provide a warranty stating that

.1 The installation of new sealed insulating glass units specified in this Section shall not cause any deleterious effect on the air and water tightness and wind load resistance performance of the skylight system, remain watertight and free of defects which shall include without being limited to breakage and loss of seal. Fogging of glass inside sealed units or failure of a field dew point test will be considered sufficient evidence of loss of seal.

.2 This warranty shall be for a period of ten (10) years from date of Substantial Performance.

.2 Repair leaks into building within 24 hours of notification. Any repairs required shall be carried out in accordance with the recommendations of the Consultant.

.3 Inspect glazing 30 days before expiry of warranty period and correct defects within 15 days of inspection.

.4 The cost of all warranties shall be included in the Contract price.

PART 2 - PRODUCTS

2.1 SKYLIGHT GLASS

.1 Sealed Insulating Glass Units: IGMA certified (IGMAC) to meet specified requirements of CAN/CGSB-12.8 with a dual perimeter edge seal, 13 mm air space and glass which meet the specified requirements of CAN/CGSB-12.3.

.2 New Skylight system shall have:

.1 Double glazed 1” (25mm)thick sealed units,

.2 6mm (1/4”) min. heat tempered outer lite,

.3 6mm (1/4”) min. laminated glass, 0.30 PVB interlayer.

.4 LowE Solarban 60 (or approved equal) on surface #2 or #3,

.5 Glass separated by ½” (13mm) argon-filled airspace

.6 Warm-edge spacers ; desiccant-filled SS or approved equal

.3 The perimeter edge seal is to consist of a continuous polyisobutylene primary seal and a continuous silicone secondary seal in full contact with the primary seal. Edge delete film as required by glass and edge seal manufacturer

.4 The edges of all glass shall be free from spalls, flake chips or rough edges which would be either visible or compromise the adhesion of the exterior weather seal.

2.2 GLAZING ACCESSORIES

.1 Ensure that glazing tapes, sealants, splines, and setting blocks are completely compatible with insulating glass unit sealants.

.2 Setting Blocks: Neoprene, EPDM or Silicone with Durometer hardness of Shore "A" 80 to 90. Thickness to be 6 mm. Width of setting blocks to slightly exceed width of sealed insulating glass unit. Length of setting blocks to be 25 mm for every 1 square metre of glass with a minimum length of 50 mm. Setting blocks shall be compatible with all adjacent components, including edge seal and must not inhibit water by blocking weep holes. Wood spacers, shims or setting blocks are not acceptable.

.3 Silicone Glazing Sealant: to comply with CAN/CGSB 19.18-M80-Type 2.

.4 Pre-shimmed Glazing Tape: pre-shimmed glazing tape such as POLYshim II Tape as manufactured by Tremco Ltd., or approved equivalent.

.5 Exterior Glazing Material: Tremco or approved equivalent VisionStrip co-extruded EPDM gasket with butyl glazing tape.

.6 Glazing Spline: neoprene, silicone or polyvinyl chloride standard glazing spline to suit glass stops, Polyshim II glazing Spline, as manufactured by Tremco, or an approved equivalent.

.7 Glazing Gaskets: extruded neoprene, or EPDM conforming to CAN/CGSB 41-GP-20M

.8 Cleaning Material: as recommended by glazing and sealant manufacturer.

.9 Primers: to glass and sealant manufacturer’s recommendation.

2.3 FABRICATION

.1 Fabricate glass to fit openings and to allow clearances, which will ensure that glass, is held firmly in place while providing clearances for thermal expansion and contraction, but not less than 3mm on each side.

.2 Replace oversize or flared lights with entirely new units of proper dimensions.

.3 Label each piece of glass to indicate manufacturer, type, and quality. Remove labels on glass units at time of installation.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Check new skylight IGU opening dimensions prior to fabricating glass units.

.2 Commencement of work implies acceptance of existing conditions and assuming full responsibility for the finished condition of the work.

.3 Protect existing roof surface along skylight during performance of repairs. Work shall not be conducted without suitable protection consisting of insulation and plywood/ sheathing type substrate.

.4 Apply glazing tapes and sealants at air and substrate temperatures not less than the minimum recommended by the material manufacturer. Work shall not be carried out during inclement weather conditions.

.5 Clean glazing rebate surfaces of all traces of sealant, dirt, dust, or other contaminants.

.6 Ensure that projections have been removed from the glazing surfaces and that sufficient width and depth clearances are provided for the glass units.

.7 Prime all surfaces to receive glazing tapes or sealants per sealant manufacturer's recommendations to provide a positive and permanent adhesion and to prevent staining. Apply primers per manufacturer's directions and test substrates for adhesion. Primer shall be suitable for materials affected.

.8 Do not cut or nip tempered glass to fit. Replace oversize or flared lights with new units of correct dimensions. Do not cut or abrade tempered, heat strengthened or coated glass.

3.2 INSTALLATION

.1 Position and glaze sealed insulating glass units into the framing, in accordance with IGMAC glazing recommendations and as indicated on the reviewed Shop Drawings. Centre the sealed insulating glass units in openings.

.2 When requested by the owner or consultant, arrange for the presence of a technical representative of the glazing materials manufacturer to advise on procedures and methods when glazing commences.

.3 Support the bottom of the sealed insulating glass units on setting blocks placed at quarter points of each lite (1/4 of the unit width from each corner) but not closer than 150 mm (6") from the corners of the units.

.4 Set shims when required to allow a space of no less than 6 mm (1/4") between shim edges and sight lines. Spacer shims are not required where glazing tape is used.

.5 Provide edge clearance of 3 mm (1/8") or to manufacturer's recommendation.

.6 Cut tape or gasket to full length of opening. Ensure glazing material is fully sealed at corners. Glazing tape: Butt tape tightly at corners and knead all joints to form one continuous strip. Dap with compatible sealant. Glazing Gasket: Butt tightly at corners and seal with compatible sealant. Do not overlap gaskets or tape at corners.

.7 Apply sealants with backing where indicated on reviewed shop drawings as specified in Section 07 92 00 – Joint Sealing. Use glazing sealants without addition of thinners from new and unopened containers clearly marked with the product name, batch number, and product manufacturer. Tool newly applied sealants with a slight bevel away from the glass surface.

.8 Ensure that glazing sealants, gaskets, tapes, and splines are in full contact with glazing surfaces.

.9 Install glazing and ensure compression to glazing tape is achieved.

.10 Remove protective coating from new glazing.

3.3 CLEANING

.1 Remove as work progresses all corrosive and foreign materials which may set or become difficult to remove at time of final cleaning or which may damage components of the window system. Examine all surfaces as often as required to ensure cleanliness.

.2 Clean and polish interior and exterior surfaces of glass after installation to the satisfaction of the Consultant and Owner, with a commercial glass cleaner or water and household hand dishwashing detergent solution.

.3 Remove excess sealants, stains, deposits, marks or blemishes from work of this section and all adjacent surfaces, by methods not harmful to the surfaces. Replace or make good all defective, scratched or damaged materials.

.4 Remove labels and perform final cleaning after completion of entire installation and immediately prior to Date of Substantial Performance.

.5 Collect broken glass and cuttings in boxes and remove from site.

END OF SECTION – 08 80 00

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Environment Canada Real Property Management Technical Services

Roof Replacement Program 2020

PACIFIC WILDLIFE RESEARCH CENTRE

HAZMAT INFORMATION

IFT

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HAZARDOUS MATERIALS SURVEY

OF

Pacific Wildlife Research Centre
543 Robertson Road
Delta, BC

PREPARED FOR:

IRC Building Sciences
#250-21900 Westminster Highway
Richmond, BC
V6V 0A8

PREPARED BY:

ACM ENVIRONMENTAL CORPORATION
#217 - 2323 Quebec Street
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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.

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FIGURES, TABLES, AND APPENDICES

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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.

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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

IFT

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.

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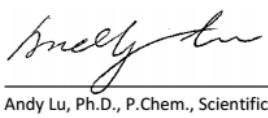
IFT

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

Van City, 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 #: Í(O"r:Î 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:
						Rush Confirmation #:

Regulatory Criteria

☐ BC CSR Soil ☐ BC CSR Water
☐ CCME (Specify) ☐ Other (Specify)
☐ Drinking Water ☐ BC Water Quality

Special Instructions

☐ Return Cooler
☐ Ship Sample Bottles (Please Specify)

Analysis Requested

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	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			# 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																								

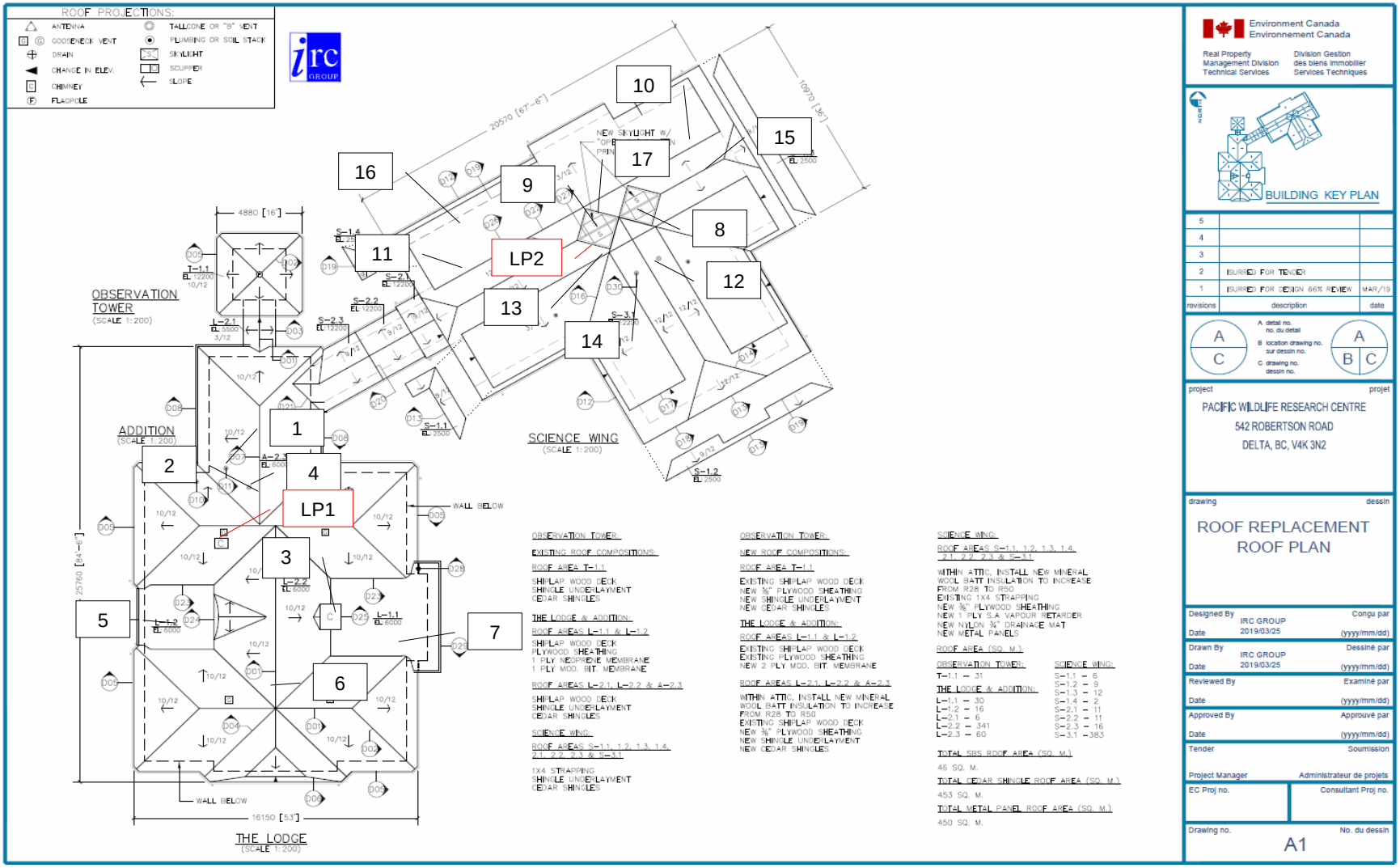
B935787_COC

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	2019/05/10	1024	BRITTANY BURLONE	2019/05/10	~~15:38~~ 15:48	BB

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

MAY/06/2021

Environment Canada
Environnement Canada

ROOF REPLACEMENT

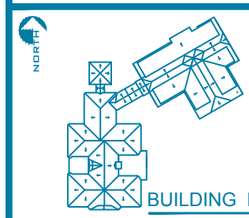
PACIFIC WILDLIFE RESEARCH CENTRE PHASE II

542 ROBERTSON ROAD DELTA, BC

LIST OF ARCHITECTURAL DRAWINGS

Environment Canada
Environnement Canada

Real Property Management Division Technical Services
Division Gestion des biens immobilier Services Techniques



BUILDING KEY PLAN

revisions	description	date
5		
4		
3		
2	ISURRED FOR REVIEW	MAY/21
1	ISURRED FOR DESIGN 66% REVIEW	MAR/19

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 (yyyy/mm/dd) — 2021/05/06

Drawn By / Dessiné par — IRC GROUP
Date (yyyy/mm/dd) — 2021/05/06

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.
VR21-078SP-21476

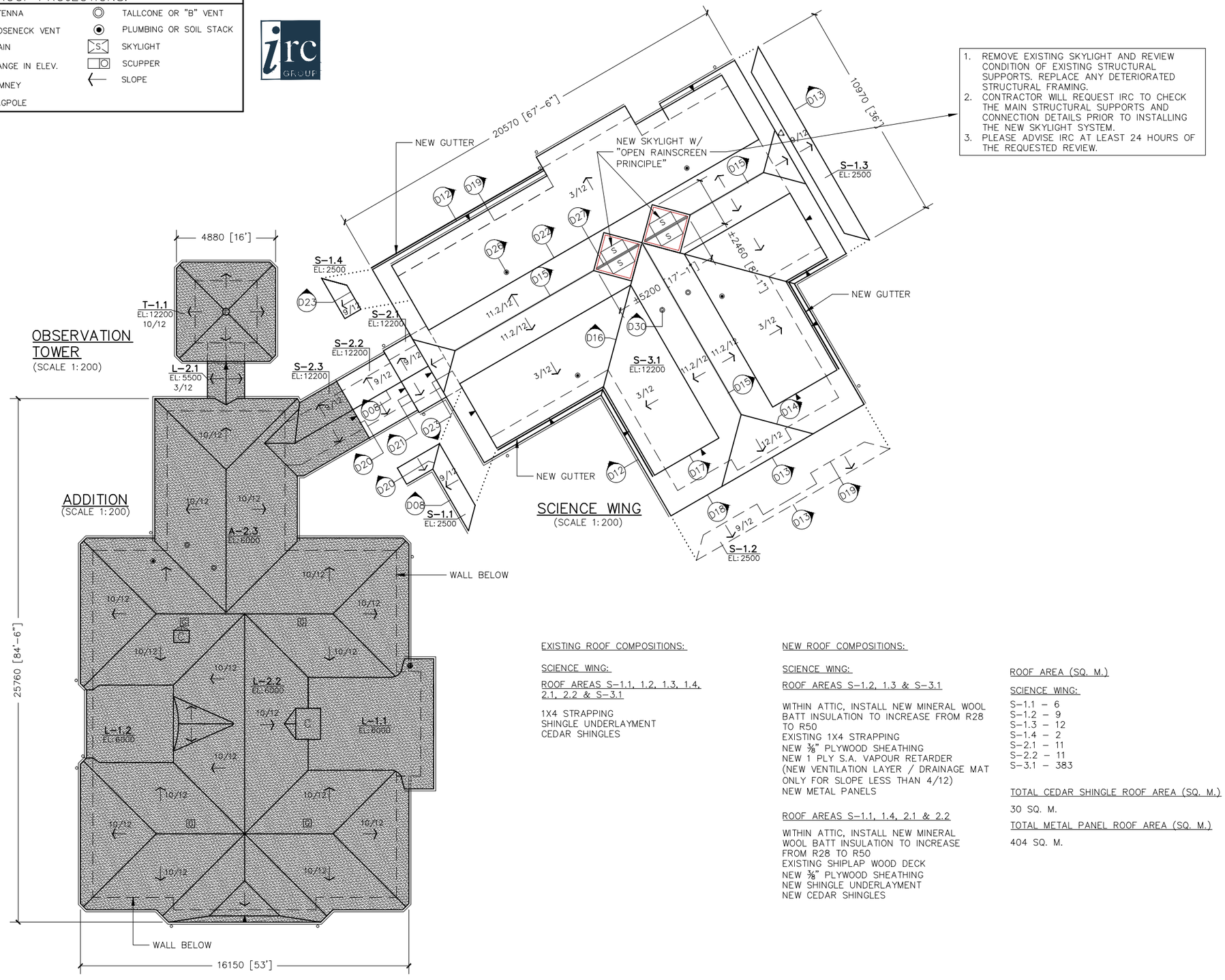
Drawing no. / No. du dessin
A1

Plotted by: bwang May 06, 2021 - 3:51pm

PWGSC 11X17 (431x279)

ROOF PROJECTIONS:

ANTENNA	TALLCONE OR "B" VENT
GOOSENECK VENT	PLUMBING OR SOIL STACK
DRAIN	SKYLIGHT
CHANGE IN ELEV.	SCUPPER
CHIMNEY	SLOPE
FLAGPOLE	



1. REMOVE EXISTING SKYLIGHT AND REVIEW CONDITION OF EXISTING STRUCTURAL SUPPORTS. REPLACE ANY DETERIORATED STRUCTURAL FRAMING.
2. CONTRACTOR WILL REQUEST IRC TO CHECK THE MAIN STRUCTURAL SUPPORTS AND CONNECTION DETAILS PRIOR TO INSTALLING THE NEW SKYLIGHT SYSTEM.
3. PLEASE ADVISE IRC AT LEAST 24 HOURS OF THE REQUESTED REVIEW.

EXISTING ROOF COMPOSITIONS:

SCIENCE WING:

ROOF AREAS S-1.1, 1.2, 1.3, 1.4, 2.1, 2.2 & S-3.1

1X4 STRAPPING
SHINGLE UNDERLAYMENT
CEDAR SHINGLES

NEW ROOF COMPOSITIONS:

SCIENCE WING:

ROOF AREAS S-1.2, 1.3 & S-3.1

WITHIN ATTIC, INSTALL NEW MINERAL WOOL BATT INSULATION TO INCREASE FROM R28 TO R50
EXISTING 1X4 STRAPPING
NEW ⅜" PLYWOOD SHEATHING
NEW 1 PLY S.A. VAPOUR RETARDER
(NEW VENTILATION LAYER / DRAINAGE MAT ONLY FOR SLOPE LESS THAN 4/12)
NEW METAL PANELS

ROOF AREAS S-1.1, 1.4, 2.1 & 2.2

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

ROOF AREA (SQ. M.)

SCIENCE WING:

S-1.1 – 6
S-1.2 – 9
S-1.3 – 12
S-1.4 – 2
S-2.1 – 11
S-2.2 – 11
S-3.1 – 383

TOTAL CEDAR SHINGLE ROOF AREA (SQ. M.)

30 SQ. M.

TOTAL METAL PANEL ROOF AREA (SQ. M.)

404 SQ. M.

Environment Canada
Environnement Canada

Real Property Management Division Technical Services
Division Gestion des biens immobilier Services Techniques

NORTH

BUILDING KEY PLAN

revisions	description	date
5		
4		
3		
2	ISURRED FOR REVIEW	MAY/21
1	ISURRED FOR DESIGN 66% REVIEW	MAR/19

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 (PHASE II)

Designed By	IRC GROUP
Date	2021/05/06 (yyyy/mm/dd)
Drawn By	IRC GROUP
Date	2021/05/06 (yyyy/mm/dd)
Reviewed By	
Date	(yyyy/mm/dd)
Approved By	
Date	(yyyy/mm/dd)
Tender	
Project Manager	

Conçu par / Dessiné par / Examiné par / Approuvé par / Soumission / Administrateur de projets

EC Proj no.

Consultant Proj no.
VR21-078SP-21476

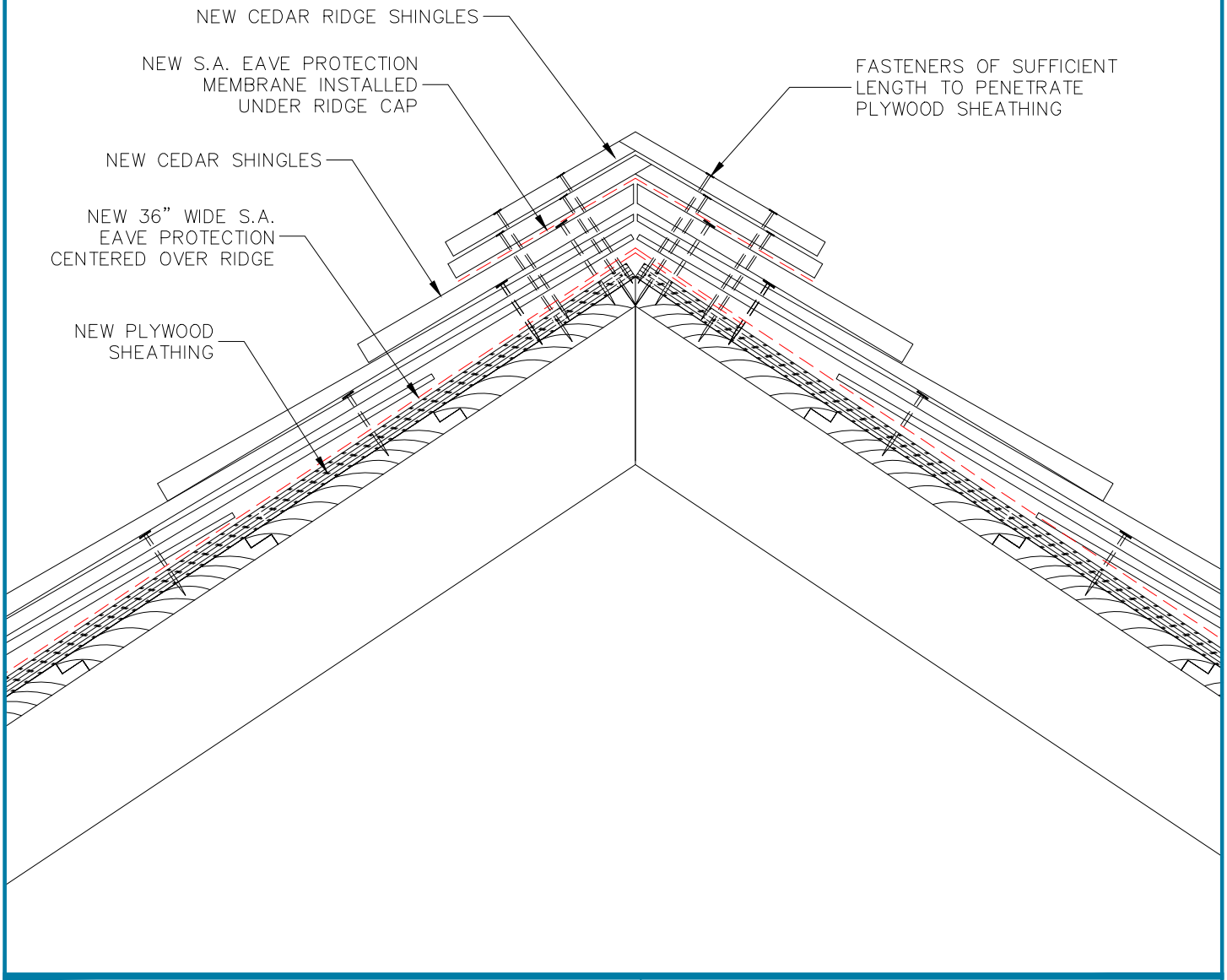
Drawing no. / No. du dessin
A1

Plotted by: bwang May 06, 2021 - 4:13pm

PWGSC 11X17 (431x279)

Environmemt Canada
Environnement Canada

IRC Building Sciences Group
Le Groupe IRC



Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

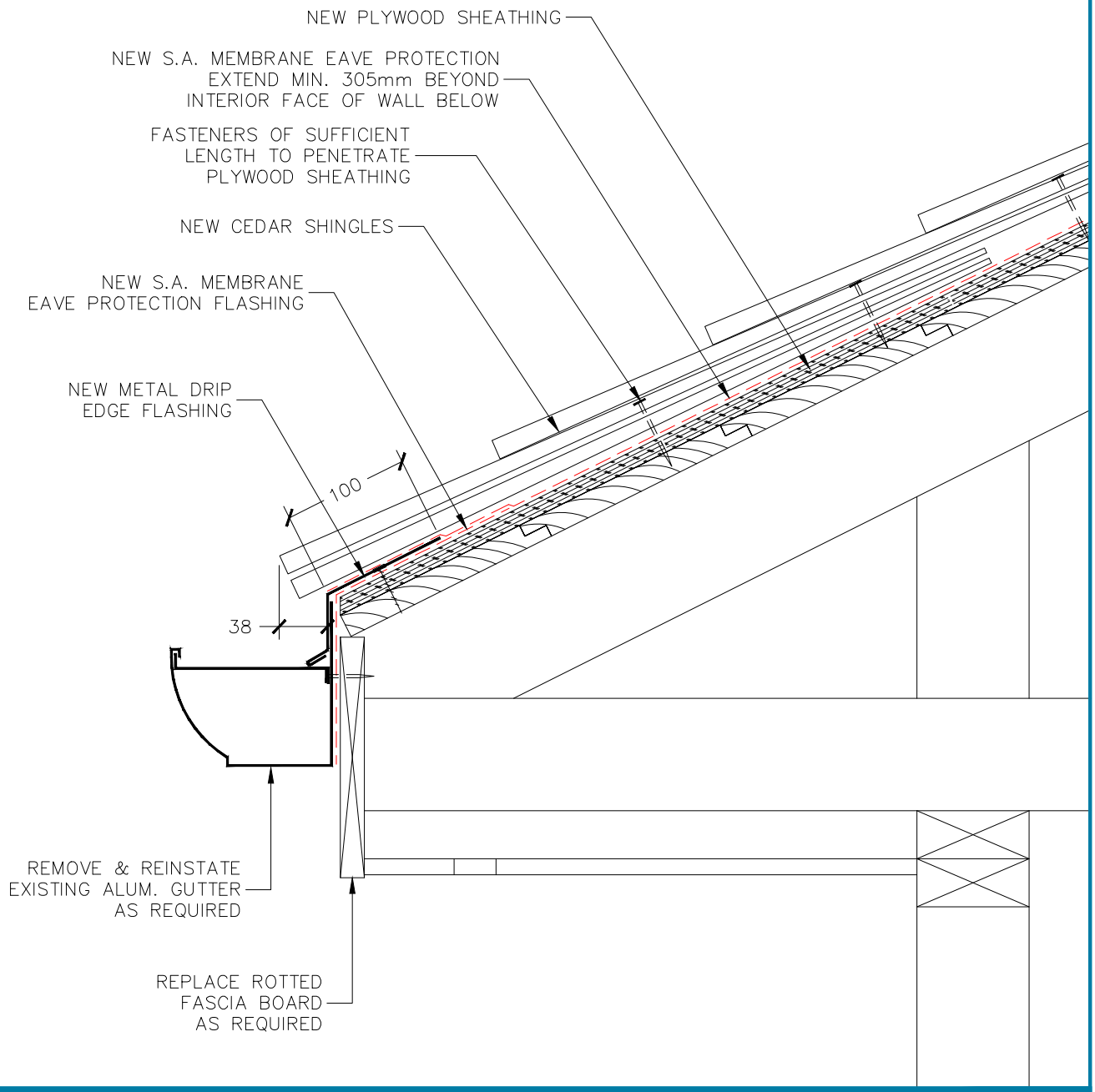
Drawing title

SHINGLE ROOF RIDGE DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IET	Consultant Project No. VR21-078SP-21476	Drawing no. D07	Revision/ Revision 0

Environmemt Canada
Environnement Canada

IRC Building Sciences Group
Le Groupe IRC



Project Title

ROOF REPLACEMENT

PACIFIC WILDLIFE RESEARCH CENTRE

5241 ROBERTSON ROAD, DELTA, BC

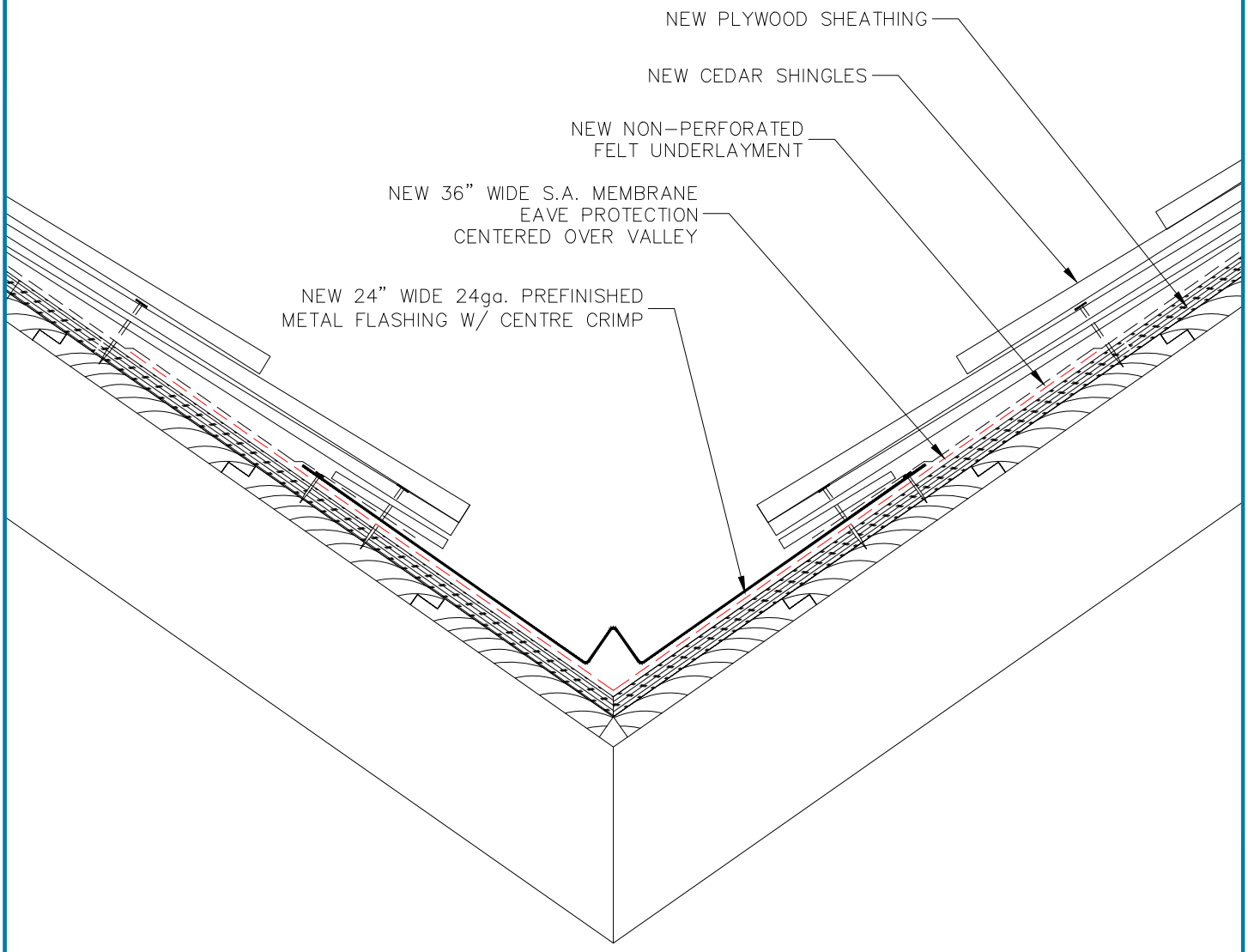
Drawing title

SHINGLE ROOF EAVE WITH GUTTER DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IET	Consultant Project No. VR21-078SP-21476	Drawing no. D08	Revision/ Revision 0

Environmemt Canada
Environnement Canada

IRC Building Sciences Group
Le Groupe IRC



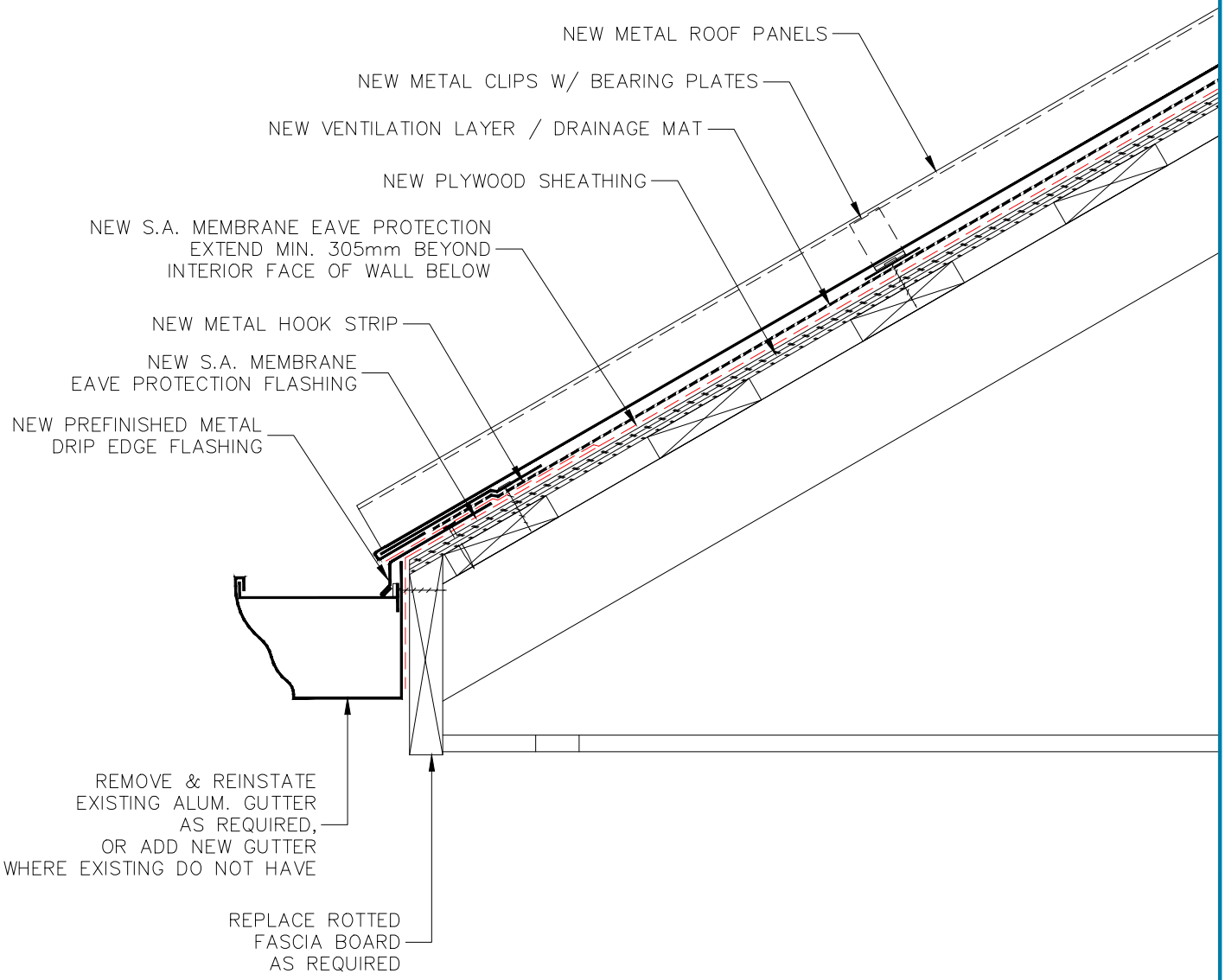
Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

SHINGLE ROOF VALLEY DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IFT	Consultant Project No. VR21-078SP-21476	Drawing no. D09	Revision/ Revision 0



Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

METAL ROOF EAVE WITH GUTTER DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IET	Consultant Project No. VR21-078SP-21476	Drawing no. D12	Revision/ Revision 0

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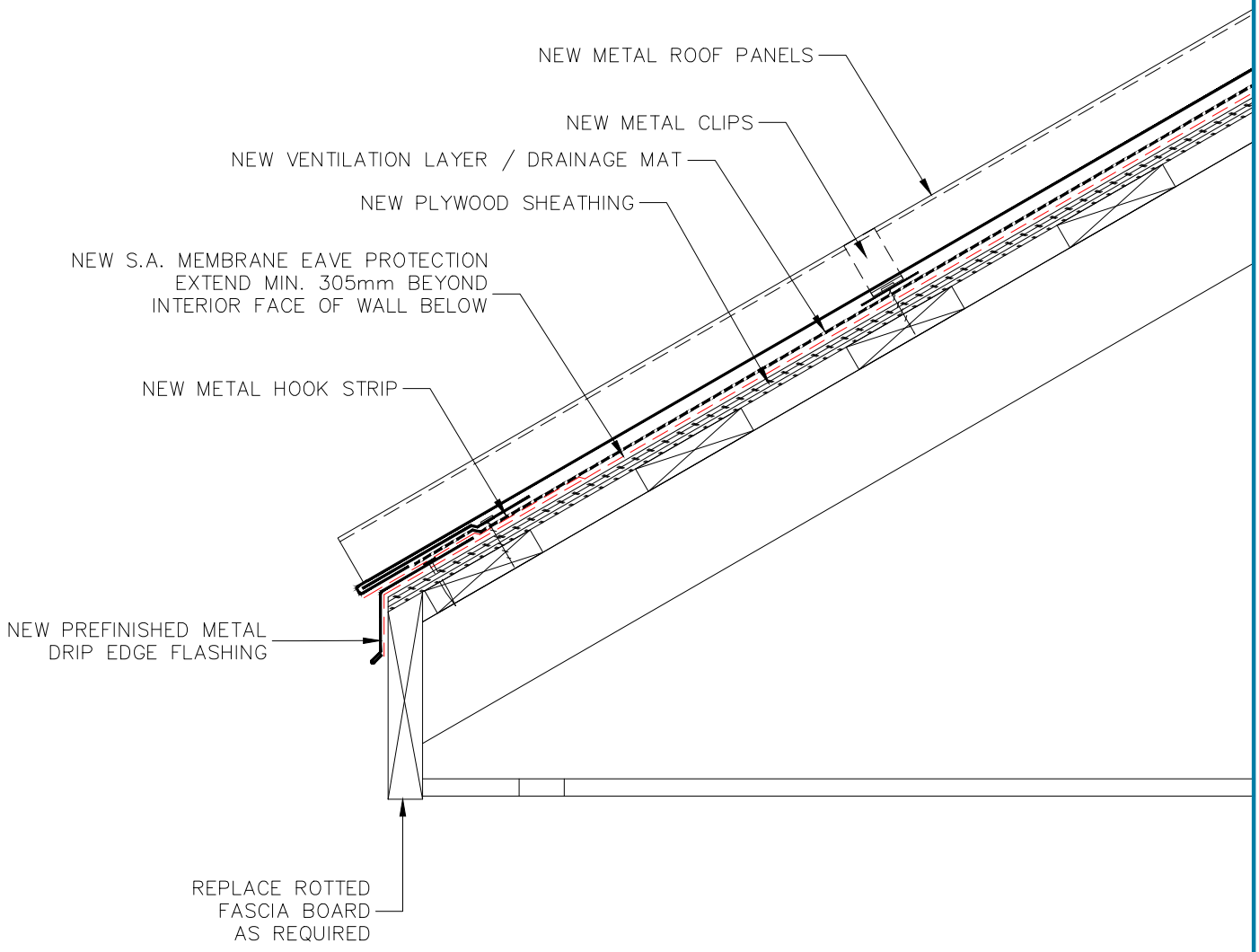

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

METAL ROOF EAVE DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IET	Consultant Project No. VR21-078SP-21476	Drawing no. D13	Revision/ Revision 0

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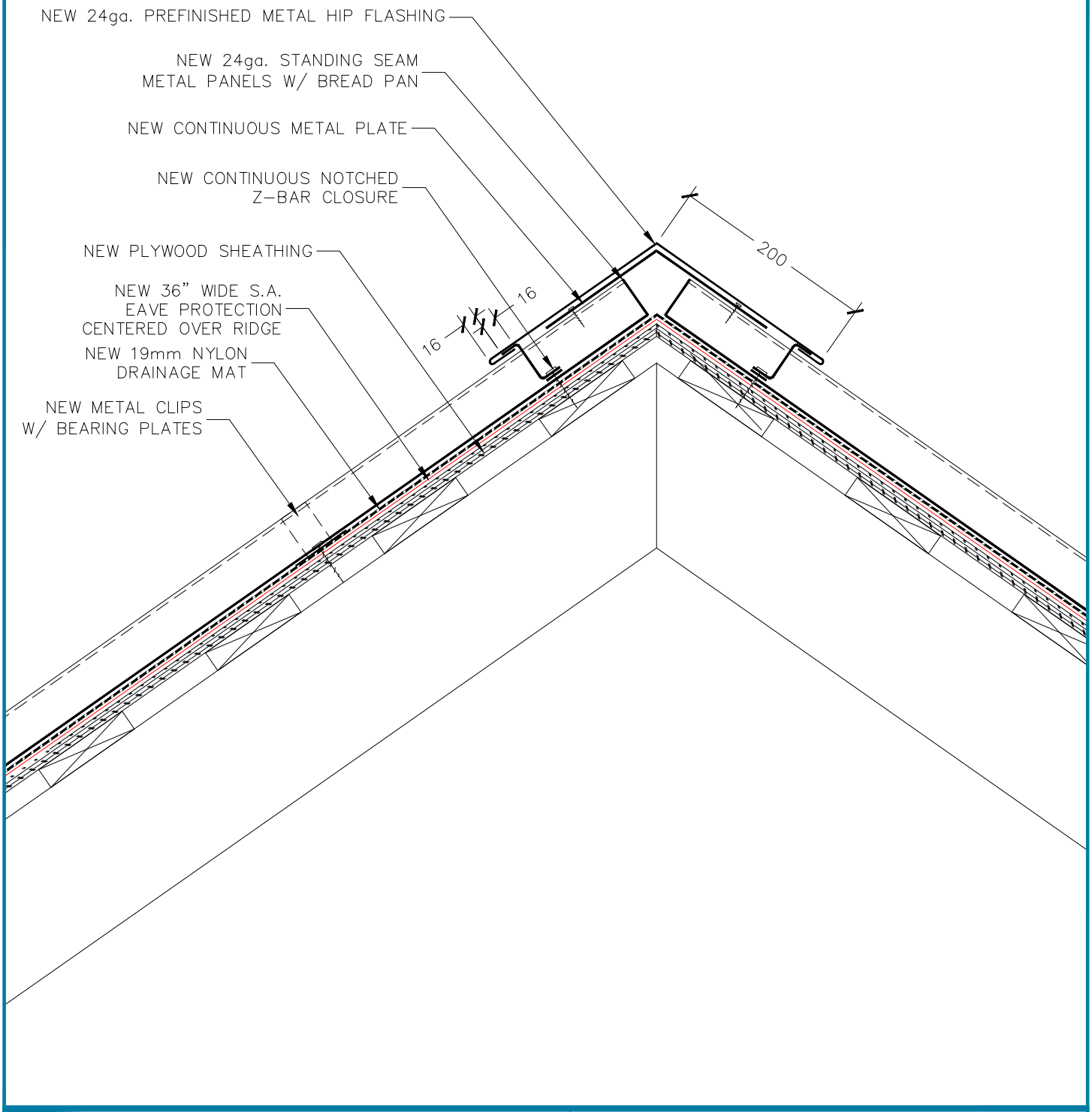

Project Title **ROOF REPLACEMENT** **PACIFIC WILDLIFE RESEARCH CENTRE** **5241 ROBERTSON ROAD, DELTA, BC**			Drawing title **METAL ROOF HIP DETAIL**	
Designed By **IRC GROUP**	Approved By Date		Scale **1:5**	
Drawn By **IRC GROUP**	Tender Project Manager		Date **2021/05/06**	
Reviewed By Date	EC Project no. IFT	Consultant Project No. **VR21-078SP-21476**	Drawing no. **D14**	Revision/ Revision **0**

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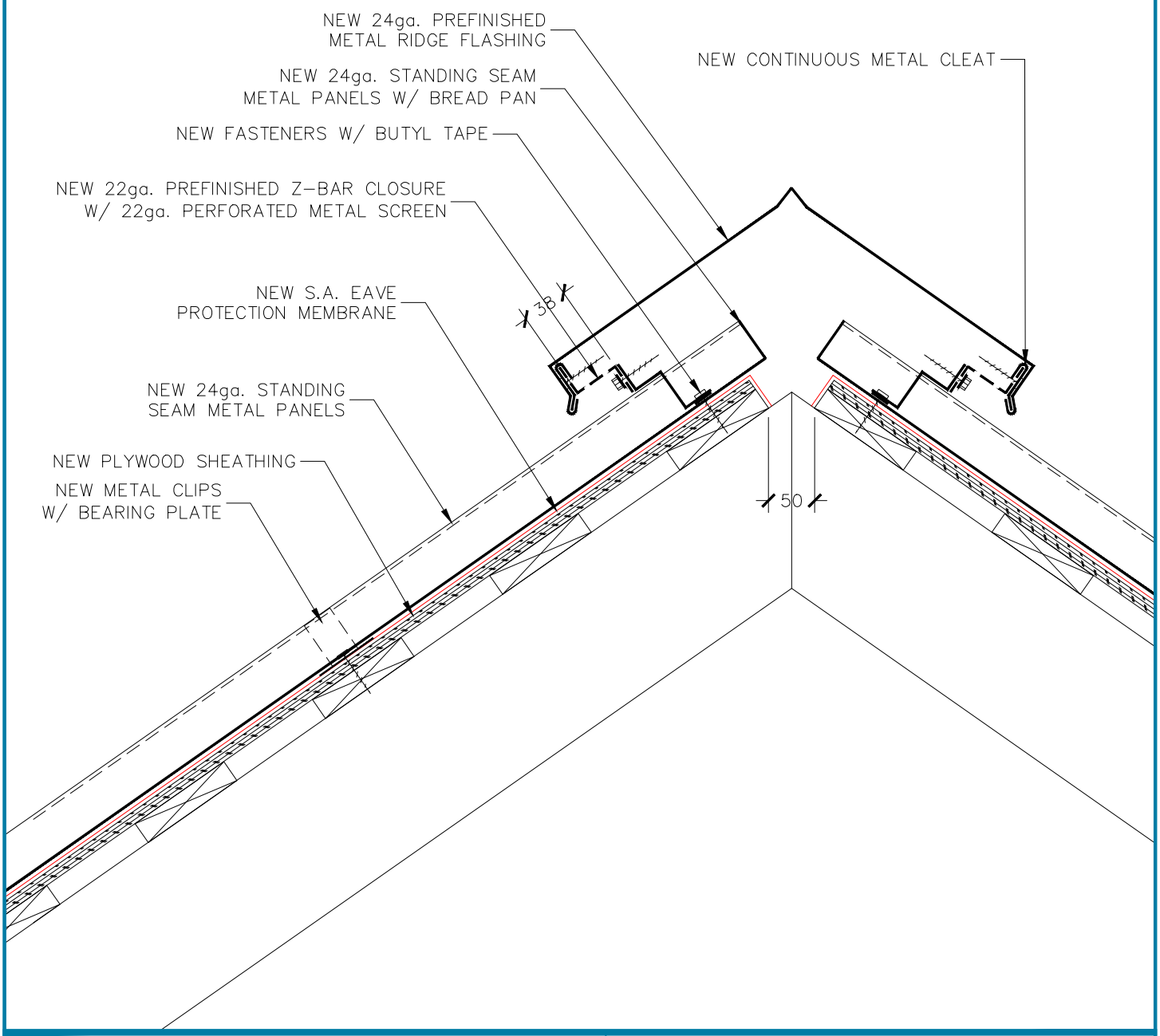

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

METAL ROOF VENT RIDGE DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IET	Consultant Project No. VR21-078SP-21476	Drawing no. D15	Revision/ Revision 0

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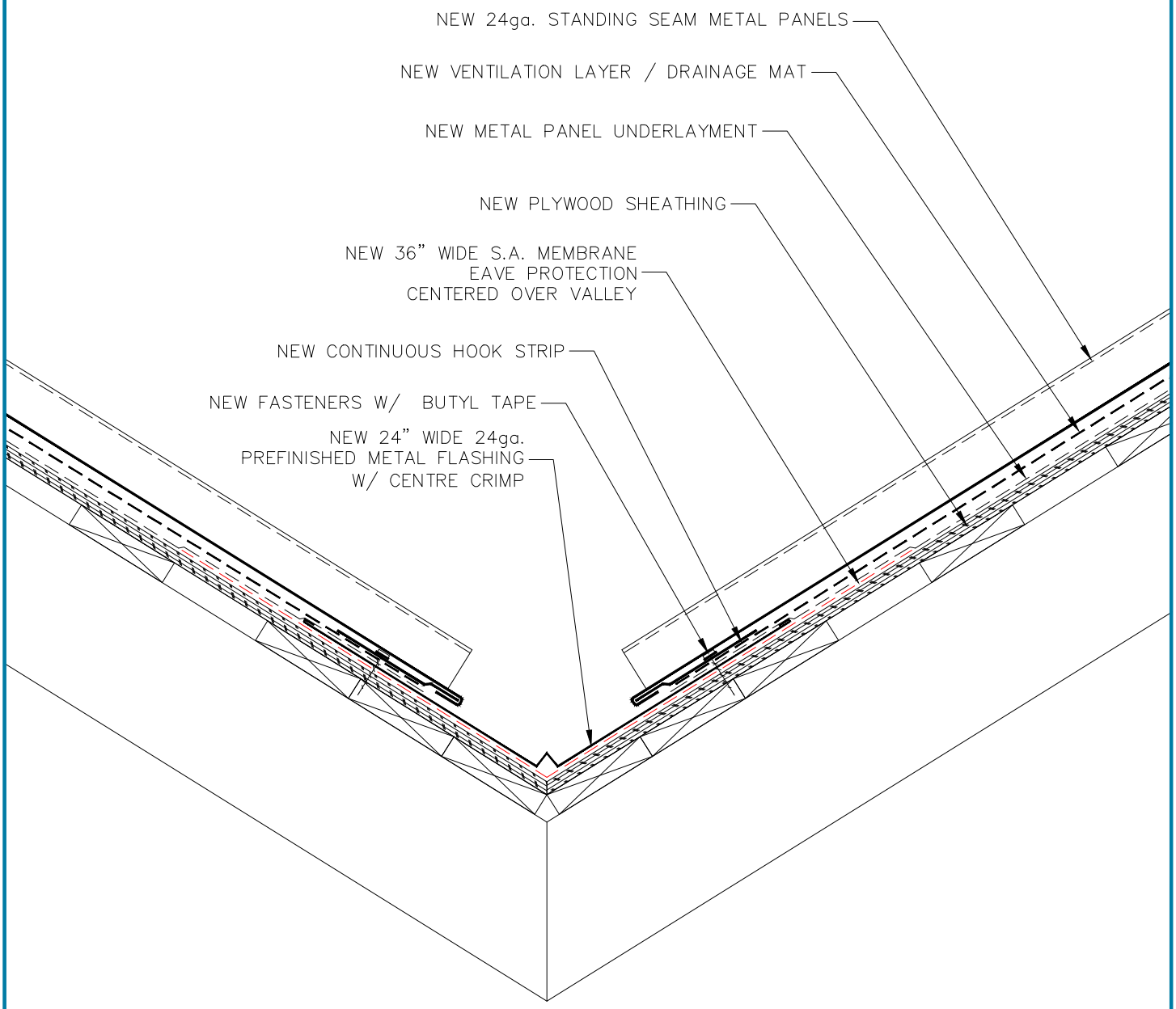
Le Groupe IRC



Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

METAL ROOF VALLEY DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IFT	Consultant Project No. VR21-078SP-21476	Drawing no. D16	Revision/ Revision 0

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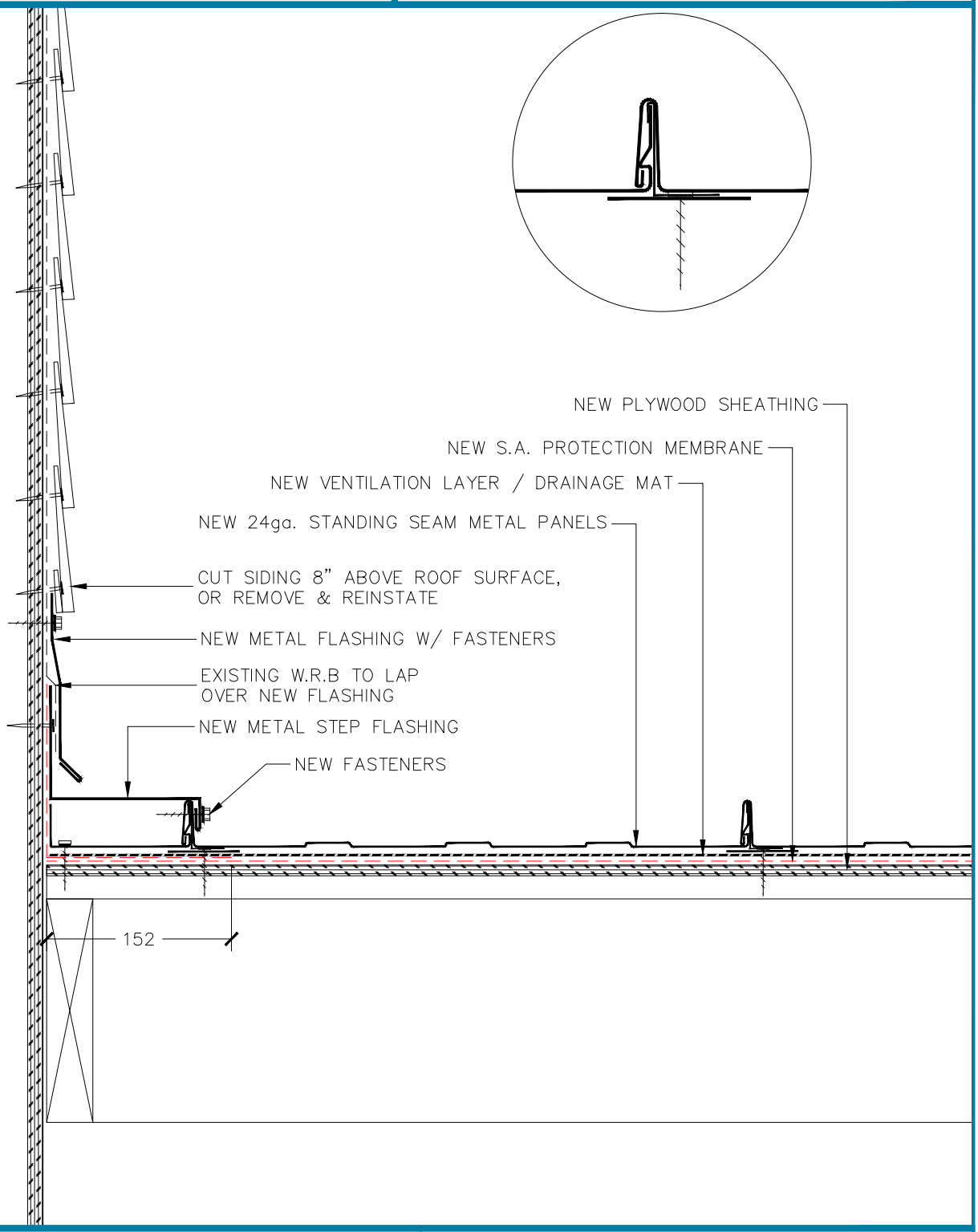

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

METAL ROOF STEP DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IET	Consultant Project No. VR21-078SP-21476	Drawing no. D17	Revision/ Revision 0

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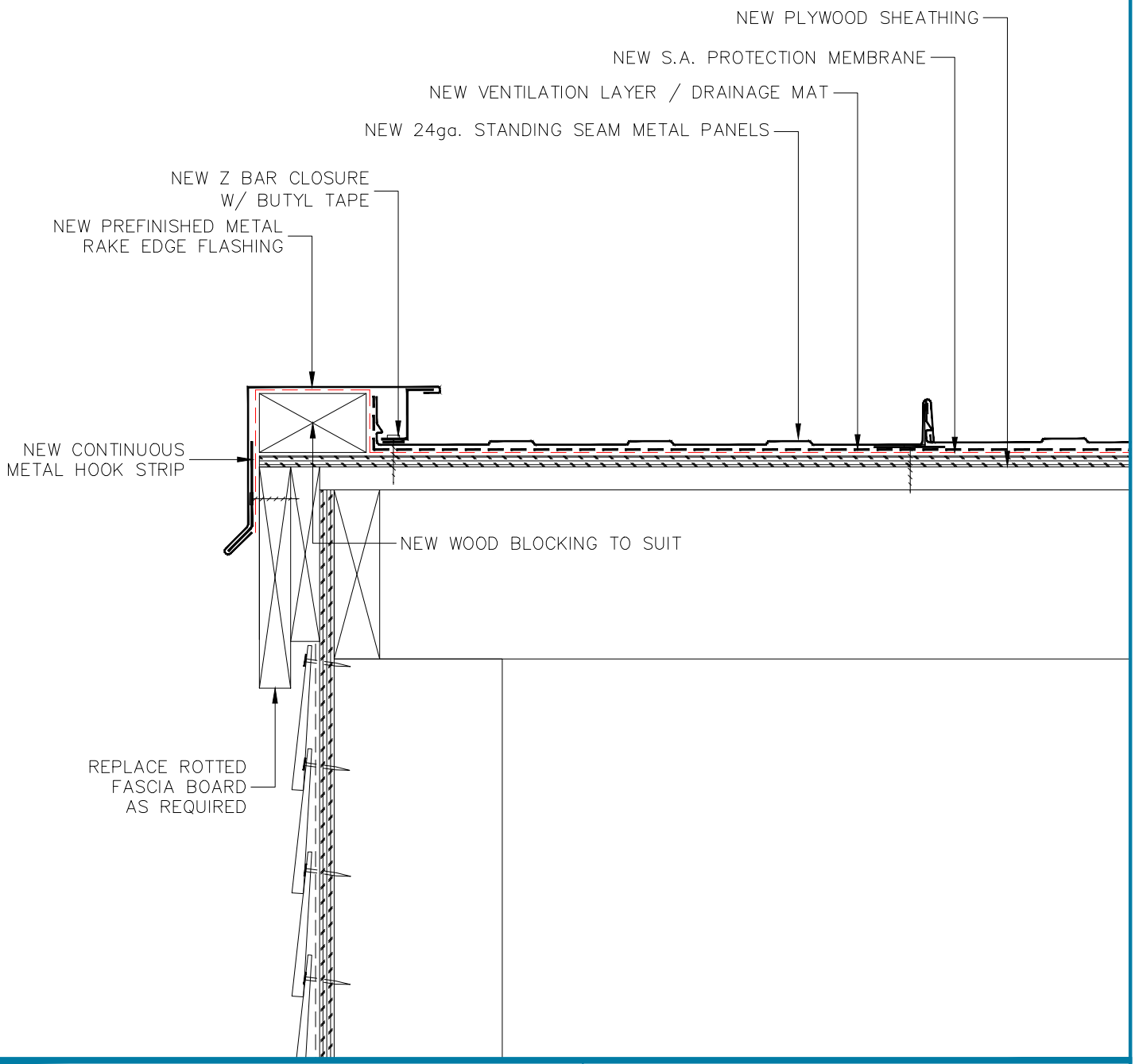

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

METAL ROOF RAKE EDGE DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IFT	Consultant Project No. VR21-078SP-21476	Drawing no. D18	Revision / Revision 0

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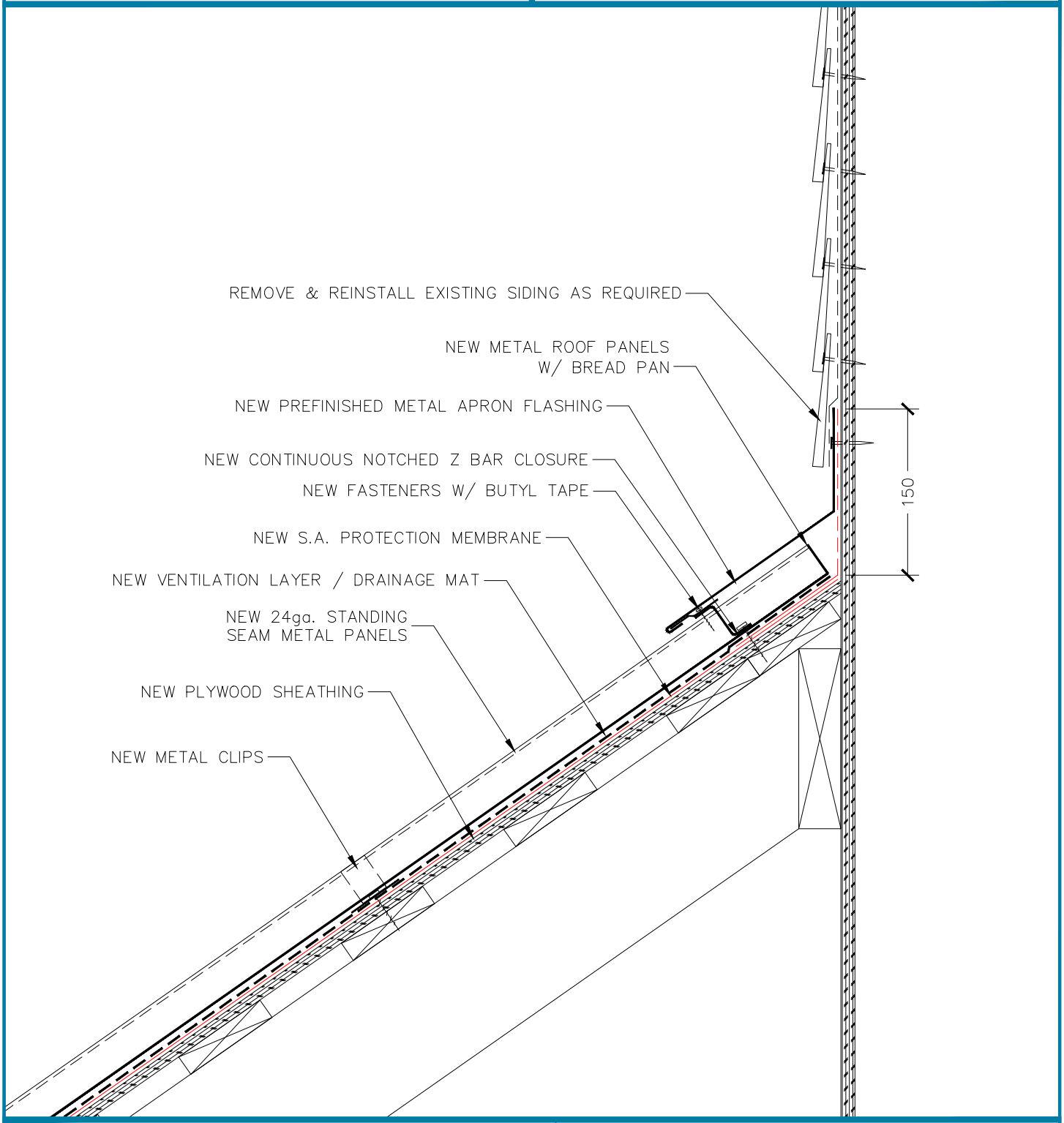

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

METAL ROOF APRON DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IET	Consultant Project No. VR21-078SP-21476	Drawing no. D19	Revision/ Revision 0

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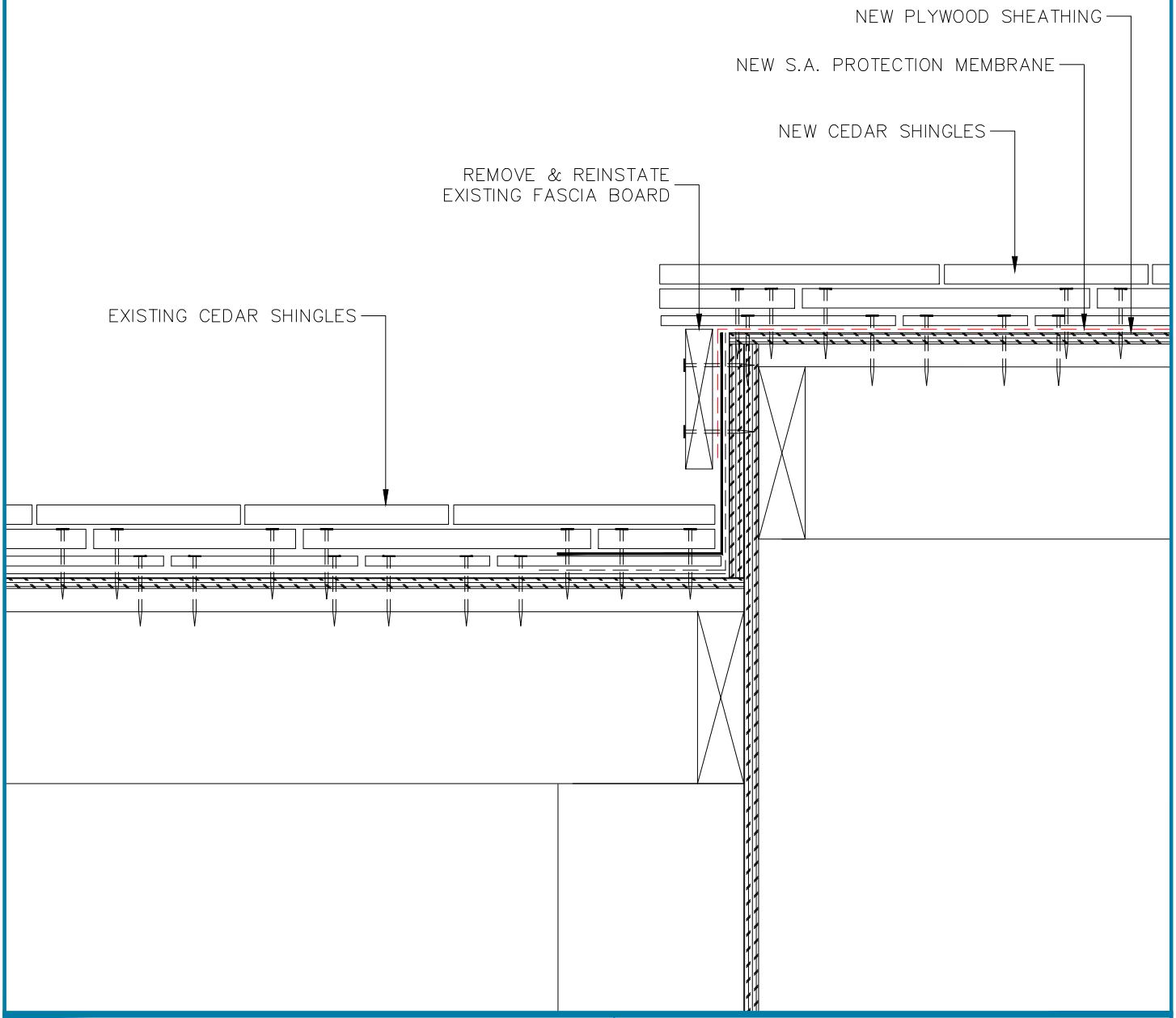
Le Groupe IRC



Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

METAL ROOF STEP DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IFT	Consultant Project No. VR21-078SP-21476	Drawing no. D20	Revision/ Revision 0

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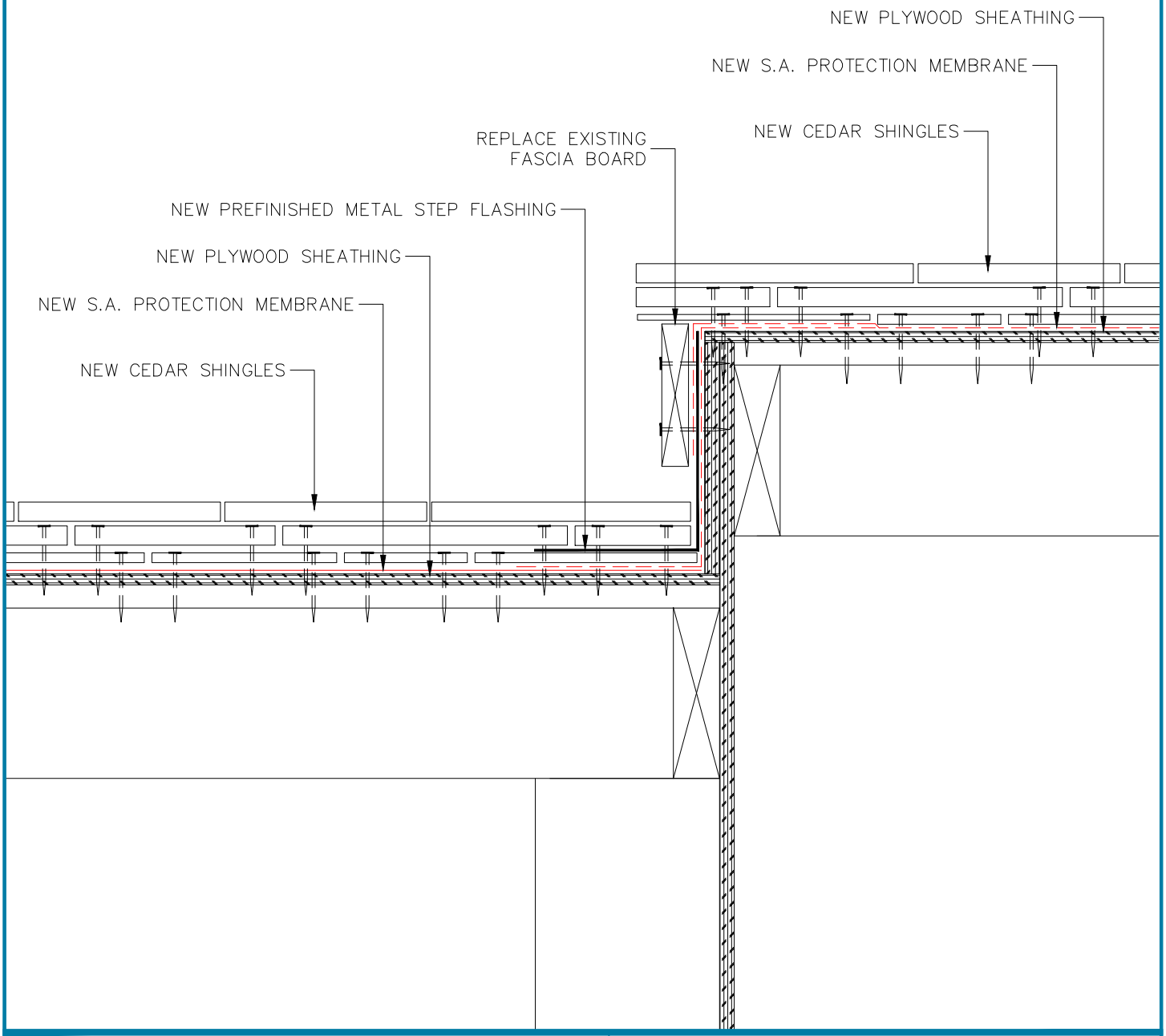

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

METAL ROOF STEP DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IFT	Consultant Project No. VR21-078SP-21476	Drawing no. D21	Revision/ Revision 0

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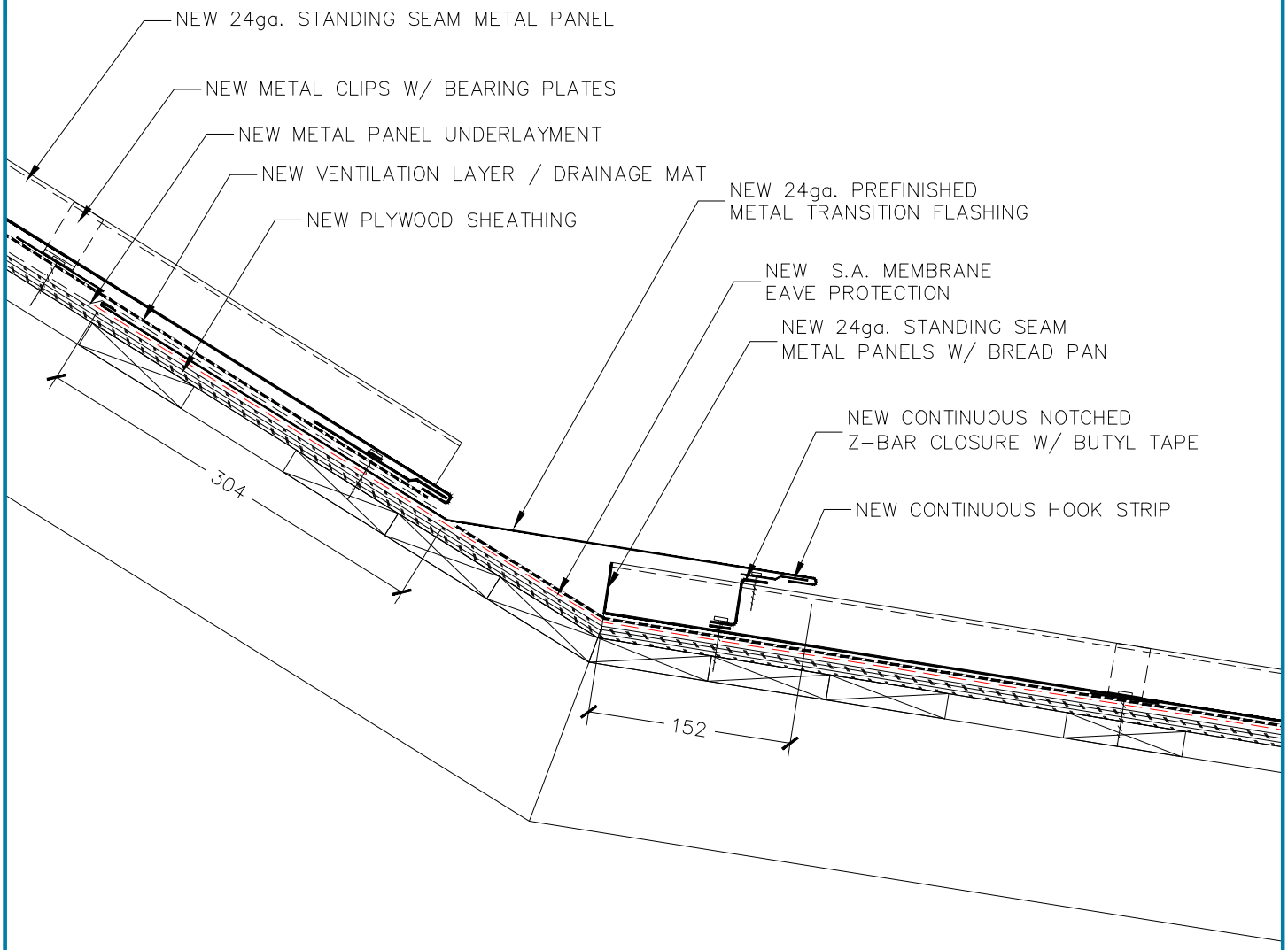

Project Title

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: 2021/05/06	
Reviewed By / Date	EC Project no. IFT	Consultant Project No. VR21-078SP-21476	Drawing no. D22	Revision/ Revision 0

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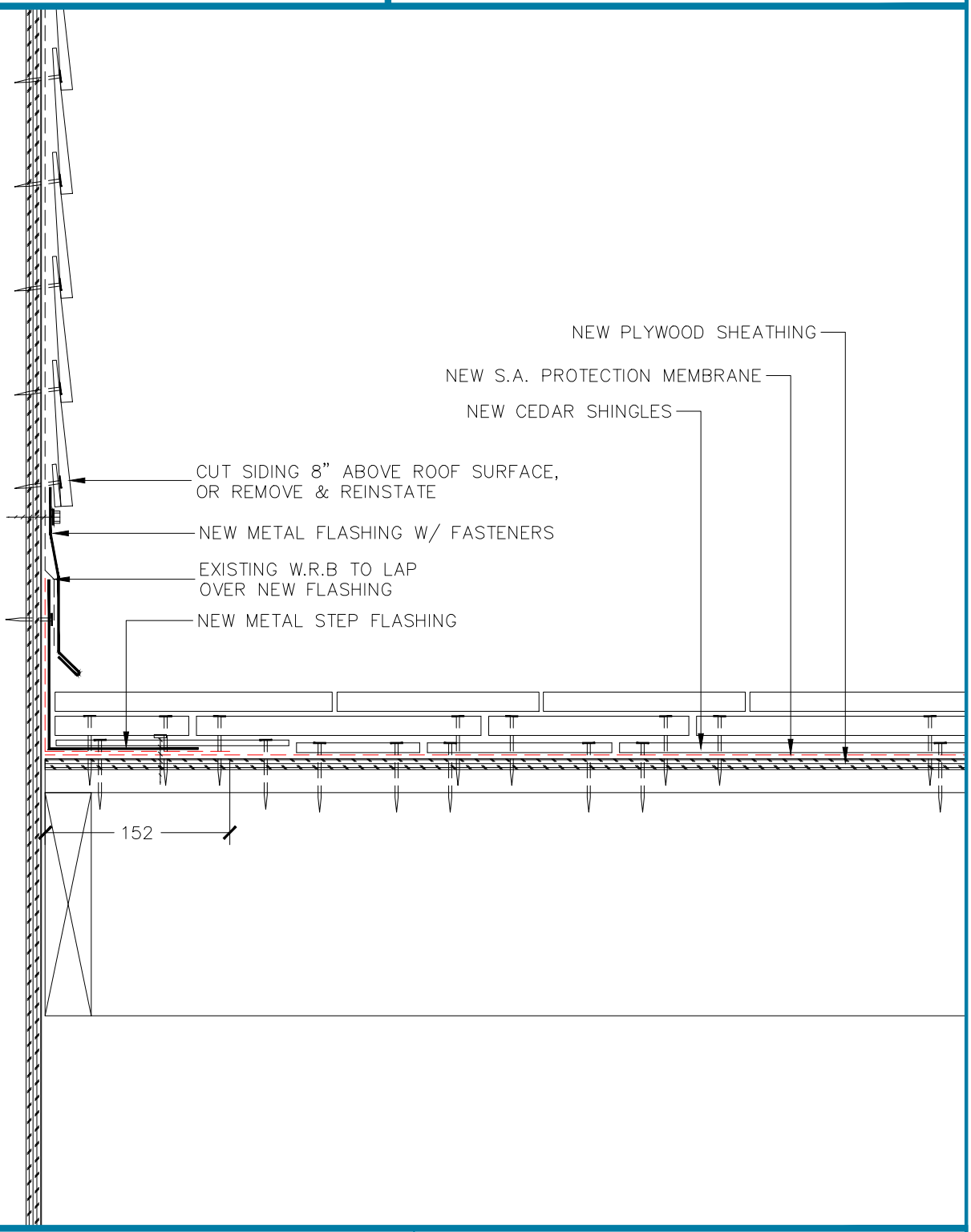


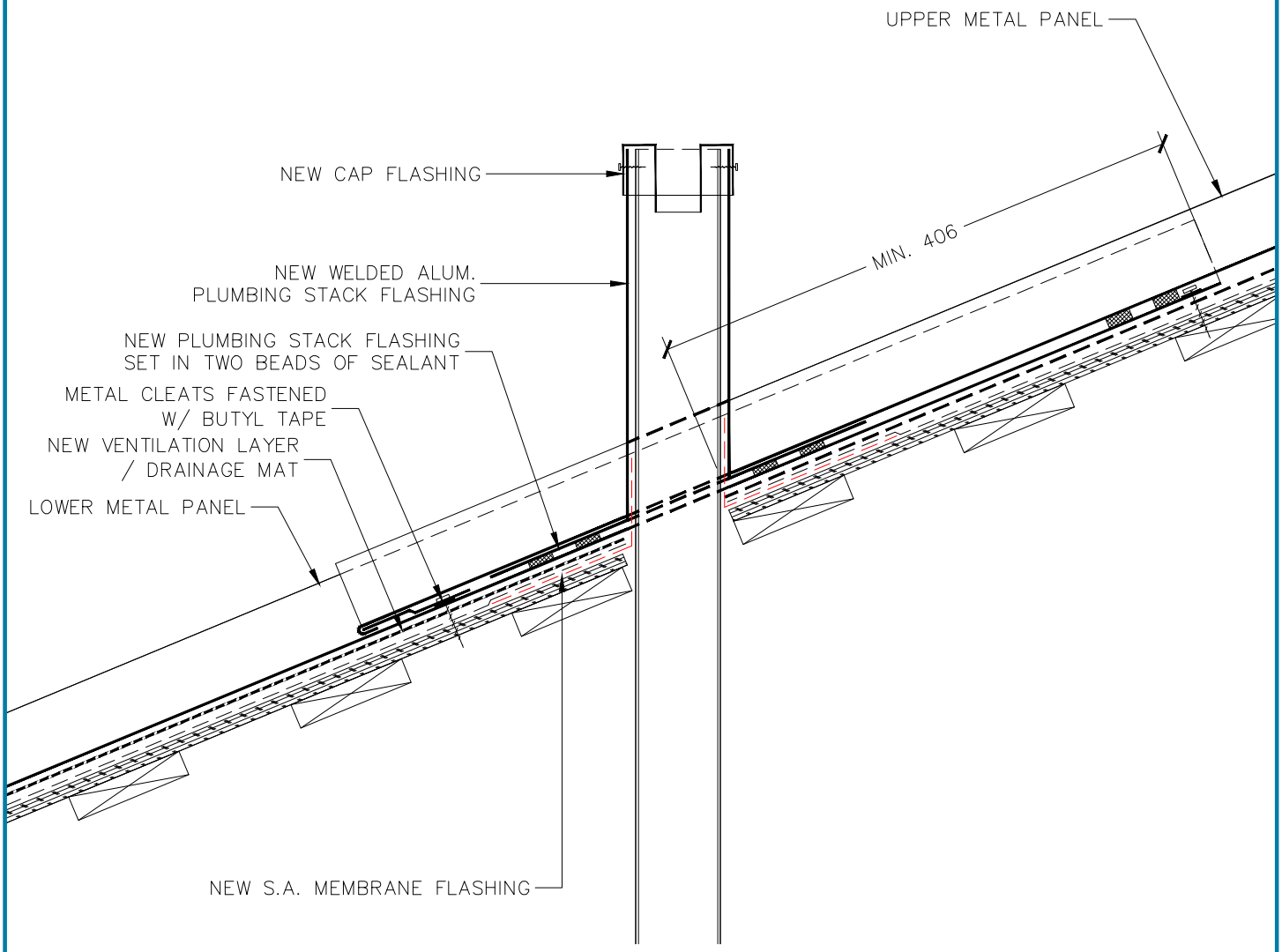
Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

METAL ROOF STEP DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IFT	Consultant Project No. VR21-078SP-21476	Drawing no. D23	Revision/ Revision 0



Project Title

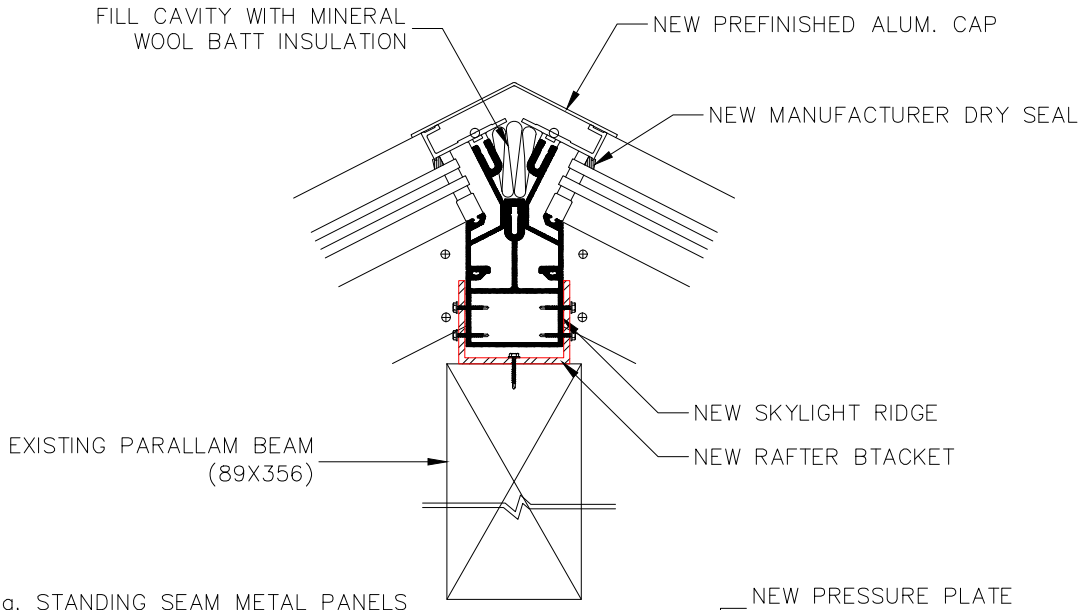
ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

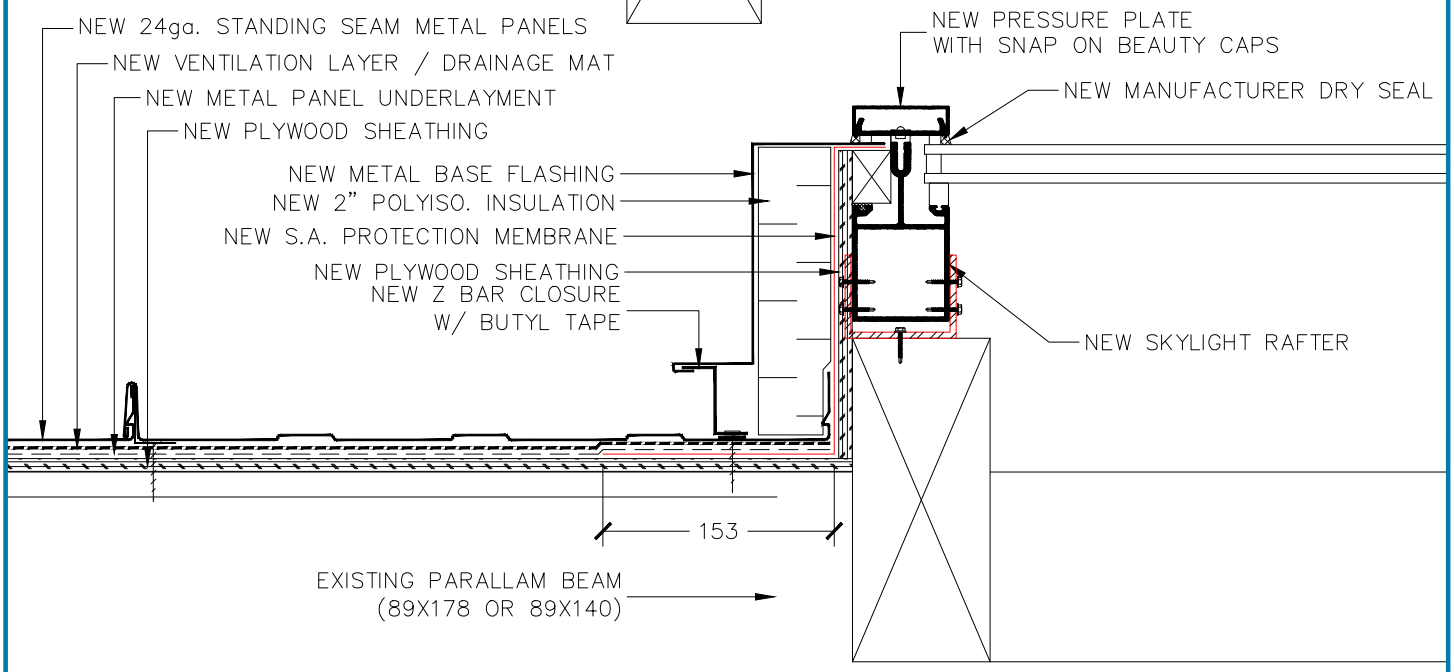
Drawing title

PLUMBING STACK DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IFT	Consultant Project No. VR21-078SP-21476	Drawing no. D26	Revision/ Revision 0

1. REMOVE EXISTING SKYLIGHT AND REVIEW CONDITION OF EXISTING STRUCTURAL SUPPORTS. REPLACE ANY DETERIORATED STRUCTURAL FRAMING.
2. CONTRACTOR WILL REQUEST IRC TO CHECK THE MAIN STRUCTURAL SUPPORTS AND CONNECTION DETAILS PRIOR TO INSTALLING THE NEW SKYLIGHT SYSTEM.
3. PLEASE ADVISE IRC AT LEAST 24 HOURS OF THE REQUESTED REVIEW.





Project Title: **ROOF REPLACEMENT** **PACIFIC WILDLIFE RESEARCH CENTRE** **5241 ROBERTSON ROAD, DELTA, BC**			Drawing title: **SKYLIGHT DETAIL**	
Designed By: IRC GROUP	Approved By Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender Project Manager		Date: 2021/05/06	
Reviewed By Date	EC Project no. IFT	Consultant Project No. VR21-078SP-21476	Drawing no.: D27	Revision/ Revision: 0

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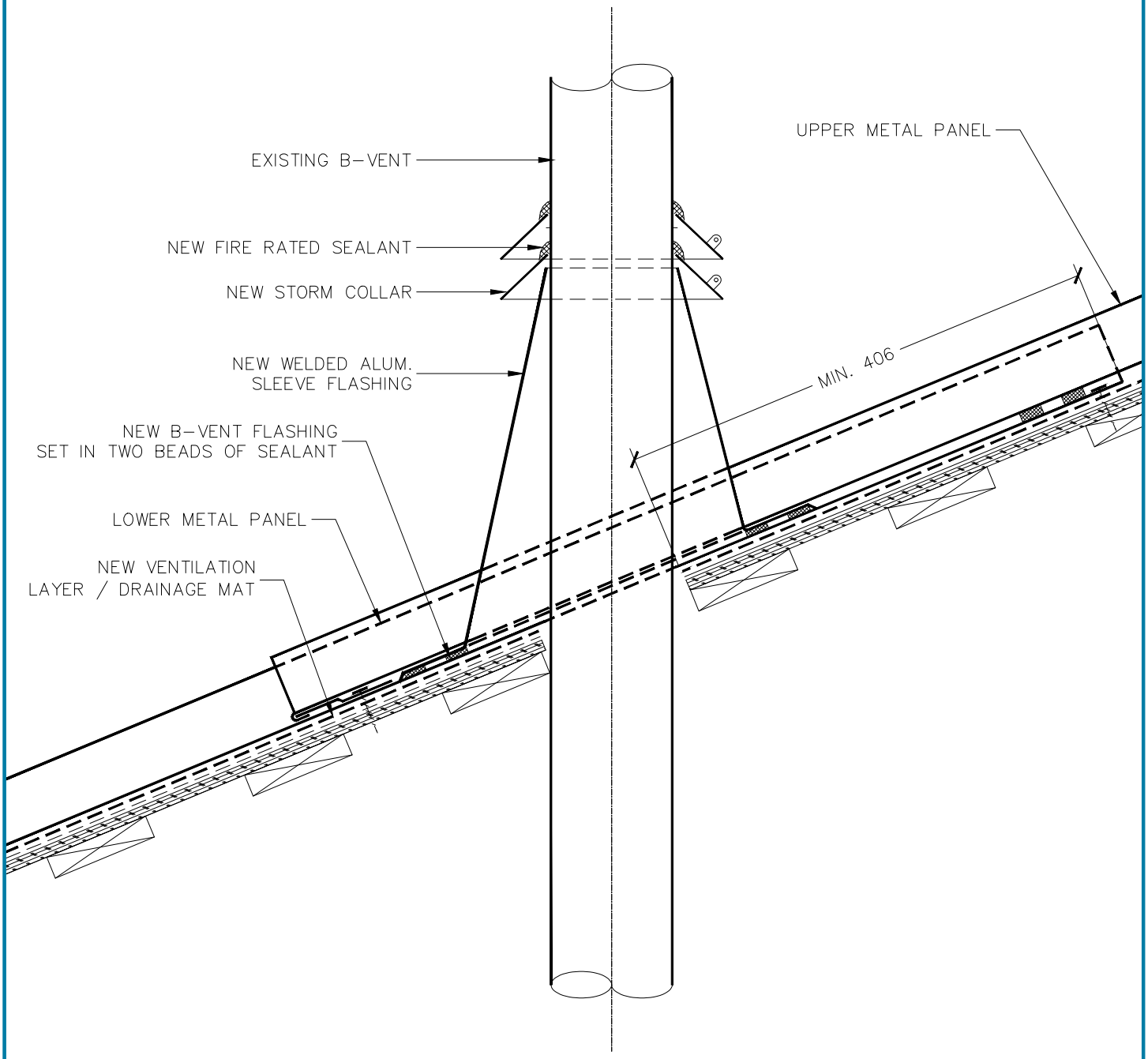

Project Title

ROOF REPLACEMENT
PACIFIC WILDLIFE RESEARCH CENTRE
5241 ROBERTSON ROAD, DELTA, BC

Drawing title

B-VENT DETAIL

Designed By: IRC GROUP	Approved By / Date		Scale: 1:5	
Drawn By: IRC GROUP	Tender / Project Manager		Date: 2021/05/06	
Reviewed By / Date	EC Project no. IFT	Consultant Project No. VR21-078SP-21476	Drawing no. D30	Revision/ Revision 0