Public Works and Government Services Canada

Requisition No. EZ899-210525/A

DRAWINGS & SPECIFICATIONS
for

Whistler Residence Roof/Wall Cladding Replacement
8648 Drifter Way, Whistler, BC

Project No.: R.105996.001

APPROVED BY:

_____ _____
Regional Manager, AES Date

_____ _____
Construction Safety Coordinator Date

TENDER:

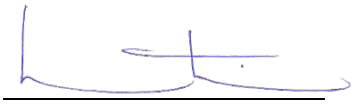
_____ _____
Project Manager Date

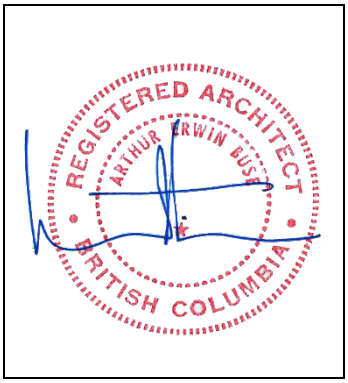
Real Property Services Branch, Professional and Technical Services, Pacific Region
Room 219 - 800 Burrard Street, Vancouver, B.C. V6Z 0B9

Specifications Seals Page – Architectural

The following Consultants' Seal refers to specific Sections of the Specification completed by *Boldwing Continuum Architects Inc.* as noted Section 00 01 10 – Contract Specifications - Table of Contents except Specification Sections and Appended Reports which have been prepared and / or signed and sealed by other professional engineers and consultants.

Architectural

Arthur E. Buse, Architect AIBC	1543	
Name, Title	Professional Registration No.	
	February 14, 2020	
Signature	Date	



Professional Seal

END OF SECTION

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DRAWINGS

Architectural

A000	Consultants, Drawing List, Legend (Symbols), Abbreviations	Rev. A
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A400	South & West Elevations	Rev. A
A401	North & East Elevations	Rev. A
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APPENDIX

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END OF SECTION

1 GENERAL

1.01 CODES

.1 Perform work to CURRENT Codes, Construction Standards and Bylaws, including Amendments up to the TENDER closing date.

1.02 DESCRIPTION OF WORK

.1 Work under this Contract covers the wall and roof replacement at 8648 Drifter Way at Whistler, B.C.

.2 Work to be performed under this Contract includes, but is not limited to, the following items covered further in the Contract documents.

.1 Removal and disposal of the existing aluminum wall cladding and associated metal trims / flashings

.2 Removal disposal of the metal panel roof and associated roof elements.

.3 Installation of new weather barrier, rain screen wood strapping with semirigid insulation and new cementitious cladding.

.4 Removal and reinstallation of the existing windows and doors for new flashings and opening protection.

.5 Installation of new self-adhesive membrane and metal roof panels with snow brake.

1.03 CONTRACT DOCUMENTS

.1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of the work.

.2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work.

1.04 DIVISION OF SPECIFICATIONS

.1 The specifications are subdivided in accordance with the current 6-digit National Master Specifications System.

.2 A division may consist of the work of more than 1 subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the work rests solely with the Contractor.

.3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.

1.05 TIME OF COMPLETION

.1 Complete the project within seven weeks after Contract Award.

1.06 HOURS OF WORK

.1 Restrictive as follows:

.1 Notify Departmental Representative of all after hours work, including weekends and holidays.

.2 Typical workday hours are to be between 8:00 am – 5:00 pm, and typical workdays to be weekdays and non-statutory holidays.

1.07 WORK SCHEDULE

.1 Carry on work as follows:

.1 Within 10 working days after Contract award, provide a “phasing bar chart” and a schedule showing anticipated progress stages and final completion of the work within the time period required by the Contract documents. Indicate the following:

.1 Submission of product data, MSDS sheets and samples.

.2 Commencement and completion of work of each section of the specifications or trade for each phase as outlined.

.3 Final completion date within the time period required by the Contract documents.

.2 Do not change approved Schedule – without notifying Departmental Representative.

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

1.08 COST BREAKDOWN

.1 Before submitting the first progress claim, submit a breakdown of the Contract lump sum prices in detail as directed by the Departmental Representative and aggregating Contract price.

1.09 CODES, BYLAWS, STANDARDS

.1 Perform work in accordance with the National Building Code of Canada (NBC) 2015, and other indicated Codes, Construction Standards and/or any other Code or Bylaw of local application.

.2 Comply with applicable local bylaws, rules and regulations enforced at the location concerned.

.3 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.

.4 In any case of conflict or discrepancy, the most stringent requirements shall apply.

1.10 DOCUMENTS REQUIRED

.1 Maintain 1 copy each of the following at the job site:

.1 Contract drawings.

.2 Contract specifications.

.3 Addenda to Contract documents.

.4 Copy of approved work schedule.

.5 Reviewed/approved shop drawings.

.6 Change orders.

.7 Other modifications to Contract.

.8 Field test reports.

.9 Reviewed/approved samples.

.10 Manufacturers' installation and application instructions.

.11 One set of record drawings and specifications for "as-built" purposes.

.12 National Building Code of Canada 2015.

.13 Current construction standards of workmanship listed in technical Sections.

.14 Building Safety Plan.

1.11 REGULATORY REQUIREMENTS

.1 Obtain and pay for Certificates, Licenses and other permit required by regulatory municipal, provincial or federal authorities to complete the work.

.2 Provide inspection authorities with plans and information required for issue of acceptance certificates.

.3 Furnish inspection certificates in evidence that the work installed conforms with the requirements of the authority having jurisdiction.

1.12 CONTRACTOR'S USE OF SITE

.1 Use of site:

.1 Limited to areas indicated. Protect residents and their possessions.

.2 Assume responsibility for assigned areas of premises for performance of this work.

.3 Be responsible for coordination of all work activities on site, including the residents and the Departmental Representative.

.2 Perform work in accordance with Contract documents.

.3 Do not unreasonably encumber site with material or equipment.

1.13 EXAMINATION

.1 Examine site and be familiar and conversant with existing conditions likely to affect work

.2 Provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims.

1.14 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment and fixtures to provide minimum interference and maximum usable space, and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative of impending installation and obtain approval for actual locations.

.4 Submit field drawings or shop drawings to indicate the relative position of various services and equipment when required by the Departmental Representative.

1.15 CUTTING AND PATCHING

.1 Cut existing surfaces as required to accommodate new work.

.2 Remove items so shown or specified.

.3 Do not cut, bore, or sleeve load-bearing members.

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

.5 Fit work watertight to pipes and conduits.

.6 Patch and make good surfaces cut, damaged or disturbed, to Departmental Representative's approval. Match existing material, colour, finish and texture.

.7 Install firestops and smoke seals in accordance with ULC-S115, around pipe, ductwork, cables and other objects penetrating fire separations to provide fire resistance not less than the fire resistance of surrounding floor, ceiling and wall assembly.

.8 Making good is defined as matching construction and finishing materials and the adjacent surfaces such that there is no visible difference between existing and new surfaces when viewed from 1.5 metres in ambient light, and includes painting the whole surface to the next change in plane.

1.16 SETTING OUT OF WORK

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

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

1.17 ACCEPTANCE OF SUBSTRATES

.1 Each trade shall examine surfaces prepared by others and job conditions which may affect his work, and shall report defects to the Departmental Representative. Commencement of work shall imply acceptance of prepared work or substrate surfaces.

1.18 QUALITY OF WORK

.1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.

.2 The workmanship, erection methods and procedures to meet minimum standards set out in the National Building Code of Canada .

.3 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative, whose decision is final.

1.19 WORKS COORDINATION

.1 Coordinate work of subtrades:

.1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.

.2 Provide each subcontractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.

.3 Develop coordination drawings when required, illustrating potential interference between work of various trades and distribute to affected parties.

.4 Submit shop drawings and order of components only after coordination meeting for such items has taken place.

.2 Work coordination:

.1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of spatial interference.

.2 Ensure that each trade provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, cutting, patching and removal or replacement of completed work.

.3 Ensure disputes between subcontractors are resolved.

.3 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor’s failure to coordinate Work.

1.20 APPROVAL OF PRODUCT DATA AND SAMPLES

.1 In accordance with Section 01 33 00, submit the requested shop drawings, product data, MSDS sheets and samples indicated in each of the technical Sections.

.2 Allow sufficient time for the following:

.1 Review of product data.

.2 Approval of shop drawings.

.3 Review of re-submission.

.4 Ordering of approved material and/or products.

1.21 PROJECT MEETINGS

.1 Departmental Representative will arrange project meetings, if required.

.2 Contractor to record and distribute meeting minutes.

1.22 AS-BUILT DOCUMENTS

.1 The Departmental Representative will provide 2 sets of drawings, 2 sets of specifications, and 2 copies of the original AutoCAD files for “as-built” purposes.

.2 As work progresses, maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings and shop drawings as changes occur.

.3 Refer to Section 01 78 30 Closeout Submittals.

1.23 CLEANING

.1 Daily conduct cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.

.2 Ensure cleanup of the work areas each day after completion of work.

.3 In preparation for interim and final inspections:

.1 Examine all sight-exposed exterior surfaced.

.2 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed exterior finished surfaces.

.4 Use cleaning materials and methods in accordance with instructions of the manufacturer of the surface to be cleaned.

1.24 ENVIRONMENTAL PROTECTION

.1 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers.

.2 Ensure proper disposal procedures in accordance with all applicable territorial regulations.

1.25 HAZARDOUS MATERIALS

.1 Refer to Appendix I for hazmat report and hazmat abatement requirements.

1.26 ADDITIONAL DRAWINGS

.1 The Departmental Representative may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in the Contract documents.

.2 Upon request, Departmental Representative may furnish up to a maximum of 10 sets of Contract documents for use by the Contractor at no additional cost. Should more than 10 sets of documents be required the Departmental Representative will provide them at additional cost.

1.27 BUILDING SMOKING ENVIRONMENT

.1 Smoking within or on the building property is not permitted.

1.28 SYSTEM OF MEASUREMENT

.1 The metric system of measurement (SI) will be employed on this Contract.

1.29 FAMILIARIZATION WITH SITE

.1 Before submitting tender, visit site – as indicated in tender documents and become familiar with all conditions likely to affect the cost of the work.

1.30 EXISTING SERVICES

.1 Where Work involves breaking into or connecting to existing services, schedule any required shut down with Departmental Representative prior to proceeding.

.2 Access to electrical receptacle and hose bib will be provided onsite.

1.31 BUSINESS LICENSES FOR CONSTRUCTION PROJECTS

.1 The Prime Contractor and all sub-contractors are required to obtain and pay for the Business License across the contract period to carry out works in the Authority having Jurisdiction's area, and to be aware of the processing time for each license.

1.32 SUBMISSION OF TENDER

.1 Submission of a tender is deemed to be confirmation of the fact that the Tenderer has analyzed the Contract documents and inspected the site and is fully conversant with all conditions.

END OF SECTION

1 GENERAL

1.01 APPROVALS

.1 Approval of shop drawings and samples: refer to Section 01 11 55, Clause 1.20.

1.02 GENERAL

.1 This Section specifies general requirements and procedures for the Contractor's submissions of shop drawings, product data, samples and other requested submittals to Departmental Representative for review. Additional specific requirements for submissions are specified in individual technical sections.

.2 Present shop drawings, product data and samples in SI Metric units.

.3 Where items or information is not produced in SI Metric units, converted values are acceptable.

.4 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submissions.

.5 Notify Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract documents and stating reasons for deviations.

.6 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Departmental Representative's review of submission unless Departmental Representative gives written acceptance of specific deviations.

.7 Make any changes in submissions which Departmental Representative may require consistent with Contract documents and resubmit as directed by Departmental Representative.

.8 Notify Departmental Representative in writing, when resubmitting, of any revisions other than those requested by Departmental Representative.

.9 Do not proceed with work until relevant submissions are reviewed and approved by the Departmental Representative.

1.03 SUBMISSION REQUIREMENTS

.1 Coordinate each submission with the requirements of the work and the Contract documents. Individual submissions will not be reviewed until all related information is available.

.2 Allow 10 ten days for Departmental Representative's review of each submission, unless noted otherwise.

.3 Accompany submissions with transmittal letter, in duplicate, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.4 Submissions shall include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.

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

.4 Details of appropriate portions of work as applicable.

.5 Layout, showing dimensions (including identified field dimensions: and clearances.

.6 Setting or erection details.

.7 Capacities.

.8 Performance characteristics.

.9 Standards.

.10 Relationship to adjacent work.

.5 After Departmental Representative's review, distribute copies.

1.04 SHOP DRAWINGS REVIEW

.1 Review of shop drawings by Departmental Representative is for the sole purpose of ascertaining conformance with the general concept.

.2 Make changes in the shop drawings as the Departmental Representative may require consistent with the Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.3 This review shall not mean that Departmental Representative approves the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same.

.4 This review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and Contract documents.

.5 Without restricting the generality of the foregoing, the Contractor is responsible for:

.1 Initial review of the shop drawings and stamped as such confirming review.

.2 Dimensions to be confirmed and correlated at the job site.

.3 Information that pertains solely to fabrication processes or to techniques of construction and installation.

.4 Coordination of the work of all sub-trades.

1.05 PRODUCT DATA

.1 Product data: manufacturers' catalogue sheets, MSDS sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products or any other specified information.

.2 Delete information not applicable to project.

.3 Supplement standard information to provide details applicable to project.

.4 Cross-reference product data information to applicable portions of Contract documents.

.5 Submit 6 copies of product data.

1.06 SAMPLES

.1 Samples: examples of materials, equipment, quality, finishes and workmanship.

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

.3 Reviewed and accepted samples will become the standard of workmanship and material against which installed work will be verified.

1.07 PROGRESS SCHEDULE

.1 Submit work schedule and cost breakdown as required in Section 01 11 55.

1.08 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic copy of colour digital photography in jpg format, standard resolution monthly with progress statement and as directed by Departmental Representative.

.2 Project identification: name and number of project and date of exposure indicated.

.3 Viewpoints and their locations as reasonably determined by Departmental Representative.

.4 Provide photographic documentation of adjacent existing conditions prior to commencement of construction for determining and accidental damage as a result of contractor's work.

.5 Frequency of photographic documentation: as directed by Departmental Representative.

.1 Upon completion of: demolition, framing and services before concealment of Work, building papers/air barriers and membranes before concealment of Work, rainscreen strapping and semirigid insulation installation before concealment of Work, and as directed by Departmental Representative.

END OF SECTION

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1 GENERAL

PWGSC Update on Asbestos Use

Effective April 1, 2016, all Public Works and Government Services of Canada (PWGSC) contracts for new construction and major rehabilitation will prohibit use of asbestos-containing materials.

COVID 19

All contractors shall follow Canadian Construction Association COVID-19 - Standardized Protocols for All Canadian Construction Sites.

1.01 REFERENCES

.1 Government of Canada.

.1 Canada Labour Code - Part II (as amended)

.2 Canada Occupational Health and Safety Regulations (as amended).

.2 National Building Code of Canada (NBC): (as amended)

.1 Part 8, Safety Measures at Construction and Demolition Sites.

.3 The Canadian Electric Code (as amended)

.4 Canadian Standards Association (CSA) as amended:

.1 CSA Z797-2018 Code of Practice for Access Scaffold.

.2 CSA S269.1-2016 Falsework for Construction Purposes.

.3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures.

.4 CSA Z1006-10 Management of Work in Confined Spaces.

.5 CSA Z462-18 Workplace Electrical Safety Standard.

.5 National Fire Code of Canada 2015 (as amended)

.1 Part 5 – Hazardous Processes and Operations and Division B as applicable and required.

.6 American National Standards Institute (ANSI): (as amended)

.1 ANSI/ASSP A10.3-2013, Operations – Safety Requirements for Powder-Actuated Fastening Systems.

.7 Province of British Columbia:

.1 Workers Compensation Act Part 3-Occupational Health and Safety. (as amended)

.2 Occupational Health and Safety Regulations. (as amended)

.8 Hazardous Materials Assessment Report:

.1 Arcadis Hazardous Building Material - Assessment, E0423 – RCMP Employee Housing PSPC Project # R.106467.01 Whistler, BC, dated February 14, 2020.

1.02 RELATED SECTIONS

.1 Refer to the following current NMS sections as required:

.1	General Instructions:	Section 01 11 55
.2	Submittal procedures:	Section 01 33 00
.3	Temporary utilities:	Section 01 51 00
.4	Temporary barriers and enclosures:	Section 01 56 00

1.03 WORKERS' COMPENSATION BOARD COVERAGE

.1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.

.2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.04 COMPLIANCE WITH REGULATIONS

.1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.

.2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

1.05 SUBMITTALS

.1 Submit to Departmental Representative submittals listed for review in accordance with Section 01 11 55 and Section 01 33 00.

.2 Work effected by submittal shall not proceed until review is complete.

.3 Submit the following:

.1 Organizations Health and Safety Plan.

.2 Site Specific Health and Safety Plan (SSSP or HASP).

.3 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.

.4 Copies of incident and accident reports.

.5 Complete set of current Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.

.6 Emergency Procedures.

.4 The Departmental Representative will review the Contractor's Site Specific Safety Plan or Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.

.5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.

.6 Submission of the Site Specific Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:

.1 Be construed to imply approval by the Departmental Representative.

.2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.

.3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

1.06 RESPONSIBILITY

.1 Assume responsibility as the Prime Contractor for work under this contract.

.2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and ordinances, and with Site Specific Health and Safety Plan.

1.07 HEALTH AND SAFETY COORDINATOR

.1 Assign a competent and qualified Health and Safety Coordinator who shall:

.1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.

.2 Be responsible for implementing, revising, daily enforcing, and monitoring the Site Specific Safety Plan (SSSP) or Health and Safety Plan (HASP).

.3 Be on site during execution of work.

.4 Have minimum two (2) years' site-related working experience.

.5 Have working knowledge of the applicable occupational safety and health regulations.

1.08 GENERAL CONDITIONS

.1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.

.2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.

.1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.

.2 Secure site at nighttime or provide security guard as deemed necessary to protect site against entry.

1.09 PROJECT / SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Residents of the house.

.2 Multi-employer work site.

.3 Federal employees and general public.

.4 Energized electrical services.

.5 Working from heights.

.6 Hazards – PSPC Preliminary Hazard Assessment included as Appendix I to Specifications.

1.10 UTILITY CLEARANCES

.1 The Contractor is solely responsible for all utility detection and clearances prior to starting the work.

.2 The Contractor will not rely solely upon the Reference Drawings or other information provided for utility locations.

1.11 REGULATORY REQUIREMENTS

.1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.

.2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirements, the Departmental Representative will advise on the course of action to be followed.

1.12 WORK PERMITS

.1 Obtain specialty permit(s) related to project before start of work.

1.13 FILING OF NOTICE

.1 The General Contractor is to complete and submit a Notice of Project as required by Provincial authorities prior to commencement of work. (All construction projects require a Notice of Work.)

.2 Provide copies of all notices to the Departmental Representative.

1.14 SITE SPECIFIC HEALTH AND SAFETY PLAN

.1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.

.2 Prepare and comply with the Site Specific Safety Plan (SSSP) or Health and Safety Plan (HASP) based on the required hazard assessment, including, but not limited to, the following:

.1 Primary requirements:

.1 Contractor's safety policy.

.2 Identification of applicable compliance obligations.

.3 Definition of responsibilities for project safety/organization chart for project.

.4 General safety rules for project.

.5 Job-specific safe work procedures.

.6 Inspection policy and procedures.

.7 Incident reporting and investigation policy and procedures.

.8 Occupational Health and Safety Committee/Representative procedures.

.9 Occupational Health and Safety meetings.

.10 Occupational Health and Safety communications and record keeping procedures.

.11 COVID-19 Protocols and Procedures.

.2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.

.3 List hazardous materials to be brought on site as required by work. SDS required for all products.

.4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.

.5 Identify personal protective equipment (PPE) to be used by workers.

.6 Identify personnel and alternates responsible for site safety and health.

.7 Identify personnel training requirements and training plan, including site orientation for new workers.

.3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.

.4 Revise and update Site Specific Safety Plan (SSSP) and/or Health and Safety Plan (HASP) as required, and re-submit to the Departmental Representative.

.5 Departmental Representative's review: the review of Site Specific Safety Plan and/or Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Site Specific Safety Plan and/or Health and Safety Plan of

responsibility for meeting all requirements of construction and Contract documents and legislated requirements.

1.15 EMERGENCY PROCEDURES

.1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:

.1 Designated personnel from own company.

.2 Regulatory agencies applicable to work and as per legislated regulations.

.3 Local emergency resources.

.4 Departmental Representative.

.5 A route map with written directions to the nearest hospital or medical clinic.

.2 Include the following provisions in the emergency procedures:

.1 Notify workers and the first-aid attendant, of the nature and location of the emergency.

.2 Evacuate all workers safely.

.3 Check and confirm the safe evacuation of all workers.

.4 Notify the fire department or other emergency responders.

.5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.

.6 Notify Departmental Representative.

.3 Provide written rescue/evacuation procedures as required for, but not limited to:

.1 Work at high angles.

.2 Work in confined spaces or where there is a risk of entrapment.

.3 Work with hazardous substances.

.4 Underground work.

.5 Work on, over, under and adjacent to water.

.6 Workplaces where there are persons who require physical assistance to be moved.

.4 Design and mark emergency exit routes to provide quick and unimpeded exit.

.5 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

.6 Contractors must not rely solely upon 911 for emergency rescue in a confined space, working at heights, etc.

1.16 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS 2015) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Safety Data Sheets (SDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.

.2 Where use of hazardous and toxic products cannot be avoided:

.1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable SDS and WHMIS 2015 documents as per Section 01 11 55 and Section 01 33 00.

.2 In conjunction with Departmental Representative, schedule to carry out work during "off hours" when tenants have left the building.

.3 Provide adequate means of ventilation in accordance with Section 01 51 00.

.4 The contractor shall ensure that the product is applied as per manufacturers recommendations.

.5 The contractor shall ensure that only pre-approved products are brought onto the work site in an adequate quantity to complete the work.

1.17 ASBESTOS HAZARD

.1 Carry out any activities involving asbestos in accordance with applicable Federal and Provincial Regulations.

.2 Removal and handling of asbestos will be in accordance with applicable Provincial / Federal Regulations.

1.18 SILICA

.1 Carry out work in accordance with WorkSafe BC regulations.

1.19 PCB REMOVALS

.1 Mercury-containing fluorescent tubes and ballasts which contain polychlorinated biphenyls (PCBs) are classified as hazardous waste.

.2 Remove, handle, transport and dispose of as indicated in Division 2 specifications.

1.20 REMOVAL OF LEAD-CONTAINING PAINT

.1 All paint containing TCLP lead concentrations above 5 ppm are classified as hazardous.

.2 Carry out demolition and/or remediation activities involving lead-containing paints in accordance with current applicable Provincial / Territorial Regulations.

.3 Work with lead-containing paint shall be completed as per Provincial and Federal regulations.

.4 Dry Scraping/Sanding of any materials containing lead is strictly prohibited.

.5 The use of Methylene Chloride based paint removal products is strictly prohibited.

1.21 ELECTRICAL SAFETY REQUIREMENTS
(Reference: WorkSafe BC OHS Regulation Part 19 – Electrical Safety)

.1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.

.1 Before undertaking any work, coordinate arc flash protection, required energizing and de-energizing of new and existing circuits with Departmental Representative.

.2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

1.22 ELECTRICAL LOCKOUT

.1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.

.2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.

.3 Keep the documents and lockout tags at the site and list in a logbook for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

1.23 OVERLOADING

.1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

1.24 FALSEWORK

.1 Design and construct falsework in accordance with CSA S269.1-1975 (R2003) (as amended).

1.25 SCAFFOLDING

.1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2018 (as amended) and B.C. Occupational Health and Safety Regulations (as amended).

1.26 CONFINED SPACE

.1 Carry out work in compliance with current Provincial / Territorial regulations.

1.27 POWER-ACTUATED DEVICES

.1 Use powder-actuated devices in accordance with ANSI A10.3 (as amended) only after receipt of written permission from the Departmental Representative.

1.28 FIRE SAFETY AND HOT WORK

.1 Obtain in Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.

.2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

.3 Hot Work permits are a mandatory requirement for any hot work activities.

1.29 FIRE SAFETY REQUIREMENTS

.1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada (as amended).

.3 Portable gas and diesel fuel tanks are not permitted on most federal work sites. Approval from the Departmental Representative is required prior to any gas or diesel tank being brought onto the work site.

1.30 FIRE PROTECTION AND ALARM SYSTEM

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut off.

.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, for purposes other than firefighting.

.3 Be responsible/liable for costs incurred from the fire department, the building owner and the tenants, resulting from false alarms.

1.31 UNFORESEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.

1.32 POSTED DOCUMENTS

.1 Post legible versions of the following documents on site:

.1 Site Specific Safety Plan (SSSP) or Health and Safety Plan (HASP).

.2 Sequence of work.

.3 Emergency procedures.

.4 Site drawing showing project layout, locations of the first-aid station, marshalling station, and the emergency transportation provisions.

.5 Notice of Project.

.6 Floor plan or site plans. Must be posted in a non-inmate access area and locked up when not being used.

.7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.

.8 Workplace Hazardous Materials Information System (WHMIS 2015) documents.

.9 Safety Data Sheets (SDS).

.10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.

.11 All Hazardous Material and Substance Reports including Lab Analysis.

.2 Post all Safety Data Sheets (SDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.

.3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

1.33 MEETINGS

.1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

1.34 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.

.3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a “stop work order”.

2 PRODUCTS

.1 Not used.

3 EXECUTION

.1 Not used.

END OF SECTION

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1 GENERAL

1.01 ACCESS AND DELIVERY

.1 Only the designated area may be used to access the site.

.2 Maintain for duration of Contract.

.3 Make good damage resulting from Contractor's use.

1.02 STORAGE FACILITIES

.1 Storage space will be limited to the area indicated.

1.03 POWER

.1 Electrical power at existing building may be used for construction purposes at no extra cost, provided that electrical components used for temporary power are replaced when damaged.

1.04 WATER SUPPLY

.1 Water supply is available at existing building and may be used for construction purposes at no cost.

1.05 SANITARY FACILITIES

.1 Contractor to provide temporary sanitary facilities for use by trade workers. Maintain in neat and orderly manner and have serviced on a daily basis.

1.06 SCAFFOLDING

.1 Construct and maintain scaffolding in rigid, secure and safe manner.

.2 Erect scaffolding independent of walls. Remove promptly when no longer required.

1.07 REMOVAL OF TEMPORARY FACILITIES

.1 Remove temporary facilities from site when directed by the Departmental Representative.

1.08 SIGNS AND NOTICES

.1 Signs and notices for safety and instruction shall be in both official languages or graphic symbols conforming to CAN/CSA-Z321.

.2 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or when directed by Departmental Representative.

END OF SECTION

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1 GENERAL

1.01 INSTALLATION AND REMOVAL

.1 Submit plan indicating proposed dimensions, and interface with existing structures and maintained walkways and egress.

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

.3 Remove from site all such work after use and phased work is completed.

1.02 FENCING

.1 Erect fence enclosure where indicated.

.1 Surround enclosed area with self-supporting 1.8m metal fence.

.2 Maintain until such work is complete.

.3 Protect site from damage by equipment and construction procedures.

1.03 GUARD RAILS AND BARRICADES

.1 Provide as required by governing authorities.

1.04 ACCESS TO SITE

.1 Maintain driveway, sidewalk as required for use by resident.

1.05 PUBLIC TRAFFIC FLOW

.1 Provide and maintain barricades as required to perform Work and protect public.

1.06 FIRE ROUTES

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

1.07 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.08 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished areas as required to complete work.

.2 Provide necessary screens, covers, and hoardings.

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

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 PRODUCTS/MATERIAL AND EQUIPMENT

.1 Use NEW products/material and equipment unless otherwise specified. The term “products” is referred to throughout the specifications.

.2 Use products of 1 manufacturer for material and equipment of the same type or classification unless otherwise specified.

.3 Unless otherwise specified, comply with manufacturer’s latest printed instructions for materials and installation methods.

.4 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer’s instructions. Departmental Representative will designate which document is to be followed.

.5 Provide metal fastenings and accessories in the same texture, colour and finish as base metal in which they occur.

.6 Prevent electrolytic action between dissimilar metals.

.7 Use non-corrosive fasteners, anchors and spacers for securing exterior work.

.1 Fastenings which cause spalling or cracking are not acceptable.

.2 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.3 Use heavy hexagon heads, semi-finished unless otherwise specified.

.8 Types of washers as follows:

.1 Plain type washers: use on equipment and sheet metal.

.2 Soft gasket lock type washers: use where vibrations occur.

.3 Resilient washers: use with stainless steel.

.9 Deliver, store and maintain packaged material and equipment with manufacturer’s seals and labels intact.

.10 Prevent damage, adulteration and soiling of products during delivery, handling and storage. Immediately remove rejected products from site.

.11 Store products in accordance with suppliers’ instructions.

.12 Touch up damaged factory finished surfaces to Departmental Representative’s satisfaction:

.1 Use primer or enamel to match original.

.2 Do not paint over nameplates.

1.02 QUALITY OF PRODUCTS

.1 Products, materials and equipment (referred to as products) incorporated into work shall be new, not damaged or defective, and of the best quality (compatible with the specifications) for the purpose intended. If requested, furnish evidence as to type, source and quality of the products provided.

.2 Defective products will be rejected regardless of previous inspections.

.1 Inspection does not relieve responsibility, but is precaution against oversight or error.

.2 Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Retain purchase orders, invoices and other documents to prove that all products utilized in this Contract meet the requirements of the specifications. Produce documents when requested by the Departmental Representative.

.4 Should any dispute arise as to quality or fitness of products, the decision rests strictly with the Departmental Representative based upon the requirements of the Contract documents.

.5 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item throughout the building.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.03 AVAILABILITY OF PRODUCTS

.1 Immediately upon signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items.

.2 If delays in supply of products are foreseeable, notify Departmental Representative of such in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of the work.

.3 In event of failure to notify Departmental Representative at the start of work and should it subsequently appear that the work may be delayed for such reason, the Departmental Representative reserves the right to substitute more readily available products of similar character, at no increase in either the Contract price or the Contract time.

1.04 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in the specifications, install or erect products in accordance with the manufacturer's instructions.

.1 Do not rely on labels or enclosures provided with products.

.2 Obtain written instructions directly from the manufacturer.

.2 Notify Departmental Representative in writing of conflicts between the specifications and the manufacturer's instructions so that the Departmental Representative may establish the course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Departmental Representative to require removal and re-installation at no increase in either the Contract price of the Contract time.

1.05 CONTRACTOR'S OPTIONS FOR SELECTION OF PRODUCTS FOR TENDERING

.1 Products are specified by **"Performance**" **specifications**: select any product meeting or exceeding specifications.

.2 Products are specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.

.3 Products specified to meet particular design requirements or to match existing materials: use only material specified. Alternative products may be considered provided full technical data is received in writing by Departmental Representative in accordance with "Special Instructions to Tenderers".

.4 When products are specified by a referenced standard or by Performance specifications, upon request of Departmental Representative obtain from manufacturer and independent laboratory report showing that the product meets or exceeds the specified requirements.

1.06 SUBSTITUTION AFTER CONTRACT AWARD

.1 No substitutions are permitted without prior written approval of the Departmental Representative.

.2 Proposals for substitution may only be submitted after Contract award. Such request must include statements of respective costs of items originally specified and the proposed substitution.

.3 Proposals will be considered by the Departmental Representative if:

.1 products selected by tenderer from those specified are not available;

.2 delivery date of products selected from those specified would unduly delay completion of Contract, or

.3 alternative product to that specified, which is brought to the attention of considered by Departmental Representative as equivalent to the product specified, and will result in a credit to the Contract amount.

.4 Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on the project. Pay for design or drawing changes required as result of substitution.

.5 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative, and the Contract price will be reduced accordingly.

END OF SECTION

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1 GENERAL

1.01 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by RCMP or other Contractors.

.2 Provide on-site containers for collection of waste materials and debris.

.1 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative.

.2 Do not burn waste materials on site.

.3 Dispose of waste materials and recyclables at authorized facilities off site.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.3 Broom clean walkways daily.

.4 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.5 Provide adequate ventilation where required during use of volatile or noxious substances.

.6 Use only cleaning materials as recommended by product manufacturer.

.7 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly remediated or coated surfaces nor contaminate building systems.

1.02 FINAL CLEANING

.1 When Work is Substantially Performed and prior to final review, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Clean reinstalled and previously protected items including photovoltaic panels, light fixtures, security mirrors, pedestrian glazing, digital signage and rainwater leaders. Confirm with Departmental Representative cleaning products to be used.

.4 Inspect finishes and reinstalled equipment and ensure specified workmanship and operation.

.5 Remove dirt and other disfiguration from exterior surfaces.

.6 Repair damage to as good or better condition.

.7 Sweep and wash clean paved areas.

1.03 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for disposal in accordance with Section 01 74 21 - Construction/Demolition

Waste Management and Disposal.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 RELATED WORK

.1 Refer to every technical section for waste management and disposal.

1.02 MATERIALS SOURCE SEPARATION

.1 Provide separate containers for re-usable and/or recyclable materials of the following:

.1 Metals.

.2 Wood.

.3 Plastics

.4 Other materials as indicated in technical sections.

.2 Implement Materials Source Separation Program for waste generated on project in compliance with approved methods and as approved by Departmental Representative.

.3 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

.4 Locate separated materials in areas which minimize material damage.

1.03 DIVERSION OF MATERIALS

.1 Create a list of materials to be separated from the general waste stream and stockpiled in separate containers, to the approval of the Departmental Representative and consistent with applicable fire regulations.

.2 Mark containers.

.3 Provide instruction on disposal practices.

1.04 STORAGE, HANDLING AND APPLICATION

.1 Handle waste materials not re-used, salvaged, or recycled in accordance with appropriate regulations and codes.

.2 Materials in separated condition: collect, handle, store on site, and transport off-site to an approved and authorized recycling facility.

.3 Materials must be immediately separated into required categories for re-use or recycling.

.4 Unless specified otherwise, materials for removal become the Contractor’s property.

.5 On-site sale of salvaged/recyclable material is not permitted.

.6 Provide Departmental Representative with receipts indicating quantity of material delivered to landfill.

.7 Provide Departmental Representative with receipts indicating quantity and type of materials sent for recycling.

END OF SECTION

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1 GENERAL

1.01 SUBMISSION

.1 Prepare instructions and data by personnel experienced in maintenance and operation of described products.

.2 Revise content of documents as required before final submittal.

.3 If requested, furnish evidence as to type, source and quality of products provided.

.4 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

1.02 FORMAT

.1 Organize data in the form of an instructional and electronic manual.

.2 Binders: vinyl, hard covered, 3 “D” ring, loose leaf 219x279 mm with spine and face pockets.

.3 Cover: identify each binder with typed or printed title “Project Record Documents”; list title of project and identify subject matter of contents.

.4 Arrange content by systems 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 Text: manufacturer’s printed data, or typewritten data.

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

1.03 CONTENTS, EACH VOLUME

.1 Table of contents – provide the following:

.1 Title of project.

.2 Date of submission.

.3 Names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.

.4 Schedule of products and systems, indexed to content of volume.

.2 For each product or system, list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product data: mark each sheet to clearly identify products and component parts, and data applicable to installation. Delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

1.04 AS-BUILT DOCUMENTS

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

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

.2 Field changes of dimension and detail.

.3 Changes made by change orders.

.4 Details not on original Contract drawings.

.5 References to related shop drawings and modifications.

.2 Contract Specifications: legibly mark each item to record actual “Workmanship of Construction”, including;

.1 Manufacturer, trade name, and catalogue number of each “Product/Material” actually installed, particularly optional items and substitute items.

.2 Changes made by addenda and change orders.

.3 As-built information:

.1 Record changes in red ink.

.2 Mark on 1 set of drawings, specifications and shop drawings at completion of project and, before final inspection, neatly transfer notations to second set.

.3 Provide 1 set of CDs in AutoCAD, Revit and PDF file format with all as-built information on the CDs.

.4 Submit all sets for the Departmental Representative.

1.05 WARRANTIES, BONDS, TEST REPORTS, INSPECTION REPORTS

.1 Separate each Document 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, Bonds, Test Results, Inspection Reports executed in duplicate by subcontractors, suppliers, manufacturers, and inspection agencies within 10 days after completion of the applicable item of work.

.4 Except for items put into use with the Departmental Representative’s permission, leave date of beginning of time of warranty until the date of substantial performance is determined.

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

.6 Co-execute submittals when required.

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

1.06 COMPLETION

.1 Submit a written certificate that the following have been performed:

.1 Work has been completed and inspected for compliance with the Contract documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Work is complete and ready for final inspection.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 CSA International

.1 CAN/CSA S350-M, Code of Practice for Safety in Demolition of Structures.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit written demolition course-of-action plan:

.1 Submit for review and approval by Departmental Representative proposed method of demolition and site plan showing access points, bins and laydown area.

.3 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution, from minimum 6 viewpoint locations on the roof, and minimum 2 viewpoints for each wall elevation. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

.4 Examine site and be familiar and conversant with existing conditions likely to affect work.

.5 Provide photographs of surrounding areas, including existing items not included within project scope but which may be liable to damage or be the subject of subsequent claims.

.6 Photographs not to include uniformed staff on duty.

1.03 SITE CONDITIONS

.1 Review "Hazardous Building Materials Assessment" dated February 14, 2020 prepared by Arcadis Design and Consultancy and take precautions to protect environment. See Appendix I.

.2 Notify Departmental Representative before disrupting building access or services.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 EXAMINATION

.1 Inspect the building and site and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

3.02 PREPARATION

.1 Protection of In-Place Conditions:

.1 Prevent movement or damage to adjacent utilities and parts of building to remain in place.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

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

.5 Do work in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Demolition/Removal:

.1 Remove items as indicated.

.2 Remove parts of existing building materials as required to permit new construction material installation.

.3 Separate waste materials for reuse, recycling and disposal.

.4 Remove recycling containers and bins from site and dispose of materials at locally available and authorized facilities.

3.03 CLEANING

.1 Cleaning:

.1 Progress Cleaning: leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 11 55 – General Instructions.

.2 Section 01 35 33 – Health and Safety Requirements.

.3 Section 02 82 00.01 – Asbestos Abatement-Minimum Precautions

1.2 REFERENCES

.1 Reports:

.1 Refer to the Assessment Report titled Hazardous Building Material Assessment Building E0423, Whistler, British Columbia, prepared for Public Services and Procurement Canada on behalf of the Royal Canadian Mounted Police, dated February 14, 2020. The report was prepared by Arcadis Canada Inc.

.2 Definitions:

.1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.

.2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.

.3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.

.4 Hazardous Building Material: component of a building or structure that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when altered, disturbed or removed during maintenance, renovation or demolition.

.3 Reference Standards:

.1 Canadian Environmental Protection Act,1999 (CEPA 1999)

.1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).

.2 SOR/2018-196 Prohibition of Asbestos and Products Containing Asbestos Regulations.

.2 Department of Justice Canada

.1 Transportation of Dangerous Goods Act, 1992 (TDG Act) [1992], (c. 34).

.2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 National Research Council Canada Institute for Research in Construction (NRC-IRC)

.1 National Fire Code of Canada (2010).

.5 WorkSafe BC

.1 British Columbia's Occupational Health and Safety Regulation (BC Reg. 296/97, including amendments to date of work)

.2 "Safe Work Practices for Handling Asbestos" (2017)

.3 "Lead-Containing Paints and Coatings; Preventing Exposure in the Construction Industry" (2017)

.6 British Columbia Hazardous Waste Regulation (BC Reg. 63/88)

.7 The Federal PCB Regulations (SOR/2008-273).

.8 The British Columbia Waste Management Act - Ozone Depleting Substances and Other Halocarbons Regulation (BC Reg. 387/99).

.9 The Federal Halocarbons Regulation (July 2003).

.10 Canadian Construction Association

.1 Standard Construction Document CCA 82 "Mould Guidelines for the Canadian Construction Industry" (2004)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data for hazardous materials to be used by the Contractor to complete the Work:

.1 Submit manufacturer's instructions, printed product literature and data sheets, and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 33 - Health and Safety Requirements to Departmental Representative for each hazardous material required prior to bringing hazardous material on site.

.3 Submit hazardous materials management plan to Departmental Representative that identifies hazardous materials, usage, location, personal protective equipment requirements, and disposal arrangements.

.4 Construction/Demolition Waste Management:

.1 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating percentage of construction/demolition wastes were recycled or salvaged

.5 Low-Emitting Materials: submit listing of adhesives and sealants used in building, comply with VOC and chemical component limits or restrictions requirements.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle hazardous materials to be used by the Contractor to complete the Work in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver hazardous materials to be used by the Contractor to site in original factory packaging, labelled with manufacturer's name and address.

.3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.4 Storage and Handling Requirements:

.1 Co-ordinate storage of hazardous materials to be used by the Contractor to complete the Work with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.

.2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

.3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.

.4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.

.1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.

.2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.

.5 Transfer of flammable and combustible liquids is prohibited within buildings.

.6 Transfer flammable and combustible liquids away from open flames or heat-producing devices.

.7 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.

.8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.

.9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.

.10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:

.1 Store hazardous materials and wastes in closed and sealed containers.

.2 Label containers of hazardous materials and wastes in accordance with WHMIS.

.3 Store hazardous materials and wastes in containers compatible with that material or waste.

.4 Segregate incompatible materials and wastes.

.5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.

.6 Store hazardous materials and wastes in secure storage area with controlled access.

.7 Maintain clear egress from storage area.

.8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.

.9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.

.10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

.11 When hazardous waste is generated on site:

.1 Co-ordinate transportation and disposal with Departmental Representative.

.2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.

.3 Use licensed carrier authorized by provincial authorities to accept subject material.

.4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material.

.5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.

.6 Only trained personnel handle, offer for transport, or transport dangerous goods.

.7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.

.8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.

.9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

.12 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

.13 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

Part 2 Products

2.1 MATERIALS

.1 Description:

.1 Bring on site only quantities hazardous material required to perform Work.

.2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

Part 3 Execution

3.1 HAZARDOUS MATERIALS ABATEMENT

.1 Scope of Abatement Activities.

.1 Abatement shall be conducted to handle, alter, remove and/or dispose of hazardous building materials as identified in the Assessment Report in accordance with applicable regulations, guidelines, standards and/or best practices for such work,

where such identified hazardous building materials will be impacted (handled, altered, damaged, removed) by the Work.

.2 Contractor is responsible for reviewing plans, specifications and reports such that they understand the locations and amounts of hazardous materials that will be impacted by the Work of this contract, and such that appropriate plans and budgets can be included in their overall bids.

.3 The listing below is a summary of the identified hazardous building material categories and associated removal and disposal regulations, guidelines and/or standards.

.1 Asbestos-Containing Materials (ACMs)

.1 Refer to the Assessment Report for identities and locations of ACMs that may require disturbance during the Work.

.2 Actions that will disturb identified ACMs are to be conducted in accordance with the requirements of the 2017 WorkSafe BC publication "Safe Work Practices for Handling Asbestos", by appropriately trained personnel.

.3 Waste transportation to be conducted in accordance with BC Reg. 63/88 and the Federal Transportation of Dangerous Goods Regulation.

.4 Waste disposal to be conducted in accordance with BC Reg. 63/88.

.5 Contractor is to conduct a risk assessment and document work procedures for actions/tasks that will or may disturb identified ACMs.

.6 Contractor is to submit the documented work procedures to the Departmental Representative for review, at least 10 days prior to initiation of work.

.1 Documented work procedures must either:

.1 Include provisions for air monitoring; or,

.2 Include risk assessments/work procedures with sufficient details to describe why air monitoring is not required.

.7 Notify Departmental Representative of suspected ACM discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Departmental Representative.

.8 If air monitoring is required as part of the Contractor's work procedures, Contractor shall retain an independent, qualified third party to take air samples inside and outside of Asbestos Work Areas in accordance with the most stringent of the recommendations set forth in the Canada Labour Code Part II, Occupational Health and Safety Regulations, BC Reg. 296/97 and the 2017 WorkSafeBC Manual "Safe Work Practices for Handling Asbestos".

.1 Air samples will be collected and analyzed in accordance with NIOSH method 7400.

.2 Air sample results will be provided to the Contractor and Departmental Representative within 24-hours of sample collection.

.3 Analysis will be conducted by qualified persons or laboratories that take part in a documented QA/QC program for such analysis.

.12 Contractor to stop Work when airborne fibre measurements exceed 0.05 fiber/cubic centimetre (f/cc), when PPE and protection factors are considered, and to correct procedures.

.13 Additional monitoring will be conducted, where possible, to verify procedural corrections were effective.

.14 If air monitoring shows that areas outside Asbestos Work Area are contaminated as determined by the Departmental Representative, Contractor will be notified to maintain and clean these areas in same manner as that applicable to Asbestos Work Area, at no additional cost to the Contract.

.15 When asbestos leakage from Asbestos Work Area has occurred, or is likely to occur, Departmental Representative may order Work shutdown and correction of deficiencies.

.16 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

.2 Lead and Lead-Containing Paints (LCPs)

.1 Refer to the Assessment Report for identities and locations of lead-containing materials (including LCPs) that may require disturbance during the Work.

.2 Actions that will disturb lead-containing materials (including paints and materials coated with LCPs) are to be conducted in accordance with the requirements of the current version of the WorkSafe BC publication "Lead-Containing Paint and Coatings: Preventing Exposure in the Construction Industry," keeping airborne exposure to lead dust to less than the 8-hour Occupational Exposure Limit (OEL) for lead of 0.05 milligram per cubic metre (mg/m^3).

.3 Although LCPs and items coated with LCPs will be removed for disposal during the Work, unless deemed necessary through risk assessment or cost analysis conducted by the Contractor, comprehensive removal of LCPs from items or surfaces is not expected to be required during the Work.

.1 Refer to the provisions of the 2017 WorkSafe BC publication "Lead-Containing Paint and Coatings: Preventing Exposure in the Construction Industry" for removal of LCPs from surfaces before any welding and torch-cutting, should the Contractor plan to use such methods to complete the Work.

.1 Contractor will be responsible for verification testing of surfaces where LCPs have been removed. Confirmation of acceptable results is to be provided to the Departmental Representative for review before proceeding with any welding or torch-cutting on surfaces where LCPs were present.

.4 Waste transportation to be conducted in accordance with BC Reg. 63/88 and the Federal Transportation of Dangerous Goods Regulation.

.5 Waste disposal to be conducted in accordance with BC Reg. 63/88.

.3 Polychlorinated Biphenyls (PCBs)

.1 Removal, alteration and/or disposal of PCB-containing equipment is not anticipated to be required during the Work.

.2 Should a material suspected to contain PCBs become uncovered during renovation activities (i.e., dielectric fluids, hydraulic fluids), all work in the areas that may disturb the material should be stopped. Samples of the suspect material should be submitted for laboratory analysis to determine if PCBs are present.

.3 PCB-containing items identified for removal and disposal should be handled, transported, stored and disposed of in accordance with the following:

.1 The transportation and disposal requirements of BC Reg. 63/88 .

.2 The transportation requirements of the Federal Transportation of Dangerous Goods Regulation.

.3 The Federal PCB Regulations (SOR/2008-273)

.4 Mould

.1 Removal, alteration and/or disposal of mould-impacted materials is not anticipated to be required during the Work.

.5 Mercury

.1 Removal of mercury-containing materials is not anticipated to be required during the Work:

.2 Precautions should be taken if workers may potentially be exposed to mercury or mercury vapours to ensure that workers exposure levels do not exceed the occupational exposure limit of 0.025 mg/m^3 as per the BC Reg. 296/97. This can be achieved by providing respiratory and skin protection applicable to the hazard and task to be completed.

.6 Ozone-Depleting Substances (ODSs)

.1 Removal, alteration and/or disposal of refrigeration or air conditioning equipment with ODS refrigerants is not anticipated to be required during the Work.

.7 Silica

.1 When silica-containing materials are to be disturbed and/or removed (e.g., coring through concrete slabs, demolition of masonry or concrete units), ensure dust control measures are employed such that airborne silica dust concentrations do not exceed the exposure limit as stipulated by BC Reg. 296/97 (Cristobalite and Quartz – each 0.025 mg/m^3). This would include, but not be limited to, the following:

.1 Providing workers with respiratory protection

.2 Wetting the surface of the materials, use of water or dust suppressing agents to prevent dust emissions

.3 Providing workers with facilities to properly wash prior to exiting the work area.

3.2 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning. Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling.

.1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.

.2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.

.3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.

.4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.

.5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

.6 Dispose of hazardous wastes in timely fashion in accordance with applicable federal and provincial regulations.

.7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

.8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:

.1 Hazardous wastes recycled in manner constituting disposal.

.2 Hazardous waste burned for energy recovery.

.3 Lead-acid battery recycling.

.4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Refer to the Assessment Report titled Hazardous Building Material Assessment Building E0423, Whistler, British Columbia, prepared for Public Services and Procurement Canada on behalf of the Royal Canadian Mounted Police, dated February 14, 2020. The report was prepared by Arcadis Canada Inc.

.2 Unless otherwise determined through risk assessment conducted by a qualified person, comply with requirements of this Section when disturbance to the following materials is required to complete the Work:

.1 Asbestos-containing grey window sealant in two (2) windows at the front entrance.

1.2 SECTION INCLUDES

.1 Requirements and procedures for applicable procedures and personal protective equipment to be utilized during set-up of asbestos abatement work areas and for abatement of ACMs of the type described within.

1.3 RELATED REQUIREMENTS

.1 Section 01 11 55 – General Instructions

.2 Section 01 35 33 - Health and Safety Requirements

1.4 REFERENCES

.1 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999 (CEPA).

.2 SOR/2018-196 Prohibition of Asbestos and Products Containing Asbestos Regulations

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.4 Underwriters' Laboratories of Canada (ULC)

.5 WorkSafe BC

.1 British Columbia’s Occupational Health and Safety Regulation (BC Reg. 296/97, including amendments to date of work)

.2 “Safe Work Practices for Handling Asbestos” (2017 Edition)

.6 The current version of the British Columbia Hazardous Waste Regulation (BC Reg. 63/88)

1.5 DEFINITIONS

.1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

.2 Amended Water: water with non-ionic surfactant wetting agent added to reduce water tension to allow thorough wetting of fibres.

.3 Asbestos-Containing Materials (ACMs): materials that contain 0.5 per cent or more asbestos by dry weight (or vermiculite insulation materials with any asbestos) and are identified under Existing Conditions including fallen materials and settled dust.

.4 Asbestos Work Area: area where work takes place which will, or may, disturb ACMs.

.5 Authorized Visitors: Departmental Representative and representatives of regulatory agencies.

.6 Competent worker: in relation to specific work, means a worker who:

.1 Is qualified because of knowledge, training and experience to perform the work.

.2 Is familiar with the provincial and federal laws and with the provisions of the regulations that apply to the work.

.3 Has knowledge of all potential or actual danger to health or safety in the work.

.7 Friable material: means material that:

.1 When dry, can be crumbled, pulverized or powdered by hand pressure, or

.2 is crumbled, pulverized or powdered.

.8 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

.9 Occupied Area: any area of the building or work site that is outside Asbestos Work Area.

.10 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.

.11 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for work.

1.6 SUBMITTALS

.1 Submittals in accordance with Section 01 11 55 – General Instructions.

.2 Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.

.3 Submit Provincial and/or local requirements for Notice of Project Form.

.4 Submit proof of Contractor's Asbestos Liability Insurance.

.5 Submit to Departmental Representative necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed.

.6 Submit proof that all asbestos workers and/or supervisor have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.

.7 Submit proof satisfactory to Departmental Representative that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test) with respirator that is personally issued.

1.7 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is performed.

.2 Health and Safety:

.1 Perform construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.

.2 Safety Requirements: worker protection.

.1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:

.1 Air purifying half-mask respirator with P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The respirator to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location. The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker not to be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.

.2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing shall consist of a head covering and full body covering that fits snugly at the ankles, wrists

and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing to include suitable footwear, and to be repaired or replaced if torn.

.2 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

.3 Before leaving Asbestos Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.

.4 Facilities for washing hands and face shall be provided within or close to the Asbestos Work Area.

.5 Ensure workers wash hands and face when leaving Asbestos Work Area. Facilities for washing are to be supplied by the Contractor.

.6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 11 55 – General Instructions.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Separate and place in designated containers steel metal plastic waste in accordance with Waste Management Plan.

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

.6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

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

.8 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, and Municipal regulations. Dispose of asbestos waste in sealed double thickness 6 mil bags or leak proof drums. Label containers with appropriate warning labels.

.9 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.9 EXISTING CONDITIONS

.1 Reports and information pertaining to ACMs that may be handled, removed, or otherwise disturbed and disposed of during this project are bound into this specification in the Appendix.

.2 Notify Departmental Representative of additional suspected ACMs discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Departmental Representative.

1.10 SCHEDULING

.1 Hours of Work: perform work during normal working hours.

1.11 OWNER'S INSTRUCTIONS

.1 Before beginning Work, provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.

.2 Instruction and training related to respirators includes, following minimum requirements:

- .1 Fitting of equipment.
- .2 Inspection and maintenance of equipment.
- .3 Disinfecting of equipment.
- .4 Limitations of equipment.

.3 Instruction and training must be provided by a competent, qualified person.

Part 2 Products

2.1 MATERIALS

.1 Drop Sheets:

- .1 Polyethylene: 0.15 mm thick.
- .2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.

.2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.

.3 Waste Containers: contain waste in two separate containers.

- .1 Inner container: 0.15 mm thick sealable polyethylene waste bag.
- .2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm thick sealable polyethylene bag.
- .3 Labelling requirements: affix pre-printed cautionary asbestos warning in both official languages that is visible when ready for removal to disposal site.

.4 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.

.5 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions using amended water.

Part 3 Execution

3.1 PROCEDURES

.1 Do construction occupational health and safety in accordance Section 01 35 33 - Health and Safety Requirements.

.2 Before beginning Work, isolate Asbestos Work Area using, minimum, preprinted cautionary asbestos warning signs in both official languages that are visible at access routes to Asbestos Work Area.

.1 Remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.

.2 Use HEPA vacuum or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.

.3 Do not use compressed air to clean up or remove dust from any surface.

.3 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.

.1 Use FR polyethylene drop sheets over surfaces that absorbs dust in Asbestos Work Area where dust and contamination cannot otherwise be safely contained. Drop sheets are not to be reused.

.4 Wet materials containing asbestos to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.

.1 Use garden reservoir type low - velocity fine - mist sprayer.

.2 Perform Work to reduce dust creation to lowest levels practicable.

.3 Work will be subject to visual inspection and air monitoring.

.4 Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.

.5 Frequently and at regular intervals during Work and immediately on completion of work:

.1 Dust and waste to be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a waste container, and

.2 Drop sheets to be wetted and placed in a waste container as soon as practicable.

.6 Cleanup:

.1 Place dust and asbestos containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste; wet and fold these items to contain dust, and then place in plastic bags.

.2 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from Asbestos Work Area.

.3 Seal waste bags and remove from site. Dispose of in accordance with requirements of Provincial and Federal Authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that the appropriate guidelines and regulations for asbestos disposal are followed.

.4 Perform final thorough clean-up of Work areas and adjacent areas affected by Work using HEPA vacuum.

3.2 AIR MONITORING

.1 If air monitoring is required, from beginning of work until completion of cleaning operations, Contractor will shall retain an independent, qualified third party to take air samples inside and outside of Asbestos Work Area enclosure[s] in accordance with British Columbia's Occupational Health and Safety Regulation and the current version of the WorkSafeBC Manual entitled "Safe Work Practices for Handling Asbestos".

.1 Contractor will be responsible for monitoring inside enclosure in accordance with applicable Provincial Occupational Health and Safety Regulations.

.2 If air monitoring shows that areas outside Asbestos Work Area enclosure[s] are contaminated, enclose, maintain and clean these areas in same manner as that applicable to Asbestos Work Area, at no additional cost to the Contract

.3 Ensure that respiratory safety factors are not exceeded.

.4 During the course of Work, the Environmental Specialist will measure fibre content of air outside Work areas by means of air samples analyzed by Phase Contrast Microscopy (PCM).

.1 Stop Work when PCM measurements exceed 0.05 f/cc and correct procedures.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 01 33 00 – Shop Drawings, Product Data, & Samples

.2 06 08 99 – Rough Carpentry for Minor Works

.3 06 20 13 – Exterior Finish Carpentry

1.02 REFERENCES

.1 ASTM International

.1 ASTM A 123/A 123M-12, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM B 211M-12e1, Standard Specification for Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire (Metric).

.3 ASTM B 221M-08, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

.4 ASTM B 241/B 241M-12, Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.

.5 ASTM B 483/B 483M-13, Standard Specification for Aluminum and Aluminum-Alloy Drawn Tubes For General Purpose Applications.

.6 ASTM E 935-13, Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.

.2 CSA International

.1 CSA W59-03(R2008), Welded Steel Construction, (Metal Arc Welding).

1.03 SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for aluminum guardrails and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada.

.2 Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

.3 Show complete layout; plan views, elevations, connections, details for fabrication and attachment to other elements, and other installation details.

.4 Engage a professional engineer licensed to practice in the Province of British Columbia who shall:

.1 Provide Schedule S-B and carry out enough timely and regular inspections to:

.1 Review fabrication and ensuring specified products are used.

.2 Ensure that manufacturer's design and installation specification as tested has been replicated.

.3 Ensure and certify installation meets the requirements of NBC (2015) for design, construction and installation, notably for wind uplift.

.4 Issue a Letter of Certification (Schedule S-C) stating that the components have been fabricated and installed in accordance with design and Code requirements.

.5 The cost of the above engineering, inspections and issuing required Schedules S-B and S-C shall be included as part of the cost for work under this.

1.04 QUALITY ASSURANCE

.1 Perform welding to CSA W59.

1.05 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect railings from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

2 PRODUCTS

2.01 DESIGN CRITERIA

.1 Installed handrail assembly and attachments to resist lateral force of 0.75 Kn/m or a concentrated load of 1.0Kn applied at any point whichever governs, without causing damage or permanent set. Test in accordance with ASTM A 935.

2.02 ALUMINUM RAILING

.1 Rails and Posts: 38 mm diameter, extruded tubing.

.2 Pickets: 25 x 25 mm, extruded tubing.

.3 Fittings: elbows, T-shapes, wall brackets, escutcheons; cast aluminum.

.4 Mounting: aluminum brackets and flanges.

.5 Exposed Fasteners: stainless steel lag and anchor bolts, color to be consistent with design of railing.

.6 Finish coatings Alcan Alloy 6061-T6.

.7 Colour: To be selected by Departmental Representative from manufacturer’s standard range of colors

2.03 FABRICATION

.1 Fit and shop assemble components in largest practical sizes for delivery to site.

.2 Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

.3 Provide anchors and bracket plates required for connecting railings to structure.

.4 Exposed Mechanical Fastenings: color to match railing; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

.5 Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

.6 Continuously seal joined pieces. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.

.7 Accurately assemble components to each other and to building structure.

.8 Accommodate for expansion and contraction of members and building movement without damage to connections or members.

3 EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for handrail installation in accordance with manufacturer's written instructions.

.1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.2 Proceed with installation only after any unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.02 INSTALLATION

.1 Install aluminum handrails in accordance with manufacturer's instructions.

.2 Install components plumb and level.

.3 Anchor railings to structure with anchors, plates as required.

.4 Conceal bolts and screws whenever possible.

.5 Assemble with spigots and sleeves to accommodate tight inconspicuous joints and secure installation.

3.03 ERECTION TOLERANCES

.1 Maximum variation from plumb: 4 mm.

3.04 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.05 PROTECTION

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

.2 Repair damage to adjacent materials caused by railing installation.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 06 20 13 - Exterior Finish Carpentry

.2 Section 07 21 13 - Board Insulation

.3 Section 07 44 56 - Mineral Fiber Reinforced Cementitious Cladding

.4 Section 07 61 00 - Sheet Metal Roofing

.5 Section 07 62 00 - Sheet Metal Flashing and Trim

.6 Section 09 91 13 - Exterior Painting

1.02 REFERENCES

.1 CSA International

.1 CAN/CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.2 CSA O121-08(R2013), Douglas Fir Plywood.

.3 CSA O141-05(R2014), Softwood Lumber.

.4 CSA O151-09(R2014), Canadian Softwood Plywood.

.5 CAN/CSA-O325.0-07(R2012), Construction Sheathing.

.6 CAN/CSA O437.0-93(R2011), Standards on OSB and Waferboard.

.2 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2014.

1.03 QUALITY ASSURANCE

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

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

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

1.04 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wood from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

2 PRODUCTS

2.01 MATERIALS

.1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:

.1 CAN/CSA-O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.3 CAN/CSA-Z809 or FSC or SFI certified.

.2 Furring, blocking and backing:

.1 Board sizes: "Standard" or better grade.

.2 Grade: "Standard" or better grade.

.3 Roof sheathing:

.1 Plywood, DFP or CSP sheathing grade or PP standard sheathing grade, T&G square edge, minimum 12.5mm (1/2") thick (or thickness as required to match existing sheathing).

2.02 ACCESSORIES

.1 Nails, spikes and staples: to CSA B111.

.2 Proprietary fasteners: screws, recommended for purpose by manufacturer.

3 EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for rough carpentry installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.02 INSTALLATION

.1 Comply with requirements of NBC, supplemented by the following paragraphs.

.1 Install wood backing where required to support any new wood sheathing edges, soffits, railings and flashings.

.2 Replace any deteriorated roof sheathing with sheathing matching thickness.

.3 Install wood rainscreen members behind new cladding.

.4 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.5 Countersink bolts where necessary to provide clearance for other work.

3.03 CLEANING

.1 Progress Cleaning:

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Waste Management: separate waste materials for reuse and recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 07 21 13 – Board Insulation

.2 Section 07 42 13 – Gutters and Downspouts

.3 Section 07 44 56 – Mineral Fiber Reinforced Cementitious Panels

.4 Section 07 92 00 – Joint Sealants

.5 Section 09 91 13 – Exterior Painting

1.02 REFERENCES

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)

.1 Architectural Woodwork Standards, Edition 2, 2014.

.2 ASTM International

.1 ASTM F 1667-15, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-11.3-M87, Hardboard.

.4 CSA International

.1 CAN/CSA B111-1974(R2003), Wire Nails, Spikes and Staples

.2 CSA O141-05(R2014), Softwood Lumber.

.3 CSA O151-09(R2014), Canadian Softwood Plywood.

.4 CAN/CSA-Z809-08(R2013), Sustainable Forest Management.

.5 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2014.

1.03 SUBMITTALS

.1 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

1.04 QUALITY ASSURANCE

.1 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).

1.05 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Storage and Handling Requirements:

.1 Store materials off the ground and protect with a weather resistant cover.

2 PRODUCTS

2.01 MATERIALS

.1 Fascia and trim softwood lumber: comb-faced pre-primed SPF kiln-dried wood, moisture content 19% or less in accordance with following standards:

.1 CSA O141.

.2 CAN/CSA-Z809 or FSC or SFI certified.

.3 NLGA Standard Grading Rules for Canadian Lumber.

.4 Machine stress-rated lumber is acceptable.

.5 Hardwood lumber: moisture content 12% or less.

2.02 ACCESSORIES

.1 Nails and staples: to CSA B111; galvanized to ASTM A 123/A 123M for exterior work, hot-dipped galvanized for treated lumber; stainless steel finish elsewhere.

.2 Wood screws: hot dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper, type and size to suit application.

.3 Adhesive and Sealants: in accordance with Section 07 92 00 - Joint Sealants.

3 EXECUTION

3.01 INSTALLATION

.1 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.

.2 Form joints to conceal shrinkage.

3.02 CONSTRUCTION

.1 Fastening:

.1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.

.2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.

.3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and fill.

.4 Replace items with damage to wood surfaces including hammer and other bruises.

3.03 PROTECTION

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

3.04 FIELD QUALITY CONTROL

.1 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

.2 Field Inspection: Coordinate filed inspection in accordance with Section 01 45 00 – Quality Control.

3.05 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

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

1.02 REFERENCES

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

.1 ASTM D 570-98(2010)e1, Standard Test Method for Water Absorption of Plastics.

.2 ASTM D2240-05(2010), Standard Test Method for Rubber Property—Durometer Hardness.

.3 D2240-05(2010), Standard Test Method for Rubber Property—Durometer Hardness.

.4 ASTM D 5147/D 5147M-14, Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material.

.5 ASTM D5034-09(2013), Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test).

.6 ASTM D5035-11, Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method).

.7 ASTM F 1869-11, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

.8 ASTM F 2170, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

.9 ASTM F 2659, Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and Other Floor Slabs and Screeds Using a Non-Destructive Electronic Moisture Meter.

.2 International Concrete Repair Institute, (ICRI).

.1 ICRI 310.2R-2013, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays and Concrete Repair.

1.03 SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for plywood and include product characteristics, performance criteria, physical size, finish and limitations.

1.04 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

1.05 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: Installer with three (3) years' experience by the manufacturer as having the necessary training to install manufacturer's products.

2 PRODUCTS

2.01 MATERIALS

.1 Primer: translucent cloudy two-component polymethyl methacrylate-based (PMMA) primer.

.1 Thickness: 0.54mm (22 wet mils).

.2 Specific Gravity @ 20°C: 1.02 kg/l.

.3 Viscosity @ 25°C: 1200 cP.

.4 Shore A: to ASTM D2240, 97.

.2 Membrane Flashing: two-component polymethyl methacrylate-based (PMMA) liquid membrane combined with fleece fabric to form a reinforced membrane for flashings.

.1 Final thickness: 2.9mm.

.2 Peak load @23°C avg: to ASTM D5147 Sec 6, 12.3 kN/m (70lbf/inch).

.3 Elongation @ peak load, avg.: to ASTM D5147 Sec 6, 42%.

.4 Shore A hardness, avg: ASTM D2240, 81.

.5 Water absorption: to ASTM D570, Method 1 to 0.41% and Method II to 1.57%.

.6 Low temperature flexibility: to ASTM D5147 Sec 11, -25°C.

.7 Dimensional stability: to ASTM D5147, Sec 10 to -0.063%.

.8 Tear strength: to ASTM D5147 Sec 7, to 0.5kN (107 lbf).

.9 Colour: pebble grey

2.02 ACCESSORIES

.3 Filling paste: Two-component polymethyl methacrylate-based (PMMA) liquid resin used as a sealant to fill cracks, voids and depressions before installation of liquid membranes.

.4 Catalyst: Dibenzoyl peroxide-based reactive agent used to induce curing of resin products during membrane application.

.5 Fabric Reinforcement: non-woven, needle-punched polyester fabric used as fabric reinforcement in liquid-applied membrane systems.

.1 Final thickness: 0.75 – 1.0mm (30 – 40 mils).

.2 Weight: 100g/m2.

.3 Tensile strength @ break (N-50mm): to ASTM D1682, ≥130 long, ≥150 transv.

.4 Elongation: to ASTM D5034 and D5035, ≥50% long, ≥ 70% transv.

.5 Water absorption:1.0%.

.6 Tear resistance: >200N.

.7 Puncture strength: >240N.

3 EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.02 PREPARATION

.1 Protect adjacent materials and mask area where membrane to be installed.

.2 Prepare surface and products in accordance with manufacturer’s written installation instructions.

.1 Concrete must be fully cured (28 days) with a minimum hardness of 24 MPa (3,500 psi).

.2 Moisture testing: test concrete to ensure substrate maximum moisture content does not exceed 6% (ASTM F 2659), or 1.5 kg/100 m²/24h (ASTM F 1869), or an internal relative humidity content of 75% (ASTM F 2170).

.3 Surfaces to be covered with the membrane must have a concrete surface profile (CSP) of 2 to 4 in accordance with the International Concrete Repair Institute.

.3 Precut fleece prior to activation of membrane, allowing length for overlapping of edges as recommended by manufacturer.

.4 All material to be from same batch.

3.03 INSTALLATION

.1 Install according to manufacturer's written installation instructions.

.2 Filling paste: Apply resin where required using rollers, brushes or notched squeegees provided for this purpose in accordance with manufacturer's instructions for the surface preparation and the use of primer.

.3 Primer: prepare with catalyst in accordance with manufacturer's written instructions and install evenly to substrate.

.4 Membrane and reinforcement: prepare and install membrane and reinforcement in accordance with manufacturer's written instructions.

.1 All flashing membranes must be installed together with the surface membranes as the work progresses.

.2 All flashing membranes must be at least 200 mm (8").

.3 Apply first layer of membrane to a wet thickness of 1.3 to 1.5mm using rollers, brushes or notched squeegees provided for this purpose.

.4 Lay out the polyester reinforcement on the resin to prevent the formation of wrinkles, swellings or fishmouths.

.5 Use rollers, brushes or notched squeegees in order to fully saturate resin reinforcement and remove wrinkles and air bubbles under the reinforcement before membrane cures.

.6 Apply second layer of membrane to a second layer wet thickness of 0.6 to 0.7mm.

.7 Each reinforcement shall overlap the previous one by a minimum of 50 mm (2").

.8 Final coating to be smooth and even.

3.04 FIELD QUALITY CONTROL

.1 Field reviews: notify Consultant when ready for review and prior to concealing assemblies.

3.05 CLEANING

.1 Progress cleaning: leave work area clean at the end of each day in accordance with Section 01 74 11 - Cleaning.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Waste Management: separate waste materials for reuse and recycling. Dispose of off-site.

3.06 PROTECTION

.1 Protect installed products from damage during construction.

.2 Repair damage to adjacent materials caused by installation.

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 07 27 00 – Air Barriers and Membranes

.2 Section 07 44 56 – Mineral Fiber Reinforced Cementitious Panels

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

1.02 REFERENCES

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

.1 ASTM C165 - [2012], Standard Test Method for Measuring Compressive Properties of Thermal Insulations.

.2 ASTM C303 - [2010], Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.

.3 ASTM C518 - [2010], Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

.4 ASTM C612 - [2010], Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

.5 ASTM C665 - [2011], Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

.6 ASTM C795 - [2013], Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

.7 ASTM C1104/C1104M - [2013], Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.

.8 ASTM C1338 - [2008], Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.

.9 ASTM E96/E96M - [2010], Standard Test Methods for Water Vapor Transmission of Materials.

.2 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC S102 - [2010], Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.2 CAN/ULC S114 - [2005], Standard Method of Test for Determination of Non-Combustibility in Building Materials.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Safety Data Sheets (SDS).

1.03 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit electronic copies of WHMIS SDS - Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's insulation products and adhesives.

.2 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

.3 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

1.04 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Health and Safety Requirements: do construction occupational health and safety in accordance with Section [01 35 29.06 - Health and Safety Requirements].

1.05 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site for recycling in accordance with Waste Management Plan

2 PRODUCTS

2.01 INSULATION

.1 Description:

.1 Semi-rigid stone wool insulation board: Non-combustible and fire resistant, lightweight, water repellent, rigid insulation board with rigid upper surface to ASTM C612 Type IVB.

.2 Performance Criteria:

.1 Board insulation for exterior cavity wall: To ASTM C612 Type IVB.

.1 Fire performance:

.1 Non-combustibility: To CAN/ULC S114.

.2 Surface Burning Characteristics: To CAN/ULC S102.

.1 Flame spread: 0.

.2 Smoke developed: 0.

.2 Thermal resistance:

.1 RSI value/25.4 mm at 24 º C: 0.75 m^2K/W to ASTM C518 (C177).

.3 Water vapour permeance: 1555 ng/Pa.s.m^2.

.4 Moisture sorption: 1 % maximum to ASTM C1104/C1104M.

.5 Fungi resistance: Zero mould growth to ASTM C1338.

.6 Corrosive resistance:

.1 Steel to ASTM C665: Pass.

.2 Stainless steel to ASTM C795: Pass.

.7 Recycled content: [16][40] % minimum.

.3 Materials:

.1 Semi-rigid stone wool insulation board: Non-combustible and fire resistant, lightweight, water repellent, rigid insulation board with rigid upper surface to ASTM C612 Type IVB.

.1 Size: 406mm x 1219 mm.

.2 Thickness: 25.4mm.

.3 Thicknesses below 50 mm Density:

.1 70 kg/m^3 to ASTM C303.

.4 Thicknesses 65 mm and above Density:

.1 Outer layer: 100 kg/m3 to ASTM C303.

.2 Inner layer: 60 kg/m3 to ASTM C303.

2.02 ACCESSORIES

.1 Insulation fasteners: in accordance with insulation manufacturer’s written instructions.

.2 Insulation clips: in accordance with insulation manufacturer’s written instructions

3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.02 WORKMANSHIP

.1 Install insulation after building substrate materials are dry.

.2 Install insulation to maintain continuity of thermal protection to building elements and spaces.

.3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.

.4 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

3.03 EXAMINATION

.1 Examine substrates and immediately inform Departmental Representative in writing of defects.

.2 Prior to commencement of work ensure:

.1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.04 SEMI-RIGID BOARD INSTALLATION

.1 Install insulation in accordance with manufacturer's recommendations.

.2 Install fasteners to insulation over substrate in accordance with manufacturer’s recommended tools and instructions.

3.05 FIELD QUALITY CONTROL

.1 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

.2 Field Inspection: Coordinate filed inspection in accordance with Section 01 45 00 – Quality Control.

3.06 CLEANING

.1 Progress Cleaning: Perform cleanup as work progresses in accordance with Section 01 74 00 - Cleaning and Waste Management.

.1 Leave work area clean at end of each day.

.2 Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 – Cleaning and Waste Management.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Not used.

1.02 REFERENCES

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

.1 ASTM C 423-09a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

.2 ASTM C 518-10, Standard Test Method for Steady-State Flux Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

.3 ASTM E 605-93(2011), Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.

.2 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S102-07, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.2 CAN/ULC-S703-09, Standard for Cellulose Fibre Insulation (CFI) for Buildings.

1.03 SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet.

.2 Submit electronic copies of WHMIS SDS - Safety Data Sheets including VOC's for adhesives and primers.

.3 Test Reports:

.1 Submit test reports, verifying qualities of insulation meet or exceed requirements of this specification, in accordance with Section 01 45 00 - Quality Control.

.2 Provide manufacturer’s ‘Certificate of Coverage Form’ indicating coverage and thickness provided is in accordance with specified requirements.

1.04 QUALITY ASSURANCE

.1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.05 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

1.06 SITE CONDITIONS

.1 Site Environmental Requirements:

.1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

.2 Ventilation:

.1 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and application to maintain non-toxic, unpolluted, safe working conditions.

2 PRODUCTS

2.01 MATERIALS

.1 Insulation: glass fibers, chemically impregnated to resist mould, mildew and fire, without an internal binder, which does not react with base surface and adjacent materials. Applied and cured insulation to conform to following requirements:

.1 Cellulose fibre insulation: to CAN/ULC-S703, Type 5, Blowing Wool.

.2 RSI factor: total RSI 2.1 (R12) minimum to ASTM C 518.

.3 Density: as per manufacturer according to ASTM E 605.

.4 Surface burning characteristics: to CAN/ULC-S102.2.

.1 Flame spread: 0.

.2 Smoke developed: 0.

3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.02 PREPARATION

.1 Protection:

.1 Provide temporary enclosures as required to prevent spray from contaminating air beyond application area.

.2 Protect adjacent surfaces and equipment from damage by over spray, fall-out, and dusting of insulation materials.

.3 Protect attic ventilation baffles to ensure they’re not compromised by blown insulation

3.03 APPLICATION

.1 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

.2 Apply insulation to sufficient thickness to achieve specified RSI 2.1 (R12) of new/additional insulation.

3.04 FIELD QUALITY CONTROL

.1 Reviewed by Department Representative after completion of the work.

3.05 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 06 08 99 – Rough Carpentry for Minor Works

.2 Section 07 44 56 – Mineral Fiber Reinforced Cementitious Panels

.3 Section 07 61 00 – Sheet Metal Roofing

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

1.02 REFERENCES

.1 Regulatory Building Codes:

.1 WorkSafe BC – Worker's Compensation Board of British Columbia, Occupational Health and Safety Regulations.

.2 National Building Code (NBC), 2015 and amendments.

1.03 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

1.04 QUALITY ASSURANCE

.1 Qualifications:

.1 Applicator: company specializing in performing work of this section with minimum 5 years' experience with installation of air/vapour barrier systems.

.1 Completed installation must be approved by the material manufacturer.

.2 Mock-up

.1 Install mock-up around 1. front door and 2. a window using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.

.1 Mock-up size: coordinate with Department Representative.

.2 Mock-up may remain as part of the work

1.05 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

1.06 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.2 Place materials defined as hazardous or toxic waste in designated containers.

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

2 PRODUCTS

2.01 SHEET MATERIALS

.1 Roof underlayment: synthetic wind resistant membrane, complete with a slip resistant walking surface:

.1 Minimum thickness ASTM D1777: 30 mils. (0.75mm)

.2 Weight per square ASTM D5261: 4.7 lbs (2.13kg)

.3 Permeability E96: 0.06 Perms

.4 Nail sealability ASTM D1970: Pass

.5 Tensile Strength ASTM D751: MD 178 lbs (81 kg) / CD 176 lbs (80 kg)

.6 Tear Strength ASTM D4533: MD 35 lbs (15.8 kg) / CD 55 lbs (25 kg)

.7 Burst Strength ASTM D751: 300psi (2065kPa)

.8 Elongation ASTM D751: MD 20% CD 20%

.9 Class a Fire ASTM E108: Pass

.10 UV exposure capability: up to 6 months

.3 Wall weather barrier: non-woven, spunbonded polyolefin, non-perforated, weather barrier:

.1 Air Penetration: <.004 cfm/ft2 at 1.57 psf, when tested in accordance with ASTM E2178. Type I per ASTM E1677.

.2 Water Vapor Transmission: 56 perms, when tested in accordance with ASTM E96-05, Method A.

.3 Water Penetration Resistance: 250 cm when tested in accordance with AATCC Test Method 127.

.4 Basis Weight: 1.8 oz/yd2, when tested in accordance with TAPPI Test Method T-410.

.5 Air Resistance: 1200 seconds, when tested in accordance with TAPPI Test Method T-460.

.6 Tensile Strength: 30/30 lbs/in., when tested in accordance with ASTM D882.

.7 Tear Resistance: 8/6 lbs, when tested in accordance with ASTM D1117.

.8 Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 15, Smoke Developed: 15

.4 Self adhesive membrane: self-healing, self-adhering composite membrane consisting of an SBS

modified bitumen, integrally laminated to a high-density thermoplastic film.

.1 ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies,

.2 Air leakage: <0.0001 CFM/ft² @1.6 lbs/ft² to ASTM E2178 and ASTM E283 and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft² for 1 hour and gust wind load pressure of 62.8 lbs/ft² for 10 seconds when tested at 1.6 lbs/ft² to ASTM E331,

.3 Vapor permeance: 0.03 perms to ASTM E96 (Desiccant Method),

.4 Vapor permeance: 0.08 perms to ASTM E96 (Wet Cup Method),

.5 Membrane Thickness: 0.0394 inches (40 mils),

.6 Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M,

.7 Elongation: 200% to ASTM D412-modifed,

.8 Meets CAN/CGSB-51-33 Type I Water Vapor Permeance requirements

2.02 ACCESSORIES

.1 Attachments: Fasteners – refer to Section 07 61 00 - Preformed Metal Roof Panels and 07 44 56 - Mineral Fiber Reinforced Cementitious Panels.

.2 Primers as required by manufacturer's written recommendations or specifications, including product technical bulletins and installation instructions.

3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.02 EXAMINATION

.1 Verify that surfaces and conditions are ready to accept work of this section.

.2 Ensure surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.

.3 Report unsatisfactory conditions to Departmental Representative in writing.

.4 Do not start work until deficiencies have been corrected.

.1 Beginning of Work implies acceptance of conditions.

3.03 PREPARATION

.1 Ensure substrates are compact, smooth and all sub surfaces are repaired/installed.

3.04 INSTALLATION

.1 Install materials in accordance with manufacturer's instructions and drawing details.

3.05 FIELD QUALITY CONTROL

.1 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

.2 Field Inspection: Coordinate filed inspection in accordance with Section 01 45 00 – Quality Control

3.06 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.07 PROTECTION OF WORK

.1 Protect finished work.

.2 Do not permit adjacent work to damage work of this section.

.3 Ensure finished work is protected from climatic conditions.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 06 08 99 – Rough Carpentry for Minor Works

.2 Section 06 20 13 – Exterior Finish Carpentry

.3 Section 07 41 13 – Metal Roof Panels

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

.5 Section 07 92 00 – Joint Sealants

1.02 REFERENCES

.1 ASTM A 792 Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.2 ASTM B 209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.3 SMACNA Architectural Sheet Metal Manual (7th Edition) 2017.

.4 National Building Code (NBC) 2015 and applicable Municipal/Territorial regulations.

1.03 DESIGN / PERFORMANCE REQUIREMENTS

.1 Design Requirements:

.1 Design Loads: Design load application shall be in accordance with local building code.

.2 Wind Loads: The design wind loads shall be based on the wind criteria in accordance with local building code.

.3 Deflection: Deflection requirements shall be in accordance with the applicable building code, or as a minimum, L/180 for wind load (but not less than 10 psf (49 kg/sq m).

.4 Accessories and Fasteners: Accessories and fasteners shall be capable of resisting the specified design wind suction forces in accordance with local building code.

1.04 SUBMITTALS

.1 Submit under provisions of Section 01 30 00 - Administrative Requirements.

.2 Product Data: Manufacturer's data sheets on each product to be used, including:

.1 Preparation instructions and recommendations.

.2 Storage and handling requirements and recommendations.

.3 Installation methods.

.3 Selection Samples: For finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

.4 Manufacturer's Certificates: Certify products meet or exceed specified requirements.

.5 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day

1.05 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in production of Architectural Sheet Metal Products of the type specified with a minimum 10 years documented experience.

.2 Installer Qualifications: Company specializing in installation of Architectural Sheet Metal Products of the type specified with a minimum 5 years documented experience.

1.06 SEQUENCING

.1 Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.07 PROJECT CONDITIONS

.1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.08 WARRANTY

.1 Provide manufacturer's prorated 40 year warranty on performance, and lifetime warrantee on manufacturing and sturdiness.

.2 Provide applicator warranty covering water tightness of the wall system for the period of 2 years from the date of substantial completion.

2 PRODUCTS

2.01 MATERIALS

.1 Gutters: Continuous, seamless 131mm wide x 33mm deep metal gutter with integral continuous perforated hanger system acting as debris guard, able to support 154kg per 300mm.

.2 Steel Sheet: Galvalume Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process in conformance with ASTM A 792.

.3 Aluminum Sheet: Aluminum sheet conforming with ASTM B 209. Grade 3105 H24, thickness 0.55mm (including finish)

.4 Factory Finish: Kynar 500 PVDF resin-based coating, applied by the manufacturer on a continuous coil coating line.

.1 Standard top side color coating comprised of a 0.70 - 0.80 mil full strength, 70% Kynar 500/Hylar 5000 fluorocarbon (Polyvinylidene Fluoride PVF2) coating over urethane primer of 0.20 - 0.30 mil on finish side. Total face dry film thickness: 1.0 mil + 0.2 mil.

.2 Reverse side shall be coated with primer and wash coat of 0.30 mil plus or minus 0.05 mil.

.3 Finish shall conform to all tests for adhesion, flexibility, and longevity as specified by the Kynar 500 PVDF resin-based coating supplier.

.4 Colour:

.1 As selected from the manufacturer's standard colour range.

.2 Color to be selected by the Department Representative.

.2 Downspouts/rainwater leaders: 76mm x 102mm in 26 gauge.

.1 Finish to match gutters.

.1 Colour to be selected by the Department Representative from manufacturer’s standard colour range.

.2 Anchor straps to be min 25mm high aluminum, finish and colour to match downspouts.

.3 Locate rainwater leaders in same locations as current.

.4 Provide premanufactured concrete splash pans at the base of all rainwater leaders that extend to finish grade.

.5 Fasteners: as approved by manufacturer.

3 EXECUTION

3.01 EXAMINATION

.1 Do not begin installation until substrates have been properly prepared, including minimum 1 primer coat and 1 topcoat to fascias and wall cladding.

.2 If substrate preparation is the responsibility of another installer, notify Departmental Representative of unsatisfactory preparation before proceeding.

3.02 PREPARATION

.1 Clean surfaces thoroughly prior to installation.

.2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

.1 Install in accordance with manufacturer's instructions. Conform to standards set forth in the Architectural Sheet Metal Manual published by SMACNA to achieve a watertight installation.

.2 Attach gutters using manufacturer's fasteners.

.3 Do not allow gutters or downspouts to come into contact with dissimilar materials.

3.04 FIELD QUALITY CONTROL

.1 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon

and submitted by end-of-day.

.2 Field Inspection: Coordinate field inspection in accordance with Section 01 45 00 – Quality Control.

3.05 CLEANING

.1 Clean any grease, finger marks or stains from the panels per manufacturer's recommendations.

3.06 PROTECTION

.1 Protect installed products until completion of project.

.2 Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 06 08 99 – Rough Carpentry for Minor Works

.2 Section 07 21 13 – Board Insulation

.3 Section 07 27 00 – Air Barriers and Membranes

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

.5 Section 07 92 00 – Joint Sealants

.6 Section 09 91 13 – Exterior Painting

1.02 REFERENCES

.1 Aluminum Association (AA).

.1 AA-DAF-45-03, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International, (ASTM).

.1 ASTM A 653/A 653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM E 96-12, Standard Test Methods for Water Vapor Transmission of Materials.

.3 ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets

.4 ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test, Tool and Tape.

.5 ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C

.3 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-1.40-97, Anticorrosive Structural Steel Alkyd Primer.

.2 CAN/CGSB 1-GP-71 Amendment 13-1995, Methods of Testing Paints and Pigments (including Amendments 1 to 12 and Supplement No. 1).

.3 CAN/CGSB-34.16-M89, Sheets, Asbestos-Cement, Flat, Fully Compressed.

.4 CAN/CGSB-34.17-M89, Sheets, Asbestos-Cement, Flat, Semi-compressed.

.5 CAN/CGSB-34.18-94, Low Density Asbestos Sheets.

.6 CAN/CGSB-34.21-M89, Panels, Sandwich, Asbestos-Cement with Insulating Cores.

.7 CGSB 41-GP-6M-2012, Sheets, Thermosetting Polyester Plastics, Glass Fibre Reinforced.

.4 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act (CEPA), 1999.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Safety Data Sheets (SDS).

.6 The Master Painters Institute (MPI).

.1 Architectural Painting Specification Manual - March 1998 (R2012).

.7 National Research Council (NRC).

.8 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act (TDGA), 1992.

.9 Underwriters Laboratories' of Canada (ULC).

.1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.2 CAN/ULC-S702-09, Standard for Thermal Insulation, Mineral Fibre, for Buildings.

.3 CAN/ULC-S704-22, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.4 CAN/ULC-S706-09, Standard for Wood Fibre Thermal Insulation for Buildings.

1.03 DESIGN REQUIREMENTS

.1 Include expansion joints to accommodate movement in wall system and between wall system and building structure, caused by structural movements, without permanent distortion, damage to infills, racking of joints, breakage of seals, or water penetration.

.2 Design members to withstand dead load and wind loads as calculated in accordance with NBC and applicable Municipal/Territorial regulations, to maximum allowable deflection of 1/180 of span.

.3 Provide for positive drainage of condensation occurring within wall construction and water entering at joints, to exterior face of wall in accordance with NRC "Rain Screen Principles".

.4 Maintain following installation tolerances:

.1 Maximum variation from plane or location shown on approved shop drawings: [10] mm/m of length and up to [20] mm/100 m maximum.

.2 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75 mm.

1.04 SUBMITTALS

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

.2 Provide manufacturer's printed product literature, specifications, installation instructions and datasheets. Include product characteristics, performance criteria, and limitations.

.3 Provide copies of Workplace Hazardous Materials Information System (WHMIS) - Safety Data Sheets (SDS) in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.4 Verification Samples: For each finish product specified, two samples, minimum 100 by 150 mm, representing actual product, color, and patterns.

.5 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

1.05 QUALIFICATIONS

.1 Manufacturer: company specializing in producing cementitious cladding with 5 years' experience with sufficient capacity to produce and deliver required units without causing delay in work.

.2 Installer: person specializing in cementitious wall panel installations with 5 years' experience and as approved by manufacturer.

.3 Mock-ups: construct mock-ups in accordance with Section 01 45 00 – Quality Control and to requirements supplemented as follows

.1 Provide minimum two mockups: around the front door, and at one window.

.2 Mock-ups are for evaluation of surface finishes and workmanship.

.3 Do not proceed with remaining work until workmanship, colour, and finish are reviewed and accepted by Consultant.

.4 Refinish mock-up area as required to produce acceptable work.

.5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.06 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

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

.4 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.5 Ensure emptied containers are sealed and stored safely.

.6 Unused paint or coating material must be disposed of at an official hazardous material collections site as approved by Departmental Representative.

.7 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.8 Dispose of unused sealant material at official hazardous material collections site approved by Departmental Representative.

.9 Unused material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

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

1.07 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Safety Data Sheets (SDS) acceptable to Labour Canada.

1.08 WARRANTY

.1 Product Warranty: Limited , non-pro-rated product warranty for 30 years.

2 PRODUCTS

2.01 MATERIALS

.1 Cementitious soffits (vented and non-vented): to 6.4 mm thick.

.1 Fiber-cement Siding - complies with ASTM C 1186 Type A Grade II.

.2 Fiber-cement Siding - complies with ASTM E 136 as a noncombustible material.

.3 Fiber-cement Siding - complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.

.2 Cementitious siding: horizontal v-groove lock joint system to 15.9mm thick x 209.5mm high (177.8 mm exposure).

.3 Insulation: semirigid stone wool insulation, 25.4mm thick, RSI as indicated.

.4 Sealants: Elastomeric Latex Joint Sealant: to ASTM C920, Class 25.

.1 Acceptable material:

.1 DAP Dynaflex 230

.2 Or pre-approved alternative

.5 Fasteners - Soffit: as approved by manufacturer.

.6 Fasteners - Siding: as approved by manufacturer into green pressure treated substrate material.

2.02 COMPONENTS

.1 Cementitious soffit: (vented and non-vented): to 6.4 mm thick. complete with factory applied primer coat.

.2 Cementitious siding: horizontal v-groove lock joint system to 15.9mm thick x 209.5mm high (177.8 mm exposure) complete with factory applied primer coat.

2.03 FABRICATION

.1 Cut panels nominal size to suit overhangs.

.2 Shop apply primer finish.

.3 Brake form metal flashings to profile required, in maximum lengths.

2.04 FINISH OF SOFFIT PANELS AND SIDING

.1 Factory Primer: Provide factory applied universal primer by manufacturer.

.2 Topcoat colour coating: Minimum 2 coats 100% acrylic spray applied weather resistant thermoplastic acrylic to dry film thickness of 0.2 to 0.25 mm colour selected by Departmental Representative.

.3 Refer to Section – 09 91 13.

3 EXECUTION

3.01 EXAMINATION

.1 Do not begin installation until substrates have been properly prepared.

.2 If framing preparation is the responsibility of another installer, notify Department Representative of unsatisfactory preparation before proceeding.

3.02 PREPARATION

.1 Clean surfaces thoroughly prior to installation.

.2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

.3 For soffit: Nominal 38mm wood framing selected for minimal shrinkage and complying with local building codes, including the use of water-resistive barriers or vapor barriers where required. Minimum 38 mm face and straight, true, of uniform dimensions and properly aligned.

.1 Install 38mm wood backing to manufacturer's instructions

.4 For siding: Nominal 38mm by 38mm green pressure treated wood framing selected for minimal shrinkage and complying with local building codes, including the use of water-resistive barriers or vapor barriers where required. Minimum 38 mm face and straight, true, of uniform dimensions and properly aligned.

.1 Install water-resistive barriers and metal flashings to dry surfaces.

.2 Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.

.3 Install 38mm by 38mm green pressure treated wood strapping and semi-rigid insulation.

3.03 INSTALLATION

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Protect surface of metals in contact with concrete, mortar, plaster or other cementitious surface with isolation coating.

.3 Touch up building framing members with primer as required.

.4 Install head and sill flashings, edge trim, cap pieces and fillers.

.5 Install wood trim pieces around openings and penetrations.

.6 Install siding and soffits:

.1 to manufacturer's instructions.

.2 Fasten through material into structural framing or code complying sheathing. Fasteners must penetrate minimum 3/4 inch (19 mm) or full thickness of sheathing. Additional fasteners may be required to ensure adequate security.

.3 Fasten through overlapping boards. Do not nail between lap joints.

.4 Inside corners: Trim inside wall corner with a single 38mm x 38mm trim.

.5 Outside Corner Board: Not applicable. Siding corners are to be mitered.

.6 Maintain 3mm gap between trims and adjacent panels and 200mm to adjacent finished grade. Seal gap with high quality paintable sealant

.7 Locate siding splices at least 305 mm away from window and door openings.

.8 Seal joints to provide weathertight and airtight installation.

3.04 FINISHING

.1 Finish factory primed, with a minimum of one coat of high quality 100 percent acrylic latex exterior grade paint within 180 days of installation, followed by one final coat onsite. Follow paint manufacturer's written product recommendation and written application instructions.

3.05 FIELD QUALITY CONTROL

.1 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

.2 Field Inspection: Coordinate field inspection in accordance with Section 01 45 00 – Quality Control.

3.06 CLEANING

.1 Wash down exposed acrylic exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.

.2 Remove excess sealant with recommended solvent.

.3 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 06 10 00 – Rough Carpentry

.2 Section 07 27 00 – Air Barriers and Membranes

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

1.02 REFERENCES

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

.1 ASTM A 792/A 792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.

.2 ASTM D 523-08, Standard Test Method for Specular Gloss.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.

.2 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound.

.3 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.3 Canadian Standards Association (CSA International).

.1 CSA-A123.3-05(R2010), Asphalt Saturated Organic Roofing Felt.

.4 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act (CEPA), 1999.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Safety Data Sheets (SDS).

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

.1 CCMC-2013, Registry of Product Evaluations.

.7 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act (TDGA), 1992.

.8 Underwriters Laboratories' of Canada (ULC)

.1 CAN/ULC-S107-10, Standard for Fire Tests of Roof Coverings. [BCBC 3.1.15.1 – not sure if applicable to this section for material type]

.2 CAN/ULC-S126-06, Standard Method of Test for Fire Spread Under Roof-Deck Assemblies.

1.03 SUBMITTALS

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

.2 Provide manufacturer's printed product literature, specifications, installation instructions and datasheets. Include product characteristics, performance criteria, and limitations.

.3 Provide copies of Workplace Hazardous Materials Information System (WHMIS) - Safety Data Sheets (SDS) in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.4 Submit proof of manufacturer's CCMC Listing and listing number to Departmental Representative.

.5 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution, from minimum 6 viewpoint locations on the roof. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

.6 Samples: provide duplicate 300 x 300 mm samples of roof panel representing gauge, profile and colour finish.

.7 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of British Columbia.

.2 Indicate arrangements of sheets and joints, types and locations of fasteners and special shapes, flashings and relationship of panels to structural frame and openings.

.8 Engage a professional engineer licensed to practice in the Province of British Columbia who shall:

.1 Provide Schedule S-B and carry out enough timely and regular inspections to:

.1 Review fabrication and ensuring specified products are used.

.2 Ensure that manufacturer’s design and installation specification as tested has been replicated.

.3 Ensure and certify installation meets the requirements of NBC (2015) for design, construction and installation, notably for wind uplift.

.2 Issue a Letter of Certification (Schedule S-C) stating that the components have been fabricated and installed in accordance with design and Code requirements.

.3 The cost of the above engineering, inspections and issuing required Schedules S-B and S-C shall be included as part of the cost for work under this Section.

.9 Manufacturers Reports: in accordance with Section 01 45 00 - Quality Control.

.1 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance with specifications.

.2 Indicate procedures followed, ambient temperatures and wind velocity during application.

.10 Closeout Submittals: in accordance with Section 01 78 00 - Closeout Submittals.

.1 Warranty:

.1 Manufacturers standard warranty.

.2 Manufacturer's warranty is in addition to, and not a limitation of other rights the Owner may have under Contract Documents.

.2 Operating & Maintenance Manuals:

.1 Submit operating and maintenance data for incorporation into manual.

1.04 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturer: Minimum 5 years' experience manufacturing similar products.

.2 Provide all primary roofing products including shingles, underlayment, and leak barrier by a single manufacturer.

.2 Installer Qualifications: Work is to be executed only by those skilled to perform it expeditiously and who has been responsible for satisfactory installations similar to that specified during a period of at least the immediate past three years.

.1 Currently licensed by RCABC.

.2 Must maintain their license throughout the duration of the project.

.3 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution, from minimum 6 viewpoint locations on the roof. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

1.05 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Separate for recycling and place in designated containers Steel, Metal waste.

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

.6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.7 Ensure emptied containers are sealed and stored safely.

.8 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

.9 Unused paint, caulking, and sealing compound materials must be disposed of at an official hazardous

material collections site as approved by Departmental Representative.

.10 Unused paint, caulking, and sealing compound materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

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

1.06 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

1.07 WARRANTY

.1 Project Warranty: Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide Manufacturers standard limited warranty – minimum of 25 years against defects, fading and corrosion.

.3 Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

2 PRODUCTS

2.01 SHEET METAL MATERIALS

.1 Prefinished sheet steel: Aluminum-zinc alloy coated steel sheet: hot-dipped to ASTM A 792/A 792M, commercial quality, grade 37 with AZ150 coating, regular spangle surface pre-finish,

.1 24 gauge base metal thickness.

.2 Factory finish: polyvinylidene fluoride (PVDF).

.1 Class F1S.

.2 Colour: ***Parchment*** (PVDF)

.3 Specular gloss: 30 units +/-5 to ASTM D 523.

.4 Coating thickness: not less than 25 micrometres.

.5 Reverse side shall be coated with primer and wash coat of 0.30 mil plus or minus 0.05 mil.

.6 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D 822 as follows:

.1 Outdoor exposure period 1000 hours.

.2 Humidity resistance exposure period 1000 hours.

.3 Preformed Metal roof panels

.1 Metal roof panels with ribs and concealed fastening leg, and lock. Panels to be of interlocking design with concealed fasteners.

.1 Materials: 24 gauge sheet steel

.2 Coverage: 305mm

.3 Rib depth: 22mm

.4 Profile: x with 3 stiffener ribs spaced evenly.

.5 Colour: ***Parchment*** (PVDF)

2.02 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Metal components

.1 Provide accessories and other items essential to complete roof panel installation including miscellaneous trim, closures and similar metal components.

.2 Fabricate metal components from same gauge and finish as metal panels unless otherwise noted.

.3 Flashing: Provide in the same gauge, colour and finish as the roof panel, unless otherwise noted. Hem all exposed edges of flashing to the underside, min. 12mm

.4 Underlay: refer to 07 27 00 Air Barriers and Membranes

.5 Sealant: Asbestos-free sealant, compatible with systems materials, recommended by system manufacturer.

.6 Sealer Tape: Butyl Sealant Tape

.7 Fasteners: concealed and exposed.

.1 Concealed fasteners shall be self-drilling screws with bonded washers. Screws may be galvanized steel or stainless steel.

.2 Exposed stainless steel rivets are to be minimized, but if required shall match the color finish of the panel

.3 SFS #10 Type A: Pancake Head #2 Square Drive, Carbon Steel, Zinc Plated (Metal to Wood)

.4 SFS #10 Self-Drill: Pancake Head #2 Square Drive, Carbon Steel, Zinc Plated (Metal to Metal).

.5 SFS #9 Woodgrip Sharp Point, exposed fastener with neoprene washer.

.8 Closure strips:

.1 Polyethylene to match profile.

.9 Pipe Flashings:

.1 Flexible EPDM pipe flashings to suit pipe diameter, with universal adaptable base to fit metal panel configurations.

.2 Color to be selected by Departmental Representative from manufacturer's standard range of colours.

.10 Snow Retention System:

.1 Preassembled Clamp with non-sliding pin design., complete with snap-in ice clip to match roof panel color:

.1 Components: Extruded aluminum rail, color strip, ice flags, clamps, top block, hex head bolt, connector link.

.2 Extruded Materials (Rails and Ice Flag): 6000 Series tempered aluminum alloy complying with ASTM B221.

.1 Stainless Steel Materials (Connector Link and Hex Head Bolts): 300 Series stainless steel complying with ASTM A582/12.

.3 Color: Match metal roofing

.11 Ridge ventilation:

.1 Profile vent to suit profile of metal roof panels:

.1 Modified polyester, non-woven, non-wicking fiber based matting

.2 Composed of 90% recycled fiber

.1 Class A Fire Rating

.12 Touch-up paint: as recommended by sheet metal roofing manufacturer.

2.03 FABRICATION

.1 Fabricate aluminum sheet metal in accordance with AA ASM-35.

.2 Form individual pieces in full lengths.

.3 Hem exposed edges on underside 12 mm, mitre and seal.

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

.5 Apply minimum 0.2 mm dry film thickness coat of plastic cement to both faces of dissimilar metals in contact.

.6 Protect metals against oxidization by back painting with isolation coating where indicated.

3 EXECUTION

3.01 INSTALLATION

.1 Use concealed fastenings except where approved by Departmental Representative before installation.

.2 Provide underlay under sheet metal roofing. Secure in place and lap joints 100 mm minimum.

.3 Install sheet metal roof panels.

.4 Flash roof penetrations with material matching roof panels and make watertight.

.5 Form seams in direction of water-flow and make watertight.

.6 Leave work clean and free of stains.

3.02 STANDING SEAM ROOFING

.1 Use 300mm wide by full length sheets to make roofing with standing seams.

.2 Fold lower end of each pan under 20 mm.

.1 Slit fold 25 mm away from corner to form tab where pan turns up to make standing seam.

.2 Fold upper end of each pan over 50 mm.

.3 Hook 20 mm fold on lower end of upper pan into 50 mm fold on upper end of underlying pan.

.3 Apply sheet metal roofing beginning at eaves. Loose lock pans to valley flashing and edge strips at eaves and gable rakes.

.4 Finish standing seams 25 mm high on flat surfaces. Bend up one side edge 40 mm and other 45 mm.

.1 Make first fold 6 mm wide single fold and second fold 12 mm wide, providing locked portion of standing seam with 5 plies in thickness.

.2 Fold lower ends of seams at eaves over at 45 degrees angle.

.3 Terminate standing seams at ridge and hips by turning down in tapered fold.

.5 Form valleys of sheets not exceeding 3 m in length. Lap joints 150 mm in direction of flow.

.1 Extend valley sheet minimum 230 mm under roofing sheets.

.2 At valley line, double fold valley and roofing sheets and secure with cleats spaced 450 mm on centre.

3.03 Gutters and Downspouts

.1 Install preformed prefinished gutters and downspouts.

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 07 27 00 – Air Barriers and Membranes

.2 Section 07 44 56 – Mineral Fiber Reinforced Cementitious Panels

.3 Section 07 61 00 – Preformed Metal Roof Panels

.4 Section 07 92 00 – Joint Sealants

1.02 REFERENCES

.1 The Aluminum Association Inc. (AAI)

.1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.

.2 AAI DAF45-03, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM A 167-99(2009), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 ASTM A 606-09a, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.

.3 ASTM A 792/A 792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.4 ASTM D 523-08, Standard Test Method for Specular Gloss.

.5 ASTM D 822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian Roofing Contractors Association (CRCA)

.1 Roofing Specifications Manual 2012.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.2 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.5 Canadian Standards Association (CSA International)

.1 CSA A123.3-05(R2010), Asphalt Saturated Organic Roofing Felt.

.2 AAMA/WDMA/CSA 101/I.S.2/A440-2008, Standard/Specification for Windows, Doors, and Unit Skylights.

.3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Safety Data Sheets (SDS).

1.03 SUBMITTALS

.1 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

1.04 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section [01 61 00 - Common Product Requirements].

.2 Waste Management and Disposal:

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

2 PRODUCTS

2.01 PREFINISHED STEEL SHEET

.1 Prefinished steel with factory applied polyvinylidene fluoride.

.1 Class [F1S] [F2S].

.2 Colour: '***Parchment***'.

.3 Specular gloss: [30] units +/- in accordance with ASTM D 523.

.4 Coating thickness: not less than 22 micrometres.

.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D 822 as follows:

.1 Outdoor exposure period 2500 hours.

.2 Humidity resistance exposure period 5000 hours.

.2 Prefinished steel with factory applied polyvinyl chloride.

.1 Class F1S.

.2 Colours '***Parchment***'

.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D 523.

.4 Coating thickness: not less than 22 micrometres

.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D 822 as follows:

.1 Outdoor exposure period 2500 hours.

.2 Humidity resistance exposure period 5000 hours.

2.02 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Underlay for metal flashing: in accordance with Section 07 27 00 – Air Barriers and Membranes.

.3 Sealants: in accordance with Section 07 92 00 - Joint Sealants.

.4 Fasteners: of same material as sheet metal.

.5 Concealed clips.

.6 Washers: of same material as sheet metal, 1 mm thick with rubber backings.

.7 Touch-up paint: as recommended by prefinished material manufacturer.

2.03 FABRICATION

.1 Fabricate metal flashings and other sheet metal work as indicated.

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

.1 Form pieces in 3000 mm maximum lengths.

.1 Make allowance for expansion at joints.

.2 Hem exposed edges on underside 12 mm.

.1 Mitre and seal corners with sealant.

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

2.04 METAL FLASHINGS

.1 Form flashings to profiles indicated of 24 gauge prefinished steel.

.2 Valley flashings to be minimum 610mm wide, in ‘W’ profile with minimum 25mm high center standing fold diverter.

3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.02 INSTALLATION

.1 Install sheet metal work as detailed.

.2 Install underlayment between roof deck and all flashings.

.3 Use concealed fastenings except where approved before installation.

.4 Provide underlay under sheet metal.

.1 Secure in place and lap joints 100 mm.

.5 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs.

.1 Flash joints using S-lock standing seams forming tight fit over hook strips.

.6 Lock end joints and caulk with sealant.

.7 Metal valley flashings must

.1 be installed before any shingle application.

.2 be secured to the deck

.1 with fasteners nailed through the metal flashing

.1 no more than 450 mm (18”) O.C.

.2 approximately 25 mm (1”) in from the edge of the metal flashing.

.2 with cleats nailed to the roof deck no more than 450 mm (18”) O.C. and hooked onto the outside edges of the flashing.

.3 extend to

.1 the edge of the eaves.

.2 the upper end of the valley or, where a slope continues above it, beyond the valley to a point no less than 300 mm (12”) past the termination of the valley.

.4 positively overlap adjoining lengths of flashing (shingle-style), where each overlap measures at least

.1 200 mm (8”) when fully caulked in the lap.

.2 300 mm (12”) when installed without caulking in the lap.

.5 have a single central upstanding diverter/divider, except where the valley is less than 1200 mm (48”) long.

.6 be sealed to the valley protection membrane with a strip of the same membrane material, when installed on low-slope roofs or in regions with high snow accumulation; each strip must measure at least 150 mm (6”) in width, and must be centred along each edge of the flashing.

3.03 EAVESTROUGHS AND DOWNPIPES

.1 Repair eaves troughs as noted and reseal where necessary to be watertight.

.2 Install downpipe and provide goosenecks back to wall where indicated.

3.04 FIELD QUALITY CONTROL

.1 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

.2 Field Inspection: Coordinate filed inspection in accordance with Section 01 45 00 – Quality Control.

3.05 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 07 41 13 – Preformed Metal Roof Panels

.2 Section 07 44 56 **–** Mineral Fiber Reinforced Cementitious Panels

.3 Section 07 62 00 **–** Sheet Metal Flashing and Trim

.4 Section 07 61 00 – Sheet Metal Roofing

.5 Section 07 71 23 – Aluminum Gutters and Downspouts

.6 Section 09 91 13 **–** Exterior Painting

1.02 REFERENCES

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

.1 ASTM C 510-16, Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.

.2 ASTM C834-14, Standard Specification for Latex Sealants.

.3 ASTM C 920-14a, Standard Specification for Elastomeric Joint Sealants.

.4 ASTM C 1184-14, Standard Specification for Structural Silicone Sealants.

.5 ASTM C 1193-16, Standard Guide for Use of Joint Sealants.

.6 ASTM C 1248-08(2012), Standard Test Method for Staining of Porous Substrate by Joint Sealants.

.7 ASTM E84-15b, Standard Test Method for Surface Burning Characteristics of Building Materials.

.2 Canadian General Standards Board (CGSB)

.1 CGSB 19-GP-5M-[1984], Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).

.2 CAN/CGSB-19.13-[M87], Sealing Compound, One-component, Elastomeric, Chemical Curing.

.3 CGSB 19-GP-14M-[1984], Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).

.4 CAN/CGSB-19.17-[M90], One-Component Acrylic Emulsion Base Sealing Compound.

.5 CAN/CGSB-19.24-[M90], Multi-component, Chemical Curing Sealing Compound.

.3 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999 (CEPA).

.4 General Services Administration (GSA) - Federal Specifications (FS)

.1 FS-SS-S-200-E(2)1993], Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Safety Data Sheets (SDS).

.6 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.03 SUBMITTALS

.1 Product Data: submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

1.04 QUALITY ASSURANCE

.1 Installer Qualifications: Installer to have minimum 5 years' experience of joint sealant installation experience on similar type projects.

1.05 DELIVERY, STORAGE, AND HANDLING

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

1.06 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.2 Collect and separate for disposal packaging material in appropriate on-site bins. Place materials defined as hazardous or toxic in designated containers.

.1 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.

.2 Divert unused joint sealing material from landfill to municipal hazardous material collections facility.

.3 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.3 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

1.07 SITE CONDITIONS

.1 Environmental Limitations:

.1 Do not proceed with installation of joint sealants under following conditions:

.1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.

.2 When joint substrates are wet or dusty.

.2 Joint-Width Conditions:

.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.08 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Safety Data Sheets (SDS) acceptable to Labour Canada.

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

2 PRODUCTS

2.01 SEALANT MATERIALS

.1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.2 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.

.3 Where sealants are qualified with primers use only these primers.

.4 Use only non-staining sealants.

2.02 SEALANT MATERIAL DESIGNATIONS

.1 Advanced Polymer: one part, low-modulus, elastomeric sealant to ASTM C920, Type S (single component), Grade NS (non-sag), Class 50, Use NT, T, G, M, A and O and CAN/CGSB-19.13.

.2 Elastomeric Latex Joint Sealant: to ASTM C920, Class 25.

2.03 SEALANT SELECTION

.1 Metal flashings: Sealant type: Advanced Polymer elastomeric sealant

.2 Gutter seal: Sealant type: Advanced Polymer elastomeric sealant

.3 Cementitious cladding and wood trims: Elastomeric Latex Joint sealant

2.04 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

3 EXECUTION

3.01 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

3.02 JOINT SURFACE PREPARATION

.1 Prepare surfaces in accordance with manufacturer's directions and as noted below.

3.03 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 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.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.04 APPLICATION

.1 Apply sealant in accordance with ASTM C1193 and manufacturer’s written instructions.

.1 Apply sealant to depths recommended for application.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction.

.4 Apply sealant using gun with proper size nozzle.

.5 Use sufficient pressure to fill voids and joints solid.

.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 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 Cleanup.

.1 Clean adjacent surfaces immediately and leave Work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 06 20 13 – Exterior Finish Carpentry

.2 Section 07 44 56 – Mineral Fiber Reinforced Cementitious Panels

.3 Section 07 92 00 – Joint Sealants

1.02 REFERENCES

.1 Environmental Protection Agency (EPA)

.1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Safety Data Sheets (SDS).

.3 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual – June 2015.

.4 Society for Protective Coatings (SSPC)

.1 Systems and Specifications, SSPC Painting Manual 2011.

1.03 SCHEDULING

.1 Schedule painting operations to prevent disruption of occupants in and about building.

1.04 SUBMITTALS

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

.2 Product Data: submit manufacturer's installation instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide electronic copies of Workplace Hazardous Materials Information System (WHMIS) - Safety Data Sheets (SDS) in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.4 Provide duplicate samples as follows:

.1 Submit 200 x 300 mm sample panels of each coating with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards.

.2 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

.5 Closeout Submittals: in accordance with Section 01 78 00 - Closeout Submittals.

.1 Operating and Maintenance:

.1 Submit operating and maintenance data for incorporation into manual and include following:

.1 Product name, type and use.

.2 Manufacturer's product number.

.3 Colour numbers.

.4 MPI Environmentally Friendly classification system rating.

1.05 QUALITY ASSURANCE

.1 Qualifications:

.1 Contractor & Applicator: to have a minimum of five (5) years proven satisfactory experience. When requested, provide list of last three (3) comparable jobs including, job name and location, specifying authority, and project manager.

.2 Conform to latest MPI requirements for exterior painting work including preparation and priming.

.3 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.

.4 Paint materials to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.

.5 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

.1 Standard of Acceptance:

.1 Exterior Cladding: No defects visible from a distance of 1000 mm at 90 degrees to surface.

.2 Soffits: No defects visible from floor at 45 degrees to surface when viewed using final lighting source.

.3 Fascia & Trims: No defects visible from a distance of 1000 mm at 90 degrees to surface.

.4 Doors: No defects visible from a distance of 1000 mm at 90 degrees to surface.

.5 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.06 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions, supplemented as follows:

.1 Deliver and store materials in original containers, sealed, with labels intact.

.2 Labels: to indicate:

.1 Manufacturer's name and address.

.2 Type of paint or coating.

.3 Compliance with applicable standard.

.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Provide and maintain dry, temperature controlled, secure storage.

.5 Observe manufacturer's recommendations for storage and handling.

.6 Store materials and supplies away from heat generating devices.

.7 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.

.8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative. After completion of operations, return areas to clean condition to approval of Departmental Representative.

.10 Remove paint materials from storage only in quantities required for same day use.

.11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.12 Fire Safety Requirements:

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

.2 Waste Management and Disposal:

.1 Separate waste materials for reuse, recycling and disposal in accordance with Section 01 74 19 - Waste Management and Disposal.

.2 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

.3 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

.6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

.7 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

1.07 SITE CONDITIONS

.1 Lighting: perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless specifically pre-approved by specifying body, and, applied product manufacturer, perform no painting work when:

.1 Ambient air and substrate temperatures are below 10 degrees C.

.2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.

.3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.

.4 Relative humidity is above 85% or when dew point is less than 3 degrees C variance between air/surface temperature.

.5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.

.2 Conduct moisture tests using a properly calibrated electronic Moisture Meter.

.3 Perform no painting work when maximum moisture content of substrate exceeds:

.1 15% for wood, and 12% for preprimed wood.

.2 15% for cementitious cladding.

.3 15% for cementitious soffit materials.

.3 Surface and Environmental Conditions:

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

.2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.

.3 Apply paint when previous coat of paint is dry or adequately cured.

.4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.

.5 Do not apply paint when:

.1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.

.2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.

.3 Surface to be painted is wet, damp or frosted.

.6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry and cured or until weather conditions are suitable

.7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.

.8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

.9 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

2 PRODUCTS

2.01 MATERIALS

.1 Paint materials listed in latest edition of MPI Approved Products List (APL) are acceptable for use on this project.

.2 Paint materials for paint systems: to be products of single manufacturer.

.3 Use only MPI listed L rated materials.

.4 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, to be as follows:

.1 Be water-based and water clean-up.

.2 Be non-flammable.

.3 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.

.4 Be manufactured without compounds which contribute to smog in the lower atmosphere.

.5 Do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.

.5 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).

.6 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavelant chromium or their compounds.

.7 Water-borne surface coatings and recycled water-borne surface coatings must have flash point of 61.0 degrees C or greater.

.8 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:

.1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of [15] mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.

.2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.

2.02 COLOURS

.1 Colour schedule is as indicated on the drawings, and as follows:

.1 P1: To match Benjamin Moore 2121-70 ‘Chantilly Lace’
.2 P2: To match Benjamin Moore 2121-50 ‘Horizon Gray’
.3 P3: To match Benjamin Moore 2141-40 ‘Creekside Green’
.4 P4: To match Benjamin Moore CC-542 ‘Willow’’

.2 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.03 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Departmental Representative's written permission.

.2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

.3 Add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.

.4 Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.

.5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.04 GLOSS/SHEEN RATINGS

.1 Paint gloss: defined as sheen rating of applied paint, in accordance with following MPI gloss/sheen standard values:

Gloss Level Category	Unit at 60 Degrees	Units at 85 Degrees
G1 – Matte finish	0 to 5	Maximum 10
G2 – Velvet finish	0 to 10	10 to 35
G3 – Eggshell finish	10 to 25	10 to 35
G4 – Satin finish	20 to 35	Minimum 35
G5 – Semi-gloss finish	35 to 70	
G6 – Gloss finish	70 to 85	
G7 – High Gloss finish	More than 85	

.2 Gloss level ratings of repainted surfaces as specified.

2.05 EXTERIOR PAINTING SYSTEMS

.1 Cementitious Composition Board Surfaces: (vertical surfaces, horizontal soffits)

.1 EXT 3.3B - Alkyd G1 finish.

.2 Metal: existing doors faces, overhead door, etc.

.1 REX 5.3B - Alkyd G4 finish over vinyl wash primer and quick dry primer.

.3 Dimension Lumber: Fascia, trim, fencing, etc.

.1 EXT 6.2C – Alkyd G1 finish over alkyd primer.

3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.02 PREPARATION

.1 Perform preparation and operations for exterior painting in accordance with MPI Painting and Maintenance Repainting Manuals except where specified otherwise.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

.3 Clean and prepare exterior surfaces to be painted or repainted in accordance with MPI Painting and Maintenance Repainting Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and surface debris by wiping with dry, clean cloths or compressed air. Do not use steel wool.

.2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Aluminum metal: abrasive blast or use etching solution to remove naturally occurring aluminum oxide layer prior to priming.

.5 Allow surfaces to drain completely and allow to dry thoroughly. Allow sufficient drying time and test surfaces using electronic moisture meter before commencing work.

.6 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.

.7 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.

.4 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminates from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/ vacuum cleaning as required.

.5 Clean wood of sap and pitch. Apply compatible spot sealer to pitch pockets, sap-effected areas and tight knots. Loose knots to be removed and filled with appropriate filling compound, level with surrounding services.

.6 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

3.03 EXISTING CONDITIONS

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, and report findings to Departmental Representative. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.3 Maximum moisture content as follows:

.1 Wood: 15%, 12% for pre-primed wood

.2 Cementitious cladding and soffits: 15%.

.4 Ensure conditions are suitable in accordance with manufacturer's instructions for application of work and for curing times. Protect area and control environment as required to ensure it continuously meets required temperature and humidity levels for proper application and adhesion.

3.04 PROTECTION

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces.

.2 Protect factory finished products and equipment.

.3 Protect building occupants in and about building.

.4 Remove light fixtures, and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Store items and re-install after painting is completed.

.5 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.6 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas.

3.05 APPLICATION

.1 Method of application to be as approved by Departmental Representative. Apply paint by brush, roller, air sprayer airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.

.2 Factory Finish Application – Cementitious Cladding and Soffits:

.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

.3 Apply paint in a uniform layer all four sides of cladding.

.4 Brush out immediately runs and sags.

.5 Separate faces until coating is cured as per manufacturer recommendations.

.3 Brush and Roller Application:

.1 Apply primer (where missing) and paint in a uniform layer using brush and/or roller of types suitable for application.

.2 Work paint into cracks, crevices and corners.

.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.

.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Departmental Representative.

.5 Remove runs, sags and brush marks from finished work and repaint.

.4 Spray Application:

.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

.3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.

.4 Brush out immediately runs and sags.

.5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.

.5 Number of coats to be as follows (after primer):

.1 Metal Doors and Wood Frames: 2 coats

.2 Overhead Door: 2 coats

.3 Wood trim: 2 coats

.4 Cementitious cladding and soffits: 2 coats (1 coat factory applied + 1 coat site applied after cladding installation)

.6 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Departmental Representative.

.7 Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.8 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.9 Sand and dust between coats to remove visible defects.

.10 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.

.11 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.06 FIELD QUALITY CONTROL

.1 If the area to be painted has been controlled temporarily (stretch film, heaters, fans, dehumidifiers, etc.) ensure environment continues to be controlled during the curing process for length of time as

recommended by paint manufacturer.

.2 Photographic documentation – submit daily electronic copies of colour digital photography in jpg format, standard resolution. Identify each photograph with date and viewpoint. Photos to be taken midafternoon and submitted by end-of-day.

.3 Field Inspection: Coordinate filed inspection in accordance with Section 01 45 00 – Quality Control.

3.07 CLEANING

.1 Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Progress Cleaning: leave Work area clean at end of each day.

.1 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.08 RESTORATION

.1 Clean and re-install hardware items removed before undertaken painting operations.

.2 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.3 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.

.4 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

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APPENDIX I
for

Whistler Residence Roof/Wall Cladding Replacement
8648 Drifter Way, Whistler, BC

Project No.: R.105996.001

ARCADIS Design & Consultancy for natural and built assets

Public Services and Procurement Canada

HAZARDOUS BUILDING MATERIAL-ASSESSMENT

RCMP BUILDINGS – E DIVISION

E0423 Employee Housing

PSPC Project # R.106467.001

Whistler, British Columbia

February 14, 2020

Arcadis Project No.:30034527

HAZARDOUS BUILDING MATERIAL ASSESSMENT

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Appendix B: Laboratory Certificates of Analysis

Appendix C: Floor Plans

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Appendix E: Asbestos Classification, Condition and Accessibility

ACRONYMS AND ABBREVIATIONS

ACM	Asbestos-Containing Materials
Arcadis	Arcadis Canada Inc.
CLC	Canada Labour Code
COHSR	Canada Occupational Health and Safety Regulations
HPP	Hazard Prevention Program
LPB	Lead Based Paints
NIOSH	National Institute for Occupational Safety and Health
NJC	National Joint Council
OHS	Occupational Health and Safety
PCBs	Polychlorinated Biphenyls
PLM	Polarized Light Microscopy
PSPC	Public Services and Procurement Canada
RCMP	Royal Canadian Mounted Police
TEM	Transmission Electron Microscopy
USEPA	United States Environmental Protection Agency

EXECUTIVE SUMMARY

Arcadis Canada Inc. (Arcadis) was retained by Public Services and Procurement Canada (PSPC, Client) to conduct a hazardous building material assessment of building E0423 located at 8648 Drifter Way, Whistler, British Columbia.

The project consisted of a baseline assessment for the full interior of the building and a limited pre-construction assessment based on a renovation scope. The objective of the baseline assessment was to document the locations of specified hazardous building materials, evaluate their condition and develop corrective action plans as required for the purposes of long term management. The objective of the pre-construction assessment was to identify hazardous building materials in preparation for building renovation.

The assessed area for the baseline assessment consisted of the entire building interior. The renovation scope assessed area was limited to the part of the building scheduled for renovation, which consisted of replacing aluminum siding, including trim and gutters.

The hazardous building materials considered during this assessment included the following:

- Asbestos-containing materials (ACMs)
- Lead, including lead-containing paints (LCPs)
- Polychlorinated biphenyls (PCBs) in electrical equipment
- Mould and/or moisture-impacted building materials
- Mercury in electrical equipment
- Ozone-depleting substances (ODSs) in heating, ventilation and air conditioning (HVAC) equipment or fixed fire suppression systems
- Silica in building materials

Arcadis performed the assessment on January 13, 2019. The assessment was conducted by Matthew Spearman, Dipl. Tech., Field Technologist of Arcadis.

Summary of Findings

Asbestos: Asbestos-containing materials (ACM) were confirmed to be present as follows:

Material	Location(s)	Total Quantity	Condition (action)	Asbestos Type (%)
Black Vapour Barrier Mastic	Room 2, 3, 4, 5 (presumed throughout)	43 linear meter	Good (7)	1% Chrysotile
Grey Window Sealant	Exterior at front door	2 windows	Good (7)	3% Chrysotile

Lead: No confirmed lead is present.

Silica: Crystalline silica is present in concrete, mortar, grout, and ceramics where present in the building.

Mercury: Mercury vapor is present in fluorescent lamps located in Room 12.

Polychlorinated Biphenyls (PCBs): No PCBs were identified during the assessment.

Ozone Depleting Substances: One domestic refrigerator is located in Room 12.

Mould: No suspect visible mould was identified during the assessment.

Recommendations

The following is a summary of significant recommendations; refer to the body of the report for detailed recommendations.

1. Prepare an Asbestos Management Plan (AMP). Perform a re-assessment of asbestos materials on an annual basis.
2. Remove and properly dispose of asbestos-containing materials if disturbed by the planned renovation work.
3. Remove and dispose of mercury-containing items when taken out of service or if disturbed by the planned renovation work.
4. Remove and recycle ODS prior to decommissioning.
5. Follow appropriate safe work procedures when handling or disturbing asbestos and silica.

Findings of this report are subject to our standard Limitations, as outlined in Section 7.

This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.

1 INTRODUCTION

1.1 Purpose

Arcadis Canada Inc. (Arcadis) was retained by Public Services and Procurement Canada (PSPC, Client) to conduct a non-destructive hazardous building material assessment of building E0423 located at 8648 Drifter Way, Whistler, British Columbia.

The project consisted of a baseline assessment for the full interior of the building and a limited pre-construction assessment based on a renovation scope. The objective of the baseline assessment was to document the locations of specified hazardous building materials, evaluate their condition and develop corrective action plans as required for the purposes of long term management. The objective of the pre-construction assessment was to identify hazardous building materials in preparation for building renovation.

The assessed area for the baseline assessment consisted of the entire building interior. The renovation scope assessed area was limited to the part of the building scheduled for renovation, which consisted of replacing aluminum siding, including trim and gutters.

Arcadis performed the assessment on January 13, 2019. The assessment was conducted by Matthew Spearman, Dipl. Tech., Field Technologist of Arcadis.

1.2 Scope of Work

The scope of work for the project, as referenced in the Arcadis Workplan dated October 30, 2019, identifies the requirement to conduct a hazardous building material assessment within building E0423. Specifically, the scope of work included:

- Review of previous reports and development of assessment protocol for conducting a non-destructive assessment.
- Review the scope of renovations, which included: aluminum siding, including trim and gutters.
- Conduct visual assessment of readily accessible areas for the presence of suspected hazardous building materials.
- Collect and submit representative suspect asbestos material and lead paint chip samples for analysis.
- Collect and submit representative samples of caulking for PCBs where impacted by the proposed renovations.
- Submit samples to accredited laboratories for analysis.
- Evaluation and interpretation of field findings and sample analytical results to develop conclusions and recommendations pertaining to hazardous building materials identified

For the purpose of this assessment, hazardous building materials re defined as follows:

- Asbestos-containing materials (ACMs)
- Lead, including lead-containing paints (LCPs)
- Polychlorinated biphenyls (PCBs) in electrical equipment

- Mould and/or moisture-impacted building materials
- Mercury in electrical equipment
- Ozone-depleting substances (ODSs) in heating, ventilation and air conditioning (HVAC) equipment or fixed fire suppression systems
- Silica in building materials

A general description of the building included in this assessment is provided in **Table 1** below:

Table 1. Building Description

Building Number (BU)	Building Name	Address	Total Inside Gross m^2	Year Constructed	Building Description
E0423	Employee Housing	8648 Drifter Way, Whistler, BC	240.8	circa 1980	Two-story building with asphalt shingle roof and poured concrete foundation. Aluminum siding exterior. Drywall interior walls. Drywall, texture coat, lay in ceiling tiles and plywood ceilings. Poured concrete, wood laminate, plywood, carpet and vinyl sheet flooring. Heating is supplied by gas fired forced air furnace and electric baseboard heaters.

The assessment was restricted to accessible locations of the buildings. Inaccessible areas, such as fixed ceiling spaces and behind fixed walls, were not investigated at the time of the assessment unless specifically impacted by the proposed renovations. Roofing or other material that may cause damage to the building envelope were not included unless specifically impacted by the proposed renovations and sampling would not compromise the building envelope integrity. Concrete block walls were not investigated for vermiculite insulation unless specifically impacted by the proposed renovations. Crawlspaces were inspected by Arcadis staff from the access hatch. No direct entry was made by Arcadis staff into crawlspace locations. Similarly, attic spaces were visually inspected by Arcadis staff using the existing access hatch. No direct entry was made by Arcadis staff into attic locations.

2 BACKGROUND INFORMATION

Arcadis was provided and instructed to relay on information presented in the following reports:

- Asbestos Building Materials Survey Report, Building E0423, dated March 30, 2018, prepared by Pinchin Ltd.

3 SURVEY METHODOLOGY

Sampling activities were conducted in accordance with Arcadis' Standard Operation Procedures which take into account current federal and provincial regulations pertaining to such work (i.e., sampling procedures, required number of samples and laboratory analytical procedures). Regulations are presented in **Appendix D.**

Representative bulk samples were collected of accessible suspect, PCB, lead and asbestos materials in sufficient quantities for laboratory analysis. Samples were sealed in polyethylene zip-lock bags labeled with the sample number, suspect material description, and sample location. As part of sampling procedures, sampling tools were cleaned between sample collection events to avoid the potential for cross-contamination of samples.

All sample bags were compiled in order and placed into a single container accompanied with a chain of custody form outlining the project information, date, building location, number of samples, and sample description. Samples were submitted to the analytical laboratory in a sealed container via courier.

3.1 Asbestos-Containing Materials

A separate set of samples was collected of each type of homogenous material suspected to contain asbestos. A homogenous material is defined by the US EPA as material that is uniform in texture and appearance, was installed at one time, and is unlikely to consist of more than one type or formulation of material. The homogeneous materials are determined by visual examination, available information on the phases of the construction and prior renovations.

Bulk sampling protocols followed the ASTM E2356 Standard, which indicates requirements for the number of samples to collect for each homogeneous material. **Table 2,** shown below, provides an outline of the minimum number of samples to be collected from the ASTM E2356 Standard.

Table 2. Bulk Material Sample Quantities

Type of Material	Size of Area of Homogeneous Material	Minimum Number of Samples Collected
Any homogeneous material, including but not limited to fireproofing, drywall joint compound, ceiling tile stucco, acoustical and stipple finishes and visually similar floor tiles	Less than 90 m^2 (<1,000 ft^2)	3
	90 m^2 or more, but less than 450 m^2 (1,000-5,000 ft^2)	5
	450 m^2 or more (>5,000 ft^2)	7

In some cases, manufactured products such as asbestos cement pipe were visually identified without sample confirmation.

Flooring mastic/adhesive are only sampled and analyzed if present on the underside of flooring samples (vinyl floor tile and vinyl sheet flooring) in sufficient quantity for laboratory analysis.

Attempts to distinguish and delineate asbestos-containing drywall compound from new non-asbestos drywall compound is often unachievable. Arcadis collected drywall joint compound samples from exterior walls, columns or other locations which are unlikely to have been renovated in an attempt to determine the presence of asbestos in the original drywall compound.

Arcadis submitted the bulk samples to a NVLAP accredited laboratory for analysis. The analysis is performed in accordance with Test Method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials, July 1993.

EPA Method 600 states that materials characterized by interfering binder/matrix or low asbestos content may require additional gravimetric reduction sample treatment beyond routine polarized light microscopy (PLM) analysis (e.g. dissolution with hydrochloric acid, treatment with organic solvents or ashing in a muffle furnace or low temperature plasma asher to remove unwanted components).

Arcadis submitted one sample of each sample set (2) of vinyl floor tiles be analyzed by transmission electron microscopy (TEM) if the first sample is reported negative by PLM.

The asbestos analysis was completed using a stop positive approach. Only one result of greater than the regulated criteria is required to determine that a material is asbestos-containing, but all samples must be analyzed to conclusively determine that a material is non-asbestos. The laboratory stopped analyzing samples from a homogeneous material once greater than the criteria was detected in any of the samples of that material. All samples of a homogeneous material were analyzed if no asbestos was detected. Where building materials are described in this report as non-asbestos, or described as containing no asbestos, this is subject to the limitations of the analytical method used and should be understood to mean no asbestos was detected.

The classification, condition, and accessibility were assessed for the materials which could contain asbestos. To determine these factors, Arcadis followed the methodology outlined in the ASTM E356 Standard. The Standard provides definitions and criteria for the assessment of ACM. The classification, conditions, and accessibility information are provided in Appendix E.

Bulk samples of materials which could contain asbestos were collected and submitted to EMSL Canada Inc. (EMSL) for analysis of asbestos content. Asbestos-containing materials are defined as 0.5% or greater, or any amount if vermiculite.

3.2 Lead

Arcadis collected samples of distinctive paint finishes and surface coatings present in more than a limited application, where removal of the paint is possible. Arcadis collects samples by scraping the painted finish to include base and covering applications. Although the surfaces where samples were collected may be covered with more than one coat of paint, the paint samples are described by the surface (visible) colour only. As analytical results are referenced to the surface paint colour only, the lead content of all painted surfaces similar to that represented by the surface paint colour were presumed to be the same, regardless of differing sub surface paints, if any.

The 2017 WorkSafeBC publication ***Safe Work Practices for Handling Lead*** (Lead Guideline) indicates the following:

> ***Unlike for asbestos-containing material, WorkSafeBC does not numerically define what would be considered a lead-containing paint or coating. All suspected paints or coatings should be tested for lead because, depending on the nature of the work, even a small amount could pose a risk to workers. In order to determine which controls and personal protective equipment would be required for a particular job, a qualified person must consider this information as part of the risk assessment.***

- Improper removal of lead paint containing 600 mg/kg lead results in airborne lead concentrations that exceed half of the exposure limit

  Exposure limit indicated in both the COHSR and BC Reg. 296/97 is 0.05 mg/m^3

  Potential for exposure exceeding half of the occupational exposure limit would be the trigger for implementation of an exposure control plan.
- Lead concentrations as low as 90 mg/kg may present a risk to pregnant women and children

Any risk assessment should include for the presence of high risk individuals within the workplace

When reviewing the above, "high risk" individuals are not expected to be present in the workplace associated with this building during building material alteration activities (i.e., demolition) that would create significant disturbance to paint with such individuals present. As such, paints containing 600 ppm lead or more will be considered "lead-containing" for the purpose of this report, such that appropriate risk assessments can be completed for demolition planning. However, information regarding the lead content of all paints tested is provided herein, for reference and risk assessment should the consideration of high risk individuals be necessary, based on the requirements of a particular situation.

Although a concentration of 600 ppm lead has been used to define paint coatings as LCPs, it should be noted that this is related to painted surfaces and the determination of appropriate provisions to protect occupants and employees from exposure to elevated concentrations of lead during typical operations and maintenance or simple renovation. This does not include painted metal surfaces that are to be welded, burned or torch-cut.

Using an arc welder or oxyacetylene torch on steel that is coated with lead-containing paint can create hazardous lead fumes and is prohibited by section 12.115 of BC Reg. 296/97.

> Regulatory excerpt: **12.115 Coatings on metals**
>
> ***A coating on metal which could emit harmful contaminants (such as lead, chromium, organic materials, or toxic combustion products) must be removed from the base metal, whenever practicable, before welding or cutting begins.***

In addition, the following information is provided in the Lead Guideline:

- Welding or torch cutting of paints or coatings on metal can create very high concentrations of airborne lead fumes. Torch cutting structural steel, coated with paint containing as little as 130 mg/kg (equivalent to ppm) lead, can release airborne levels of lead as high as 0.8 mg/m^3 (16 times the exposure limit).

Given this information and that the analytical detection limit for lead paint analysis is approximately 80– 90 ppm (not significantly different than 130 ppm, which, per above, may release airborne lead levels 16 times the exposure limit), any paint coating on a metal surface to be welded, burned or torch-cut must be removed prior to that action being undertaken, unless a project-specific or tasks-specific risk assessment and safe work practices are developed by a qualified person.

Paint and surface coatings are evaluated for condition. The criteria for condition evaluation pertaining to LCPs described herein are generally based on the United States Housing and Urban Development (HUD) 2012 ***Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing***.

When evaluating the condition of LCPs, an attempt should be made to determine whether the deterioration is due to a moisture problem or some other existing building deficiency. **"Poor"** surfaces are considered to be a hazard and should be corrected. "**Fair"** surfaces should be repaired but are not yet considered to

be a hazard; if not repaired, they should be monitored frequently. "**Good/intact"** surfaces should be monitored to ensure that they remain in a nonhazardous condition.

In addition, the presence of paint debris must be considered in evaluating condition. Given the variety of paint uses, there are many applications that can have a tendency for the paint to "wear" from the surface slowly, over an extended period of time. Conditions where paint has worn from a surface are worth noting for maintenance discussions (i.e., related to re-coating the surface should, for example, the coating provide weather protection), however, in the absence of loose paint chip debris/dust, such conditions would not represent a potential exposure situation related to lead.

The condition evaluation criteria for LCPs are summarized in Table 3, below.

Table 3. Lead-Containing Paint Condition Categories

Type of Building Component[1]	Total Area of Deteriorated Paint on Each Component		
	Good/Intact	**Fair[2]**	**Poor[3]**
Exterior components with large surface areas.	Entire surface is intact.	Less than or equal to 10 square feet	More than 10 square feet
Interior components with large surface areas (walls, ceilings, floors, doors.	Entire surface is intact.	Less than or equal to 2 square feet	More than 2 square feet
Interior and exterior components with small surface areas (windowsills, baseboards, soffits, trim).	Entire surface is intact.	Less than or equal to 10% of the total surface area of the component.	More than 10% of the total surface area of the component

NOTES:

1 Building component in this table refers to each individual component or side of building, not the combined surface area of all similar components in a room (e.g., a wall with 1 square foot of deteriorated paint is in "fair" condition, even if the other three walls in a room are intact).

2 Surfaces in "fair" condition should be repaired and/or monitored but are not considered to be "lead-containing paint hazards".

3 Surfaces in "poor" condition are considered to be "lead-containing paint hazards" and should be addressed through abatement or interim controls.

Analysis for lead in paints or surface coatings was performed in accordance with EPA Method No. 3050B/ Method No. 7420; flame atomic absorption at laboratory accredited by the American Industrial Hygiene Association (AIHA).

3.3 Silica

Arcadis identified building materials suspected of containing crystalline silica (e.g. concrete, cement, tile, brick, masonry, mortar) by knowledge of current and historic applications and visual inspection only. Arcadis did not perform sampling of these materials for laboratory analysis of crystalline silica content.

3.4 Mercury

Building materials/products/equipment (e.g. thermostats, barometers, pressure gauges, light tubes), suspected to contain mercury were identified by visually inspection only. Dismantling of equipment suspected of containing mercury was not performed. Sampling of these materials for laboratory analysis of mercury content was not performed.

Mercury spills or damaged mercury-containing equipment was recorded where observed.

3.5 Polychlorinated Biphenyls (PCBs)

The presence or absence of fluorescent lights was documented during the course of our investigation to determine whether there were any of the T12 type. T12 fluorescent lamps, with a diameter of 1.5 inches, utilize transformer type magnetic ballasts, which may contain PCBs. The use of T12s has been discontinued and replaced with new high-efficiency 1-inch T8 lamps (and other types) which use electronic ballasts which do not contain PCBs.

Wet transformers were assessed for PCBs based on the age of the building, a review of maintenance records and examination of labels or nameplates on equipment, where present and accessible. The information is compared to known ban dates of PCBs and Environment Canada publications.

Dry type transformers are presumed to be free of dielectric fluids and hence non-PCB. Caulking's were not sampled for PCB content unless specifically impacted by the proposed renovation scope. The material is considered a PCB solid if PCB content is 50ppm or greater based on the threshold given in SOR/2008-273.

3.6 Suspect Visible Mould

Arcadis identified the presence of any suspect visible mould or water damage observed during the course of our site investigation. Suspect visible mould is typically a coloured, textured substance or discolouration or staining on a building material surface which, based on our experience, may be mould growth. The adjective ***suspect*** is used where the presence of mould has not been confirmed by laboratory analysis. If any mould growth is concealed within wall cavities it is not addressed in this assessment.

3.7 Ozone Depleting Substances (ODS)

Arcadis determined the potential presence of ODS (chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, halons, etc.) in air conditioning units, chillers, commercial coolers and fire suppression systems by visual inspection of manufactures' labels or plates, maintenance records, or logbooks, etc..

4 RESULTS

4.1 Asbestos

During the course of our assessment, representative bulk samples of material were collected by Arcadis staff. The samples were forwarded to EMSL in Burnaby, British Columbia (BC) for asbestos analyses. EMSL holds a current Certificate of Accreditation for Bulk Asbestos Fibre Analysis under the Voluntary Accreditation Program (NVLAP). Bulk sampling was performed in general accordance with the

requirements specified in ASTM E2356 Standard, BC Reg. 296/97 and in the WorkSafe BC publication Safe Work Practices for Handling Asbestos.

Results of bulk sample analysis for asbestos content are provided in Table 4. Site Photographs are provided in **Appendix A.** Laboratory certificates of analysis have been provided in **Appendix B**. Floor plans indicating sample locations and room numbers are provided in **Appendix C**.

Table 4. Results of Bulk Sample Analysis for Asbestos

Sample Number	Sample Description	Sample Location	Asbestos Type %	Friable (Y/N)	Accessibility	Condition (action)
A1A	Black Vapour Barrier Mastic	Room 2	1% Chrysotile	N	C	Good (7)
A1B	Black Vapour Barrier Mastic	Room 3	Positive Stop	N	C	Good (7)
A1C	Black Vapour Barrier Mastic	Room 4	Positive Stop	N	C	Good (7)
A2A*	Grey Duct Mastic	Room 4	None Detected	NA	NA	NA
A2B	Grey Duct Mastic	Room 4	None Detected	NA	NA	NA
A3A*	Vinyl Sheet Flooring – Grey/beige patterned	Room 8	None Detected	NA	NA	NA
A3**B**	Vinyl Sheet Flooring – Grey/beige patterned	Room 8	None Detected	NA	NA	NA
A4A**	Vinyl Sheet Flooring – Beige	Room 8	None Detected	NA	NA	NA
A4B	Vinyl Sheet Flooring – Beige	Room 8	None Detected	NA	NA	NA
A5A*	Vinyl Sheet Flooring – Beige, marbled squares	Room 12	None Detected	NA	NA	NA
A5B	Vinyl Sheet Flooring – Beige, marbled squares	Room 12	None Detected	NA	NA	NA

Sample Number	Sample Description	Sample Location	Asbestos Type %	Friable (Y/N)	Accessibility	Condition (action)
A6A**	Grey Window Sealant	Exterior	3% Chrysotile	N	A	Good (7)
A6B	Grey Window Sealant	Exterior	Positive Stop	N	A	Good (7)
A7A**	White Firestop Putty	Exterior	None Detected	Na	NA	NA

Notes: NA: Not Applicable

* Previous samples were collected in the 2018 Pinchin Ltd. assessment; however, additional samples were collected to comply with current PSPC guidelines

**.Due to the limited quantity of material on site, or potential for visible and building envelope damage, limited sampling was completed.

The following building materials were common in the building: however, these materials do not contain asbestos and were not sampled during the survey:

- Aluminum siding; wood baseboard and flooring, concrete, ceramics, glass fiber insulation and similar man-made mineral fibers.

No ACMs were identified in the 2018 Pinchin Ltd. Assessment. Asbestos-containing materials were confirmed present during this assessment as follows:

Table 5. Summary of Confirmed Asbestos-Containing Materials

Material	Location(s)	Total Quantity	Condition	Asbestos Type (%)
Black Vapour Barrier	Room 2, 3, 4, 5 (presumed throughout)	43 linear meter	Good (7)	1% Chrysotile
Grey Window Sealant	Exterior at front entrance	2 windows	Good (7)	3% Chrysotile

Potential for Vermiculite Insulation

As part of the assessment, Arcadis assessed the subject building for areas where vermiculite insulation, a potential ACM, would likely be present. This included making note of attic spaces, floor cavities and masonry block or brick walls, which are typical areas where vermiculite is found. Limited intrusive investigation was performed only where impacted by proposed renovations. No locations that may potentially contain vermiculite (that could not otherwise be assessed) were observed by Arcadis.

Presumed Materials

A number of materials which might contain asbestos were not sampled during this assessment due to limitations in scope or were too destructive to sample effectively. Where present, these materials are presumed to contain asbestos until otherwise proven by sampling and analysis.

Materials observed on site and presumed to contain asbestos include:

- Roofing, felts and tar;
- Building paper (concealed)
- Caulking (concealed);
- Window sealant (concealed);
- Electrical components or wiring within control centers, breakers, motors or lights, insulation on wiring; and,
- Adhesives
-

4.2 Lead

During the course of our site investigation, representative bulk samples of predominant paint types were collected by Arcadis staff. The samples were forwarded to EMSL for lead analyses. Results of bulk sample analysis for lead content are provided in Table 6. The laboratory report is provided in **Appendix B**.

Table 6. Results of Analyses of Bulk Samples for Paint for Lead

Sample No.	Sample Location(s)	Sample Description	Lead Content (ppm)
L01	Room 2	Olive paint on gypsum board	<80
L02	Room 3	Mauve paint on gypsum board	<80
L03	Room 1	Beige paint on gypsum board	140
L04	Room 6	Grey paint on concrete floor	<80
L05	Exterior	White paint on wood support column	140
L06	Exterior	Brown paint on wood stairs	<80

Lead was not detected at a level above the definition of lead paint (600 ppm) in any samples. Where one colour of paint is indicated in the sample descriptions in Table 6, only one layer of paint was observed. Where multiple colours are indicated in the sample description, multiple layers of paint were observed.

No samples were collected form painted metal surfaces (fascia, gutters etc.). Typically, paint applied to this type of metal is very thin and would result in visible damage if the surveyor were to collect sufficient material for laboratory analysis. In most cases the metal will be recycled with the paint intact and, therefore, does not pose a lead exposure risk.

Lead is presumed present in glazing on ceramic tiles.

4.3 Silica

Crystalline silica is a presumed component of the following materials where present in the building:

- poured concrete;

- ceramic tiles;
- Ceramic tile grout; and,
- Ceramic tile mortar.

4.4 Mercury

Mercury vapor is present in fluorescent lamps located in Room 12.

4.5 Polychlorinated Biphenyls (PCBs)

Based visual observations (evidence of T-8 fixtures) the building has been comprehensively re-lamped and will not contain PCB ballasts.

Caulking in the assessed areas was not suspected to contain PCBs due to the installation date stamp of visible on the windows (1988).

4.6 Suspect Visible Mould

Suspect visible mould and/or water staining was not observed during the assessment.

4.7 Ozone Depleting Substances

Ozone Depleting Substances (ODS) was identified as follows:

Table 7. Equipment Containing ODS

Equipment Type	Location(s)	ODS Type	Weight (kgs)
Domestic Refrigerator	Room 12	Fluorocarbons	Unknown

5 RECOMMENDATIONS

Perform a detailed intrusive assessment prior to future building renovation or demolition operations. The assessment should include destructive testing (i.e. coring and/or removal of building finishes and components), and sampling of materials not previously tested (i.e. roofing materials, mastics etc.).

All hazardous building materials were reported in good condition. All ACM observed were considered to fall under a recommended Action Level 7 (routine surveillance).

5.1 Ongoing Management

1. Ensure that all asbestos-containing materials identified are managed in place. The RCMP Asbestos Management Plan (AMP), PSPC publication ***Asbestos Management Standard*** as well as the WorkSafeBC publication ***Safe Work Practices for Handling Asbestos*** provides guidance in asbestos management programs including risk assessment, development of safe work procedures, worker instructions, development and implementation of Asbestos Management Plans and record keeping.

2. If silica-containing materials will be affected by sanding, drilling, chipping, grinding, cutting, sawing, sweeping or blasting, develop a silica exposure control plan to address control methods and personal protective equipment requirements in order to reduce worker exposure to a level as low as reasonably achievable below the occupational exposure limit prescribed in the ***Canada Occupational Health and Safety Regulation*** and BC ***Occupational Health and Safety Regulation***. Guidance is provided in the WorkSafeBC publication ***Developing a Silica Exposure Control Plan***. Silica control methods can include construction of barriers or enclosure systems to restrict access to and contain the work area; the use of wet methods; local exhaust ventilation when practical; and the use of personnel protective equipment.
3. Recycle fluorescent lamps when taken out of service. Do not break lamps.
4. Ozone depleting substances must be managed in accordance with the provincial and federal regulations (e.g. prohibition of release, recovery, record keeping, servicing by certified personnel, leak testing, etc.).

5.2 Building Renovation Work

The following specific recommendations are made regarding renovation involving the hazardous materials identified.

1. Prepare plans and performance specifications for hazardous material removal required for the planned work. The specifications should include the scope of work, safe work practices, personal protective equipment, respiratory protection, and disposal of waste materials.
2. Investigate any items excluded from the scope of work of this report. Ideally this investigation will be performed as part of the development of the specifications, or at a minimum immediately prior to commencing renovations when the areas are no longer occupied. Specifically, the following materials/areas need to be investigated:
    - Destructive testing to investigate suspect hazardous materials behind aluminum siding.
    - Destructive testing on painted metal surfaces (fascia, gutters etc.) if the material is to be sanded or otherwise abrasively disturbed
3. Provide this report and the detailed plans and specifications to the contractor prior to bidding or commencing work.
4. Retain a qualified consultant to specify, inspect and verify the successful removal of hazardous materials.
5. Update the asbestos inventory upon completion of the abatement and removal of asbestos-containing materials.

The following general recommendations are made regarding renovation involving the hazardous materials identified.

Asbestos

Remove all identified asbestos-containing materials (ACM) using "Minimum Asbestos Abatement Precautions" prior to renovation, alteration, maintenance or demolition work or if ACM may be disturbed by the work.

If the identified ACM will not be removed prior to commencement of the work, disturbance of ACM must follow the appropriate asbestos precautions for the classification of work being performed.

Asbestos-containing materials must be disposed of at a landfill approved to accept asbestos waste.

Silica

Construction disturbance of silica-containing products may result in excessive exposures to airborne silica, especially if performed indoors and dry. Cutting, grinding, drilling or demolition of materials containing silica should be completed only with proper respiratory protection and other worker safety precautions that comply with provincial standards or guidelines.

Mercury

Do not break lamps. Recycle fluorescent lamps when taken out of service.

Mould

No mould was observed; if mould is uncovered inside wall cavities during hand demolition, use appropriate precautions and protect workers using methods that comply with provincial guidelines.

Ozone Depleting Substances

Remove and recover refrigerants prior to disposal in compliance with regulations. Used licensed technicians to perform this work.

6 REFERENCES

The following legislation and documents were referenced in completing the assessment and this report:

1. Occupational Health and Safety Regulation, B.C. Reg. 296/97, WorkSafe BC.
2. Safe Work Practices for Handling Asbestos, WorkSafe BC, 2012 Edition.
3. Hazardous Waste Regulation, B.C. Reg. 261/2006, BC Ministry of Environment.
4. Ozone Depleting Substances and Other Halocarbons Regulation, B.C. Reg. 220/2006, Environmental Management Act.
5. PCB Regulations, SOR/2008-273, Canadian Environmental Protection Act.
6. Lead-Containing Paint and Coatings, Preventing Exposure in the Construction Industry, WorkSafe BC, June 2011.
7. Mould Guidelines for the Canadian Construction Industry, Standard Construction Document CCA 82 – 2004, Canadian Construction Association.
8. Minister of Justice. 2018. Canada Labour Code. R.S.C., 1985, c. L-2. August 27, 2018.
9. Minister of Justice. 2018. Canada Occupational Health and Safety Regulations. SOR/86-304. August 27, 2018.

10. Public Services and Procurement Canada. 2017. Asbestos Management Standard. June 5, 2017.
11. Transport Canada. 2017. Consolidated Transport of Dangerous Goods Regulations including Amendment SOR/2017-253.
12. ASTM E2356 Standard Practice for Comprehensive Buildings Asbestos Surveys
13. Royal Canadian Mounted Police, Asbestos Management Plan, Version 2018-01, February 2018

7 LIMITATIONS

This report, prepared for Public Services and Procurement Canada, does not provide certification or warranty, expressed or implied, that the investigation conducted by Arcadis identified all hazardous materials associated with the subject building. The work undertaken by Arcadis was directed to provide information on the presence of hazardous materials in construction materials based on visual inspection of readily accessible areas of the subject building, and on the results of laboratory analysis of a limited number of bulk samples. The material in this report reflects Arcadis' best judgment in light of the information available at the time of the investigation, which was performed on January 13, 2020. This report is not intended to be used as a scope of work or technical specification for remediation of hazardous materials. This report was prepared by Arcadis for Public Services and Procurement Canada. Any use which any other party makes of the report, or reliance on, or decisions to be based on it, is the responsibility of such parties.

APPENDIX A

Site Photographs

Project Photographs

Public Services and Procurement Canada
Building E0423

Photo: 1

Date:
January 13, 2020

Description:
Front view of employee housing

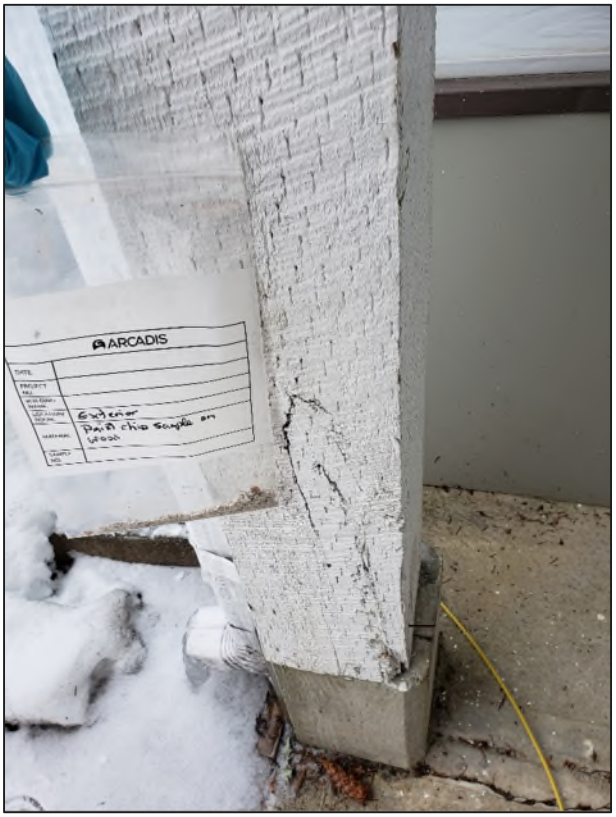


Photo: 2

Date:
January 23, 2020

Description:
Non lead white paint on exterior wood column

Project Photographs

Public Services and Procurement Canada
Building E0423

Photo: 3

Date:
January 13, 2020

Description:
Asbestos-containing black vapour barrier mastic in Room 4

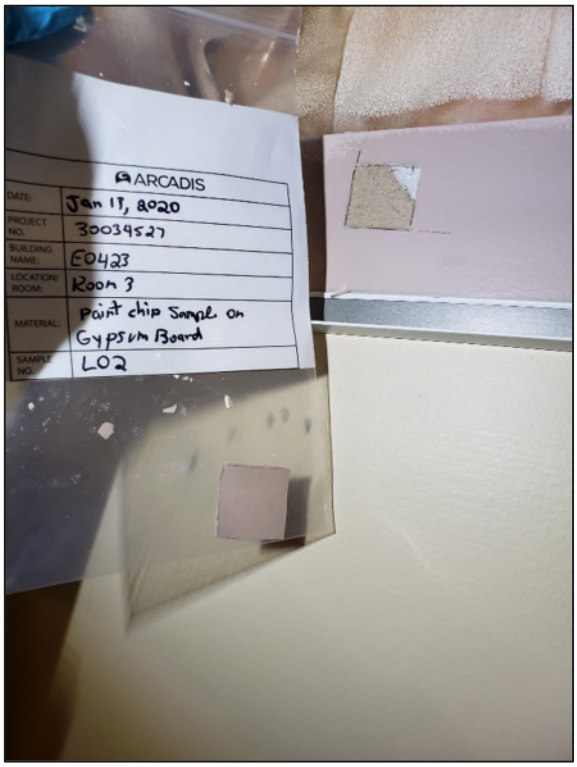


Photo: 4

Date:
January 13, 2020

Description:
Non lead mauve paint above lay-in ceiling tiles. Typical non lead beige paint below in Room 3

Project Photographs

Public Services and Procurement Canada
Building E0423

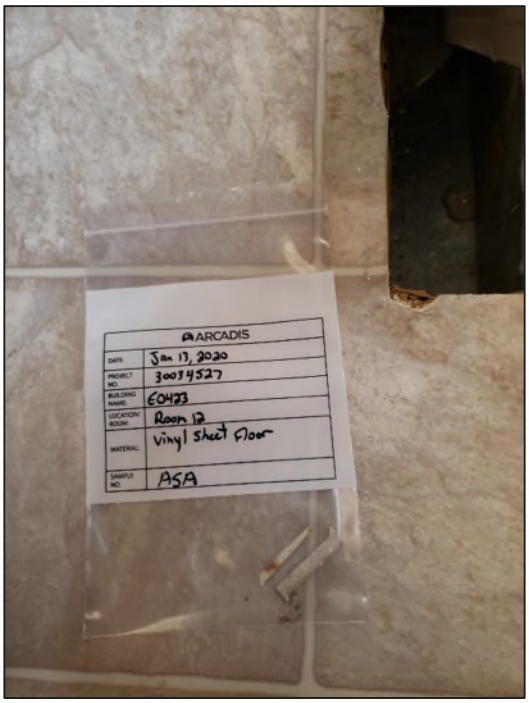


Photo: 5

Date:
January 13, 2020

Description:
Typical non-ACM vinyl sheet flooring in Room 12

Photo: 6

Date:
January 13, 2020

Description:
Worn non lead grey paint on concrete floor in Room 6

APPENDIX B

Laboratory Certificates of Analysis

EMSL Canada Inc.

4506 Dawson Street Burnaby, BC V5C 4C1
Phone/Fax: (604) 757-3158 / (604) 757-4731
http://www.EMSL.com / vancouverlab@EMSL.com

EMSL Canada Order ID: 692000108
Customer ID: 55ACAV42
Customer PO: 30034527
Project ID:

Attn: Jerry Botti
ARCADIS Canada Inc.
308-1080 Mainland Street
Vancouver, BC V6B 2T4

Phone: (604) 632-9941
Fax:
Collected:
Received: 1/14/2020
Analyzed: 1/21/2020

Proj: 30034527

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID: A1A ***Lab Sample ID:*** **692000108-0001**
Sample Description: E0423 - ROOM 2/VAPOUR BARRIER MASTIC

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2020	Black	0.0%	99.0%	**1% Chrysotile**	

Client Sample ID: A1B ***Lab Sample ID:*** **692000108-0002**
Sample Description: E0423 - ROOM 3/VAPOUR BARRIER MASTIC

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/21/2020				Positive Stop (Not Analyzed)	

Client Sample ID: A1C ***Lab Sample ID:*** **692000108-0003**
Sample Description: E0423 - ROOM 4/VAPOUR BARRIER MASTIC

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/21/2020				Positive Stop (Not Analyzed)	

Client Sample ID: A2A ***Lab Sample ID:*** **692000108-0004**
Sample Description: E0423 - ROOM 4/DUCT MASTIC

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2020	Gray	0.0%	100.0%	None Detected	

Client Sample ID: A2B ***Lab Sample ID:*** **692000108-0005**
Sample Description: E0423 - ROOM 4/DUCT MASTIC

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2020	Gray	0.0%	100.0%	None Detected	

Client Sample ID: A3A ***Lab Sample ID:*** **692000108-0006**
Sample Description: E0423 - ROOM 8/VINYL SHEET FLOORING

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2020	Tan	20.0%	80.0%	None Detected	

Client Sample ID: A3B ***Lab Sample ID:*** **692000108-0007**
Sample Description: E0423 - ROOM 8/VINYL SHEET FLOORING

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
TEM Grav. Reduction	1/20/2020	Beige	0.0%	100.0%	None Detected	

EMSL Canada Inc.

4506 Dawson Street Burnaby, BC V5C 4C1
Phone/Fax: (604) 757-3158 / (604) 757-4731
http://www.EMSL.com / vancouverlab@EMSL.com

EMSL Canada Order ID: 692000108
Customer ID: 55ACAV42
Customer PO: 30034527
Project ID:

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID: A4A ***Lab Sample ID:*** **692000108-0008**

Sample Description: E0423 - ROOM 8/VINYL SHEET FLOORING

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2020	Gray/Tan	20.0%	80.0%	None Detected	

Client Sample ID: A4B ***Lab Sample ID:*** **692000108-0009**

Sample Description: E0423 - ROOM 8/VINYL SHEET FLOORING

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
TEM Grav. Reduction	1/20/2020	Beige	0.0%	100.0%	None Detected	

Client Sample ID: A5A ***Lab Sample ID:*** **692000108-0010**

Sample Description: E0423 - ROOM 12/VINYL SHEET FLOORING

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/21/2020	Gray	20.0%	80.0%	None Detected	

Client Sample ID: A5B ***Lab Sample ID:*** **692000108-0011**

Sample Description: E0423 - ROOM 12/VINYL SHEET FLOORING

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
TEM Grav. Reduction	1/20/2020	Beige	0.0%	100.0%	None Detected	

Client Sample ID: A6A ***Lab Sample ID:*** **692000108-0012**

Sample Description: E0423 - EXTERIOR AT FRONT ENTRANCE/WINDOW SEALANT

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/21/2020	Gray	0.0%	97.0%	**3% Chrysotile**	

Client Sample ID: A6B ***Lab Sample ID:*** **692000108-0013**

Sample Description: E0423 - EXTERIOR AT FRONT ENTRANCE/WINDOW SEALANT

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/21/2020				Positive Stop (Not Analyzed)	

Client Sample ID: A7A ***Lab Sample ID:*** **692000108-0014**

Sample Description: E0423 - EXTERIOR/FIRESTOP PUTTY

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/21/2020	White	0.0%	100.0%	None Detected	

EMSL Canada Inc.

4506 Dawson Street Burnaby, BC V5C 4C1
Phone/Fax: (604) 757-3158 / (604) 757-4731
http://www.EMSL.com / vancouverlab@EMSL.com

EMSL Canada Order ID: 192000108
Customer ID: 55ACAV42
Customer PO: 30034527
Project ID:

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Analyst(s):

Ioana Taina	TEM Grav. Reduction (3)
Margaret Lee	PLM (8)

Reviewed and approved by:

Nicole Yeo, Laboratory Manager
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. This report must not be used to claim product endorsement by NVLAP of any agency or the U.S. Government

Samples analyzed by EMSL Canada Inc. Burnaby, BC

Initial report from: 01/21/202011:17:32

EMSL Canada Inc.
2333 18th Avenue NE, Unit 48, Calgary, AB T2E 8T6
Phone/Fax: (403) 879-1149 / (403) 879-1152
http://www.EMSL.com CalgaryLab@EMSL.com

EMSL Canada Or	652000287
CustomerID:	55ACAV42
CustomerPO:	
ProjectID:	

Attn: **Jerry Botti**
ARCADIS Canada Inc.
308-1080 Mainland Street
Vancouver, BC V6B 2T4

Phone: (604) 632-9941
Fax:
Received: 01/15/20 8:40 AM
Collected: 1/13/2020

Project: **30034527**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

Client Sample Description	*Lab ID*	*Collected*	*Analyzed*	*Weight*	*Lead Concentration*
L01	***652000287-0001***	1/13/2020	1/16/2020	0.2511 g	<80 ppm
	Site: E0423 - ROOM 2				
L02	***652000287-0002***	1/13/2020	1/16/2020	0.2593 g	<80 ppm
	Site: E0423 - ROOM 3				
L03	***652000287-0003***	1/13/2020	1/16/2020	0.2584 g	140 ppm
	Site: E0423 - ROOM 1				
L04	***652000287-0004***	1/13/2020	1/16/2020	0.2603 g	<80 ppm
	Site: E0423 - ROOM 6				
L05	***652000287-0005***	1/13/2020	1/16/2020	0.2602 g	140 ppm
	Site: E0423 - EXTERIOR				
L06	***652000287-0006***	1/13/2020	1/16/2020	0.2613 g	<80 ppm
	Site: E0423 - EXTERIOR				

Jefferson Salvador, Laboratory Manager
or other approved signatory

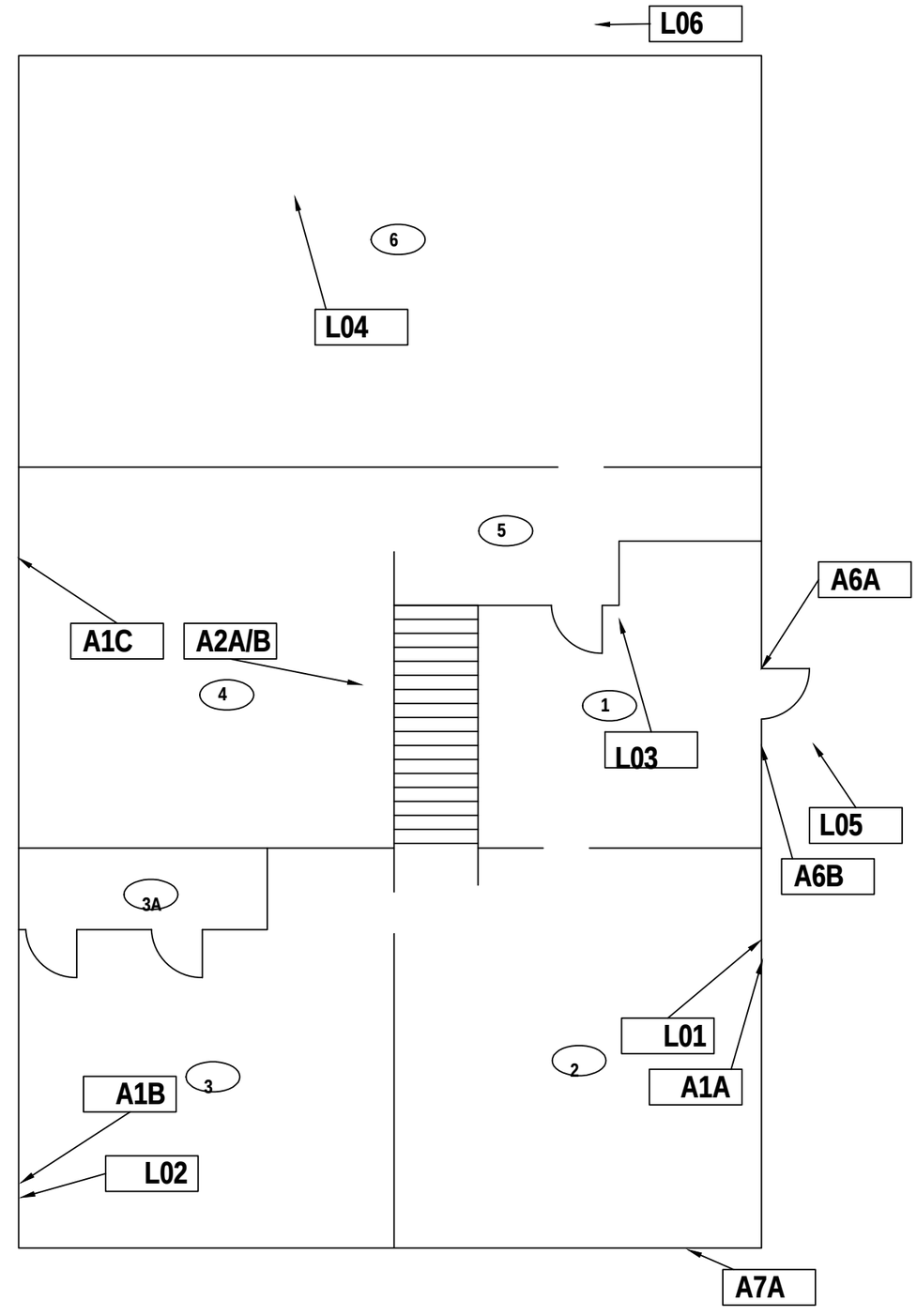
*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.008 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise. Definitions of modifications are available upon request.

Samples analyzed by EMSL Canada Inc. Calgary, AB CALA Accreditation #A3942

Report Amended: 01/21/2020 15:17:42 Replaces the Inital Report 01/21/2020 15:16:20. Reason Code: Client-Other (see report comment)

APPENDIX C

Floor Plans



LEGEND

- A-XXX — Asbestos Sample Location
- L-XXX — Lead Sample Location
- X — Room Number

N.T.S

Title: RCMP DIV E HAZARDOUS BUILDING MATERIAL ASSESSMENT 2019-2020

Project: BUILDING E0423
8648 DRIFTER WAY, WHISTLER, B.C. - FIRST FLOOR

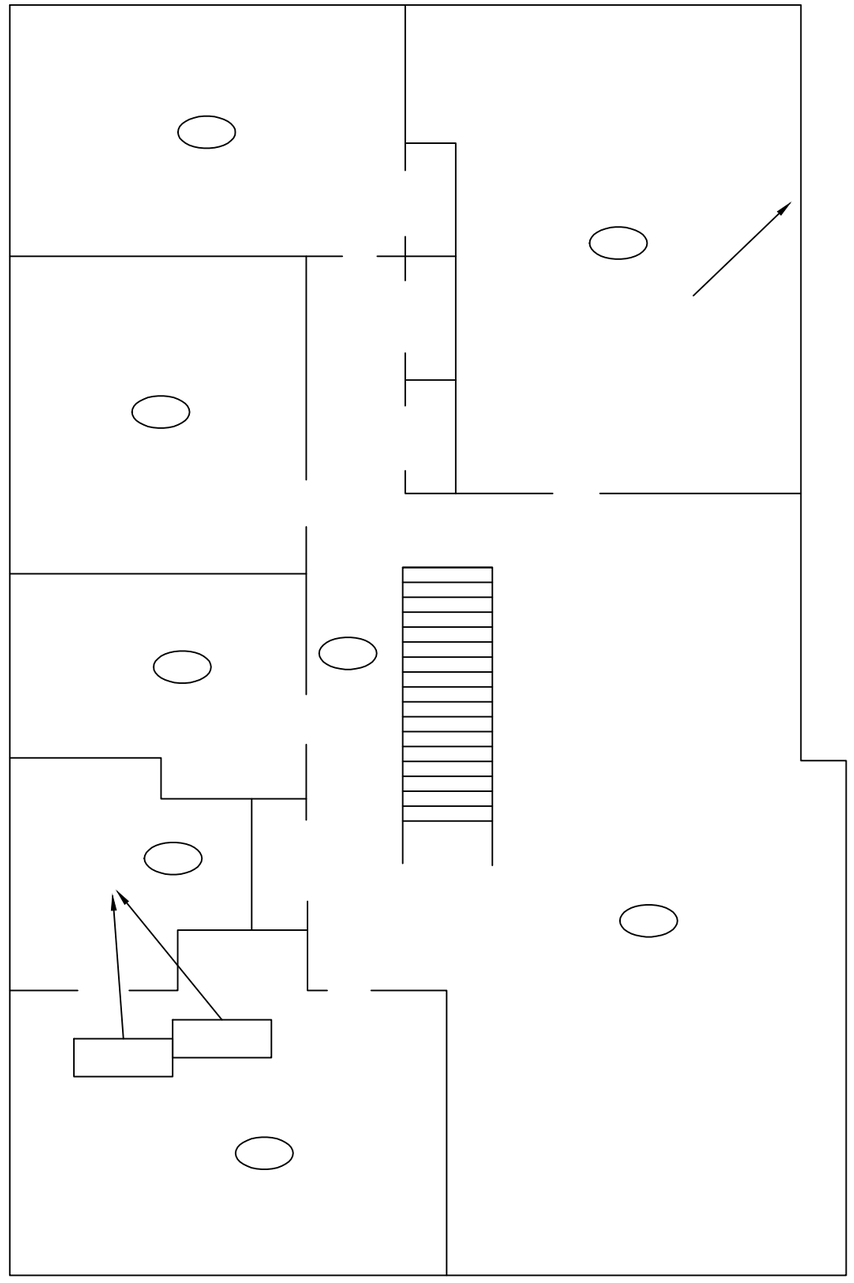
Client: PUBLIC SERVICES AND PROCUREMENT CANADA

Project Number:	Drawn By:	Plot Size:	Date:
30034527	CB	11X17"	FEBRUARY 2020

ARCADIS

firstfloor G:\PROJECTS\30034527 - RCMP Phase 2 HBMA PSPC\CAD\E0423.dwg

FIGURE C-1



secondfloor G:\PROJECTS\30034527 - RCMP Phase 2 HBMA PSPC\CAD\E0423.dwg

11

12

A5A/B

10

13

9

8

14

A3A/B A4A/B

LEGEND

A-XXX Asbestos Sample Location

X Room Number

N.T.S

Title: **RCMP DIV E HAZARDOUS BUILDING MATERIAL ASSESSMENT 2019-2020**

Project: BUILDING E0423
8648 DRIFTER WAY, WHISTLER, B.C. - SECOND FLOOR

Client: PUBLIC SERVICES AND PROCUREMENT CANADA

Project Number:	*Drawn By:*	*Plot Size:*	*Date:*
30034527	CB	11X17"	FEBRUARY 2020

FIGURE C-2

APPENDIX D

Regulations and Health Effects

Asbestos

Occupational Health and Safety (OHS) for federal employees is regulated by the Canada Labour Code (CLC) Part II. The ***Canada Occupational Health and Safety Regulations (COHSR), Part X, Hazardous Substances*** covers specific requirements related to the management and control of asbestos-containing materials (ACM). The COHSR, Part X, Hazardous Substances, states an employee shall be kept free from exposure to a concentration of airborne chrysotile asbestos in excess of 0.1 fibre/cm^3 or f/cc. There are also specific requirements for hazard prevention detailed in the Hazard Prevention Program (HPP) in the CLC.

For the purposes of this report, the following federal requirements will be followed, unless provincial requirements are more stringent. Federal legislation and policy referenced in this report includes:

- Canada Labour Code, August 27, 2018;
- Canada Occupational Health and Safety Regulations Part X, Hazardous Substances; SOR/86-304, August 27, 2018;
- Public Services and Procurement Canada Asbestos Management Standard, June 2017;
- Asbestos Management Plan, Royal Canadian Mounted Police, Version 2018-01, February 2018; and,
- Transport Canada, Transport of Dangerous Goods Regulations

The management and requirements for the potential disturbance of asbestos in buildings is also regulated at the provincial level under the ***British Columbia Occupational Health and Safety Regulations,296/97, and Safe Work Practices for Handling Asbestos, WorkSafeBC, 2017 Edition***.

The BC Occupational Health and Safety Regulations, 296/97 (BC Reg 296/97), require specific actions when asbestos is a potential health hazard in a workplace. Section 6.1 of the regulation defines an asbestos-containing material as follows:

"asbestos-containing material" means the following:

(a) a manufactured article or other material, other than vermiculite insulation, that would be determined to contain at least 0.5% asbestos if tested in accordance with one of the following methods:

(i) Asbestos, Chrysotile by XRD, Method 9000 (Issue 2, dated August 15, 1994) in the NIOSH Manual of Analytical Methods, published by the United States National Institute for Occupational Safety and Health, Centre for Disease Control;

(ii) Asbestos (bulk) by PLM, Method 9002 (Issue 2, dated August 15, 1994) in the NIOSH Manual of Analytical Methods, published by the United States National Institute for Occupational Safety and Health, Centre for Disease Control;

(iii) Test Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116, dated July 1993) published by the United States Environmental Protection Agency;

(b) vermiculite insulation that would be determined to contain any asbestos if tested in accordance with the Research Method for Sampling and Analysis of Fibrous Amphibole in Vermiculite Attic Insulation (EPA/600/R-04/004, dated January 2004) published by the United States Environmental Protection Agency;

The duties of employers, contractors, or owners include:

- identifying and labeling ACM that can potentially release asbestos fibres;
- keeping a current written record of all ACM present in the workplace;
- conducting regular surveillance and maintenance of asbestos materials to prevent fibre release;
- developing a written exposure control plan if workers may be exposed to harmful levels of asbestos;
- conducting work in a way that prevents the release of asbestos fibres as much as possible;
- notifying, informing, and training workers; and,
- notifying Occupational Health and Safety (OHS) at least 48 hours before beginning an asbestos-abatement.

Disturbance of asbestos during construction and demolition is regulated under section 20.112 of BC Reg 296/97.

The 2017 WorkSafeBC publication Safe Work Practices for Handling Asbestos (Asbestos Guide) is used by Occupational Health and Safety officers as a guide when reviewing abatement work practices and employer codes of practice, and generally meets the requirements of the COHSR.

The Asbestos Guide also provides significant additional background information pertaining to asbestos, along with details on health effects and other applicable legislation within the province of British Columbia (e.g., the federal Hazardous Products Act, the BC Building Code and waste disposal regulations).

Disposal of asbestos waste is governed by the British Columbia Hazardous Waste Regulation (BC Reg. 63/88). The Federal Transportation of Dangerous Goods Regulation and BC Reg. 63/88 set out the requirements for the proper transport of asbestos waste in British Columbia. In general, and for transportation and disposal, the waste must be placed in a double sealed container, properly labeled, free of cuts, tears or punctures and disposed of at a licensed waste station which has been properly notified of the presence of asbestos waste.

Health effects

Undisturbed asbestos within building materials poses no health risks. Asbestos poses a risk when building materials containing asbestos are impacted, or disturbed, thereby releasing the asbestos fibres into the air

Asbestos-related diseases are caused when suspended airborne asbestos fibres are inhaled and the fibres settle into various regions of the lungs and remain for extended periods. Once embedded in the lungs the asbestos fibres cause scarring within the lung tissue, ultimately leading to impaired lung function (asbestosis) and/or various cancers (lung cancer; mesothelioma). These asbestos-related diseases are irreversible and fatal. The risk of lung-related cancers is increased in individuals who smoke.

These asbestos-related diseases most often occur in individuals who have been exposed to high concentrations of airborne asbestos over a long period of time, though mesothelioma has been found in individuals with short-term exposures. Symptoms or the development of these asbestos-related diseases usually occur 10 to 25 years after exposure

Lead

In Canada, the Surface Coating Materials Regulations (SOR/2005-109) under the federal Hazardous Products Act provides a concentration of lead that must not be exceeded in surface coatings that are presently sold in this country. This value has recently been reduced from 600 ppm (2005) to 90 ppm (2010).

With respect to potential lead exposures associated with disturbance to surfaces coated with lead-containing products, the 2011 WorkSafeBC manual titled Lead-Containing Paint and Coatings: Preventing Exposure in the Construction Industry, indicates the following:

- Improper removal of lead paint containing 600 mg/kg lead results in airborne lead concentrations that exceed half of the exposure limit
    - This potential for exposure exceeding half of the occupational exposure limit would be the trigger for implementation of an exposure control plan.
- Lead concentrations as low as 90 mg/kg may present a risk to pregnant women and children
    - Any risk assessment should include for the presence of high risk individuals within the workplace

The disposal of lead-containing paint is regulated under the Federal ***Transportation of Dangerous Goods Act*** and by the British Columbia Ministry of Environment. All lead-based paints and associated nonmetal substrate (concrete, plaster, wood, etc.) must undergo Toxicity Characteristic Leachate Properties (TCLP) metals testing to determine disposal procedures. Upon the completion of the test, the total concentration of metals in the waste extract must be compared to Schedule 4, Table 1 of the Hazardous Waste Regulation.

The Federal Transportation of Dangerous Goods Regulation and BC Reg. 63/88 set out the requirements for the proper transport of lead waste in British Columbia.

Health Effects

Elemental lead and inorganic lead compounds are absorbed through ingestion or inhalation and can incorporate into the bone marrow, nerve tissue, brain, and kidneys. In children, symptoms of lead poisoning can include headaches, irritability, abdominal pain, vomiting, anemia, weight loss, poor attention span, noticeable learning difficulty, slowed speech development, and hyperactivity. In adults, symptoms of lead poisoning can include pain, numbness or tingling of the extremities, muscular weakness, headache, abdominal pain, memory loss, unsteady gait, pale skin, weight loss, vomiting, irritability, and anemia. Although adults are susceptible to the toxic effects of lead, children are at high risk due to the nature of a child's activities that involve the introduction of non-food items into their bodies.

Excessive airborne lead and surface contamination can be transferred to employees' hands and may results in lead ingestion. Therefore, work practices intended to minimize surface lead concentrations, such as frequent cleaning of work surfaces should be included in an overall lead exposure control plan

PCB

As of September 5, 2008, under subsection 93(1) of the ***Canadian Environmental Protection Act,*** (CEPA), Federal PCB regulations were published by the Canada Gazette Part II (SOR/2008-273) that imposed specific deadlines for the elimination of all PCBs in concentrations at or above 50 milligrams/kilogram (mg/kg). This regulation required the elimination of all PCBs and PCB-containing materials currently in-use and in storage and limited the period of time PCB materials could be stored before being eliminated. Other aspects of the regulation govern the labelling and reporting of stored PCB materials and equipment as well

as improved practices for the management of PCBs that remain in use (i.e., those with PCB concentrations less than 50 mg/kg) until their eventual elimination.

In British Columbia, PCB equipment becomes PCB wastes as soon as it is removed from service. This is the case even if the intent is to treat, recycle, or reuse the equipment.

When PCB wastes are stored in British Columbia, the full requirements of BC Reg. 63/88 apply to:

- 1.0 kg or more of pure PCB
- 100 L or more of any liquid containing more than 50 ppm of PCB
- 100 kg or more of any material other than a liquid, contaminated with more than 50 ppm of PCB

These amounts are the total of all amounts at a single location owned or controlled by the same person. They include PCB equipment. BC Reg. 63/88 also provides packaging requirements for storage, labeling requirements, waste destruction requirements, and references SOR/2008-273, indicating:

The Federal Transportation of Dangerous Goods Regulation sets out the requirements for the proper transport of PCB waste across provincial boundaries.

In British Columbia, a manifest issued by the Ministry of Environment (or equivalent federal document) must be used for hazardous wastes shipped from sites in British Columbia. A manifest must be used to transport:

- 5 kg or more of PCB solids
- 5 L or more of PCB liquids
- An amount of a PCB solid or PCB liquid containing more than 500 g of PCB within BC
- 500 g or more of solids, liquids, or mixtures of these containing 50 mg/kg of PCB outside of BC

Health effects

PCBs are insoluble in water; however, they readily dissolve in fats and other organic compounds. It is these attributes and fat-solubility that allow PCBs to persist in the environment and bio-accumulate in humans and animals. Exposure to PCBs can affect the immune system, reproductive system, nervous system and endocrine system. In humans, PCBs are potentially cancer-causing.

Mould

At present, there are no specific laws or regulations governing acceptable levels of mould in buildings. The lack of specific regulatory standards is due in part to an inability to establish exposure-response relationships. Variation in individual susceptibility, limitations in sampling and analytical techniques, and the vast number of fungal agents and their products make it difficult to establish safe levels of exposure for all individuals. With a lack of defined exposure criteria, current Health Canada and other agency guidelines on the assessment and control of mould contamination in public buildings are largely based on prudent avoidance (i.e., remove any indoor growth or amplification site of mould, regardless of the concentration of moulds or their products in the indoor environment).

Although there are currently no regulations in Canada pertaining specifically to mould in buildings, occupational health and safety regulations typically require employers to take every precaution reasonable in the circumstances for the protection of workers.

The WorkSafeBC Guideline for Part 4 of BC Reg. 296/97 discusses the application of the Regulation to workplaces with mould showing on exposed or hidden surfaces, or where mould may be a factor in complaints regarding indoor air quality. The guideline provides information for investigating indoor air quality complaints with respect to mould contamination, including information on sampling for the

presence of moulds in buildings. Information is also provided on possible health effects and for cleanup personnel involved in the remediation of buildings damaged by water and mould.

Health Effects

There are a number of documented cases of health problems related to exposure to indoor fungi.

Both high-level, short-term exposures and lower-level, long-term exposures can result in illness. The most common symptoms from exposure to mould in indoor environments are runny nose, eye irritation, cough, congestion, aggravation of asthma, headache, flu-like symptoms, fatigue, and skin rash. People with suppressed immune systems may be susceptible to fungal infections as a result of exposure to indoor moulds.

People who are exposed to mould growth on building materials will not necessarily exhibit adverse health effects. However, the mould must still be removed. Humans are at risk from indoor mould when fungal spores, fragments or metabolites are released into the air and inhaled or physically contacted (dermal exposure).

Not everyone experiences allergic reaction; the susceptibility to exposure varies with the individual's genetic predisposition, age, state of health, and concurrent exposures. For these reasons, and because the measurement of exposure is not standardized and biological markers of exposure to fungi are largely unknown, it is not possible to establish "safe" or "unsafe" levels of exposure. However, federal and provincial policies have been written to minimize mould exposure and the elimination of mould indoors.

Mercury

In Canada, the Surface Coating Materials Regulations (SOR/2005-109) under the federal ***Hazardous Products Act*** provides a concentration of mercury that must not be exceeded in surface coatings that are presently sold in this country. This value was set at 10 ppm in 2005. However, it is important to note that there is not a direct correlation between the concentration of mercury in a material to the potential occupational exposure if the material is disturbed.

Mercury disposal should be through a scrap dealer (elemental mercury), recycling firm for mercury vapour and returned to the manufacturer for light tubes and fixtures. Disposal of mercury waste is governed by BC Reg. 63/88.

The Federal Transportation of Dangerous Goods Regulation and BC Reg. 63/88 set out the requirements for the proper transport of mercury waste in British Columbia.

Health Effects

Routes of exposure for mercury and mercury compounds include inhalation, ingestion, skin and/or eye contact. Mercury is hazardous if it is inhaled or absorbed through the skin, therefore exposure controls (including both respiratory protection and skin protection) are important to consider.

Elemental (metallic) mercury most often causes health effects through inhalation of its vapour, which can be absorbed through the lungs. This kind of exposure can result when elemental mercury is spilled (or products that contain elemental mercury break) and the mercury is exposed to the air. Vapour concentrations can vary especially in warm or poorly-ventilated indoor spaces where the airborne concentration can exceed the permissible exposure limit (provincially set).

Chronic mercury "poisoning" can be caused by long-term exposure to low airborne concentrations (or low levels) of mercury. Symptoms or effects of mercury exposure include: tremors, emotional changes,

neuromuscular effects, mental changes/disturbances, digestive disturbances, headaches, insomnia, and changes in nervous response.

Silica

Regulations pertaining to silica are provided in BC Reg. 296/97. Included are general provisions (minimizing release; keeping worksite clear of unnecessary accumulations; ensuring methods for decontamination prevent generation of airborne silica), provisions for “restricted areas” (where there is a reasonable chance that the airborne concentration of silica exceeds or may exceed the occupational exposure limit), provisions for use in abrasive blasting, and provisions for health assessments for workers exposed to silica.

Health Effects

Crystalline silica dust particles, which are small enough to be inhaled into the lungs (respirable size), can cause a number of health problems. As with asbestos, silica within building materials poses no threat to human health if left undisturbed.

Exposure to crystalline silica airborne dust my cause scaring of the lungs with coughing and shortness of breath—also known as “silicosis”, a form of disabling, progressive, and sometimes fatal pulmonary fibrosis.

Ozone Depleting Substances (ODS)

ODSs are regulated in British Columbia by the British Columbia ***Waste Management Act***—Ozone Depleting Substances and Other Halocarbons Regulation (BC Reg. 387/99 as amended by BC Reg. 109/2002).

On federal land, aboriginal land and federal works, buildings and undertakings, the Federal Halocarbon Regulation 2003 (SOR/2003-289, including associated amendments) applies. All other buildings and uses of refrigerants and other agents are under the Ozone-Depleting Substances Regulations 1998 (SOR/99-7), under CEPA. The regulations prohibit the release of halocarbons contained in refrigeration systems, air conditioning systems, fire extinguishers (except to fight a fire that is not a fire caused for training purposes) or containers or equipment used in the re-use, recycling, reclamation or storage of a halocarbon.

The regulations also impose restrictions on the servicing and dismantling, disposing of or decommissioning of any system containing halocarbons and requires the recovery of halocarbons into an appropriate container by a certified individual. The regulation also details an owner’s record-keeping obligations.

If ODS-containing materials are to be removed and disposed of, all ODSs must be handled, recycled, stored, and/or disposed of in accordance with the requirements of BC Reg. 63/88.

The Federal Transportation of Dangerous Goods Regulation and BC Reg. 63/88 set out the requirements for the proper transport of ODS waste in British Columbia.

Health Effects

Health effects are not typically related to exposure to ODSs directly, but to the consequences of ODS release to the atmosphere, subsequent degradation of the earth’s ozone layer, and implications associated with increased UVB light exposure.

APPENDIX E

Asbestos Classification, Condition and Accessibility

1.1 Spray Applied Fireproofing, Insulation and Texture Finishes

To evaluate the condition of ACM spray applied as fireproofing, thermal insulation, or texture, decorative or acoustic finishes, the following criteria are applied:

GOOD

Surface of material shows no significant signs of damage, deterioration or delamination. Up to 1 percent visible damage to surface is allowed within range of **GOOD**. Evaluation of sprayed fire-proofing requires the surveyor to be familiar with the irregular surface texture typical of sprayed asbestos products. **GOOD** condition includes un-encapsulated or unpainted fireproofing or texture finishes, where no delamination or damage is observed, and encapsulated fireproofing or texture finishes where the encapsulation has been applied after the damage or fallout occurred.

POOR

Sprayed materials show signs of damage, delamination or deterioration. More than 1 percent damage to surface of ACM spray.

In observation areas where damage exists in isolated locations, both **GOOD** and **POOR** condition may be reported. The extent or percentage of each condition will be recorded on the survey or re-assessment form.

NOTE: **FAIR** condition is not utilized in the evaluation of the sprayed fireproofing, sprayed insulation, or texture coat finishes.

The evaluation of ACM spray applied as fireproofing, non-mechanical thermal insulation, or texture, decorative or acoustic finishes which are present above ceilings, may be limited by the number of observations made, and by building components such as ducts or full height walls that obstruct the above ceiling observations. Persons entering the ceiling are advised to be watchful for ACM **DEBRIS** prior to accessing or working above ceilings in areas of buildings with ACM regardless of the reported condition.

1.2 Mechanical Insulation

The evaluation of the condition of mechanical insulation (on boilers, breaching, ductwork, piping, tanks, equipment etc.) utilizes the following criteria:

GOOD

Insulation is completely covered in jacketing and exhibits no evidence of damage or deterioration. No insulation is exposed. Includes conditions where the jacketing has minor surface damage (i.e., scuffs or stains), but the jacketing is not penetrated.

FAIR

Minor penetrating damage to jacketed insulation (cuts, tears, nicks, deterioration or delamination) or undamaged insulation that has never been jacketed. Insulation is exposed but not showing surface disintegration. The extent of missing insulation ranges should be minor to none.

POOR

Original insulation jacket is missing, damaged, deteriorated or delaminated. Insulation is exposed and significant areas have been dislodged. Damage cannot be readily repaired.

The evaluation of mechanical insulation may be limited by the number of observations made and building components such as ducts or full height walls that obstruct observations. It is not possible to observe the full length of mechanical insulation from all angles.

1.3 Non-friable and Potentially Friable Materials

Non-friable materials generally have little potential to release airborne fibres, even when damaged by mechanical breakage. However, some non-friable materials, i.e., exterior asbestos cement products, may have deteriorated so that the binder no longer effectively contains the asbestos fibres. In such cases of significantly deteriorated non-friable material, the material should be treated as a friable product.

2. Evaluation of Accessibility

The accessibility of building materials known or suspected of being ACM is rated according to the following criteria:

ACCESS (A)

Areas of the building within reach (from floor level) of all building users. Includes areas such as gymnasiums, workshops, and storage areas where activities of the building users may result in disturbance of ACM not normally within reach from floor level.

ACCESS (B)

Frequently entered maintenance areas within reach of maintenance staff, without the need for a ladder. Includes: frequently entered pipe chases, tunnels and service areas or areas within reach from a fixed ladder or catwalk, e.g. tops of equipment, mezzanines.

ACCESS (C) EXPOSED

Areas of the building above 2.4 metres where use of a ladder is required to reach the ACM. Only refers to ACM that is exposed to view, from the floor or ladder, without the removal or opening of other building components such as ceiling tiles, or service access door or hatch. Does not include infrequently accessed service areas of the building.

ACCESS (C) CONCEALED

Areas of the building which require the removal of a building component, including lay-in ceilings and access panels into solid ceiling systems. Includes rarely entered crawl spaces, attic spaces, etc. Observations will be limited to the extent visible from the access points.

ACCESS (D)

Areas of the building behind inaccessible solid ceiling systems, walls or mechanical equipment, etc. where demolition of the ceiling, wall or equipment, etc. is required to reach the ACM. Evaluation of condition and extent of ACM is limited or impossible, depending on the surveyor's ability to visually examine materials in ACCESS D.

3. ACM DEBRIS

3.1 DEBRIS from Friable ACM

The presence of fallen ACM is noted separately from the presumed friable ACM source (sprayed fireproofing, thermal insulation, texture, decorative or acoustic finishes or mechanical insulation) and is referred to as **DEBRIS**.

3.2 DEBRIS from Damaged Non-Friable ACM

The presence of fallen ACM from damaged non-friable ACM is also reported separately from the non-friable ACM source. Only fallen non-friable ACM that has become friable is reported as **DEBRIS**.

The identification of the exact location or presence of **DEBRIS** on the top of ceiling tiles is limited by the number of observations made and the presence of building components such as ducts or full height walls

that obstruct observations. Workers are advised to be watchful for the presence of **DEBRIS** prior to accessing or working in proximity to mechanical insulation or above ceilings in areas of buildings with ACM regardless of the reported presence or absence of **DEBRIS**.

4. Action Matrix and Action Descriptions

The Asbestos Management Plan requires the following responses:

- Immediately clean-up **DEBRIS** that is likely to be disturbed.
- Remove, repair or enclose friable ACM in **POOR** or **FAIR** condition whose continued deterioration will result in **DEBRIS** that is likely to be disturbed.

The following factors shall be considered in making site-specific recommendations for compliance with the existing applicable regulations or codes and the practical implementation of the Asbestos Management Plan:

1. ACM in **POOR** condition is not routinely repairable. If an abatement action is necessary, removal is the recommended action (enclosure is a viable option in unusual circumstances, e.g. where removal is difficult or costly and the asbestos-containing material can be thoroughly enclosed).

2. Mechanical insulation in **FAIR** condition will be repaired or removed based on the following general recommendations, applied on a case-by-case basis:
   - ACM insulation found in **FAIR** condition in ACCESS (B) or ACCESS (C) EXPOSED areas is to be repaired.
   - ACM mechanical insulation found in **FAIR** condition in ACCESS (B) and ACCESS (C) EXPOSED areas, where future damage to the ACM is likely to occur, is to be removed.

3. ACM in **GOOD** condition present in ACCESS (A) can be managed by surveillance, as long as it is not disturbed by future renovation, maintenance or demolition. Proactive removal of the ACM in ACCESS (A) will be considered where damage is possible by on-going occupant activity (accidental or intentional).

4. Non-friable or manufactured products are considered in the action matrix as follows:
   - Non-friable and manufactured products reported in **POOR** condition, or friable **DEBRIS** resulting from the deterioration of non-friable ACM, are treated as friable materials and the appropriate action, and depending on accessibility is determined from the action matrix for friable ACM.
   - For non-friable or manufactured products reported in **GOOD** condition, Action 7 (surveillance) is recommended regardless of accessibility.

5. All asbestos-containing material from a particular area is to be removed where small quantities of asbestos are present, and removal will negate the need for the use of an Asbestos Management Program in that area.

The action matrix provided below establishes the recommended asbestos control action. The ACTIONS themselves are described in full following the table.

4.1 Action Matrix Tables

ACCESS	CONDITION			DEBRIS
	GOOD	FAIR	POOR	
(A)	ACTION 5/7[1]	ACTION 5/6[2]	ACTION 3	ACTION 1
(B)	ACTION 7	ACTION 6/5[3]	ACTION 3	ACTION 1
(C) EXPOSED	ACTION 7	ACTION 6	ACTION 4	ACTION 2
(C) CONCEALED	ACTION 7	ACTION 7	ACTION 4	ACTION 2
(D)	ACTION 7	ACTION 7	ACTION 7	ACTION 7

[1] If material in **ACCESS (A)/GOOD** condition is not removed **ACTION 7** is required.

[2] If material in **ACCESS(A)/FAIR** condition is not removed **ACTION 6** is required.

[3] Remove ACM in **ACCESS (B)/FAIR** condition if ACM is likely to be disturbed.

4.2 Action Descriptions

ACTION 1 - Immediate Clean-Up of DEBRIS that is Likely to Be Disturbed

Access that is likely to cause a disturbance of the ACM **DEBRIS** is to be restricted and **clean up ACM DEBRIS is to be done immediately**. Use correct asbestos procedures. This action is required for compliance with regulatory requirements and good practice. The assessor should immediately notify the Asset or Property and Facility Manager, or Regional/Area Asbestos Management Coordinator of this condition.

ACTION 2 - Intermediate risk precautions for Entry into Areas with ACM DEBRIS

At locations where ACM **DEBRIS** can be isolated in lieu of removal or cleaned up, use appropriate means to limit entry to the area. Restrict access to the area to persons using intermediate risk asbestos precautions. The precautions will be required until the ACM **DEBRIS** has been cleaned up, and the source of the **DEBRIS** has been stabilized or removed.

ACTION 3 - ACM Removal Required for Compliance

Remove ACM for compliance with regulatory requirements and good practice. Utilize asbestos procedures appropriate to the scope of the removal work.

ACTION 4 - Access into areas where asbestos-containing material is present and likely to be disturbed by access requires intermediate risk precautions.

Intermediate risk asbestos precautions are to be used when entry or access into an area is likely to disturb the ACM. **ACTION 4** must be used until the ACM is re-moved (Use **ACTION 1** or **2** if **DEBRIS** is present). Intermediate risk or high-risk precautions should be used for removal (depending on extent of removal).

ACTION 5 - Proactive ACM Removal

Removal of ACM in lieu of repair may be considered, even if it is in **GOOD** condition at locations, where ACM is easily accessible, limited in quantity, and removal would be cost-effective.

ACTION 6 - ACM Repair

Repair ACM found in **FAIR** condition, and not likely to be damaged again or disturbed by normal use of the area or room. Upon completion of the re-pair work treat ACM as material **in GOOD** condition and implement **ACTION 7**. If ACM is likely to be damaged or disturbed during normal use of the area or room, **ACTION 5** is to be implemented.

ACTION 7 - Routine Surveillance

Institute routine surveillance of the ACM. Trained workers or contractors must use appropriate asbestos precautions (low, intermediate or high) during disturbance of the remaining ACM.

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