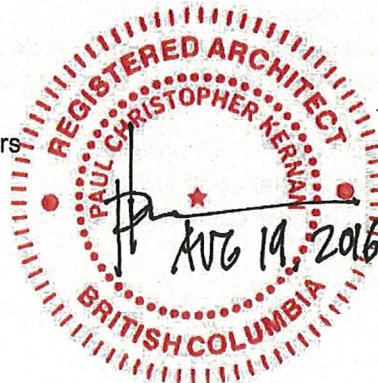


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1 GENERAL

1.1 WORK DESCRIBED BY CONTRACT DOCUMENTS

- .1 The work of the Contract comprises of the roof replacement, localized gutter replacement and localized repainting of various building at the Fort Rodd Hill National Historic Site, Victoria, BC.
- .2 Work to be performed under this Contract includes the following items covered further in the Contract documents:
 - .1 Temporary hoarding: All work areas (individual buildings) are to be protected with hoarding. Owner requires minimum height of 1800mm (6 feet) for temporary hoarding around individual buildings. Contractor's hoarding is to be erected in a manner to maintain access to all buildings.
 - .1 No more than 4 buildings are to be enclosed in temporary hoarding and/or weather protection at one time. Refer to section 1.3 – Contractor's Use of the Site and Work Restrictions.
 - .2 Temporary facilities: Contractor is to provide site office, site storage of materials, temporary toilets. Contractor may locate temporary facilities in parking lot of the Fort Rodd Hill site.
 - .3 Review of testing reports provided with the Contract documents. Based on the findings of the testing reports: Contractor to determine if hazardous materials abatement is required.
 - .4 Documentation of existing conditions of roof assemblies at each stage of work. Contractor to verify if existing roofing felt is installed below existing roofing materials.
 - .5 Maintaining the existing configuration of insulation and ventilation at each roof assembly. Insulation and ventilation are not to be altered except where noted.
 - .6 Full removal of existing coatings and repainting of fascia boards and roof trim boards at buildings #2, #3, #4, #5, #6, #10, #11, as indicated below. Refer to detail drawings.
 - .7 Replacing typical roofing materials and associated accessories in kind. Colours of new roofing materials and associated accessories are to match the existing colours. Refer to individual items below for a description of work for individual buildings.
 - .8 **Sloped roof replacement of the Staff Housing – Carriage House (Building #2):**
 - .1 Removal of existing asphalt shingles on sloped roof to expose existing 1x8 wood solid sheathing (Note: pricing to allow for 5% replacement of deteriorated 1x8 wood solid sheathing).
 - .2 Installation of new R1 asphalt shingle roof assembly. Install new laminate 3-tab shingles, colour to match existing red shingles. Refer to 07 31 13 – Asphalt Shingles.

- .3 Installation of prefinished metal flashings where indicated in construction details. Prefinished metal flashings include, but are not limited to: diverter flashings, step flashings, apron flashings, valley flashings and drip flashings. Colour to match existing.
- .4 Repainting of wood elements. Repainting work includes but is not limited to: wood fascia boards at roof gables and eaves:
 - .1 Removal of existing coatings from painted wood elements.
 - .2 Repainting of wood elements, colour to match existing.
- .5 Replacement of existing gutter and rainwater leaders:
 - .1 Removal and disposal of existing gutters and rainwater leaders.
 - .2 Supply and installation of new pre-coated steel 23 Ga reinforced half-round gutter complete with gasket seal at every gutter to gutter connection and corner to gutter connection. Refer to section 07 62 00.
- .6 Replacement of existing stucco cladding at masonry chimneys. New stucco is to match existing stucco in colour and texture. Refer to 09 24 23 – Stucco.
- .9 Sloped roof replacement of the Collections Building (Building #3):**
 - .1 Removal of existing asphalt shingles on sloped roof to expose existing 1x6 wood spaced sheathing (Note: pricing to allow for 5% replacement of deteriorated 1x6 wood spaced sheathing).
 - .2 Installation of new R1 asphalt shingle roof assembly. Install new laminate 3-tab shingles, use manufacturer standard colour, red to match existing. Refer to 07 31 13 – Asphalt Shingles.
 - .3 Installation of prefinished metal flashings where indicated in construction details. Prefinished metal flashings include, but are not limited to: diverter flashings, step flashings, apron flashings, valley flashings and drip flashings. Colour to match existing.
 - .4 Replacement of existing gutter and rainwater leaders:
 - .1 Removal and disposal of existing gutters and rainwater leaders.
 - .2 Supply and installation of new pre-coated 23Ga reinforced sheet steel gutters and rainwater leaders complete with gasketed joints, half-round gutter and rainwater leader complete with funnel type drain head and clamp ring stand-offs. Colour as directed by the consultant, to match existing half-round gutters at Fort Rodd Hill site. Refer to section 07 62 00.
- .10 Sloped roof replacement of the Warrant Officer's Quarters (WOQ, Building #4):**
 - .1 Prior to commencement of work at the Warrant Officer's Quarters building, existing conditions and detailing of the

roof are to be documented. Documentation is to continue through the roof repair process. Roof is to be documented using written, visual and physical evidence in order to identify and preserve existing features. Provide layout drawing of existing slates and shop drawings for new slates in accordance with 01 33 00 – Submittal Procedures.

- .2 Removal of existing slate roofing on sloped roof to expose existing 2x8 wood solid sheathing. (Note: pricing to allow for 5% replacement of deteriorated 2x8 wood solid sheathing).
 - .3 Installation of new R2 slate roof assembly. Field verify size and exposure of existing slate roofing. Size, shape, colour, texture, exposure and coursing of the original slate is to be documented and matched. The existing headlap is to be maintained. Detailing at the ridge is to match the existing detailing.
 - .4 Replacement of roof insulation. Remove existing roof insulation in attic space. Replace with new batt insulation. Contractor to review testing reports provided and determine if hazardous materials abatement is necessary.
 - .5 Installation of prefinished metal flashings where indicated in construction details. Prefinished metal flashings include, but are not limited to: diverter flashings, step flashings, apron flashings, valley flashings, ridge flashings and drip flashings. Colour to match existing.
- .11 Sloped roof replacement of WW2 Hut Washroom Building (Building #5):**
- .1 Removal of existing cedar shingles on sloped roof to expose existing 2x8 wood solid sheathing. (Note: pricing to allow for 5% replacement of deteriorated 2x8 wood solid sheathing).
 - .2 Installation of new R3 cedar shingle roof assembly. New shingles are to match size and exposure of existing cedar shingles.
 - .3 Installation of prefinished metal flashings where indicated in construction details. Prefinished metal flashings include, but are not limited to: diverter flashings, step flashings, apron flashings, valley flashings and drip flashings. Use manufacturer standard colour to match existing.
 - .4 Replacement of existing gutter and rainwater leaders:
 - .1 Removal and disposal of existing gutters and rainwater leaders.
 - .2 Supply and installation of new pre-coated 23Ga reinforced sheet steel gutters and rainwater leaders complete with gasketed joints, half-round gutter and rainwater leader complete with funnel type drain head and clamp ring stand-offs. Colour as directed by the consultant, to match existing half-round gutters at Fort Rodd Hill site. Refer to section 07 62 00.
- .12 Sloped roof replacement of Canteen Veranda (Building #6):**

- .1 Removal of existing cedar shingles on sloped roof to expose existing 1x6 wood sheathing. (Note: pricing to allow for 5% replacement of deteriorated 1x6 wood sheathing).
 - .2 Installation of new R3 cedar shingle roof assembly. New shingles are to match size and exposure of existing cedar shingles. Finish cedar shingles with stain in accordance with 09 91 00 – Painting. Use custom colour to match existing red painted cedar shingles.
 - .3 Installation of prefinished metal flashings where indicated in construction details. Prefinished metal flashings include, but are not limited to: diverter flashings, step flashings, apron flashings, valley flashings, ridge flashings and drip flashings.
- .13 New roof assembly for the Latrine Building (Building #9):**
- .1 Construction of new wood-framed roof assembly with solid wood sheathing. Wood framed components are to be pressure treated, and finished with a solid stain, refer to 09 91 00 – Painting. Colour of stain to match Canteen Veranda painted framing (Building #6).
 - .2 Installation of new R3 cedar shingle roof assembly. New shingles are to match size and exposure of the Canteen Veranda (Building #6). Finish cedar shingles with stain in accordance with 09 91 00 – Painting. Use custom colour to match existing red painted cedar shingles.
 - .3 Installation of prefinished metal flashings where indicated in construction details. Prefinished metal flashings include, but are not limited to: diverter flashings, step flashings, apron flashings, valley flashings, ridge flashings and drip flashings.
- .14 Sloped roof replacement of Washroom Building (Building #10):**
- .1 Removal of existing shingles on sloped roof to expose existing sheathing. (Note: pricing to allow for 5% replacement of deteriorated wood sheathing).
 - .2 Installation of new R4 standing-seam metal roof assembly. Includes but is not limited to: standing seam metal roof complete with attachment clips, ventilation mat, galvanized metal z-girts, rigid insulation and self-adhesive waterproof membrane. Colour to match existing red roofs at Fort Rodd Hill site.
 - .3 Installation of prefinished metal flashings where indicated in construction details. Prefinished metal flashings include, but are not limited to: diverter flashings, step flashings, apron flashings, valley flashings, ridge flashings and drip flashings. Colour to match existing flashings.
 - .4 Repainting of building exterior. Repainting work includes but is not limited to: stucco cladding, wood siding, privacy screens, fascia boards, barge boards and trim boards.
 - .1 Removal of existing coatings from painted wood elements.
 - .2 Repainting of wood elements.

- .3 Repainting of stucco clad wall assemblies.
- .5 Replacement of existing gutter and rainwater leaders:
 - .1 Removal and disposal of existing gutters and rainwater leaders.
 - .2 Supply and installation of new pre-coated 23Ga reinforced sheet steel gutters and rainwater leaders complete with gasketed joints, half-round gutter and rainwater leader complete with funnel type drain head and clamp ring stand-offs. Colour as directed by the consultant, to match existing half-round gutters at Fort Rodd Hill site. Refer to section 07 62 00.
- .15 Sloped roof replacement of Entrance Kiosk (Building #11):**
 - .1 Removal of existing shingles on sloped roof to expose existing 2x8 wood solid sheathing. (Note: pricing to allow for 5% replacement of deteriorated 2x8 wood solid sheathing).
 - .2 Installation of new R4 standing-seam metal roof assembly. Includes but is not limited to: standing seam metal roof complete with attachment clips, ventilation mat, galvanized metal z-girts, rigid insulation and self-adhesive waterproof membrane. Colour to match existing red roofs at Fort Rodd Hill site.
 - .3 Installation of prefinished metal flashings where indicated in construction details. Prefinished metal flashings include, but are not limited to: diverter flashings, step flashings, apron flashings, valley flashings, ridge flashings and drip flashings. Colour to match existing flashings.
 - .4 Repainting of building exterior. Repainting work includes but is not limited to: stucco cladding, fascia boards, barge boards and trim boards. Colours to match existing.
 - .1 Removal of existing coatings from painted wood elements.
 - .2 Repainting of wood elements.
 - .3 Repainting of stucco clad wall assemblies.
 - .5 Replacement of existing gutter and rainwater leaders:
 - .1 Removal and disposal of existing gutters and rainwater leaders.
 - .2 Supply and installation of new pre-coated 23Ga reinforced sheet steel gutters and rainwater leaders complete with gasketed joints, half-round gutter and rainwater leader complete with funnel type drain head and clamp ring stand-offs. Colour as directed by the consultant, to match existing half-round gutters at Fort Rodd Hill site. Refer to section 07 62 00.
- .16 Installation of Federal Infrastructure Investment signage:**
 - .1 Supply and installation of one federal infrastructure investment sign in conformance with style guide in Appendix 2.
 - .2 Location to be determined by Parks Canada.

- .1 The work of this contract is to be completed within twenty (20) weeks of contract award.

1.3 CONTRACTOR'S USE OF THE SITE AND WORK RESTRICTIONS

- .1 Use of Site:
 - .1 The Fort Rodd Hill is a recognized federal historic site. The Fort Rodd Hill historic site is an operational site. All activities and security controls must remain operational at all times unless otherwise indicated. Coordinate with the Departmental Representative for all activities that impact on-going operations.
 - .2 Work is to be executed with least possible interference or disturbance to the normal use of the Fort Rodd Hill site. Refer to 01 14 00 – Work Restrictions.
 - .3 Work restrictions and security provisions will be enforced.
 - .4 Assume responsibility for assigned premises for laydown and storage areas as established at the project start-up meeting and for performance of this work.
 - .5 There will be other Contractors on-site for a separate (not included in this Contract) project at the “Lower Battery” portion of the site.
- .2 Do not unreasonably encumber site with material or equipment.
- .3 Maintain temporary hoarding and weather protection throughout duration of work.
 - .1 No more than 4 buildings are to be enclosed in temporary hoarding and/or weather protection at one time, unless written approval by Departmental Representative is provided. Temporary hoarding and/or weather protection is to be completely dismantled at a work zone before proceeding to erecting hoarding and/or weather protection at the next work zone.
 - .2 Contractor to develop a sequencing plan for review by the Departmental Representative.
- .4 Execute work with least possible interference or disturbance to normal use. Make arrangements with Departmental Representative to facilitate work as stated.
- .5 Maintain existing services and provide for personnel, visitor and vehicle access.
- .6 Where security is reduced by work, provide temporary means to maintain security. Review measures with Departmental Representative before proceeding.
- .7 Hours of Work:
 - .1 Carry out work during “regular hours”, 7:00am to 8:00pm PST, Monday to Friday, and 8:00am to 6:00pm on Saturdays, Sundays and statutory holidays.

- .2 Delivery of materials is not permitted on Saturdays, Sundays and statutory holidays.
- .8 Special Requirements:
 - .1 Delivery and removal of construction bins to occur between 8:00am and 10:00am but is not permitted on Saturdays, Sundays and statutory holidays.
- .9 Special Events:
 - .1 Allow for interruptions of the Work by special events. These interruptions could be, but not limited to:
 - .1 December 25, 2016 – Christmas
 - .2 December 26, 2016 – Boxing Day
 - .3 January 1, 2017 – New Year's Day
 - .4 April 9, 2017 – Vimy Barrage Event

1.4 MINIMUM STANDARDS

- .1 Work to conform to the minimum applicable standards of the Canadian General Standards Board, the Canadian Standards Association, the National Building Code of Canada 2010 (NBC) and applicable Provincial and Municipal codes. In the case of conflict or discrepancy, the most stringent requirement applies.
- .2 Work must be carried out in conformance to WorkSafe BC safety standards and requirements.
- .3 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.

1.5 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. Drawings have been prepared in colour for clarity purposes and are intended to be printed in colour. Contractor is responsible for any misinterpretations caused as a result of printing in black and white.

1.6 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 one 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.

1.7 TAXES

- .1 Pay all taxes properly levied by law (including Federal, Provincial and Municipal).

1.8 REGULATORY REQUIREMENTS

- .1 Building Permit is not required. Obtain and pay for - Certificates, Licenses and other permits 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.

1.9 PROJECT MEETINGS

- .1 Within ten (10) days after award of Contract, the Contractor will schedule a project start-up meeting in accordance with 01 31 19 – Project Meetings.
 - .1 Contractor is to provide the agenda for the project start-up meeting. Refer to 01 31 19 – Project Meetings for start-up meeting agenda items.
 - .2 Subsequent meetings will be held in conformance with 01 31 19 – Project Meetings.

1.10 SECURITY

- .1 For Contractor access to building interior and for contractor access to exterior work after 17:30 hours, coordinate with and pay for the services of a commissionaire from the BC Commissionaires from the time of beginning work on site until substantial completion of the work. The contractor shall provide the Departmental Representative with an estimate of the total cost for that requirement after contract award at which time the Departmental Representative will then contract directly with Commissionaires BC for that work and pay for those costs directly accordingly since they will not work directly for the contractor. Upon completion of the contract work, a change order credit will be issued for the full cost of the Commissionaires so the contractor shall allow for that cost in their contract pricing. Contractor can refer to the following web site as a reference: <http://www.commissionaires.bc.ca>
- .2 Provide required service for any security to contractor's forces for further works to be done between substantial and final completion.

1.11 NON SMOKING ENVIRONMENT

- .1 Smoking is not permitted on site.

1.12 WORK SCHEDULE

- .1 Provide detailed project schedule (Gantt Bar Chart) within 5 working days of Award of Contract date showing activity sequencing, interdependencies and duration estimates. Include listed activities as follows:

- .1 Shop drawings.
 - .2 Samples.
 - .3 Approvals.
 - .4 Procurement.
 - .5 Construction.
 - .6 Installation.
 - .7 Site works.
 - .8 Testing.
 - .9 Acceptance.
- .2 Do not change approved schedule without notifying and receiving approval from Departmental Representative.
 - .3 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.
 - .4 Schedule Work in consultation with Departmental Representative to minimize impact on public use of facility during operating hours.

1.13 SUBMITTALS

- .1 Product Data: Manufacturers catalogue sheets, brochures, literature, performance charts and diagrams.
 - .1 Submit electronic copies of documentation.
 - .2 Delete information not applicable to project.
 - .3 Cross-reference product data information to applicable portion of Contract Documents.
- .2 Samples: examples of materials, equipment, quality, finishes and workmanship.
 - .1 Provide two samples of each material as indicated in technical sections.
 - .2 Where colour, pattern or texture is criterion, submit full range of samples.
 - .3 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.
- .3 Shop Drawings:
 - .1 Submit electronic copies of all shop drawings to include:
 - .1 Date.
 - .2 Project Title and number.
 - .3 Name and address of Subcontractor, Supplier and Manufacturer.
 - .4 Fabrication.
 - .5 Key plan and layout, showing dimensions, including identified field dimensions and clearances.
 - .6 Setting or erection details.
 - .7 Relationship to adjacent work.
 - .8 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions,

verification of field measurements and compliance with Contract Documents.

- .9 Revised shop drawing submissions to be bubbled identifying revisions.
- .4 Submit drawings stamped and signed by professional engineer registered and licensed in the Province of British Columbia as indicated.

1.14 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.

1.15 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy of each document as follows:
 - .1 Contract Drawings.
 - .2 Contract Specifications.
 - .3 Addenda to Contract Documents.
 - .4 Copy of approved work schedule.
 - .5 Environmental Protection Plan.
 - .6 Reviewed and approved Shop Drawings.
 - .7 List of Outstanding Shop Drawings.
 - .8 Change Orders.
 - .9 Other Modifications to Contract.
 - .10 Field Test Reports.
 - .11 Reviewed and approved samples.
 - .12 Copy of Approved Work Schedule.
 - .13 Manufacturer's installation and application instructions.
 - .14 National Building Code, 2010.
 - .15 Health and Safety Plan and Other Safety Related Documents.
 - .16 Other documents as specified.

1.16 HEALTH, SAFETY AND HAZARDOUS MATERIALS

- .1 Comply with Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Comply with British Columbia Workers Compensation Act.
- .3 Perform duties in accordance with the British Columbia Occupational Health and Safety Regulation.
- .4 Submit copies of WCB Clearance Letter and WCB Contractor Rating. Submit copy of Final WCB Clearance Letter at completion of project.
- .5 Submit letter stating that Contractor assumes the role of Prime Contractor for the purposes of site safety responsibility and the Workers Compensation Act.

- .6 Submit copies of work site health and safety meeting minutes, inspection reports, reports or directions issued by Federal, Provincial or Municipal health and safety inspectors, incident and accident reports, and follow-up reports.
- .7 Work at site may involve contact with lead-containing paint. Take appropriate precautions.
- .8 Notify the Departmental Representative 48 hours for access to interior work and advise if work involves hazardous substances (Canada Labour Code, Part II, Section 10) or caulking.
- .9 Ensure fire code requirements are continued to be met during the course of construction. Ensure emergency exits from the building, exterior emergency egress paths, or access areas for emergency vehicles are not restricted.

1.17 EXAMINATION

- .1 Examine site and be familiar and conversant with existing conditions likely to affect work.
- .2 Provide photographs of surrounding objects and structures liable to be damaged or be the subject of subsequent claims (photographs not to include staff on duty).

1.18 EXISTING SERVICES

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by the authorities having jurisdiction.

1.19 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment indicated or specified are to be considered as approximate.
- .2 Locate equipment 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 his approval for actual location.
- .4 Submit field drawings or shop drawings to indicate the relative position of various services and equipment when required by the Departmental Representative and/or as specified.

1.20 SETTING OUT OF WORK

- .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .2 Provide devices needed to lay out and construct work.

1.21 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 Contractor. Commencement of work shall imply acceptance of prepared work or substrate surfaces.

1.22 QUALITY OF WORK

- .1 Remedial Work:
 - .1 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of work.
 - .2 Perform remedial work required to repair or replace part or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Ensure that quality workmanship is performed through use of skilled and experienced tradesmen, under supervision of qualified journeyman.
- .3 The workmanship, erection methods and procedures to meet minimum standards set out in the National Building Code Construction Standards.
- .4 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative whose decision is final.

1.23 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 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required.
 - .1 Provide each subcontractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.
 - .2 Develop coordination drawings when required, illustrating potential interference between work of various trades and distribute to affected parties.
 - .1 Pay particularly close attention to overhead work or near to building structural elements, including existing roof.
 - .2 Identify on coordination drawings, building elements and interface requirements.
 - .3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
 - .4 Publish minutes of each meeting.
 - .5 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
- .3 Submit shop drawings and of rebuilt components only after coordination meeting for such items has taken place.
- .4 Work cooperation:

- .1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of 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, patching and removal or replacement of completed work.
- .3 Ensure disputes between subcontractors are resolved.
- .5 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate Work.
- .6 Maintain efficient and continuous supervision. Full-time site superintendent required throughout project.

1.24 APPROVAL OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- .1 In accordance with Section 01 33 00 - Submittals Procedures, 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 - refer to technical sections.

1.25 TESTING AND INSPECTIONS

- .1 Particular requirements for inspection and testing to be carried out by testing service or laboratory approved by the Departmental Representative.
- .2 The Contractor will appoint and pay for the services of testing agency or testing laboratory as specified, and where required for the following:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .1 Mill tests and certificates of compliance.
 - .2 MPI Painting Inspections.
 - .3 Tests specified to be carried out by Contractor under the Departmental Representative's supervision.
- .3 Where tests or inspections by designated testing laboratory reveal work is not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as the Departmental Representative may require to verify acceptability of corrected work.
- .4 Contractor shall furnish labour and facilities to:

- .1 Notify Departmental Representative in advance of planned testing.
- .5 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .6 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.
- .7 The Departmental Representative may require, and pay for, additional inspection and testing services.
- .8 Provide Departmental Representative with 2 copies of testing laboratory reports as soon as they are available.

1.26 AS-BUILT DOCUMENTS

- .1 The Departmental Representative will provide 2 sets of drawings, 2 sets of specifications, 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.

1.27 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 and concealed spaces.
 - .2 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed exterior finished surfaces, including glass.
- .4 Use cleaning materials and methods in accordance with instructions of the manufacturer of the surface to be cleaned.

1.28 CONTROL

- .1 Existing Structure:
 - .1 The existing structure forms a National Historic Site. The Contractor and sub trade personnel shall pay utmost attention to the preservation of all existing items on this site at all times during remediation work. Prior to the commencement of this project, the Contractor shall submit to the Departmental Representative a list of all proposed protection measures for approval. This list must identify procedures for the protection of adjacent building materials and elements to prevent accidental damage to this national historic site for the duration of the project.
 - .2 Provide temporary dust tight screens and/or partitions to localize dust generating activities, and for protection of workers, finished areas of work and public. Precautionary measure shall be taken for

potential source of Lead and Arsenic dust within the complex.
Refer to Appendix 1.

- .3 Protect work area with scaffolding structure for work with weather-tight polyethylene film during construction.
- .4 Maintain and relocate protection until work is complete.

1.29 PUBLIC WAY CONSTRUCTION

- .1 Design, erect and maintain hoarding and covered pedestrian walkways to support all loads including windloads and provide protection, complete with signs and electrical lighting as required by authority having jurisdiction and Departmental Representative.

1.30 RELICS AND ANTIQUITIES

- .1 Relics and antiquities and items of historical or scientific interest shall remain property of Department. Protect such articles and request directives from Departmental Representative.
- .2 Give immediate notice to Departmental Representative if evidence of historical or archeological finds are encountered during remediation work and await Departmental Representative's written instructions before proceeding with work in this area.

1.31 ENVIRONMENTAL PROTECTION

- .1 Contractor is responsible for environmental protection during all construction activities at all locations work is performed.
- .2 Environmental degradation arising from construction activities shall be prevented, abated, controlled and minimized by complying with all applicable federal, provincial and local laws and regulations concerning environmental pollution control and abatement.
- .3 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers. Construction methods shall be employed to ensure no fuels, oils, wood preservatives or other contaminants enter the site. As general Mitigation Measures for this project, it must be enforced and closely supervised and monitored as follows:
 - .1 All contractors and work crews must be briefed upon the importance of adhering to prescribed best practices or mitigation measures. Project meeting prior to commencement of the work shall indicate the above requirements have been fully explained to the contractor and staff.
 - .2 A copy of the mitigation measures shall be posted in a conspicuous location on site or readily accessible for reference.
 - .3 Conduct work in a manner which clearly separates visitors from the active construction area on site to minimize potential accidents for public safety.
 - .4 Contractor and sub trade personnel must develop and maintain spill response and reporting procedures including containment methods. In the event of a spill, contact the Provincial Emergency Program at 1-800-663-3456.

- .5 The Contractor is to have personnel on site that are trained and ready to use spill containment kits. Ensure proper disposal procedures in accordance with all applicable provincial and municipal regulations. Fires and burning of rubbish on site is not permitted.
- .6 The Contractor must have all spill containment kits ready for immediate deployment, containing sufficient quantities of absorbent materials on site in close proximity to working machinery and equipment such as fuel portable generator, air compressors, hoist and tools.
- .7 Ensure all equipment used on site is clean and free from contaminants.
- .4 Ensure proper disposal procedures in accordance with all applicable provincial regulations.

1.32 MAINTENANCE
MATERIALS,
SPECIAL TOOLS
AND SPARE PARTS

- .1 Specific requirements for maintenance materials, tools and spare parts are specified in individual technical sections.

1.33 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 5 sets of Contract documents for use by the Contractor at no additional cost. Should more than 5 sets of documents be required the Departmental Representative will provide them at additional cost.

1.34 SYSTEM OF
MEASUREMENT

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

1.35 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.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

1 GENERAL

1.1 ACCESS AND EGRESS

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

1.2 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security as approved by Departmental Representative.
- .4 Elevators are not permitted for Contractor use.
- .5 Closures: protect work temporarily until permanent enclosures are completed.

1.3 ALTERATIONS AND REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations occupants, public and normal use of premises.
- .2 Maintain existing services and abide by regulations for personnel and vehicle access.
- .3 Any work which impacts the operations onsite must have one (1) week notice and must be approved by Departmental Representative. Five (5) visitor parking passes, valid for duration of the work will be allocated to the Contractor for the visitor's parking lot. Work truck will be allowed to be located in the Contractor's laydown area where indicated. Additional parking will be permitted where directed by Departmental Representative. Do not occupy any other parking areas without the approval of the Departmental Representative.

1.4 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where work involves breaking into or connecting to existing services, give Departmental Representative one (1) week notice for permission. The maximum number of shut-down periods, is limited to four (4) for duration of the project.

- .3 Provide for personnel and pedestrian traffic.
- .4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .5 Contractor will be held responsible for damages to facility equipment as the result of service shut-downs.
- .6 Contractor will be held responsible for unscheduled shut-downs of building utilities and services.
- .7 Contractor will not be allowed to connect to Owner's existing data and communication services for his own use.

1.5 SPECIAL REQUIREMENTS

- .1 Security Camera:
 - .1 Security cameras to remain operational. Cameras requiring temporary relocation to be serviced as directed by Departmental Representative.
 - .2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
 - .3 Keep within limits of work and avenues of ingress and egress. Respect properties adjacent to work site, providing continued access for public vehicular and pedestrian traffic.
 - .4 Noise Generation:
 - .1 Means and procedures of controlling and isolating other excessive or disturbing noise and vibration affecting occupied areas shall be the responsibility of the Contractor and approved by the Departmental Representative.

1.6 SECURITY

- .1 Be accountable for tools/equipment at all times. Do not leave tools unattended and/or within reach of the travelling public.
- .2 Act professionally at all times. No foul language or rude behavior.
- .3 Do not interact with the public, unless authorized to do so where required.

1.7 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted on the site.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 ADMINISTRATIVE

- .1 Contractor will arrange pre-construction project meeting.
- .2 Contractor to assume responsibility for setting meeting times and recording and distributing meeting minutes. Contractor to attend project meetings throughout the progress of the work and at the call of Departmental Representative.
- .3 Contractor to provide physical space and make arrangements for progress meetings.
- .4 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 START-UP MEETING

- .1 Contractor will:
 - .1 Within ten (10) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
 - .2 Departmental Representative, Contractor, major Subcontractors, field reviewers and supervisors will be in attendance.
 - .3 Establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.
 - .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .2 Provide Agenda, to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 11 55 – General Instructions – Bar (Gantt) Chart.
 - .3 Schedule of submission of shop drawings and samples. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
 - .5 Delivery schedule of specified equipment.
 - .6 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
 - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .8 Record drawings in accordance with Section 01 78 00 - Closeout Submittals.

- .9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .10 Monthly progress claims, administrative procedures, photographs, hold backs.
- .11 Appointment of inspection firms.
- .12 Insurances, transcript of policies.

1.3 PROGRESS MEETING

- .1 Contractor will:
 - .1 During course of Work and up to project completion, schedule progress meetings every two weeks. Additional meetings will be scheduled to resolve extraordinary issues as required.
 - .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
 - .3 Notify parties minimum three (3) days prior to meetings.
 - .4 Contractor will record minutes of progress meetings and circulate to attending parties and affected parties not in attendance.
 - .5 Provide Agenda. Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for effect on construction schedule and on completion date.
 - .12 Other business.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 07 31 13 – Asphalt Shingles.
- .2 Section 09 91 00 – Painting.

1.2 APPROVALS

- .1 Approval of shop drawings: refer to Section 01 11 55 – General Instructions.

1.3 ADMINISTRATIVE

- .1 This Section specifies the 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, samples and mock-ups 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 submittals.
- .5 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review 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 or order construction materials or products until relevant submissions are reviewed and approved by the Departmental Representative.
- .10 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. **Submittals not stamped, signed, dated and identified as to specific project**

will be returned without being examined and considered rejected.

- .11 Verify field measurements and affected adjacent Work are coordinated.
- .12 Keep one reviewed copy of each submission on site.

1.4 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 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.
- .3 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. **Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.**
 - .5 Details of appropriate portions of work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions (including identified field dimensions) and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristic.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Relationship to adjacent work.
- .4 After Departmental Representative's review, distribute copies. Keep one reviewed copy of each submission on site.

1.5 SHOP DRAWINGS

- .1 Shop drawings: original drawings or modified standard drawings, diagrams, illustrations, schedules, performance charts, brochures or other data provided by Contractor to illustrate details of portions of work which are specific to project requirements.
 - .1 Indicate materials, methods of construction and attachment or anchorage erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Provide cross references to drawings and specifications.
- .2 Submit electronic drawings for each requirement requested in technical specification sections and as requested by Departmental Representative. Cross- reference shop drawing information to applicable portions of the Contract documents.
- .3 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .4 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .5 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name, project number and address.
- .6 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .7 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

- .8 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .9 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .10 Delete information not applicable to project.
- .11 Supplement standard information to provide details applicable to project.

1.6 SHOP DRAWING REVIEW

- .1 Review of shop drawings by the Departmental Representative is for the sole purpose of ascertaining conformance with the general concept.
- .2 Allow seven (7) business days for Departmental Representative's review of each submission.
- .3 This review shall not mean that the 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 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with ordering materials or Work.
- .6 Make changes in shop drawings by Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested. All revisions to be clearly clouded.
- .7 Without restricting the generality of the foregoing, the Contractor is responsible for:
 - .1 Dimensions to be confirmed and correlated at the job site.
 - .2 Information that pertains solely to fabrication processes or to techniques of construction and installation.
 - .3 Coordination of the work and all sub-trades.
- .8 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, electronic copy will be returned and ordering, fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings with bubbled changes, through same procedure indicated

above, must be performed before fabrication and installation of Work may proceed.

- .9 Shop drawings to incorporate applicable key plan, plan, elevations and details for all work submitted. No materials to be ordered and no work to be fabricated shall be undertaken until shop drawings and other related submittals are reviewed.

1.7 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 electronic copies of product data.

1.8 SAMPLES

- .1 Submit for review samples in duplicate as requested in individual technical specification Sections. Label samples with origin and intended use. One sample will be returned with Shop Drawing Review.
- .2 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .3 Where colour, pattern or texture is criterion, submit full range of samples.
- .4 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to ordering materials or proceeding with Work.
- .5 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

1.9 MOCK-UPS

- .1 Erect mock-ups where directed by Departmental Representative and in accordance with Section 01 45 00 - Quality Control. Upon acceptance by Departmental Representative, mock-up may remain.

1.10 PROGRESS SCHEDULE

- .1 Submit work schedule and cost breakdown in accordance with Section 01 11 55 – General Instructions.

1.11 INSPECTION
REPORTS

- .1 Submit in electronic test results and inspection reports where indicated.

1.12 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, building name and elevation with date of exposure indicated.
- .3 Number of viewpoints: 4 locations.
 - .1 Viewpoints and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: as directed by Departmental Representative.
 - .1 Before concealment of Work and as directed by Departmental Representative.

1.13 CERTIFICATES AND
TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 REFERENCES

- .1 Government of Canada:
 - .1 Canada Labour Code – Part II
 - .2 Canada Occupational Health and Safety Regulations
- .2 National Building Code of Canada (NBC):
 - .1 Part 8, Safety Measures at Construction and Demolition Sites.
- .3 Canadian Standards Association (CSA) as amended:
 - .1 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
 - .2 CSA 350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
 - .3 CSA Z797-2009, Code of Practice for Access Scaffold.
- .4 Fire Protection Engineering Services, HRSDC:
 - .1 FCC No. 301, Standard for Construction Operations.
 - .2 FCC No. 302, Standard for Welding and Cutting.
- .5 American National Standards Institute (ANSI):
 - .1 ANSI/ASSE A10.3-2006, American National Standard – Construction and Demolition Operations – Safety Requirements for Powder-Actuated Fastening Systems.
- .6 Province of British Columbia:
 - .1 Worker's Compensation Act Part 3-Occupational Health and Safety.
 - .2 Occupational Health and Safety Regulation.

1.2 RELATED SECTIONS

- .1 Refer to the following sections as required:
 - .1 Section 02 41 99 – Demolition for Minor Works: health and safety requirements specific to demolition.

1.3 WORKERS COMPENSATION BOARD COVERAGE

- .1 Comply fully with Worker's Compensation Act, regulations and orders made pursuant thereto and any amendments up to completion of work.
- .2 Maintain Worker's Compensation Board coverage during the term of Contract, until and including date that Certificate of Final Completion is issued.

1.4 COMPLIANCE WITH REGULATIONS

- .1 PWGSC may terminate Contract without liability to Canada where Contractor, in the opinion of PWGSC, refuses to comply with a

requirement of Worker's Compensation Act or Occupational Health and Safety Regulations.

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

1.5 SUBMITTALS

- .1 Submit to Departmental Representative submittals listed for review, in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Work effected by submittal will not proceed until review is complete.
- .3 Submit the following:
 - .1 Health and Safety Plan
 - .2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
 - .3 Copies of incident and accident reports.
 - .4 Complete set of Material Safety Data Sheets (MSDS) and all other documentation required by Workplace Hazardous Materials Information (WHIMIS) requirements.
 - .5 Emergency Procedures.
- .4 Departmental Representative will review Contractor's site-specific Health and Safety Plan and emergency procedures and provide comments to Contractor within 5 working days after receipt of plan. Revise plan as appropriate and re-submit to Departmental Representative.
- .5 Submission of Health and Safety Plan and any revised version to Departmental Representative is for information and reference purposes only. It will not:
 - .1 Be construed to imply approval by Departmental Representative.
 - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
 - .3 Relieve Contractor of his legal obligations for provision of health and safety on project.

1.6 RESPONSIBILITY

- .1 Assume responsibility as Prime Contractor for work under this Contract.
- .2 Be responsible for health and 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 and local statues, regulations and ordinances and with site-specific Health and Safety Plan.

1.7 HEALTH AND
SAFETY CO-
ORDINATOR

- .1 Health and Safety Coordinator must:
 - .1 Be responsible for completing all health and safety training and ensuring that personnel that do not successfully complete required training are not permitted to enter site to perform work.
 - .2 Be responsible for implementing, daily enforcing and monitoring site-specific Health and Safety Plan.
 - .3 Be on site during execution of work.

1.8 GENERAL
CONDITIONS

- .1 Provide safety barricades and lights around work site as required to provide 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 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 night time as deemed necessary to protect site against entry.

1.9 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 above authorities, the most stringent provision will apply. Should dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

1.10 WORK PERMITS

- .1 Obtain specialty permits related to project before start of work.

1.11 FILING OF NOTICE

- .1 Complete and submit Notice of Project as required by Provincial authorities.
- .2 Provide copies of all notices to Departmental Representative.

1.12 HEALTH AND
SAFETY PLAN

- .1 Conduct site-specific hazard assessment based on review of Contract documents, required work and project site. Identify known and potential health risks and safety hazards.
- .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including but not limited to 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.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and record keeping 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 work.
- .3 List of hazardous materials to be brought on site as required by work.
- .4 Indicate engineering and administrative control measures to be implemented at 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 plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in plan.
- .4 Submit to Departmental Representative as indicated in 1.5 Submittals.

1.13 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.
- .2 Include following provisions in emergency procedures:
 - .1 Notify workers and first-aid attendant, of nature and location of emergency.
 - .2 Evacuate all workers safely.
 - .3 Check and confirm safe evacuation of all workers.

- .4 Notify fire department or other emergency responders.
- .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond 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 risk of entrapment.
 - .3 Work with hazardous substances.
 - .4 Underground work.
 - .5 Work, on, over, 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 Departmental Representative.

1.14 HAZARDOUS PRODUCTS

- .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 Material Safety Data Sheet (MSDS) acceptable to Departmental Representative and in accordance with Canadian Labour Code.
- .2 Where use of hazardous and toxic products cannot be avoided:
 - .1 Advise Departmental Representative beforehand of product(s) intended for use. Submit applicable MSDS and WHMIS documents as per section 01 33 00 – Submittal Procedures.
 - .2 In conjunction with Departmental Representative, schedule to carry out work during “off hours” when tenants have left building.
 - .3 Provide adequate means of ventilation in accordance with Section 01 55 00 – Temporary Utilities.

1.15 ELECTRICAL SAFETY REQUIREMENTS

- .1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.
 - .1 Before undertaking any work, coordinate required energizing and e-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.

1.16 ELECTRICAL
LOCKOUT

- .1 Develop, implement and enforce use of established procedures to provide electrical lockout and 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 Departmental Representative.
- .3 Keep documents and lockout tags at site and list in log book for full duration of Contract. Upon request, make such data available for viewing by Departmental Representative or by an authorized safety representative.

1.17 OVERLOADING

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

1.18 SCAFFOLDING

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

1.19 CONFINED SPACES

- .1 Carry out work in confined spaces in compliance with Provincial regulations.

1.20 POWDER
ACTUATED
DEVICES

- .1 Use powder-actuated devices in accordance with ANSI/ASSE A10.3 only after receipt of written permission from Departmental Representative.

1.21 FIRE SAFETY AND
HOT WORK

- .1 Obtain Departmental Representative's authorization before 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 and roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

1.22 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 daily basis.

1.23 FIRE PROTECTION
AND ALARM
SYSTEMS

- .2 Handle, store, use and dispose of inflammable and combustible materials in accordance with National Fire Code of Canada.
- .1 Where available, fire protection and alarm systems not to be:
 - .1 Obstructed.
 - .2 Shut off.
 - .3 Left inactive at the end of a working day or shift.
- .2 Where fire protection and alarm systems have been disconnected, provide 24-hour fire watch.
- .3 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.
- .4 Be responsible/liable for costs incurred from fire department, building owner and tenants, resulting from false alarms.

1.24 UNFORSEEN
HAZARDS

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

1.25 POSTED
DOCUMENTS

- .1 Post legible versions of following documents on site:
 - .1 Health and Safety Plan.
 - .2 Sequence of work.
 - .3 Emergency procedures.
 - .4 Site drawing showing project layout, location(s) of first-aid station(s), evacuation route and marshalling station and emergency transportation provisions.
 - .5 Notice of Project.
 - .6 Floor plans or site plans.
 - .7 Notice as to where a copy of Worker's Compensation Act and Regulations are available on work site for review by employees and workers.
 - .8 Workplace Hazardous Materials Information System (WHMIS) documents.
 - .9 Material Safety Data Sheets (MSDS).
 - .10 List of names of Joint Health and Safety Committee members or Health and Safety Representative, as applicable.
 - .1 Name of "qualified coordinator" responsible for coordination of health and safety activities in accordance with Section 118 of Worker's Compensation Act.
 - .2 Post all Material Safety Data Sheets (MSDS) on site, in common area, visible to all workers and locations

accessible to tenants when work of this Contract include construction activities adjacent to occupied areas.

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

1.26 MEETINGS

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

1.27 CORRECTION OF NON COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.
- .3 Departmental Representative issue "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. General Contractor will be responsible for costs arising from such "stop work order".

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 02 41 99 – Demolition for Minor Works.
- .2 Section 02 83 10 - Lead Base Paint Abatement – Minimum Precautions.
- .3 Section 09 91 00 – Painting.

1.2 REFERENCES

- .1 Definitions:
 - .1 Environmental Pollution and Damage: presence of chemical, Physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.
- .2 Reference Standards:
 - .1 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Convene start-up meeting prior to beginning work with contractor's representative and Departmental Representative to:
 - .1 Verify Environmental Protection Plan and conformance requirements to municipal, provincial and federal regulations.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to commencing construction activities or delivery of materials to site, provide Environmental Protection Plan for review and approval by Departmental Representative.
- .3 Ensure Environmental Protection Plan includes comprehensive overview of known or potential environmental issues to be addressed during construction.

- .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .5 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Drawings showing locations of proposed temporary scaffolding over water crossings, material storage areas, structures, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
 - .6 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Ensure plan includes measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
 - .7 Pollution Control Plan:
 - .1 Including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .2 Identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
 - .3 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .4 Air pollution control plan detailing provisions to assure that dust, paint overspray, debris, materials, and trash, are contained on project site.
 - .5 Name of individual who will be responsible for implementing and supervising the spill containment and cleanup.
 - .6 Training requirements for Contractor's personnel and methods of accomplishing the training.
 - .8 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

1.5 FIRES

- .1 Fires and burning of rubbish on site not permitted.

1.6 DRAINAGE

- .1 Do not allow water containing suspended materials to enter waterways, sewer or drainage systems.
- .2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.7 POLLUTION CONTROL

- .1 Contractor and sub trade personnel must develop and maintain spill response and reporting procedures including containment methods.
- .2 In the event of a spill, Contractor shall immediately contain and assess the spill, provide appropriate notifications and take the necessary steps to prevent further discharge. Notifications shall include contacting the Provincial Emergency Program at 1-800-663-3456 and the Departmental Representative.
- .3 The Contractor must have spill containment kits ready for immediate deployment, containing sufficient quantities of absorbent materials on site in close proximity to work area including working machinery and equipment such as fuel portable generator, air compressors, hoist and tools.
- .4 The Contractor is to have personnel on site that are trained and ready to use spill containment kits. Ensure proper disposal procedures in accordance with all applicable provincial and municipal regulations. Fires and burning of rubbish on site is not permitted.
- .5 Contractor is responsible for immediate clean up of the spill and restoration of the area to the satisfaction of the Departmental Representative and other regulatory agencies, where involved.
- .6 Ensure all equipment used on site is clean and free from contaminants. Materials and equipment shall be regularly inspected, maintained, operated and stored in a manner that prevents deleterious substances (eg. Petroleum products, silt, etc.) from entering air.
- .7 Ensure proper procedures in accordance with all applicable provincial regulations.
- .8 Control emissions from equipment to local authorities' emission requirements.
- .9 Prevent extraneous materials from contaminating air beyond application area. Provide temporary enclosures.

1.8 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

- .1 Do not take action until after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with National Building Code of Canada (NBC), 2010 including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Perform Work in accordance with WorkSafe BC current requirements and standards.
- .3 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

- .1 Lead-containing Paint present. Take appropriate precautions in accordance with Section 02 83 10 – Lead Base Paint Abatement – Minimum Precautions.
- .2 Asbestos containing vermiculite was previously installed at the building but has since been removed. There may be some residual debris near attic locations. Take necessary precautions.
- .3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative.

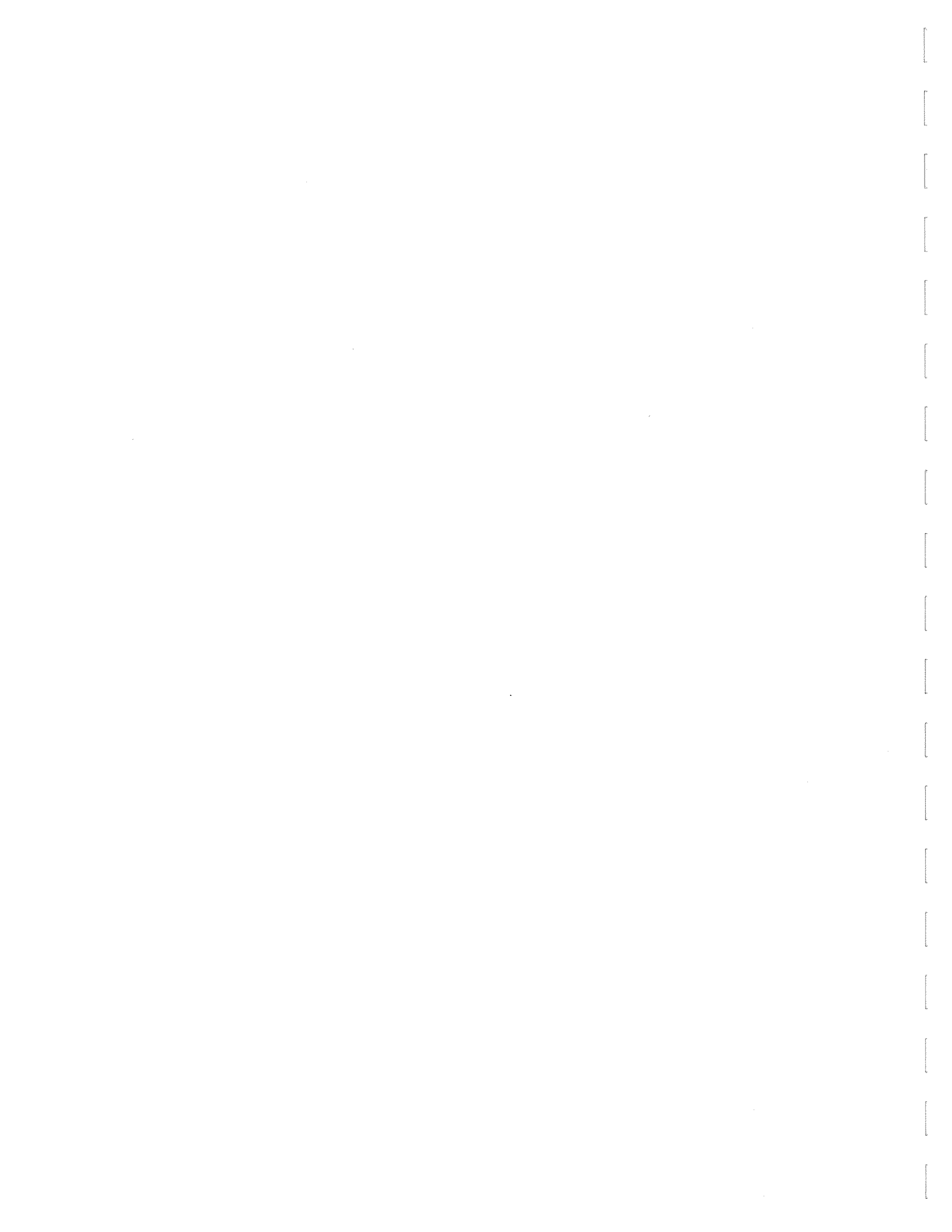
1.3 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions and municipal by-laws.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION



1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 07 31 29 – Cedar Shingles.
- .2 Section 09 91 00 – Painting.

1.2 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

1.4 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

- .2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.6 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.7 REPORTS

- .1 Submit two (2) copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

1.8 TESTS AND MIX DESIGNS

- .1 Furnish test results as requested.
- .2 Cost of tests beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.9 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in technical specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable and as approved by Departmental Representative.

- .3 Prepare mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Mock-ups, when approved may remain as part of Work.

1.10 MILL TESTS

- .1 Submit mill test certificates as required of specification Sections.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION



1 GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA) as amended:
 - .1 CAN/CSA Z321-96(R2001), Signs and Symbols for the Occupational Environment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 ACCESS AND DELIVERY

- .1 Only designated entrance may be used for access to building. Confirm with Departmental Representative.
 - .1 Maintain for duration of Contract.
 - .2 Make good damage resulting from Contractor's use.
- .2 Use of facilities will be granted to the Contractor by reservation through the Departmental Representative.
 - .1 Limited parking is permitted as directed by Departmental Representative. Security has been instructed to have unauthorized vehicles towed at the Contractor's expense. Refer to Section 01 14 00 – Work Restrictions.

1.4 STORAGE FACILITIES

- .1 Storage space will be provided as directed by Departmental Representative.

1.5 WATER

- .1 Water supply is available at existing building and may be used for construction purposes at no cost.
 - .1 Hose bib locations for each building as directed by Departmental Representative.

1.6 POWER

- .1 Electrical power and lighting at existing buildings may be used for construction purposes at no extra cost, provided that warranties are not affected thereby and electrical components used for temporary power are replaced when damaged. Do not use emergency power or UPS panels for this purpose.
 - .1 Power located as directed by Departmental Representative.

1.7 HEATING AND VENTILATION

- .1 Do not begin work until arrangements have been made with the Departmental Representative for protection of heating, ventilating and air-conditioning (temporary removal of existing exterior vents or louvres).
 - .1 If there is any dirt or dust in the heating and ventilating system, it will be the Contractor's responsibility to return to its original state in accordance with the Departmental Representative's specifications.
- .2 Prevent dust and odour migration to occupied areas.
 - .1 Do not deactivate HVAC system.

1.8 TEMPORARY
COMMUNICATION
FACILITIES

- .1 Provide and pay for temporary telephone, fax, data hook up, lines and equipment necessary for own use and use of Departmental Representative.

1.9 SANITARY
FACILITIES

- .1 Provide and pay for temporary sanitary facilities necessary for own use and use of Departmental Representative.

1.10 SCAFFOLDING

- .1 Construct and maintain scaffolding in rigid, secure and safe manner in accordance with Section 01 52 00 – Construction Facilities and WorkSafe BC requirements.
- .2 Scaffolding to be erected independent of walls where possible. Remove promptly when no longer required. Remove fastenings from structure, if used and patch, sand and paint to match.

1.11 REMOVAL OF
TEMPORARY
FACILITIES

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

1.12 SIGNS AND
NOTICES

- .1 Signs and notices for safety and instruction are permitted and shall be in both official languages and 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.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-Z271-10, Safety Code for Suspended Platforms.
 - .2 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Indicate use of supplemental or other staging area.
- .3 Provide construction facilities in order to execute work expeditiously.
- .4 Remove from site all such work after use.

1.4 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA- Z271.
- .2 Provide and maintain scaffolding, ladders, platforms and temporary stairs.

1.5 BARRIERS AND ENCLOSURES

- .1 In accordance with Section 01 56 00 – Temporary Barriers and Enclosures and WorkSafe BC requirements.

1.6 ELEVATORS

- .1 Existing elevators not to be used by construction personnel and transporting of materials.

1.7 SITE STORAGE/LOADING

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.8 CONSTRUCTION
PARKING

- .1 Limited parking will be permitted on site as directed by Departmental Representative. Provide for additional parking off site. Refer to 01 14 00 – Work Restrictions.
- .2 Provide and maintain adequate access to project site.

1.9 SECURITY

- .1 Provide and pay for responsible security personnel to guard contractor storage and laydown area after working hours and during holidays.

1.10 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.

1.11 EQUIPMENT, TOOL
AND MATERIALS
STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.12 SANITARY
FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.13 PROTECTION AND
MAINTENANCE OF
TRAFFIC

- .1 Refer to Section 01 14 00 – Work Restrictions.
- .2 Provide access as necessary to maintain traffic.
- .3 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .4 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .5 Protect travelling public from damage to person and property.

- .6 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .7 Verify adequacy of existing roads and allowable load limit on these roads. Contractor responsible for repair of damage to roads caused by construction operations.
- .8 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .9 Dust control: adequate to ensure safe operation at all times.
- .10 Provide snow removal during period of Work when required.

1.14 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable, where directed by Departmental Representative.
- .4 Stack stored new or salvaged material not in construction facilities.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION



1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 02 41 99 – Demolition for Minor Works.
- .2 Section 02 83 10 – Lead Base Paint Abatement – Minimum Precautions.
- .3 Section 07 31 13 – Asphalt Shingles.
- .4 Section 07 31 26 – Slate Roofing.
- .5 Section 07 31 29 – Cedar Shingles.
- .6 Section 09 91 00 – Painting.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-O121-08(R2013), Douglas Fir Plywood.

1.3 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.4 HOARDING

- .1 Erect temporary building envelope enclosures to protect wall assemblies from elements during Work.
- .2 Erect and maintain pedestrian walkways and exits including roof and side covers, complete with signs and electrical lighting as required by law.
- .3 Protect site from damage by equipment and construction procedures.

1.5 GUARD RAILS AND BARRICADES

- .1 Provide as required by governing authorities.

1.6 WEATHER ENCLOSURES

- .1 Provide weather tight closures to unfinished remediated wall assemblies and other openings in exterior walls including window sashes, vents, louvres and lighting.
- .2 Design enclosures to withstand wind pressure and snow loading.

1.7 DUST TIGHT
SCREENS

- .1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.

1.8 ACCESS TO SITE

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

1.9 PUBLIC TRAFFIC
FLOW

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

1.10 FIRE ROUTES

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

1.11 PROTECTION FOR
OFF-SITE AND
PUBLIC PROPERTY

- .1 Protect surrounding property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.12 PROTECTION OF
BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment, including existing roof coverings during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative locations and installation schedule three (3) days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

1.13 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate waste materials for reuse and recycling.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 07 31 29 – Cedar Shingles.
- .2 Section 07 62 00 – Sheet Metal Flashings.
- .3 Section 09 91 00 – Painting.

1.2 REFERENCES

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.3 PRODUCTS, MATERIALS AND EQUIPMENT

- .1 Products, materials, equipment and articles incorporated in Work shall be NEW, not damaged or defective, and of best quality for purpose intended and compatible with the specifications. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Use products of one (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.

1.4 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for 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 Work.
- .3 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that

Work may be delayed for such reason, the Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 STORAGE, HANDLING, AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store sheet materials on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .5 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.6 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

1.7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.8 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.9 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.10 REMEDIAL WORK

- .1 Refer to Section 01 73 00 – Execution.
- .2 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .3 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 FASTENINGS

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Provide metal fastenings and accessories in the same texture, colour and finish as base metal in which they occur.
 - .1 Prevent electrolytic action between dissimilar metals.
 - .2 Use non-corrosive fasteners, anchors and spacers for securing exterior work unless stainless steel or other material is specifically requested in technical specification sections.
 - .3 Use heavy hexagon heads, semi-finished unless otherwise specified.
 - .4 Bolts may not project more than 1 diameter beyond bolts.
- .3 Types of washers as follows:
 - .1 Soft neoprene washers: use for exposed fastening of exterior metal panels.
- .4 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.
- .5 Prevent damage, adulteration and soiling of products during delivery, handling and storage. Immediately remove rejected products from site.
- .6 Store products in accordance with suppliers' instructions.
- .7 Touch up damaged factory finished surfaces according to manufacturer's recommendations and to Departmental Representative's satisfaction.
 - .1 Use primer or enamel to match original.
 - .2 Do not paint over nameplates.

- .8 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .9 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .10 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

**1.12 PROTECTION OF
EXISTING BUILDING
AND WORK IN
PROGRESS**

- .1 Protect existing building components and finishes (including glazing, roof finishes, ramps, guardrails, stairways and areas not included in scope of work) from damage. Repair damaged components and finishes according to Departmental Representative's specifications, to better condition.
- .2 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

**1.13 CONTRACTOR'S
OPTIONS FOR
SELECTION OF
PRODUCT FOR
TENDERING**

- .1 Products are specified by 'Prescriptive' specifications: select any product meeting or exceeding specifications.
- .2 Products specified under "Acceptable Products": select any one of the indicated manufacturers or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated Products.
- .3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.
- .4 Products specified to meet particular design requirements or to match existing materials: use only material specified Acceptable Product. Alternative products may be considered provided full technical data is received in writing by Departmental Representative in accordance with Section 01 11 55 – General Instructions.
- .5 When products are specified by a referenced standard or by or performance specifications, upon request of Departmental Representative obtain from manufacturer an independent laboratory report showing that the product meets or exceeds the specified requirements at no cost to Departmental Representative.
- .6 Provide cost saving breakout in bid form for alternate material or system if incorporated.
- .7 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.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 02 41 99 – Demolition for Minor Works.
- .2 Section 07 31 29 – Cedar Shingles.
- .3 Section 07 62 00 – Sheet Metal Flashings.
- .4 Section 09 91 10 – Painting.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Departmental Representative or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Departmental Representative or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.3 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.4 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work and review existing conditions with Departmental Representative.

- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work.

1.5 EXECUTION

- .1 Execute cutting, fitting, and patching to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Restore work with new products in accordance with requirements of Contract Documents.
- .7 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of at municipal approved facilities. Do not burn waste materials on site.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers for collection of waste materials and debris.
- .5 Provide and use marked separate bins for recycling.
- .6 Dispose of waste materials and debris off site.
- .7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not contaminate building systems.

1.2 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris including that caused by Owner or other Contractors.
- .5 Vacuum clean behind grilles, louvres and screens.
- .6 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .7 Broom clean and wash exterior walks, steps and surfaces; where used for project Work.
- .8 Remove dirt and other disfiguration from exterior surfaces of Work.

- .9 Clean equipment and fixtures to sanitary condition; clean glazing and frames where adjacent to work.

**1.3 WASTE
MANAGEMENT AND
DISPOSAL**

- .1 Separate waste materials for reuse and recycling.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Refer to technical sections for waste management and disposal.

1.2 WASTE MANAGEMENT GOALS

- .1 Prior to start of Work, conduct meeting with Departmental Representative to review and discuss PWGSC's Waste Management Plan and Goals.

1.3 DEFINITIONS

- .1 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .2 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .3 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 - .2 Returning reusable items including pallets or unused products to vendors.
- .4 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

1.4 STORAGE, HANDLING, AND PROTECTION

- .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 where directed and transport off-site to an approved and authorized recycling facility.
- .3 Materials must immediately be separated into required categories for re-use or recycling.
- .4 Unless specified otherwise, materials for removal become Contractor's property.
- .5 Separate non-salvageable materials for recycling where applicable recycling facility exists. Transport and deliver non-salvageable items to licensed recycling and disposal facilities.

- .6 Protect structural components not removed for demolition from movement or damage.
- .7 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
- .8 Separate and store materials produced during dismantling of structures in designated areas.
- .9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.

1.5 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner into waterways, storm, or sanitary sewers.
- .3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

1.6 USE OF SITE AND FACILITIES

- .1. Execute work with least possible interference or disturbance to normal use of premises.
- .2 Maintain security measures as approved by Departmental Representative.

1.7 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

2 PRODUCTS (NOT USED)

3 EXECUTION

3.1 APPLICATION

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

3.2 CLEANING

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION



1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 07 31 29 – Cedar Shingles.
- .2 Section 07 62 00 – Sheet Metal Flashings.
- .3 Section 09 91 10 – Painting.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative review.
 - .2 Departmental Representative's review:
 - .1 Departmental Representative and Contractor to review Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and reviewed for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Work: complete and ready for final review.
 - .4 Final Review:
 - .1 When completion tasks are done, request final review of Work by Departmental Representative.
 - .2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-review.

1.3 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with contractor's representative and Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify Project requirements.
 - .2 Review manufacturer's warranty requirements.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Three (3) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, two (2) final hard copies and one electronic copy of operating and maintenance manuals. Substantial completion will not be considered until this submission is completed.
- .3 Ensure spare parts, maintenance materials and special tools are new, neither damaged nor defective, and of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.
- .5 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

1.3 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by Section numbers and sequence of the Table of Contents according to the contract documents Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages with drawing number and description visible.
- .9 Provide 1:1 scaled CAD files in dwg format on CD.

1.4 CONTENTS-
PROJECTS
RECORD
DOCUMENTS

- .1 Table of Contents (for each volume): provide the following:
 - .1 Title of project.
 - .2 Date of submission
 - .3 Names, addresses, telephone numbers and email addresses of Consultant, Contractor and Sub-Contractors with name of responsible parties.
 - .4 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 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 identify specific 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.
 - .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.5 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, reference to visible and accessible features of construction.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.
 - .4 Change Orders and other modifications to Contract.
 - .5 Details not on original Contract drawings.
 - .6 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 as work progresses.
 - .2 Mark on 1 set of drawings, specifications and shop drawings at completion of project and, before final review, neatly transfer notations to second set.
 - .3 Provide 1 set of CDs in PDF file format with all as-built information included.
 - .4 Submit all sets to Departmental Representative.

1.6 EQUIPMENT AND SYSTEMS

- .1 Include manufacturer's printed operation and maintenance instructions.
- .2 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .3 Additional requirements: as specified in individual specification sections.

1.7 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with colour and texture designations.
 - .1 Provide information for re-ordering products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual specifications sections.

1.8 WARRANTIES

- .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 and inspection reports executed in by subcontractors, suppliers, manufacturers and inspection agencies within 10 days after completion of 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 with Operating and Maintenance manual.
- .8 Conduct joint 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.

1.9 COMPLETION

- .1 Submit a written certificate that the following have been performed:
 - .1 Work has been completed and reviewed for compliance with the Contract documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Work is complete and ready for final review.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 REFERENCES

- .1 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 ACTION AND INFORMATION SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures and 01 74 19 - Construction/Demolition Waste Management and Disposal.

1.3 SITE CONDITIONS

- .1 If material resembling spray or trowel-applied asbestos or other designated substance be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.
 - .1 Proceed only after receipt of written instructions have been received from Departmental Representative.
- .2 Notify Departmental Representative before disrupting building access or services.

2 PRODUCTS (NOT USED)

3 EXECUTION

3.1 EXAMINATION

- .1 Inspect building with Departmental Representative 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 in operating condition.

3.2 PREPARATION

- .1 Protection of In-Place Conditions:
 - .1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building and finishes to remain.
 - .2 Protect existing roofing.
 - .3 Keep noise, dust, and inconvenience to occupants to minimum.
 - .4 Protect building systems, services and equipment.

- .5 Provide temporary dust screens, covers, railings, supports and other protection as required.
- .6 Do Work in accordance with Section 01 35 33 - Health and Safety Requirements.
- .2 Demolition/Removal:
 - .1 Remove items as indicated.
 - .2 Remove parts of existing buildings as indicated to permit remedial construction. Items for reinstallation to be stored in a dry, protected area as directly by Departmental Representative.

3.3 REINSTALLATION

- .1 Reinstall elements that have been removed for remediation work once remediated work has been completed and reviewed by Departmental Representative.
- .2 Install to original position and make good any damaged elements to satisfaction of Departmental Representative.
- .3 Upon completion of installation, notify Departmental Representative for review of completed work.

3.4 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 Refer to demolition drawings and specifications for items to be salvaged for reuse.
- .4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Construction/Demolition and Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at authorized facility.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Comply with requirements of this Section when performing following Work:
 - .1 Removal of lead-containing coatings and hazardous materials as required.

1.02 RELATED REQUIREMENTS

- .1 Section 02 41 99 – Demolition for Minor Works.
- .2 Section 09 91 00 – Painting.

1.03 REFERENCES

- .1 Department of Justice Canada
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .2 Health Canada
 - .1 Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).
- .3 Human Resources and Social Development Canada (HRSDC)
 - .1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.
- .4 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .5 U.S. Environmental Protection Agency (EPA)
 - .1 EPA 747-R-95-007-1995, Sampling House Dust for Lead.
- .6 U.S. Department of Labour - Occupational Safety and Health Administration (OSHA) - Toxic and Hazardous Substances
 - .1 Lead in Construction Regulation - 29 CFR 1926.62-[1993].
- .7 Underwriters' Laboratories of Canada (ULC)

1.04 DEFINITIONS

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Authorized Visitors: Departmental Representative or designated representatives.
- .3 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. For protection of underlying surfaces from damage and to prevent lead dust entering in clean area.
- .4 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.
- .5 Action level: employee exposure, without regard to use of respirators, to airborne concentration of lead of 50 micrograms per cubic meter of air (50 ug/m²) calculated as 8-

hour time-weighted average (TWA). Minimum precautions for lead abatement are based on airborne lead concentrations less than 0.05 milligrams per cubic meter of air for removal of lead based paint by methods noted in paragraph 1.1.

- .6 Competent person: individuals capable of identifying existing lead hazards in workplace taking corrective measures to eliminate them.
- .7 Lead dust: wipe sampling on vertical surfaces and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of lead based paint waste in accordance with requirements of authority having jurisdiction.
- .3 Provide proof of Contractor's General Insurance.
- .4 Quality Control:
 - .1 Provide Departmental Representative necessary permits for transportation and disposal of lead based paint waste and proof that lead based paint waste has been received and properly disposed.
 - .2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, and aspects of work procedures and protective measures.

1.06 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead paint, provided that in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements and WorkSafe regulations and standards.
 - .2 Safety Requirements: worker and visitor protection.
 - .1 Protective equipment and clothing to be worn by workers and visitors in work Area include:
 - .1 Half mask respirator: half-mask particulate respirator with N - series filter, and 95 % efficiency could be provided.
 - .2 Eating, drinking, chewing, and smoking are not permitted in work area.
 - .3 Ensure workers wash hands and face when leaving work area. Facilities for washing are located where approved by Departmental Representative.
 - .4 Visitor Protection:
 - .1 Instruct Authorized Visitors procedures to be followed in entering and exiting work area.

1.07 WASTE MANAGEMENT AND DISPOSAL

- .1 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional

and Municipal regulations.

- .2 Disposal of lead waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of lead waste in sealed double thickness 6 ml bags or leak proof drums. Label containers with appropriate warning labels.
- .3 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.08 EXISTING CONDITIONS

- .1 Reports and information pertaining to lead based paint to be handled, removed, or otherwise disturbed and disposed of during this Project are bound into this specification.
- .2 Notify Departmental Representative of lead based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.09 SCHEDULING

- .1 Not later than two days before beginning Work on this Project notify following in writing:
 - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
 - .2 Provincial Ministry of Labour.
 - .3 Disposal Authority.
- .2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.
- .3 Provide Departmental Representative copy of notifications prior to start of Work.

1.10 PERSONNEL TRAINING

- .1 Provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of lead exposure, in personal hygiene, in aspects of work procedures, and in use, cleaning, and disposal of respirators.
- .2 Instruction and training related to respirators includes, at minimum:
 - .1 Proper 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 competent, qualified person.
- .4 Supervisory personnel to complete required training.

2 PRODUCTS

2.01 MATERIALS

- .1 Polyethylene 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
- .2 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.

- .3 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 lead paint residue.
- .4 Lead waste containers: type acceptable to dump operator with tightly fitting covers and 0.15 mm thickness sealable polyethylene liners.
 - .1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

3 EXECUTION

3.01 SUPERVISION

- .1 One Supervisor for every ten workers is required.
- .2 Supervisor must remain within work area during disturbance, removal, or handling of lead based paints.

3.02 PREPARATION

- .1 Remove and store items to be salvaged or reused.
 - .1 Protect and wrap items and transport and store in area specified by Departmental Representative.
- .2 Work Area:
 - .1 Shut off and isolate HVAC system to prevent dust dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.
 - .2 Seal off openings with polyethylene sheeting and seal with tape.
 - .3 Maintain emergency fire exits or establish alternatives satisfactory to Authority having jurisdiction.
 - .4 Where water application is required for wetting lead containing materials, provide temporary water supply appropriately sized for application of water as required.
 - .5 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical cables and equipment.
- .3 Do not start work until:
 - .1 Arrangements have been made for disposal of waste.
 - .2 Tools, equipment, and materials waste containers are on site.
 - .3 Arrangements have been made for building security.
 - .4 Notifications have been completed and preparatory steps have been taken.

3.03 LEAD ABATEMENT

- .1 Removal of lead-containing coatings with a chemical gel or paste and fibrous laminated cloth wrap; or removal with non-powered hand tools. Use of power tools for paint removal is not permitted. Contractor to determine method in accordance with regulatory bodies and WorkSafe BC.
- .2 Remove lead based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.
- .3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet

sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.

- .4 After completion of stripping work, clean surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .5 After cleaning to remove visible lead based paint, and after encapsulating lead containing material impossible to remove, wet clean entire work area, and equipment used in process. After inspection by Departmental Representative apply continuous coat of slow drying sealer to surfaces of work area.

3.04 INSPECTION

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by Departmental Representative will result in work stoppage, at no cost to Owner.
- .2 Departmental Representative will inspect work for:
 - .1 Adherence to specific procedures and materials.
 - .2 Final cleanliness and completion.
 - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

3.05 FINAL CLEANUP

- .1 Following cleaning and when lead wipe surfaces sampling are below acceptable concentrations, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

3.06 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

- .1 Repair or replace objects damaged in course of work to their original state or better, as directed by Departmental Representative.

END OF SECTION



1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 09 91 00 – Painting.

1.2 REFERENCES

- .1 ASTM A53-[90b], Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A269-[92], Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .3 ASTM A307-[92a], Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
- .4 CAN/CGSB-1.40-[M89], Primer, Structural Steel, Oil Alkyd Type.
- .5 CAN/CGSB-1.108-[M89], Bituminous Solvent Type Paint.
- .6 CAN/CGSB-1.181-[92], Ready-Mixed, Organic Zinc-Rich Coating.
- .7 CAN/CSA-G40.21-[M92], Structural Quality Steels.
- .8 CAN/CSA-G164-[M92], Hot Dip Galvanizing of Irregularly Shaped Articles.
- .9 CAN/CSA-S16.1-[M89], Limit States Design of Steel Structures.
- .10 CSA W59-[1989], Welded Steel Construction (Metal Arc Welding).

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 11 55 – General Instructions: Shop Drawings, Product Data, Samples and Mock-ups.
- .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 PROTECTION

- .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
- .2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

2 PRODUCTS

2.1 MATERIALS

- .1 Steel sections and plates: to CAN/CSA-G40.21
 - .1 WF beams and HSS shapes: Grade 350W

- .2 Channels, angles and plates: Grade 300W
- .2 Steel pipe: to ASTM A53
 - .1 Minimum yield strength is 241 MPa (36 ksi)
 - .2 Standard weight unless noted otherwise.
- .3 Painting and surface preparation of steel sections and plates:
 - .1 For non-exposed conditions inside of heated walls provide single primer only.
 - .2 For steel in non-exposed conditions but subject to outside humidity levels provide a corrosion resistant primer only.
 - .3 For steel in exposed conditions provide hot dipped galvanized corrosion resistant coating. Primer coat and top coats are as per Specification Section 09 91 00.
 - .1 For detailed paint requirements refer to Specification Section 09 91 00.
 - .2 Surface preparation requirements to meet Steel Structures Painting Council (SSPC) levels as specified in Section 09 91 00. In no case is the surface preparation to be less than level SP2.
- .4 Welding materials: to CSA W59.
- .5 Welding electrodes: to CSA W48 Series.
- .6 Bolts and anchor bolts: to ASTM A307.
- .7 Anchor bolts for exposed conditions to attach steel components to concrete.
 - .1 Provide stainless expansion anchor bolts conforming to AISI 304 or 316.
 - .2 Acceptable products:
 - .1 Hilti Kwik Bolt 3
- .8 Grout for baseplates: non-shrink, non-metallic, flowable, 24h, MPa 15, pull-out strength 7.9 MPa.

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m2 to CAN/CSA-G164.
- .2 Shop coat primer: to CAN/CGSB-1.40.
- .3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

- .4 Bituminous paint: to CAN/CGSB-1.108.

2.4 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of bituminous paint:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.5 SHOP PAINTING

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7°C.
- .3 Clean surfaces to be field welded; do not paint.

2.6 ANGLE LINTELS

- .1 Steel angles: hot dipped galvanized, sizes indicated for openings. Provide 150 mm minimum bearing at ends.
- .2 Weld or bolt back-to-back angles to profiles as indicated.
- .3 Finish for exposed angles: Refer to Section 09 91 00.

2.7 PIPE RAILINGS

- .1 Steel:
 - .1 Pipe: 40 mm nominal outside diameter, formed to shapes and sizes as indicated.
 - .2 Galvanize pipe railings after fabrication. Prime and finish paint as per Section 09 91 00.

3 EXECUTION

3.1 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Provide components for building by other sections in accordance with shop drawings and schedule.

- .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

END OF SECTION

1 GENERAL

1.1 SUMMARY

- .1 This section specifies product and process pertaining to steel stud work, Z-girts and other miscellaneous cold formed metal framing elements.

1.2 REFERENCES

- .1 National Building Code
- .2 BC Building Code
- .3 ASTM A653/A 653M - Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- .4 ASTM A123, Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
- .5 ASTM A792/A 792M – Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-coated by Hot-Dip Process
- .6 ASTM A 924/A 924M – Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .7 ANSI/AWS D1.3 Structural Welding Code – Sheet Steel.
- .8 CGSB 1-GP-181M Standard for: Coating, Zinc Rich, Organic Ready Mix.
- .9 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .10 CSA W47.1 Certification of Companies for Fusion Welding of Steel Structures.
- .11 CSA W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .12 CSA-W59, Welded Steel Construction (Metal Arc Welding).
- .13 CAN/CSA-S136, Cold Formed Steel Structural Members.
- .14 Canadian Sheet Steel Building Institute CSSBI 50M, Lightweight Steel Framing Manual.
- .15 Canadian Sheet Steel Building Institute CSSBI 51M, Lightweight Steel Framing Design Manual.
- .16 AWCC of BC Specification Standards Manual – Section 9.8

1.3 DESIGN CRITERIA

- .1 All design details provided are designed to the 1998 BCBC for wind and seismic loading. Wind loading is for $q_{1/30} = 0.45\text{Kpa}$ for strength and $q_{1/10} = 0.36\text{Kpa}$ for deflection. Seismic loading is based on $v = 0.2$.

- .2 Proposed revisions to the drawing details to be submitted to Consultant for review prior to undertaking repairs / upgrade work.
- .3 All design of steel studs is based on Limit States Design principles using factored loads and resistances.
- .4 Loads and load factors shall be determined in accordance with NBC.
- .5 Resistances and resistance factors are determined in accordance with BCBC and CSA-S136.
- .6 All design conforms to the requirements of specified fire rated assemblies.
- .7 Provide bridging to be provided to prevent member rotation and member translation perpendicular to the minor axis.
- .8 Maximum deflections under specified loads conform to the following:
 - .1 Wall studs supporting stucco cladding $h/360$ for studs supporting masonry veneer $h/720$.
 - .2 Roof joists and rafters $L/360$.
- .9 Design components or assemblies to accommodate specified erection tolerances of the structure.
- .10 The spacing of wall stud members is not to exceed the following:
 - .1 Wall studs 400mm o.c. as required.
- .11 Allowance for movement of the structure. Design wind bearing stud end connections to accommodate floor/floor deflections such that the studs are not loaded axially. Minimum allowance is 10mm (3/8").
- .12 Connections between lightweight steel framing members shall be by bolts or sheet metal screws.
- .13 Resistances for sheet metal screws are based on the manufacturer's lower bound test values multiplied by the appropriate resistance factor, Φ_c , given in CSA-S136.

1.4 SUBMITTALS

- .1 Submit certified copies of mill reports covering chemical and mechanical properties, and coating designation of steel used in this work. The length of pieces need not exceed 300mm. Tag pieces with the name of the part and project, metal thickness exclusive of coating, coating, and the manufacturer.
- .2 Submit samples of fasteners along with manufacturer data on chemical composition, mechanical and corrosion resistance properties.

2 PRODUCTS

2.1 MATERIALS

- .1 Steel studs and tracks:
 - .1 Steel to CAN/CSA-S136, fabricated from ASTM A446M, Grade A to D steel. For 18 gauge and thinner, $f_y = 33\text{ksi}$ otherwise f_y

- = 50ksi. Minimum thickness is 20 gauge. Steel to be identified as to specification, types, grade and mechanical properties. Sizes of members as noted in the design documents.
- .2 Metallic zinc coating to be no less than G90 (Z275).
 - .3 Colour code steel studs in accordance with CSSBI 50M.
- .2 Sheet metal thicknesses without coating thicknesses are defined as:
- .1 25ga is 0.0179"
 - .2 20ga is 0.0329"
 - .3 18ga is 0.0428"
 - .4 16ga is 0.0538"
 - .5 In no case is the supplied sheet steel to be less than 95% of the required thickness not including any coatings. A G90 coating adds 0.0015" to the base steel thickness.
- .3 Sheet metal screws: pan head, self-drilling and tapping metal screws
- .1 Minimum Size: #10 with point type # 5 (drill point) or as required.
 - .2 Length to suit assembly of materials.
 - .3 Corrosion protection to be zinc or cadmium plated, 0.008 mm minimum thickness or approved alternate.
- .4 Stud Bent plates and stud Z clips:
- .1 Thickness as indicated with grades as per ASTM A446M.
 - .2 Minimum thickness: 16 Gauge minimum unless noted otherwise.
 - .3 Zinc corrosion protection at least to G90 (Z275) thickness unless indicated otherwise.
- .5 Grout:
- .1 non-shrink, non-metallic, flowable, 24h, MPa 15, pull-out strength 7.9 MPa.

3 EXECUTION

3.1 GENERAL

- .1 Fabrication and erection shall conform to design documents. Modifications required to accommodate as-built conditions, other than minor dimensional changes, shall be submitted for approval.

3.2 FABRICATION

- .1 Where specified, provide cut-outs centred in the webs of the members to accommodate services. The effect of cut-outs on the strength and stiffness of the member shall be considered.
- .2 The steel thickness exclusive of coating shall be marked on each member by embossing, stamping with indelible ink or by colour coding.

3.3 STORAGE OF MATERIALS AND ERECTION

- .1 Products to be protected from conditions that may cause physical damage or corrosion.
- .2 Protect all adjacent elements from debris as a part of work including steel cuttings and filings.
- .3 Lightweight steel framing shall be erected true and plumb within the specified tolerances. Temporary bracing shall be employed wherever necessary to withstand all loads to which the structure may be subject during erection and subsequent construction. Temporary bracing shall be left in place as long as required for the safety and integrity of the structure. The Erector shall ensure that during erection a margin of safety consistent with the requirements of the BCBC and CSA-S136 exists in the uncompleted structure.
- .4 Erection tolerances:
 - .1 For the purposes of this section, camber is defined as the deviation from straightness of a member or any portion of a member with respect to its major axis, and sweep is defined as the deviation from straightness of a member of any portion of a member with respect to its minor axis.
 - .2 Plumb: not to exceed 1/500th of member length.
 - .3 Camber and Sweep: not to exceed 1/1000th of member length.
 - .4 Studs shall seat into top and bottom tracks as shown. The gap between end of stud and bottom track web is not to exceed 1mm.
 - .5 Spacing: not more than 3 mm from design spacing.
- .5 Make all field measurements necessary to insure the proper fit of all members.
- .6 Cutting of members may be by saw or shear. Torch cutting is not permitted.
- .7 Holes that are field cut into lightweight steel framing members to be as indicated and as approved by Consultant. In general all holes made to new stud and track members must be reinforced with a partial member of similar size and thickness.

3.4 SCREWS

- .1 Steel screws shall equal or exceed the minimum diameter indicated on shop drawings and design documents.
- .2 Penetration beyond joined materials shall be not less than 3 exposed threads.
- .3 Thread types and drilling capability shall conform to the manufacturer's recommendations.
- .4 Screws covered by sheathing materials shall have low profile heads.
- .5 Screws which are shown as penetrating sheathing or plywood liners in the opposite direction to normal construction must be sized so

that the screws tips do not protrude through the interior drywall face or the plywood window liner where the screws would be visible or would affect the self adhered membrane around the rough opening of the window.

3.5 FASTENERS

- .1 All fasteners to the concrete structure must be done in accordance with the manufacturer's instructions including maintaining minimum edge distance, minimum spacing, correct drill hole size and depth and correct placing tools.
- .2 Any concrete damage occurring during fastener installation must be brought to the Consultant's attention. Any damage done to the structure as a result of the contractor's failure to observe manufacturer's instructions is to be made good at the contractor's expense.
- .3 All installers must be familiar with the fasteners being used and must have prior training with the fastener manufacturer's technical representative.

3.6 CONTRACTOR REVIEW OF EXISTING CONDITIONS

- .1 Confirm that the existing framing spacing is at 16" spacing (maximum) to accept the new exterior Z-girt furring which is at 16" spacing. Any deviations from this are to be brought to the Consultant's attention.
- .2 Identify all areas of deviation from the expected framing conditions and bring it to the Consultant's attention. This includes but is not limited to the existing stud spacing and thickness, stud and track connections to other studs and the concrete structure.
- .3 All existing gas and electrical and in-wall service lines must be accommodated or relocated to suit the new work. Contractor to advise the consultant of conflicts prior to doing the work.

3.7 CLEAN-UP

- .1 Clean-up all debris including steel cuttings and filings.

END OF SECTION



1 GENERAL

1.1 SUMMARY

- .1 Work includes labour, materials, equipment and services necessary for:
 - .1 Treatment of new lumber, plywood and cedar shingles.

1.2 REFERENCES

- .1 CAN/CSA 080 Series 080.1-08 – Specification of treated wood.
- .2 CAN/CSA 080 Series 080.2-08 – Processing and treatment
- .3 CAN/CSA 080 Series 080.3-08 – Preservative formulations
- .4 CAN/CSA 080 Series 080.4-08 – Hydrocarbon solvents
- .5 CAN/CSA 080 Series 080.5-08 – Additives
- .6 American Wood Preserver's Association Standards 1996.

1.3 QUALITY ASSURANCE

- .1 Inspection of products treated with preservative by vacuum-pressure impregnation will be carried out by an accredited inspection agency of the Canadian Wood Preservers Bureau (CWPB).
- .2 All treated lumber and plywood shall bear an identifying stamp in accordance with the CWPB requirements.

1.4 CERTIFICATES

- .1 For products treated with preservative by vacuum-pressure impregnation submit following information certified by authorized signing officer of treatment plant:
 - .1 Information listed in AWPA.M2 and revisions specified in CAN/CSA-O80 Series, Supplementary Requirement to AWPA Standard M2 applicable to specified treatment.
 - .2 Moisture content after drying following treatment with water-borne preservative.
 - .3 Acceptable types of paint, stain, and clear finishes that may be used over treated materials to be finished after treatment.

1.5 ENVIRONMENTAL AND SAFETY

- .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 material safety data sheets acceptable to WCB. Ensure that building occupants, as well as adjacent materials including landscaping are thoroughly protected.

2 PRODUCTS

2.1 MATERIALS

- .1 In general all lumber is to be pressure treated.
- .2 All wood treatment to meet the requirements of CSA 080.1-08 for specific use and exposure. Where this specification is more strict than the CSA 080.1 standard then this specification will govern.
- .3 All lumber must be pressure treated after final cutting and fabrication whenever possible.
- .4 All wood products to be dried to below 19% moisture content after treatment by kiln drying. Wood products that require air drying instead of kiln dried are subject to the approval of to the Consultant. If treated wood becomes wet after treatment and kiln drying it will need to be air dried to below 19% moisture content before installation.
- .5 For the purpose of this specification, the use of borate treated wood products is limited to areas where the wood will not be subject to continual or direct water runoff as noted in the following sections.
- .6 Preservative treatment for new lumber is to be as follows:
 - .1 Framing inside of the moisture barrier and not subject to exterior humidity including stud walls, plates, headers, deck framing members (over living space): Borate (as B_2O_3) 2.8 kg/m^3 .
 - .2 Framing subject to direct moisture or used for rot repair of existing deteriorated framing (studs, plates, rafters, as directed by the Consultant): ACQ-C or ACQ-D, 4.0 kg/m^3 .
- .7 Field treatment of treated lumber is to comply with CSA 080.3. Minimum of two coats.
- .8 Cedar roof shingles are to be CCA treated in accordance with CSA 080.1-97 – non-incised.
- .9 Preservative field treatment for ACQ or CCA treated lumber or plywood is to be with an organic solvent such as Copper Napthenate.
- .10 Preservative field treatment borate treated lumber is to be inorganic borate based insecticide / fungicide.
 - .1 Preservative field treatment to be dyed to allow easy identification of field treated wood areas. Dye additive to be:
 - .1 Sansin P-320
 - .2 Dye Tablets
 - .3 Food Colouring
 - .4 Approved alternative.
 - .2 Acceptable products:
 - .1 Boracol 20-2 BD Inorganic Boron Wood Preservative.
 - .2 Pre-Ser-Vor 25-3 Inorganice Boron Wood Preservative.
 - .3 Shellguard Insecticide and Fungicide Concentrate For Wood.

3 EXECUTION

3.1 FACTORY APPLICATIONS OF PRESERVATIVES

- .1 All new lumber shall be factory treated to obtain an average net retention as specified.
- .2 Minimum depth of penetration in solid lumber is to meet CSA 080.1 Table 5 requirements but not less than 10mm for wood less than 115mm and not less than 13mm for wood greater than or equal to 115mm.
- .3 Retention values and depth of penetration is to be verified by assay method.
- .4 Following water-borne preservative treatment, dry all dimension lumber and plywood sheathing to maximum moisture content of 19%.

3.2 FIELD APPLICATION OF PRESERVATIVES

- .1 Field treat the following areas with the appropriate product:
 - .1 All cut ends of treated wood products.
 - .2 All bolt holes, chamfers, cuts, notches, etc to be thoroughly coated by submersing into preservative or other means acceptable to Consultant if submersion is not practical.
 - .3 Existing dimension lumber and plywood that is not removed and replaced but exposed during the course of the retrofit may require treatment as directed by Consultant. Existing treated lumber which is in good condition and not affected by mold will generally not require field treatment. Retained wood can be treated with either copper naphthenate or borate based preservative at the direction of the Consultant. Retained wood that is field treated with copper naphthenate is to be dried prior to treatment. Retained wood that is field treated with borate based preservative can be damp prior to treatment. Before covering up retained wood it must be below 15% moisture content.
- .2 Field Application of wood preservatives to be applied by qualified personnel, in accordance with the manufacturers' instructions but not less than:
 - .1 Two coats applied by brush or roller. Underside of plywood decks can be done by spraying in two coats.
 - .2 Minimum 3 minute immersion of wood in preservative.

END OF SECTION

1 GENERAL

1.1 SUMMARY

- .1 Work included: Labour, materials, equipment and services necessary to provide rough carpentry for but not limited to roof overhangs, reframing, sheathing, parapet caps, fascias, and trims.

1.2 REFERENCES

- .1 BCBC – Part 9
- .2 CSA B111 Wire Nails, Spikes and Staples.
- .3 CAN/CSA-G164 Hot Dip Galvanizing of Irregularly Shaped Articles.
- .4 CAN/CSA 086.1 Engineering Design in Wood
- .5 CSA O121 Douglas Fir Plywood.
- .6 CAN/CSA-O141 Softwood Lumber.
- .7 CSA O151 Canadian Softwood Plywood.
- .8 CAN/CGSB-71.26 Adhesive for Field-Gluing Plywood to Lumber Framing and Metal Studs.
- .9 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.

1.3 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.

2 PRODUCTS

2.1 LUMBER MATERIAL

- .1 Unless otherwise specified, dimensions, thickness of materials must match existing or be in accordance with BCBC Part 9 Requirements as a minimum, whichever is more stringent.
- .2 All wood except cedar to be pressure treated in accordance with Specification 06 05 73 – Wood Treatment. See note on treatment of plywood sheathing in following section.
- .3 Framing lumber: to match existing size and grade, unless noted on the drawings or as directed by the Consultant.
 - .1 Report any discrepancies in grading of existing lumber to Consultant.

- .4 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.
- .5 Wood Spaced Sheathing and Trim boards:
 - .1 1x or 2x material as noted, any replacement wood is to match existing size, species and grain profile of existing wood. Field verify: clear Douglas Fir (knot free), No.2 or better, kiln dried.
 - .2 Moisture content 19% or less.
- .6 Material requirements to meet BCBC Part 9 Requirements as a minimum unless specified otherwise.

2.2 ACCESSORIES

- .1 Corrosion resistant coatings on connectors and fasteners is as follows:
 - .1 For non-ACQ treated wood and in covered unheated areas not subject to direct moisture, all connectors to be a minimum of G185 hot dipped galvanizing and fasteners to be hot dipped galvanized. Screw fasteners are as noted below. Applies to balcony soffits, parapets, roof attics and unheated decks.
 - .2 For non-ACQ treated wood and in exposed conditions subject to direct moisture, all connectors to be a minimum of G185 hot dipped galvanizing and fasteners to be hot dipped galvanized. Screw fasteners are as noted below. Applies to exposed panels, fascia boards, cedar boards, deck boards.
 - .3 For ACQ treated wood in all locations all connectors and fasteners to be stainless steel unless noted otherwise. Do not combine stainless connectors with non-stainless fasteners.
- .2 Hot dipped galvanized fasteners to meet the following requirements:
 - .1 Hot dipped galvanizing to meet CAN/CSA-G164 and ASTM A653. Nails, spikes and lag screws when hot dipped galvanized are to meet ASTM A153 Class D at 1.0 oz of zinc per sq ft of surface area of the fastener. Bolts, washers and nuts are to meet ASTM A153 Class D at 1.25 oz of zinc per sq ft of surface area of the fastener.
- .3 Corrosion protected screws:
 - .1 Corrosion resistant coatings for screws to meet the following requirement:
 - .1 For non-exposed conditions interior of the exterior sheathing plane and moisture barrier:
 - .1 Zinc plated with a yellow chromate conversion coating.
 - .2 Coating to meet 50 hours of salt spray test to ASTM B117.
 - .2 For exposed conditions and in covered unheated areas not subject to direct moisture exterior of the moisture barrier or subject to exterior humidity (not including ACQ wood applications)
 - .1 Zinc rich base coat with conversion coating and a baked on protective barrier coating.

- .2 Coating to meet 500 hours of salt spray test to ASTM B117.
- .3 Approved products:
 - .1 Grabbergard Exterior All-Weather Screws by Grabber Construction Products.
- .3 For exposed conditions in exposed conditions subject to direct moisture (not including ACQ wood applications)
 - .1 Zinc rich base coat with conversion coating and a baked on protective barrier coating.
 - .2 Coating to meet 1000 hours of salt spray test to ASTM B117.
 - .3 Approved products:
 - .1 Grabbergard Exterior All-Weather Screws by Grabber Construction Products.
 - .2 DT1500 or DT1700 coated screws by Leland Industries
- .4 Stainless steel screws:
 - .1 For exposed and unexposed conditions where screws are in contact with ACQ wood. Can also be used in fully exposed conditions subject to moisture such as deck boards.
 - .1 Approved products:
 - .1 Stainless steel wood screws.
 - .2 DT1700 coated screws by Leland Industries.
 - .3 Approved alternate.
- .5 Stainless steel components to meet the following requirements.
 - .1 Nails and spikes (when stainless steel) are to be, 304 or 316 Series, purpose made for replacement of conventional nails.
 - .2 Stainless steel screws to be 304 or 316 Series.
 - .3 Stainless steel bolts to be 304 or 316 Series.
 - .4 Connectors (hangers, framing anchors) to be stainless steel Type 316L.
- .6 Screws
 - .1 #8 minimum size (length to suit) wood screws with Robertson flat head.
 - .2 Fabricate to ANSI B18.6.4
- .7 Nails, spikes and staples:
 - .1 Fabricate to CSA B111.
 - .2 Minimum nail length to be 2.5" (64 mm). Refer to Part 9 for other minimum fastener requirements. Refer to the drawings for specific requirements.
- .8 Staples:
 - .1 Fabricate to CSA B111.
 - .2 16 ga. 304 Series stainless steel staples compatible with material, sheathing, framing or other substrate being fastened. Length to be 2" (51 mm). Zinc coated staples will not be accepted.

- .9 Bolts:
 - .1 Size to be 1/2" (12.5 mm) minimum diameter unless indicated otherwise, complete with nuts and washers
- .10 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws, explosive actuated fastening devices, recommended for purpose by manufacturer and as approved by the Consultant.
- .11 Deck/balcony sheathing waterproof adhesive to CGSB 71-GP-26M, cartridge loaded.
 - .1 Acceptable products:
 - .1 PL400 by PL Adhesives and Sealants
 - .2 Alternate product approved by Consultant.
- .12 Sill gasket: Polyfoam by Foampak or approved equal.

3 EXECUTION

3.1 GENERAL

- .1 Comply with requirements of BCBC Part 9 minimum, supplemented by the following paragraphs and contract drawings.
- .2 Protect new wood products, connectors and fasteners from weather and moisture.
- .3 All lumber must be below 19% moisture content at the time of installation.
- .4 Treated wood must be below 15% moisture content at the time of installation.
- .5 Lumber and plywood that is installed must be protected from moisture. Any lumber that becomes wet must be dried to the moisture contents noted above before covering up.

3.2 REPLACEMENT OF DAMAGED FRAMING

- .1 Where directed by the Consultant, replace existing damaged lumber framing with new lumber to match size and grade of existing element, unless otherwise shown on the drawings or as directed by the Consultant.
- .2 Replace entire length of damaged member. No splicing or scabbing to existing elements allowed without prior approval of Consultant.
- .3 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .4 Countersink bolts where necessary to provide clearance for other work.
- .5 Provide temporary support and shoring in accordance with WCB for the structure while working on structural members. Notify Consultant of any conditions, which appear to be unsafe.

3.3 INSTALLATION OF
STRAPPING,
FURRING AND
BLOCKING

- .6 Level and re-align building structure and framing to original grades, levels and elevations true, plumb and square as required to correct shifting due to deterioration of structural elements.

- .1 Fasten strapping to sheathing and support framing (where possible) at 8" (200 mm) o.c. horizontally and vertically.
- .2 Soffit and overhang locations: Fasten strapping to sheathing and support framing (where possible) at 6" (150 mm) o.c. at ends and corners, and 12" (300 mm) o.c. along intermediate supports with a minimum #10 – 2.5" (63 mm) screws.
- .3 Install furring and blocking as required to space-out and support wall and ceiling finishes, facings, fascia, soffit, and other work as required.
- .4 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .5 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .6 Install sleepers, wood cants, fascia backing, nailers, curbs and other wood supports as required.
- .7 Where rim joists are removed, install new rim joists to match. Ensure new rim joist is installed tight between top of wall plate the underside of floor sheathing.

END OF SECTION

[Illegible text]

1 GENERAL

1.1 SUMMARY

- .1 Work described in this section includes but is not limited to the following:
 - .1 All labour, materials, equipment and services necessary for the application of self-adhesive membrane for wall and metal roof assemblies.

1.2 REFERENCES

- .1 ASTM D412 Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
- .2 CGSB 37-GP-9 Primer, Asphalt, Unfilled, for Asphalt Roofing, Damproofing and Waterproofing.
- .3 CGSB 37-GP-15 Application of Asphalt Primer for Asphalt Roofing, Damproofing and Waterproofing.
- .4 CGSB 37.29 Rubber-Asphalt Sealing Compound.
- .5 CGSB 37-GP-56 Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

1.3 STORAGE AND HANDLING

- .1 Provide and maintain dry, off-ground weatherproof storage.
- .2 Store rolls of membrane in upright position.
- .3 Remove only in quantities for same day use.

1.4 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install membrane system when ambient temperatures are at or below 5°C for 24 hours before application, and only during dry conditions.
 - .1 Use cold weather products where required by manufacturers guidelines.
- .2 Minimum temperature for installation of primer is 5°C.
 - .1 Use cold weather products where required by manufacturer's guidelines.
- .3 Install membrane on dry substrates, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into membrane system.

- .4 If water penetrates through the membrane assembly due to inadequate protection including from interior sources, Contractor to cut and inspect damages, remove and replace all materials at his own cost, to eliminate all trace of water in the assembly.
- .5 Do not allow membrane to remain exposed longer than 6 weeks.

1.5 QUALITY ASSURANCE

- .1 Applicator: Company specializing in performing the work of this section with minimum two years documented experience. Provide list of previous projects and references upon request by the Consultant.

2 PRODUCTS

2.1 MEMBRANE – BELOW METAL ROOFS AND FLASHINGS

- .1 SBS modified bitumen self adhesive membrane to meet the following minimum criteria:
 - .1 Membrane is to be 40 mils thick (including release film) and must have a release film to protect the adhesive surface.
 - .2 The membrane system must not show any signs of softening, flow or deterioration at temperatures 110 °C or below.
 - .3 Acceptable products:
 - .1 Lastobond Shield HT, by Soprema
 - .2 Blueskin PE 200 HT, by Monsey Bakor
 - .3 Jiffy Seal Ice & Water Guard HT, by ProtectoWrap
 - .4 Approved equivalent.

2.2 ACCESSORIES

- .1 Primer: High tack SBS rubber based primer: to CGSB 37-GP-9Ma as recommended by manufacturer.
- .2 Mastic sealant: As recommended by the manufacturer.
- .3 Termination bars:
 - .1 Minimum 18 Ga. for steel, 1/16" for aluminium
 - .2 G200 galvanized steel or aluminium
 - .3 1.5" (38 mm) wide x continuous lengths where possible.
 - .4 Gum lip as required.
- .4 Metal termination flashings: Refer to 07 62 00 Sheet Metal Flashings.

3 EXECUTION

3.1 EXAMINATION OF SURFACES

- .1 Examine surfaces to have membrane installed and immediately inform Consultant in writing of defects.

3.2 PREPARATION

- .1 Protect adjacent surfaces not designated to receive membrane.
- .2 Clean and prepare surfaces to receive membrane in accordance with manufacturer's recommendations. Surfaces are to be clean, dry and free of foreign matter.
- .3 Ensure substrate is continuous. Provide solid backing as required. Unsupported membrane of 8 mm or greater is unacceptable. Fill voids as required or reinstall sheathing to meet maximum gap requirement.
- .4 All sharp metal edges to be rounded or smoothed off to prevent puncture of membrane.

3.3 INSTALLATION

- .1 Install membrane in accordance with manufacturer's instructions. Observe temperature and humidity limitations for application.
- .2 Prime areas to receive membrane in accordance with manufacturer's recommendations. Primer must be dry prior to application of membrane. Primer is typically required on all surfaces including underlying layers of membrane. Membrane must be applied to primed area that same day.
- .3 Roll out sheets. Discard wrinkled or bubbled membrane.
- .4 Remove release paper layer. Roll out on substrate with a mechanical roller to encourage full contact bond. Use heat gun as required to achieve adequate continuous bond.
- .5 Lap sides and ends in accordance with manufacturer's instructions and with the project details. All laps to be a minimum of 50 mm.
- .6 All exposed laps except shingle laps to be masticed.
- .7 Prestrip membrane (and sheathing paper) as required to ensure shingle fashion laps at tie-ins.
- .8 Patch deficient areas with membrane extending 150 mm minimum in all direction from affected area. Seal top and sides of patch with mastic.
- .9 Extend membrane onto items protruding to or penetrating assembly and seal termination with mastic.
- .10 Ensure no membrane or membrane accessories extend to future exterior sealant locations or on finished surfaces. Clean any affected areas as required.

- .11 Install termination bars (if required) onto membrane to continuously secure as indicated and directed by Consultant. Fasten as required to provide continuous support of membrane and to eliminate bowing of termination bar (minimum 6" o/c).
- .12 Seal leading edge with mastic at the end of each day's work.

3.4 METAL ROOF AREAS

- .1 Review existing self adhered membrane conditions. All existing metal roof screw fastener holes to be sealed with 4" x 4" patch of new membrane complete with primer and mastic around edge of patch.
- .2 Install new membrane at damaged locations of the existing membrane surface. Overlap onto undamaged membrane a minimum of 4" beyond damaged area. All patches require primer and mastic at free edges.

3.5 CLEAN UP AND PROTECTION

- .1 Clean off drips and smears of bituminous material and primers off adjacent materials immediately.
- .2 At end of each day's work, provide protection for completed work and materials out of storage.

END OF SECTION

1 GENERAL

1.1 SUMMARY

- .1 Work includes labour, materials, equipment and services necessary to provide and install asphalt shingles.

1.2 REFERENCES

- .1 CSA A123.1-[M1979] Asphalt Shingles Surfaced with Mineral Granules.
- .2 CAN-CSA A123.5 M90 Asphalt Shingles With Fiberglass Felt Core
- .3 CAN3-A123.51-[M85] Asphalt Shingle Application on Roof Slopes 1:3 and Steeper.
- .4 CSA B111-[1974] Wire Nails, Spikes and Staples.
- .5 CAN/CGSB-37.4-[M89] Fibrated, Cutback Asphalt, Lap Cement for Asphalt Roofing.
- .6 CAN/CGSB-37.5-[M89] Cutback Asphalt Plastic Cement.
- .7 CAN/CGSB-51.32-[M77] Sheathing Membrane, Breather Type.
- .8 CSA A123.3-M1979 Organic No. 15 Felt.
- .9 CGSB 37-GP-4Ma Lap Cement.

1.3 QUALIFICATIONS

- .1 Roofing Contractor to be officially recognized as an authorized contractor by the roofing materials manufacturer.
- .2 Employ skilled applicators approved by membrane manufacturer.

1.4 WARRANTY

- .1 Provide the Owner, through the "Shingle Manufacturer" a material and labour guarantee stating that the shingles will be repaired or replaced for a total of five (5) years after the final completion date, non pro-rated (exclusive of costs for tear-off of shingles and flashings and metal work) in the event of a manufacturing defect which results in leaks.
- .2 Provide the owners, through the "Shingle Manufacturer" a transferable, pro-rated "replacement shingles" warranty for years six (6) to forty (40).

1.5 MOCK-UP

- .1 Construct mock-ups in accordance with Section 01 11 55 – General Instructions.
- .2 Construct mock-up of one selected roof area. Accepted mock-up may form part of completed work

- .3 Allow 48 hours for inspection of mock-up by Consultant before proceeding with remaining work.

1.6 QUALITY ASSURANCE

- .1 Conform to the latest guarantee standards of the RCABC as published in the RGC ("RCABC Guarantee Corporation") roofing practices manual for a 5-year guarantee. Provide RCABC 5-year guarantee certificate.
- .2 Installer Qualifications: Only competent, qualified tradesmen experienced with shingle roofing shall execute the work of this section.
- .3 A crew of qualified tradesmen is defined as follows:
 - .1 The foreman and at least one other man shall have a minimum of 5 years experience in the installation of asphalt shingle roofs; the balance of the crew installing the asphalt shingles and accessories must demonstrate a knowledge of roofing practices and have a minimum of one year of experience in shingle roofing.
 - .2 The foreman and one other member of the crew must have experience in the installation of asphalt shingles of the same manufacturer.
 - .3 All workmen shall install all roofing materials in strict conformance with the manufacturer's latest printed instructions for materials and installation methods.
 - .4 Workman shall proceed with the installation of materials and accessories only where the substrate is in a condition suitable for the application.
 - .5 Workman shall be knowledgeable and experienced in performing their duties in a safe and practical manner and in compliance with all safety standards and requirements.

1.7 SUBMITTALS

- .1 Submit material samples as requested by the Consultant
- .2 Provide two samples of the shingles in the approved colour.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Provide bills of lading to the Consultant as requested.
- .2 Materials shall be stored on the site in a location approved by the Consultant.
- .3 Provide and maintain dry, off-ground weatherproof storage.
- .4 Deliver and store all new materials in their original packaging, bearing the Manufacturer's name, related standards and any other specifications or reference standards.

- .5 Protect and permanently store all materials in a dry, well-ventilated and weatherproof location. Remove from this location only materials to be used the same day. Maintain storage location at minimum +10 °C. Keep materials away from open flame or welding sparks. Prevent water-based materials from freezing.
- .6 Avoid stockpiling materials on suspended areas, which could at certain places affect the loading of such areas.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Install roofing on dry sheathing, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.
- .2 Before commencing work, Contractor to ensure that forecasted meteorological conditions shall permit work to be carried out without interruption during the course of the day.
- .3 Minimum temperature for solvent-based adhesive is -5 °C.
- .4 The work will not be left unprotected at the end of each working day or during any interruption of work.
- .5 If water penetrates through the assembly due to inadequate protection, Contractor to cut and inspect damages, remove, replace and re-install all materials at his own cost, to eliminate all traces of water in the assembly.
- .6 Roofing must be watertight at end of each shift.

1.10 PROTECTION

- .1 Protect all adjacent surfaces from any damage that may result from the work of this section. If required, the contractor shall make good any deterioration resulting from his work in progress.
- .2 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage.

2 PRODUCTS

2.1 ROOFING MATERIALS

- .1 Asphalt Shingles:
 - .1 To CSA A123.1 [M1979] Asphalt Shingles Surfaced With Mineral Granules and / or CAN-CSA A123.5 M90 Asphalt Shingles With Fiberglass Felt Core.
 - .1 Type: Laminated shingles
 - .2 Colour: To match existing.
 - .2 Acceptable Products
 - .1 Certainteed Landmark Premium
 - .2 Malarkey Highlander
 - .3 IKO Cambridge AR

- .4 Approved alternate
- .2 Accessories:
 - .1 Roofing Felt: to CSA A123.3-M1979 (organic No. 15 felt).
 - .2 Eave protection: No.30 Non perforated asphalt saturated organic roofing felt as manufactured by Hal Industries Inc. or pre-approved alternate.
 - .3 Cement: Lap cement to CGSB 37-GP-4Ma.
 - .4 Nails: 10mm (3/8") head, corrosion-resistant roofing nails of galvanized steel to CSA B 111-[1974], length sufficient to penetrate 19mm (3/4") into sheathing.
 - .5 Sheet Metal Flashings: Min 26 gauge pre-finished steel. Refer to 07 62 00 – Sheet Metal Flashings.

3 EXECUTION

3.1 REMOVAL OF EXISTING ROOFING

- .1 Remove existing asphalt shingles, flashings and underlayment and expose roof sheathing.
- .2 Withdraw existing shingle and flashing nails, set those which break off. Leave surfaces free from dirt and loose material.
- .3 Consultant to inspect roof sheathing. Take up, cut out or remove areas of roof sheathing affected by fungal or insect attack as directed on site by Consultant.

3.2 INSTALLATION OF NEW SHEATHING

- .1 Replace identified areas of deteriorated wood in-kind with new wood sheathing. Refer to 06 10 00 – Rough Carpentry.

3.3 WORKMANSHIP

- .1 Install asphalt shingles in accordance with the RCABC system sheet specification STR-AS and CAN3-A123.51-[M85] Asphalt Shingle Application on Roof Slopes 1:3 and Steeper.
- .2 Install bottom step flashing (soakers) interleaved between shingles at vertical interfaces.
- .3 Provide zinc strips at all ridges, hips and shoulders. Exposure 4.

3.4 EXAMINATION OF ELEMENTS

- .1 Examine work areas and immediately inform Consultant in writing of any defects.
- .2 Prior to commencement of work ensure substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.
- .3 Contractor shall inspect and approve substrate condition prior to commencement of work. Commencement of work implies acceptance of the surface condition.

3.5 FIELD QUALITY
CONTROL

- .1 The contractor is responsible to notify the Consultant 48 hours prior to the commencement of the work.
- .2 All deficiencies are to be corrected.

3.6 CLEANING

- .1 At completion of work, all refuse resulting from the work of this Section to be removed from site.
- .2 Clean all adjacent surfaces affected by roofing work.

3.7 EXTRA MATERIALS

- .1 Provide two, unopened bundles of the specified shingles to the Owner at project completion.

END OF SECTION



1 GENERAL

1.1 DESCRIPTION

- .1 Work includes labour, materials, equipment and services necessary to provide and install slate shingle roofing for the locations indicated in the Contract documents.

1.2 REFERENCES

- .1 ASTM C406 Specification for Roofing Slate
- .2 CSA A123.3 M 1979, Roofing felt.
- .3 CSA B111 Wire Nails, Spikes and Staples
- .4 SRCA General Roofing Installation Guidelines for Natural Quarried Slate
- .5 RCABC Roofing Practice Manual – Section 7.4.1

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 11 55 - General Instructions.
- .2 Submit full size shingles of finish and profile specified. Samples to be provided:
 - .1 Slate Shingle: Full size, of each colour, size, texture and shape
 - .2 Ridge Cap: 300mm (12") long sample

1.4 QUALITY ASSURANCE

- .1 Source Limitations: Obtain each colour of slate shingle from single quarry capable of producing slate of consistent quality in appearance and physical properties.
- .2 Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - .1 Build mockups for slate shingles including related roofing materials.
 - .2 Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Consultant specifically approves such deviations in writing.
 - .3 Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Store underlayment rolls on end, on pallets or other raised surfaces. Do not double stack rolls.
- .2 Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.
- .3 Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.6 WARRANTY

- .1 Provide a manufacturer's standard material guarantee for 5 years.
- .2 Special Warranty: Standard form in which roofing Installer agrees to repair or replace slate roofing that fails in materials or workmanship within specified warranty period.
 - .1 Warranty Period: five years from date of Substantial Completion.

2 PRODUCTS

2.1 SLATE SHINGLES

- .1 Slate Shingles: ASTM C 406, Grade S1; hard, dense, and sound; chamfered edges, with nail holes machine punched or drilled and countersunk. No broken or cracked slates, no broken exposed corners, and no broken corners on covered ends that could sacrifice nailing strength or laying of a watertight roof.
 - .1 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - .1 North Country Slate
 - .2 Glendyne Inc.
 - .3 American Slate Company
 - .4 Echeguren Slate Inc.
 - .5 Pre-approved alternate
 - .2 Thickness: To match existing, as per contract documents.
 - .3 Size: To match existing, as per contract documents.
 - .4 Nail holes: Two per shingle.
 - .5 Butt shape: To match existing slate roof.
 - .6 Colour: Manufacturer standard colour and profile, to match existing. Field verify sample with existing slate roof.
 - .7 Weather-Exposure Color Change: Unfading
 - .8 Natural Cleft: To match existing, as per contract documents.
 - .9 Slate must be free of any visible inclusions of oxidizable iron pyrite.

- .10 Curvature or twist in slate shingles shall not exceed 1/8 inch in 12 inches (3 mm in 100 mm). Curved slate shingles shall be trimmed and punched to permit them to be laid with convex side up. Knots, knurls and cramps are acceptable on the exposed slate shingle face. Knots, knurls and cramps on the back or covered portion of slate shingles, which prevent close contact of slate shingles or the laying of a watertight roof, will not be accepted.
- .11 Slate shingles shall be trimmed with 90-degree square corners. Face dimensions of slate shingles shall not differ from those specified by more than 1/8 inch (3 mm).
- .12 Starter Slate Size: Length of starter slates to be the exposure of the field slates plus the specified headlap and rounded up to the nearest full inch. Starter slates are to be front-side punched and installed chamfered edge down.
- .13 Headlap: to match existing.

2.2 UNDERLAYMENT

- .1 Roofing Felt Underlayment: asphalt saturated felt, to CSA A123.3 M 1979, perforated, 15 lb. weight.
 - .1 Acceptable product: No. 15 Shake felt by Hal Industries or preapproved equal.
- .2 Eave Protection:
 - .1 Acceptable products:
 - .1 Asphalt saturated felt, 2 layers of No. 15, to CSA A123.3M 1979, perforated.
 - .2 2 layers of No.15 Shake Felt by Hal Industries or preapproved equal.

2.3 ACCESSORIES

- .1 Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.
- .2 Slating Nails: ASTM F 1667, copper smooth shanked, wire nails; 0.135-inch (3.4-mm) minimum thickness; sharp pointed; with 3/8-inch- (10-mm-) minimum diameter flat head; of sufficient length to penetrate a minimum of 3/4 inch (19 mm) into sheathing.
- .3 Wood spaced sheathing and solid sheathing: To match existing, refer to 06 10 00 – Rough Carpentry.
- .4 Metal Flashings: 26 gauge minimum, manufacturer standard colour to match existing, pre-painted and galvanized flashings. Minimum galvanizing is to be G90 or AZM150. Refer also to Metal Flashings 07 62 00 for further information.
 - .1 Colour to match existing flashings where flashing is below slate roof. Flashings over slate roof are as per spec 07 62 00.
- .5 Nails: All fasteners to be Type 304 or 316 stainless steel. Nails must have sufficient length to penetrate completely through the sheathing.
- .6 Nominal thickness of ridge nailer shall be equal to two times the slate thickness specified. Nominal thickness of hip nailers shall be three times the slate thickness specified. Protect with additional layer of underlayment before installing hip and ridge accessory.

3 EXECUTION

3.1 GENERAL REQUIREMENTS

- .1 Install slate shingles in accordance with RCABC Roofing Practices Manual Article 7.4.1.2 Slate Roofing.
- .2 Whenever the requirements explicitly stated in this specification are more stringent than noted in the above Article, the more stringent requirement will apply.

3.2 PREPARATION

- .1 Verify that roofing penetrations and are properly flashed to deck surface.
- .2 Comply with slate shingle distributor's recommendations on preparation of acceptable roof deck.
- .3 Verify that substrate is sound, dry, smooth, and clean prior to installation of underlayment.

3.3 EAVE PROTECTION

- .1 Install eave protection so that it extends a minimum of 36" (900 mm) up from the eave or 24" past the exterior wall line which ever is greater. Extend eave protection a minimum of 1-1/2" (40mm) behind gutters if present.

3.4 UNDERLAYMENT

- .1 Install one layer of roofing felt horizontally in successive strips with 150 mm horizontal laps arranged to shed water. Vertical laps shall be made where required and have a minimum 300 mm overlap.
- .2 Install a 30" wide strip of No. 15 felt over roofing felt at valleys, hips and ridges prior cedar roofing and flashing installation. All laps in the felt must be formed to shed water (ie. shingle laps).

3.5 WOOD NAILER AND CANT STRIPS

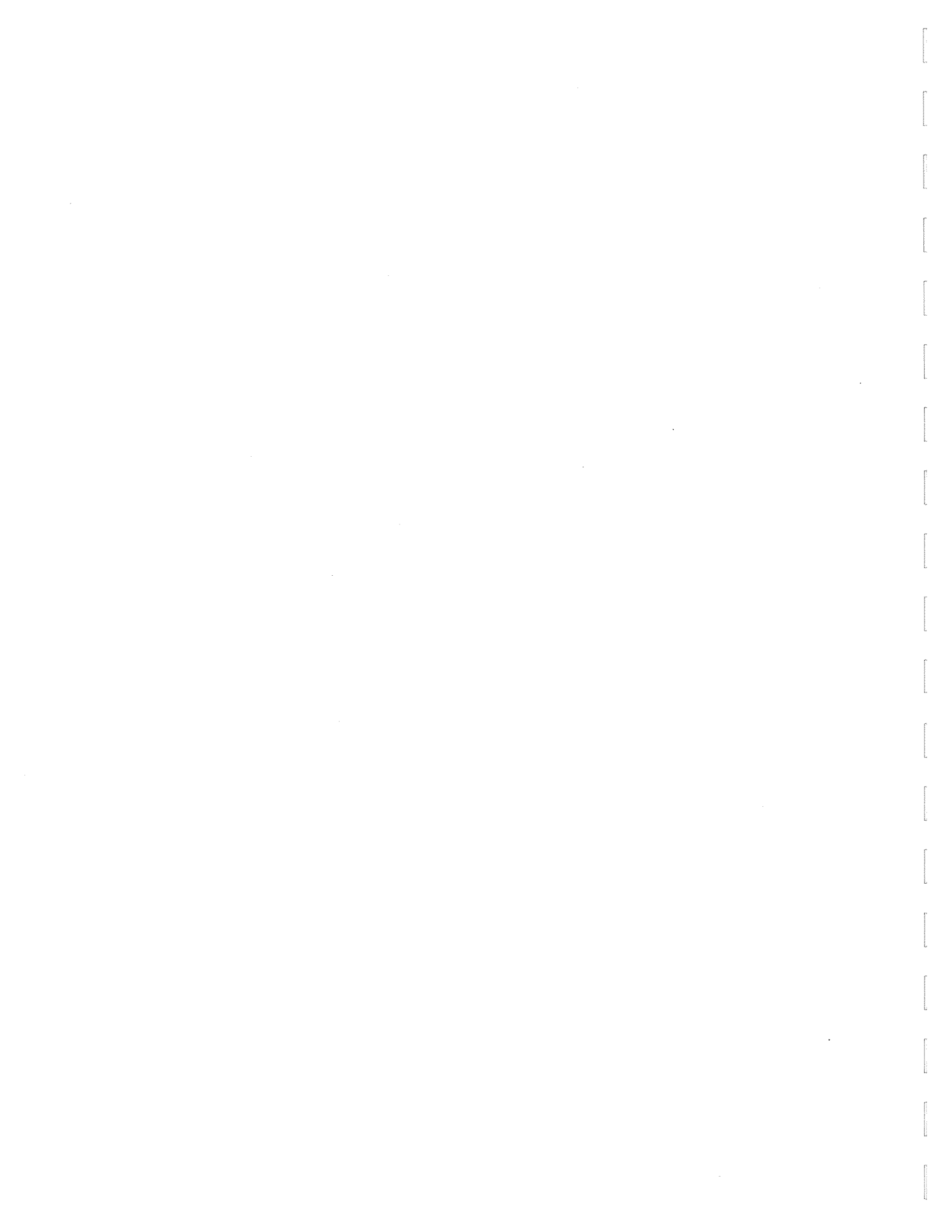
- .1 Nailers: Install 2 inch (50 mm) wide by 48 inch (1220 mm) long preservative treated wood nailers as detailed at ridge and hips, directly over underlayment.
- .2 Nominal thickness of ridge nailer shall be equal to two times the slate thickness specified.
- .3 Nominal thickness of hip nailers shall be three times the slate thickness specified.
- .4 Attach with Type 304 or 316 stainless steel nails.
- .5 Protect with additional layer of underlayment before installing hip and ridge accessory.

3.6 SLATE ROOFING APPLICATION

- .1 Do slate roof work in accordance with manufacturer's written instructions, ASTM C406, and as described in the RCABC Roofing Practices Manual Section 7.4.1.

- .2 Install shingles as required as recommended for roof slope and shingle length. Refer to RCABC specification.
- .3 Starter courses must be doubled or be underlaid with specially cut starter slates.
- .4 Shingles are to be applied in straight horizontal single courses.
- .5 Shingles should be staggered on successive rows with more than 75 mm (3") difference.
- .6 Nails should be driven just flush so as not to crack the slate over or under.
- .7 Additional holes can be made by use of a zax. The holes should be struck on the underside so the spalling will create a countersink for the nail head.
- .8 Slates should extend a minimum of 150 mm (6") into valleys with the cut line being tapered 1% from bottom to top.
- .9 On mitred hips, slates are cut flush at the apex to match slates on the other side. The unexposed portion of these slates is covered with a metal flashing which should extend 50 mm up from the tiles being covered.
- .10 Install field slates flush with each other on opposite sides of ridges before placement of metal ridge cap.
- .11 Install step flashings at vertical surfaces meeting sloped roofing. Extend flashing a minimum of 5" up vertical surfaces, 4" between courses of roofing and 3" headlap. Interlace step flashing with each successive course of shingles.
- .12 Install apron, backpan, and counter flashings as required following the RCABC specification.
- .13 Penetrations through the slate roofing is to follow RCABC recommendations.
- .14 All ridges and hips to receive an underlayment of 15lb roofing felt prior to capping. All hips and ridges to be of alternate underlay and use concealed fasteners.
- .15 Provide zinc strips at all ridges, hips and shoulders. Exposure 4.

END OF SECTION



1 GENERAL

1.1 DESCRIPTION

- .1 Work includes labour, materials, equipment and services necessary to provide and install cedar roofing and localized cedar wall cladding.

1.2 REFERENCES

- .1 CSA 0118.1 Western Red Cedar Shingles and Shakes.
- .2 CSA A123.3 M 1979, Roofing felt.
- .3 CSA B111 Wire Nails, Spikes and Staples.
- .4 RCABC Roofing Practice Manual
- .5 CSA 080 Series-97 Wood Preservation

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 11 55 - General Instructions.
- .2 Submit full size shingles of finish and profile specified.

1.4 WARRANTY

- .1 Provide a manufacturer's standard material guarantee for thirty (30) years.

2 PRODUCTS

2.1 MATERIALS

- .1 Western red cedar shingles: to CSA 0118.1-97, 18" length; shingle width and pattern to match existing.
- .2 Cedar shingles must be No. 1 Blue Label (100% heartwood, 100% clear and 100% edge grain) except for starter course that may be No. 2 grade. Shingles to be sawn both sides.
- .3 Cedar shingles must be preservative treated by means of chemical impregnation. Kiln dried after treatment to less than 19% moisture content.
- .4 Finish: As directed by the consultant, cedar shingles are to be stained, to match existing red painted cedar shingles. Refer to 09 91 00 – Painting for schedule of cedar shingle roofs to receive solid stain finish.
- .5 Roofing Felt Underlayment: asphalt saturated felt, to CSA A123.3 M 1979, perforated, 15 lb. weight.
 - .1 Acceptable product: No. 15 Shake felt by Hal Industries or preapproved equal.
- .6 Eave Protection:
 - .1 Acceptable products:
 - .1 Asphalt saturated felt, 2 layers of No. 15, to CSA A123.3M 1979, perforated.

- .2 2 layers of No.15 Shake Felt by Hal Industries or preapproved equal.
- .7 Metal Flashings: 26 gauge, dark brown, prepainted and galvanized flashings. Minimum galvanizing is to be G90 or AZ150.
 - .1 Refer also to Sheet Metal Flashings 07 62 00 for further information.
 - .2 Colour to match existing flashings where flashing is below cedar roof. Flashings over cedar roof are as per spec 07 62 00.
- .8 Nails: Fabricate to CSA B111. All fasteners to be stainless steel ring shank type. Nails must have sufficient length to penetrate the underlying strapping a minimum of 20 mm, or in the case of plywood, completely through the sheathing. Staples and T-nails will not be accepted.
- .8 Spaced wood sheathing (for replacement of deteriorated strapping):
 - .1 All wood sheathing to be pressure treated wood as per Specification 06 05 73 and 06 10 00.
 - .2 Spaced sheathing (across down the slope) is to be 1x6 strapping spacing to match the weather exposure of the cedar roofing.

3 EXECUTION

3.1 GENERAL REQUIREMENTS

- .1 Install cedar shingles in accordance with RCABC Roofing Practices manual RGC system sheet specification STR-CS.
- .2 Whenever the requirements explicitly stated in this specification are more stringent than noted in the above RGC specifications the more stringent requirement will apply.

3.2 REMOVAL OF EXISTING ROOFING

- .1 Remove existing cedar shakes and underlayment.
- .2 Retain existing flashings where indicated remove other flashings.
- .3 Consultant to inspect roof sheathing as required. Cut out and remove portion of sheathing affected by rot or fungal attack as directed on site by Consultant.
- .4 Replace cut out portions of sheathing with new sheathing of equal sectional dimensions, and specified grade. Seat each end of board on rafter, with 1" bearing, and secure to rafter.

3.3 EAVE PROTECTION:

- .1 Install eave protection so that it extends a minimum of 36" (900 mm) up from the eave or 24" past the exterior wall line which ever is greater. Extend eave protection a minimum of 1-1/2" (40mm) behind gutters if present.

3.4 ROOFING FELT UNDERLAYMENT

- .1 Install one layer of roofing felt horizontally in successive strips with 150 mm horizontal laps arranged to shed water. Vertical laps shall be made where required and have a minimum 300 mm overlap
- .2 Install a 30" wide strip of No. 15 felt over roofing felt at valleys, hips and ridges prior cedar roofing and flashing installation. All laps in the felt must be formed to shed water (ie. shingle laps).
- .3 Install 24" (minimum) wide crimped metal flashings in valleys. Flashing to have a central fold and hemmed edges on sides.

3.5 SHINGLE APPLICATION

- .1 Do cedar roof work in accordance with CSA O118 and as described in the RGC specifications.
- .2 Install shingles over dry substrate.
- .3 Install shingles as required as recommended for roof slope and shingle/shake length. Refer to RGC specification.
- .4 Shingles are to be applied in straight single courses.
- .5 Lay shingles with grain perpendicular to eaves.
- .6 Saw shingles parallel to valley centre line. Do not break joints into valley.
- .7 Butts of first course must project minimum of 1-1/2" (40mm) beyond roof edge.
- .8 Minimum projection of cedar roofing for gable ends is 1" (25mm)
- .9 Maximum recommended exposure must not be exceeded.
- .10 Space shingles from 1/4" to 3/8" (6 to 10 mm).
- .11 Stagger joints minimum of 1-1/2" (40 mm) in succeeding courses. Ensure that in any 3 courses no two joints are in alignment.
- .12 Over hips and ridges use shingles of uniform width approximately 6" (150 mm) wide. Apply shingles at same weather exposure as field of roof.
- .13 Use two nails per shingle. Space nails 3/4" (20 mm) from edge and 1-1/2" (40 mm) above butt line of following course.
- .14 Drive nails flush but do not crush shingles.
- .15 Install step flashings at vertical surfaces meeting sloped roofing. Extend flashing a minimum of 5" up vertical surfaces, 4" between courses of roofing and 3" headlap. Interlace step flashing with each successive course of shingles/shakes.
- .16 Install apron, backpan, and counter flashings as required following the RGC specification.
- .17 Penetrations through the cedar roofing is to follow RGC recommendations.
- .18 All ridges and hips to receive an underlayment of 15lb roofing felt prior to capping. All hips and ridges to be of alternate underlay and use concealed fasteners.
- .19 Provide zinc strips at all ridges, hips and shoulders. Exposure 4.

3.6 SIDEWALL
APPLICATIONS

- .1 Sidewall applications to follow the recommendations in the RGC Roofing practices manual Section 7.2.2.2 and 7.2.3.1 as applicable.
- .2 Install all shingles in single coursing pattern.

END OF SECTION

1 GENERAL

1.1 SUMMARY

- .1 Work included: labour, materials, equipment and services necessary to remove existing metal roofs and install new metal roofs complete with trim, penetration flashings and accessories as required.
- .2 Work includes all roof perimeter flashings which extend from the roof surface onto adjoining surfaces.

1.2 REFERENCES

- .1 AAMA 621 Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates.
- .2 ASTM A525M-87 Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process Metric.
- .3 ASTM A526M-85 Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
- .4 ASTM A792-89 Specification for Steel Sheet, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .5 ASTM D523-85 Test Method for Specular Gloss.
- .6 CAN/CGSB-37.5-M89 Cutback Asphalt Plastic Cement.
- .7 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound.
- .8 Aluminum Association Aluminum Sheet Metal Work in Building Construction-1971.
- .9 SMACNA Architectural Sheet Metal Manual.

1.3 DESIGN REQUIREMENTS

- .1 General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- .2 Provisions for Thermal Movement: New metal roofing and cladding systems shall be fabricated and installed so that they provide for expansion and contraction of the component materials without oil canning, buckling, hole elongation, fastener failure or excess stress loading situations developing at any time during the temperature cycle. Allowance shall be set for the temperature occurring at the time of installation of the metal roofing. Base calculations on surface temperatures of materials due to both solar heat gain and night-time-sky heat loss but not less than specified below. Clips shall

be designed and installed to resist rotation and to avoid shear stress when roofing material expands and contracts.

- .1 Temperature Change: Low of -50 deg C to a high of 70 deg C for material surfaces.
- .3 Water Infiltration: The metal roof and wall system is to be designed and installed to not allow any infiltration of water into the building interior. All laps of metal flashing and connections of roof panels shall be installed to allow moisture to run over and off the material. Where possible, install continuous sheets of metal roofing with no laps.
- .4 Venting: Metal roof system shall be designed to provide venting of the insulation space as specified in the National Building Code of Canada.
- .5 Sheet metal roofing and cladding shall be designed to resist positive and negative wind loads in accordance with National Building Code of Canada, local wind pressures 1 in 50 years without failure or permanent set.
- .6 Sheet metal roofing and cladding shall be designed to resist snow and rain loads in accordance with the National Building Code of Canada, for the 1 in 50 year return period without failure or permanent set. Roof system to be anchored at continuous horizontal line for drag loads caused by retained snow and ice load. Determination of the retained snow and ice load is by the Engineer engaged by the roofing contractor.
- .7 Provisions for Ice Damming: Details at the eaves and valleys shall be designed to accommodate the build-up of ice without back-up of moisture into the seams or under roofing. Roof seams and supporting clips to be designed to resist the effects of sliding snow and ice.
- .8 Provide for positive drainage, to the exterior face of the wall, any water entering at joints and/or any condensation occurring within the wall construction.
- .9 The roof system shall accommodate, by means of expansion joints, any movement in the roof itself and between the roof and the building structure, caused by structural movements (deflection and wracking, etc.) and/or thermal expansion and contraction without permanent distortion, damage to infills, cracking of joints, breakage of seals, or water penetration.
- .10 Maintain the following tolerances:
 - .1 Maximum variation from plane: 10mm/10m of length.
 - .2 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75mm.
- .11 Design roof openings, flute and batten closures, thermal clips and other flashings and accessories in accordance with the manufacturer's recommendations.

1.4 SUBMITTALS

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

- .2 Submit two 300 x 300 mm samples of each sheet metal material and colour including a typical finished seam.
- .3 Submit samples of fasteners and anchoring assemblies for both the new metal roof.

1.5 MOCK-UP

- .1 Prior to starting the installation of the metal roof system provide a mockup of typical roof components for review by the Consultant.

1.6 WARRANTY ON FINISHES

- .1 Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
- .2 Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - .1 Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - .2 Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - .3 Film Integrity: there shall be no evidence of cracking, chipping, peeling, crazing, spotting, flaking, checking or loss of adhesion.
- .3 Finish Warranty Period: 20 years from date of Substantial Completion.

1.7 QUALITY ASSURANCE

- .1 Roofing installers must have a minimum of 3 years experience with the respective roofing product on this project.

2 PRODUCTS

2.1 PREFINISHED SHEET STEEL

- .1 General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- .2 Base Metal Base Metal to be:
 - .1 Aluminium-zinc coated (Galvalume) steel sheet conforming to the requirements of ASTM A792 (or A792M) with a minimum coating of AZ50(AZM150).
 - .2 24-gauge thickness.
- .3 Exposed Coil-Coated Finish:
 - .1 Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed

metal surfaces to comply with coating and resin manufacturers' written instructions. Dry film thickness of not less than 1.0 mil (0.025 mm) for primer and topcoat.

- .4 Color: Both top and underside of flashing exposed to view to be finished with the same colour. Custom colour to match existing red roofs.
- .5 Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

2.2 UNFINISHED STEEL

- .1 Form all customized flashings and other unfinished steel flashing products including vents, saddles, etc. of 24 Ga. minimum sheet steel according to the following:
 - .1 Base Metal to be:
 - .1 Aluminium-zinc coated (Galvalume) steel sheet conforming to the requirements of ASTM A792 (or A792M) with a minimum coating of AZ50(AZM150).
 - .2 Formed flashings to be typically folded and sealed and as approved by Consultant. Avoid soldering flashings. Use clinched joints whenever possible.
 - .3 Paint off site after fabrication to match prefinished flashing. Type and method of paint application must be preapproved by the Consultant. Paint must be a baked on finish.

2.3 METAL ROOFING

- .1 Profile to be an interlocking vertical rib system. Width between upstanding ribs is to be a minimum of 12" and a maximum of 18". All fastenings to be concealed. Maximum rib height is 2". Roofing attachment system must be able to attach to plywood sheathing below roof membrane.

2.4 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Rubber-asphalt sealing compound: to CAN/CGSB-37.29.
- .3 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .4 Access path: from preformed and reinforced sheet metal fastened to upright ribs of metal roof. Details to be reviewed during shop drawing review.
- .5 Fasteners:
 - .1 Concealed fasteners:
 - .1 ITW Buildex Teks low profile with Climacoat.
 - .2 Stainless steel suitable for standing seam metal roof application. Stainless to be 300 series when exposed otherwise 300 or 400 Series is acceptable.

- .3 DT2000 coated screws by Leland Industries Inc.
- .4 Approved alternate.
- .2 Sheathing Fasteners:
 - .1 ITW Buildex Rock-on S-12, size as required.
 - .2 Stainless steel suitable for standing seam metal roof application. Stainless to be 300 series when exposed otherwise 300 or 400 Series is acceptable.
 - .3 DT2000 coated screws by Leland Industries.
 - .4 Approved alternate.
- .6 Butyl tape: Butyl tape to meet TT-C-1796-A or approved equivalent.
- .7 Closures: custom made metal Z closure clips. Perforated when required.
- .8 Ridge vent insect screen: Stainless steel or fibre glass wire mesh.
- .9 Sealants: Colour matched to roof cladding. Refer to Section 07900.
- .10 Hidden roofing jacks: 24 gauge, G90, soldered sheet steel with zinc primer paint on soldered joints.
- .11 Exposed roof jacks: 24 gauge, G90, soldered sheet steel with zinc primer paint on soldered joints. Finish paint roof jack with colour matched super durable powder coat paint (to meet AAMA 2604).
- .12 Touch up paint: Liquid applied from can using small applicator. Paint to be colour and gloss matched to the roof metal. Submit sample of touched up sheet metal for review by consultant.
- .13 Self adhered membrane: As per section 07 23 13.
- .14 Roof insulation:
 - .1 Extruded polystyrene: to CAN/CGSB-51.20, Type 3.
 - .2 Minimum 5-year aged R value of 5.8 per inch at 4 degrees C.
 - .3 Thickness: as indicated in assembly schedule at metal roof assemblies.

2.5 FABRICATION

- .1 Fabrication shall be in accordance with the applicable requirements of CAN/CSA-S136, *Cold Formed Steel Structural Members*. Care shall be taken to protect exposed surfaces and other features that are important to the appearance.
- .2 Fabricate all components of the system in the factory, ready for field installation. Make allowances for expansion at all joints.
- .3 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .4 Apply minimum 0.2 mm dry film thickness coat of isolation coating to both faces of dissimilar metals in contact.
- .5 Penetrations through the roof planes are to be fabricated and installed to allow for expansion and contraction of the roof sheet without buckling.

- .6 Exterior corners of same profile, material and finish as adjacent material, shop cut and brake formed to right angle, concealed corner brace, hairline exposed joint, pop rivet connections with painted head to match siding.
- .7 Accessories: cap flashings, drip flashings, internal corner flashings, copings and closures for head, jamb, sill and corners, to match existing, brake formed to shape, thickness as required to prevent failure due to loads or distortion. Provide thermal clips, galvanized, proprietary items to suit siding profile and wall system.

3 EXECUTION

3.1 ROOF WORK PROCEDURE

- .1 Remove the existing roof cladding system to gain access to the areas which require new subframing, sheathing, membrane and flashing work. This will include all sloped roof areas and flashings
- .2 Install metal subframing as required. Refer to Section 05 40 00 – Cold Formed Metal Framing.
- .3 Install sheathing over the entire roof surface observing the required edge details and vents.
- .4 Install self adhered membrane system as indicated. Refer to Section 07 23 13. Refer to details for detailing at roof penetrations and edge flashings.
- .5 Install new roof cladding system complete associated accessories.
- .6 Install gutter and rainwater leader system. Refer to section 07 62 00 – Sheet Metal Flashings.
- .7 Clean roof surface.

3.2 INSPECTION

- .1 Prior to installation of metal roof, confirm site conditions are compatible with manufacturer's recommendations and the roof cladding shop drawings. Inspect existing assemblies and ensure all conditions will provide satisfactory performance of the replacement roof (such as framing, sheathing, self adhesive membrane, clearances for perimeter seals, and adequate ventilation, etc.). Notify the Consultant in writing of any discrepancies.
- .2 All membrane surfaces shall be firm and dry, without ridges, warps or voids, defects and shall be fully adhered to the supporting sheathing.

3.3 METAL ROOF WORK

- .1 Fabricate and install metal roofing in accordance with the approved shop drawings. Follow RCABC recommended practices.
- .2 Remove any strippable protective coating on the panels and flashings prior to installation and in any case do not allow the

strippable coating to remain on the panels in extreme heat, cold, or in direct sunlight or other UV source.

- .3 Install all perimeter flashings and transitions to other building components. Provide self adhered membrane tie-ins as detailed.
- .4 Install flashings and roof jacks around penetrations to the roof system as per the approved shop drawings and detail drawings. The roof cladding system to provide a complete weather tight installation. Provide tie-in of self adhered membrane to new flashings and roof jacks. Flanges from exposed roof jacks are to extend across the flat section of the roof profile and up the standing seams on both sides of the penetration area.
- .5 Discrepancies between job site conditions and drawings as approved shall be brought to the attention of the Consultant or his representative for resolution.
- .6 All panels to be continuous from top to eave.
- .7 Flash roof penetrations with material matching roof panels, and make watertight.
- .8 Form seams in direction of water flow and make watertight.
- .9 Install closures as required complete with colour matching sealants.
- .10 Provide ridge vent with insect screen, membrane support flashing and ridge cap.

3.4 PROTECTION

- .1 All persons working on or around metal roofing surfaces must wear soft rubber-soled footwear.
- .2 During metal roof work, the membrane surface must be continually protected from damage by workers, ladders and other construction activity. Any damage must be repaired promptly.
- .3 Any metal roofing material, surfaces or finishes damaged, disfigured, marred or scratched, are to be replaced at no cost to the owner.

3.5 CLEAN-UP AND CLOSE-OUT

- .1 As work progresses, remove excess scrap and keep working surface free from debris on a daily basis.
- .2 Touch-up areas as required or directed with manufacturer's standard touch-up paint. Follow instructions for application carefully.
- .3 Leave project at completion free from stains and scrap. Wash panel surface with water if necessary.

END OF SECTION



1 GENERAL

1.1 SUMMARY

- .1 Work includes: labour, materials, equipment and services necessary to provide flashings and trim as indicated including: cross cavity, cap, base, window and door head and sill, balcony, deck, cricket, saddle, roof, counter flashings, standing seam metal roofs, gutters and downpipes.

1.2 REFERENCES

- .1 Canadian Sheet Steel Building Institute (CSSBI) S8-2001: Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products.
- .2 AAMA 621 Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates.
- .3 ASTM A792 /A792M Specification for Steel Sheet, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process with a minimum zinc coating designation Z150.
- .4 ASTM A653/653M Specification for Sheet Steel, Zinc-Coated or Zinc-Iron Alloy Coated by the hot dip process, with a minimum zinc coating designation Z275
- .5 ASTM D523 Test Method for Specular Gloss.
- .6 ASTM B32 Specification for Solder Metal.
- .7 Aluminium Association Designation System for Aluminium Finishes.
- .8 Aluminium Association Aluminium Sheet Metal Work in Building Construction.
- .9 CSA B111 Wire Nails, Spikes and Staples.
- .10 CAN/CGSB-93.1 Sheet, Aluminum Alloy, Prefinished, Residential.
- .11 Canadian Roofing Contractors Association (CRCA).
- .12 SMACNA Architectural Sheet Metal Manual.
- .13 CGSB 1-GP-171M, Type 1 Inorganic Zinc Rich Primer
- .14 SSPC Paint 20, Type 1-B Inorganic Zinc Rich Primer
- .15 Roofing Contractors Association of British Columbia (RCABC).

1.3 SUBMITTALS

- .1 Submit duplicate 150 x 150 mm samples of each type of sheet metal material, colour and finish.
- .2 Submit documentation identifying sheet metal source, testing results to specified standards and finish.

1.4 MOCK-UPS

- .1 Provide for approval prior to fabrication and installation and as part of the exterior wall assembly, mock-up for review by the Consultant, a sample of each flashing assembly detailed for the project, including cap and through wall flashing, window/door head and sill flashing, base and drip edge flashing and custom flashing fabrications.

1.5 DESIGN REQUIREMENTS

- .1 General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- .2 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - .1 Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces

1.6 WARRANTY ON FINISHES

- .1 Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
- .2 Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - .1 Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - .2 Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - .3 Film Integrity: there shall be no evidence of cracking, chipping, peeling, crazing, spotting, flaking, checking or loss of adhesion.
- .3 Finish Warranty Period: 20 years from date of Substantial Completion.

2 PRODUCTS

2.1 PREFINISHED SHEET STEEL

- .1 General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- .2 Base Metal to be:

- .1 Aluminium-zinc coated (Galvalume) steel sheet conforming to the requirements of A792M with a minimum coating of AZM150.
- .2 26 gauge thickness.
- .3 Exposed Coil-Coated Finish:
 - .1 Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions. Dry film thickness of not less than 1.0 mil (0.025 mm) for primer and topcoat.
- .4 Color: As selected by Consultant. Both top and underside of flashing exposed to view to be finished with the same colour. Colour of sheet metal flashings are to match existing metal flashings.
- .5 Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

2.2 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .3 Touch-up paint: as recommended by prefinished material manufacturer.
- .4 Cleats, clips, and splice plates: of same material, coating, and temper as sheet metal, minimum 50mm wide. Thickness same as sheet metal being secured.
- .5 Fasteners:
 - .1 Into wood:
 - .1 Steel pan head screws with coarse thread for wood.
 - .1 #8 x 1" (minimum) long stainless steel suitable for metal flashing application. Stainless to be 300 Series when exposed otherwise 300 or 400 Series is acceptable.
 - .2 For exposed conditions use hex-head stainless steel screws, with neoprene washer, hex heads coloured to match flashing.
 - .2 Into sheet steel:
 - .1 Steel pan head screws with fine thread for metal. Can be self tapping or self drilling.
 - .1 #8 x 1/2" (minimum) long stainless steel suitable for metal flashing application. Stainless to be 300 Series when exposed otherwise 300 or 400 Series is acceptable.
 - .2 For exposed conditions use pan head stainless steel screws, with neoprene washer, heads coloured to match flashing.

- .6 Solder: to ASTM B32 Standard Specifications For Metal Solders
- .7 Touch-up paint: as recommended by prefinished material Manufacturer.
- .8 Gutters & Rainwater Leaders: pre-coated sheet steel, 23Ga reinforced complete with gasket seal at every gutter to gutter connection and corner to gutter connection
 - .1 Coating system to finish gutters and rainwater leaders to consist of a polyester resin paint over a primer coating, passivation layer and G90 zinc coating. Coating to be present inside crimp connections and inside pipe components.

3 EXECUTION

3.1 FABRICATION

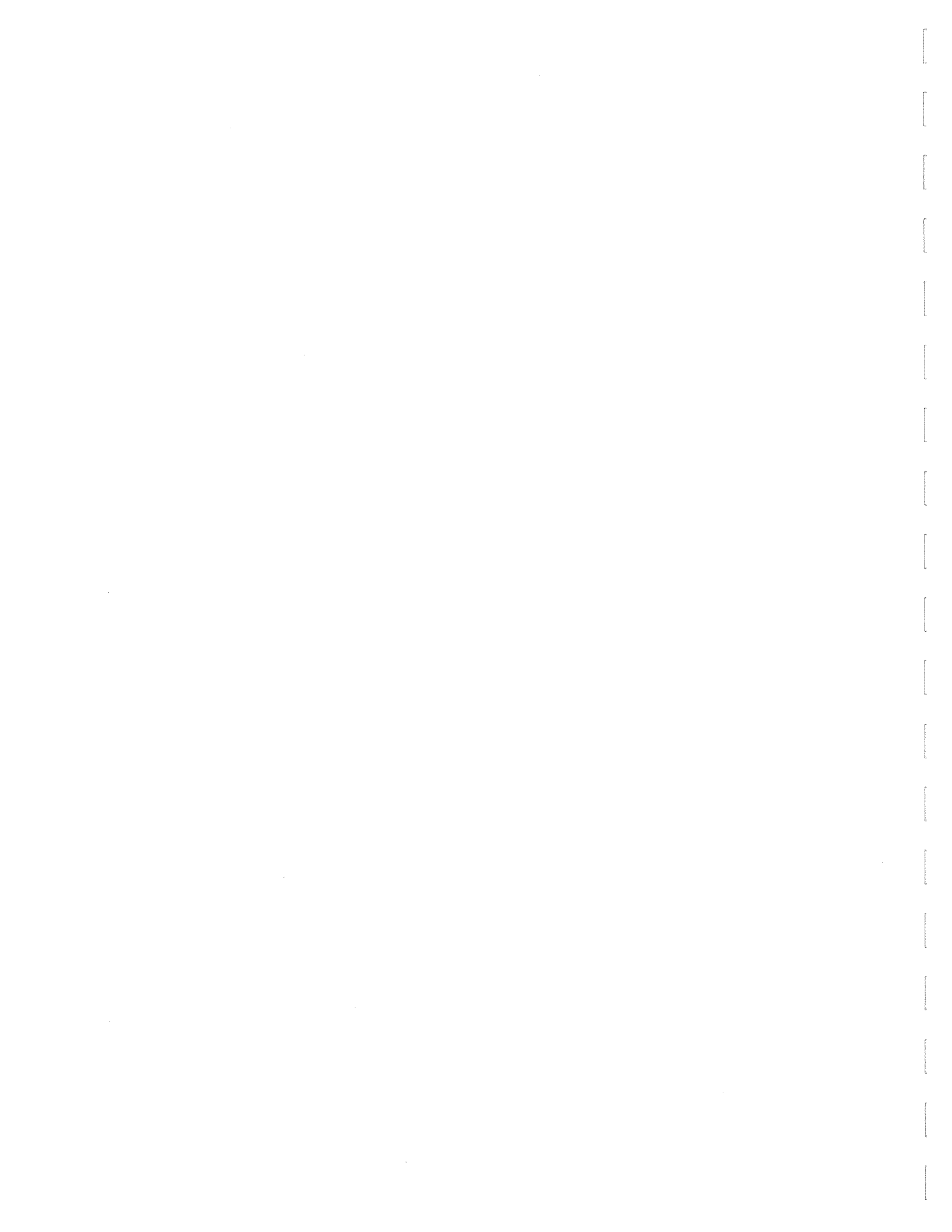
- .1 Fabricate metal flashings and sheet metal work other than aluminium in accordance with applicable CRCA 'FL' series details and SMACNA Architectural Sheet Metal Manual.
- .2 Fabricate aluminium flashings and other sheet aluminium work in accordance with Aluminium Association Aluminium Sheet Metal Work in Building Construction.
- .3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints. Use maximum length sections possible to minimize joints.
- .4 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.
- .5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.
- .7 Form joints between lengths of flashing sections with standing seams whenever possible. S-locks can only be used if approved by the Consultant.
- .8 All exposed or visible metal flashing and trim to be finished in selected colour as indicated including exposed rear faces of end dams, joints, etc. No exposed or visible steel or aluminium flashing work to be unfinished.
- .9 Fabricate custom flashing details and saddles to minimize solder joints.
- .10 Install sealant at flashing joints.
- .11 Metal Flashings including drip edge flashing, base flashing, etc.
 - .1 Form all flashing surfaces as shown on drawings. Minimum slope of 1 in 4 to the exterior to be used where not shown.
 - .2 Form flashings, copings and fascias to profiles indicated.
- .12 Custom flashing fabrications

- .1 Shop fabricate custom flashing as indicated.
- .2 Form custom flashing fabrications to minimize the number of metal seams and joints. Whenever possible form flashing with standing or breadpan seams.
- .3 Use clinched joints whenever possible to avoid soldering.
- .4 Soldered joints must be preapproved by the Consultant.
 - .1 Fully solder joints.
 - .2 Neutralize solder flux with neutralizing bath prior to painting.
- .5 Paint off site after fabrication to colour specified. Type and method of paint application must be preapproved by the Consultant. Paint must be a baked on finish application after fabrication.

3.2 INSTALLATION

- .1 Install sheet metal work in accordance with RCABC details, SMACNA Architectural Sheet Metal Manual and Aluminium Sheet Metal Work in Building Construction as shown.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal as required. Secure in place and lap underlayment joints 100 mm.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock and standing seams forming tight fit over hook strips.
- .5 Lock end joints and caulk with sealant.
- .6 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
- .7 Install flashings lapped “shingle” style with membranes to divert water to the exterior.
- .8 Install all flashings so that all surfaces have a minimum slope of 1:4 to the exterior.
- .9 Custom flashing fabrications
 - .1 Install custom soldered flashing fabrications as indicated.

END OF SECTION



1 GENERAL

1.1 SUMMARY

- .1 Work includes: labour, materials, equipment and services necessary for the:
 - .1 The supply and installation of stucco system and, including stucco backing paper, lathing, furring, accessories.

1.2 REFERENCES

- .1 ASTM E96 - Standard Test methods for Water Vapour Transmission of Materials
- .2 Can 2-51.32 Sheathing Paper, Breather Type
- .3 U.S. UUB-790a
- .4 British Columbia Building Code – Current Version
- .5 Association of Wall and Ceiling Contractors Specification Manual (A.W.C.C.) - 2003
- .6 British Columbia Wall and Ceiling Association (BCWCA) Stucco Resource Guide
- .7 CSA CAN3-S136 Cold Form Steel Structural Members
- .8 CSA B111-1974, Wire Nails, Spikes and Staples
- .9 ASTM C1063, Installation of Lath and Furring for Portland Cement Plaster
- .10 ASTM A653, Standard Specification for Steel Sheet, Zinc Coated (Galvanised) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process
- .11 ASTM A123, Standard Specification for Zinc (Hot Dip Galvanised) Coatings on Iron and Steel Products
- .12 ASTM C833-96a Standard Specification for Welded Wire Lath

1.3 QUALITY ASSURANCE - STANDARD SPECIFICATIONS

- .1 Section 9.1 - Lathing and Metal Furring of Assurance - Standard the Association of Wall and Ceiling Contractors (A.W.C.C.) Specification Standards Manual, together with authorized additions and amendments, shall be used as a reference standard and shall form part of this project specification.
- .2 Section 9.3 - Stucco of the Association of Wall and Ceiling Contractors (A.W.C.C.) Specification Standards Manual, BCWCA Stucco Resource Guide, together with authorized additions and amendments, forms part of this project specification. A copy of these manuals will be kept on site by the applicator.

- .3 The applicator shall have a minimum of five (5) years proven satisfactory experience in work similar to that required by this section. If requested by Consultant, Contractor to provide proof prior to commencement of work that a qualified crew of stucco applicators will be maintained throughout the duration of the work.
- .4 Conform to Manufacturer's specification and detail requirements contained in the Manufacturer's manual, latest edition, for stucco system products including preparation, detailing and application of materials.
- .5 Manufacturer to review site prior to and periodically during work to confirm application in accordance with their recommendations. Provide written report upon request by Consultant.
- .6 Where modifications to the A.W.C.C. Specification Standards Manual are included in this project specification and results in a conflict, then the more stringent shall apply unless indicated otherwise by the Consultant.
- .7 The installer of the lathing and metal furring shall keep a copy of section 9.1 - Lathing and Metal Furring of the A.W.C.C. Specification Standards Manual, complete with updates, available at the project site for reference purposes.
- .8 Reference in these project specifications to Section Numbers, Parts and Item numbers means those Sections, Parts and Items contained within Section 9.1 & 9.3 of the A.W.C.C. Specifications Standards Manual.
- .9 Products and installation shall be in Imperial measurement as specified under Section 9.1 of the A.W.C.C. Specification Standards Manual.

1.4 MOCK-UPS

- .1 A mock-up is required at a location selected by the Consultant. The Mock-up shall be completed and accepted prior to work proceeding. Upon acceptance by the Consultant, the mock-up may remain as part of the finished work.
 - .1 Lath: The mock-up shall include sheathing, sheathing paper, flashing, furring, lath and stucco backing paper.
 - .2 Stucco: The mock-up shall include flashings, stucco trim, reveals, corner bead, stops and control joints and complete stucco base coats including proposed finishes.
- .2 When requested, prepare a designated surface area (in each texture/colour scheme) to requirements specified herein, with specified system showing workmanship for review and approval. If approved, surface area shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.5 SEQUENCING & COOPERATION WITH OTHER TRADES

- .1 Sequence work under the provision of Section 01 11 55 – General Instructions.

1.6 PRODUCT DELIVERY
/ STORAGE /
HANDLING

- .1 Deliver materials to the job site in manufacturer's original packaging, containers and bundles with manufacturer's brand name and identification intact and legible.
- .2 Store level and flat. Handle and store materials to protect against contact with damp and wet surfaces, exposure to weather, breakage and damage to edges.
- .3 Keep materials dry, off the ground, under cover, free from exposure, dampness and freezing and in accordance with manufacturer's requirements.
- .4 Remove any wet or deteriorated materials unsatisfactory for installation from the site.
- .5 Handle and store materials to prevent damage, inclusion of foreign matter, and rusting of metals.
- .6 Corner beads, casing beads, reveals and such trim shall be shipped in rigid packages to avoid damage. Bent or deformed materials will be rejected by the Consultant.

1.7 JOB CONDITIONS

- .1 Examine the underlying surfaces and adjoining work and report in writing visible defects at time of installation, which might impair the lathing work to the Contractor and Consultant.
- .2 Commencement of work shall imply acceptance of surfaces to receive lath and metal furring.
- .3 Do not commence lathing or metal furring work until the work that is to receive it and site conditions are satisfactory.

1.8 SUBMITTALS

- .1 Backing paper:
 - .1 Product Data: Provide data on material characteristics performance criteria limitations.
 - .2 Manufacturer's installation instructions: Indicate preparation installation requirements and techniques, product storage and handling criteria.
- .2 Submit certified copies of mill reports covering chemical and mechanical properties and all coating designation of steel used.
- .3 Submit manufacturer's product technical literature and specifications including proprietary components, installation instructions and recommendations for review.
- .4 Colour and texture to be approved by the Consultant and to match existing.

- .5 Submit two sets of stucco samples consisting of scratch and brown coats, texture and colour two feet by two feet in size for review and/or selection.

1.9 WARRANTY

- .1 Provide 5 year stucco manufacturer warranty for material defects for complete stucco system (base coats and finish coats).

2 PRODUCTS

2.1 STUCCO BASE COAT MATERIALS

- .1 Basecoats:
 - .1 In accordance with AWCC Section 9.3
 - .1 Premixed glass fibre reinforced in accordance with manufacturer's instructions.
 - .2 Imasco Stucco System – Greatwall ¾" – Basecoat Concentrate
 - .3 Dryvit Classic Cement Plaster Base
 - .4 Approved alternate.
 - .2 Water – potable, clean and free from injurious amounts of oil, acid, alkali, organic matter or other deleterious substances.
 - .3 Sand – (If required) to conform to ASTM C897 and NBC 9.28.2.2, natural or manufactured, clean, sharp and free of loam, clay, silt, soluble salts and organic matter, freshwater washed. Sampling and testing to conform to ASTM C144.
 - .4 Admixtures: As recommended by stucco basecoat manufacturer.

2.2 BONDING AGENT

- .1 Surface primer for application of stucco parging to masonry or concrete surfaces – non-oxidizing, non-crystallizing, and non-re-emulsifiable type conforming to ASTM C932, used to improve bond strength and adhesion: shall conform to Section 9.3 - Part 2, Item 2.1.

2.3 STUCCO FINISH COAT

- .1 Stucco finish coat to be made by same manufacturer as the stucco basecoat.
- .2 Manufacturer to confirm installed finish coat to provide adequate performance for a minimum of 10 years including no noticeable loss of bond, colour retention, cracking, bleeding, blushing, blistering, chalking, efflorescence, mildew growth, etc.
- .3 Finish colours and textures to match existing stucco coating at chimneys.
- .4 Provide performance testing data of finish coat on specified base coat for review upon request of Consultant.

- .5 Primer in accordance with manufacturer's written recommendations.
- .6 Acceptable products
 - .1 Flexcoat by Imasco
 - .2 Weatherlastic by Dryvit
 - .3 Perfector Acrylic by Imasco
 - .4 Standard DPR by Dryvit
 - .5 Approved alternate.

2.4 STUCCO BACKING PAPER AND FASTENERS

- .1 Stucco backing paper shall be 3-ply semi-rigid asphalt board:
 - .1 Acceptable product: Rain-Screen Board, as manufactured by Hal Industries Inc.
 - .2 Or approved alternate.
- .2 Joint Tape:
 - .1 Polyethylene tape which bonds well to Stucco Backing paper and is approved by the Manufacturer for this use.
- .3 Support Wire (For use with Spray Foam Insulation and steel girts):
 - .1 Approved product: Stainless steel wire, 0.030 inch dia.

2.5 METAL LATH

- .1 All steel lath materials to be cold drawn and hot dipped galvanized as per ASTM A641/A641M-98. Galvanizing is to be a minimum 0.10 oz/sq ft unless noted otherwise. Alternate is to galvanized steel is stainless steel.
- .2 Lath of the following types in accordance with Table 9.1 are required:
 - .1 Welded wire lath (vertical assemblies)
 - .1 1 ½" wire grid
 - .2 17 gauge (0.05") round wire (flat wire is not permitted)
 - .3 Self-furring
 - .2 Rib Lath (horizontal assemblies) in accordance with Table 9.1
 - .1 3/8" Rib
 - .2 Galvanized.
 - .3 Self Diamond mesh in accordance with Table 9.1
- .3 Stucco Lath Attachments: shall conform to Section 9.1 - Part 2, Item 4 for vertical and horizontal surfaces. Refer to fastener section for specific requirements.
- .4 Wood Lath Support Spacing:
 - .1 Vertical Assemblies (exterior walls) with wood supports – at spacing of 200 mm (8") o.c.

2.6 ACCESSORIES

- .1 All accessories manufactured of stainless steel or minimum AZ150 galvalume steel. Minimum thickness of material is 25 gauge (unless noted otherwise. All accessories to be of the same material for the project unless otherwise approved by the Consultant.
- .2 Sheet metal thicknesses without coating thicknesses are defined as:
 - .1 25ga is 0.0188"
 - .2 20ga is 0.0346"
 - .3 18ga is 0.0451"
 - .4 16 ga is 0.0566"
 - .5 In no case is the supplied sheet steel to be less than 95% of the required thickness not including any coatings.
- .3 Stucco trim accessories: including striplath, foundation base screeds, control joints, casing beads, metal screeds, drip screeds, corner beads, long leg stucco stops shall conform to Section 9.1 - Part 2, Item 14. (See Section 1.3.2 regarding modifications to AWCC).
- .4 All corner beads to be straight corner welded wire type, hot dipped galvanized, using 17ga (0.044") wire and has a minimum level of galvanizing of 0.15 oz/ sq ft (Class 1). There is to be a minimum of 9 longitudinal wires and 5 woven wires. The corner wire is to be 16 ga (0.058") wire and has a minimum level of galvanizing of 1.0 oz/sq ft (Class 3). Vinyl coated corner wire corner beads are available from K-Lath as an alternate. Stainless steel wire is also acceptable in lieu of hot dipped galvanized wire.
- .5 Stucco stops
 - .1 To be square edge.
 - .2 Perforated stucco stop to be used at the bottom or draining edge of stucco panels only. Solid stucco stop to be used at all other locations.
 - .3 Long leg or expanded flange stucco stop to allow fastening of the stucco stop where flashing may interfere or as required.
- .6 All visible metal edges of stucco accessories (including stucco stop) to be painted after the application of stucco to match the finish stucco colour.
- .7 Accessories and shapes used as grounds are to be sized and dimensioned to provide for required plaster thickness and allow for embedment of plaster flanges. Corner beads to have large openings to allow full embedment in plaster.
- .8 Control joints to be formed with 1/2" W-expansion joint as detailed. Thickness of material is 25 gauge.
- .9 Caulked control joints are formed with back to back stucco stops with backer rod and sealant.
- .10 Insect screen: Hot dipped galvanized screen or nylon screen

- .11 Soffit vent strip: Flanged, PVC perforated vent strip with 1.75" wide perforated web (3.25" wide overall, including flanges). 7 sq. in. of free air flow per linear foot. Accepted products:

2.7 FASTENERS - LATH

- .1 Nails, spikes and staples: Fabricate to CSA B111. All fasteners to be corrosion protected by either hot dipped galvanizing or stainless steel. Nails, spikes to be hot dipped galvanized to meet ASTM A153 Class D at 1.0 oz of zinc per sq ft of surface area of the fastener. Minimum nail length to be 2.5" (64 mm) min. Use wide head roofing nails. Refer to Part 9 for minimum fastener requirements. Refer to the drawings for specific requirements.
- .2 Staples: to conform to CSA B111, 16 ga. Stainless steel staples compatible with material, sheathing, framing or other substrate being fastened. Length to be 2 (51 mm). Zinc coated staples will not be accepted.
- .3 Screws:
 - .1 Screw parameters such as pitch and gauge as per manufacturers requirements for material thickness attached. Hex heads or other heads, which will interfere with scratch coat application, are not to be used. Unless required otherwise, the following is to be used:
 - .1 Wood substrates: #10 x 2½" HDG wafer head screws or 2½" HDG roofing nails
 - .2 Approved Corrosion Protection:
 - .1 Stainless steel screws – 300 series stainless
 - .2 Alternate screws will be reviewed if samples submitted with mechanical information and corrosion protection test data for comparison with published test data on corrosion and strength performance of specified products.

2.8 ISOLATION COATINGS

- .1 As required to separate dissimilar metals.
- .2 Bituminous paint or approved tape.

3 EXECUTION

3.1 INSTALLATION – FURRING OR STRAPPING

- .1 Horizontal or Sloped Soffits – Install strapping for sloped and horizontal suspended soffits as shown in accordance with Section 06 10 00 Rough Carpentry.
- .2 Exterior Walls – Erect vertical strapping as shown in accordance with Section 06 10 00 – Rough Carpentry.

3.2 STUCCO BACKING PAPER

- .1 Verify that surface and conditions are ready to accept work of this Section in accordance with the manufacturer's recommendations. Remove all sharp objects or obstructions prior to applying stucco backing paper.
- .2 Install materials in accordance with manufacturer's written guidelines and recommendations unless otherwise noted below.
- .3 After installation of girts but before installation of stucco stops and control joints, install breather board horizontally beginning 50 mm below the lowest point of Z-bars (strapping) and progressing upwards with each succeeding sheet. After stucco stops are installed over the breather board, trim the excess breather board flush to the perimeter of stucco stop.
- .4 Shingle lap the top sheet of the breather board over the sheet below. Leave gap between butted core joints as recommended by manufacturer.
- .5 Vertical and horizontal joints to be sealed with tape. Ensure all vertical joints are supported by cavity (Z-girt) backing. If backing at vertical joints is soft or incomplete use self adhered membrane in place of tape.
- .6 Apply 100 mm strip of tape reinforcement when noted in the drawings such as at outside/inside corners.
- .7 For wood systems, vertical straps are to be at 8"oc maximum.
- .8 If the breather board has been damaged resulting in perforation, cover damaged area with new material ensuring that lapping rules have been followed. For small tears or perforations, apply a small patch of self-adhesive membrane.
- .9 Ensure that breather board is sealed with membrane at all penetrations.
- .10 Prior to the application of the stucco wire lath and stucco basecoats, review the backing paper to ensure there are no wrinkles and the backing paper will provide a continuous flat support.
- .11 Exterior building envelope finish to be installed within a two (2) month time period after placing breather board.

3.3 APPLICATION - STUCCO LATH

- .1 Fasten metal lath to furring or strapping in accordance with manufacturer's recommendations unless noted otherwise in this section.
 - .1 Metal lath at vertical applications to be attached with roofing nails, staples or screws with washers.
 - .2 Metal lath at sloped and suspended soffits and horizontal locations to be attached with screws and washers.

- .2 Metal lath shall be erected with the long dimension right angles to the supports, and the ends of the panels offset from adjoining sheets wherever possible. Application of flat lath shall be started on a support one space removed from a corner or angle, and be bent in to or around the corner.
- .3 Attachments for securing metal lath to supports shall be spaced at intervals not exceeding 6" (150 mm) along the straps located at the wall studs which is 16" oc or less. If studs are wider apart than 16" oc but not greater than 24" oc attach lath to every strap regardless of stud locations. Typically locate fasteners just below the horizontal wires. Whenever possible fasten the lath at the intersection of a horizontal and vertical wire. When fastening next a vertical wire, alternate the location of each fastener to the opposite sides of wire.
- .4 When fastening metal lath with staples angle staple at 45° and fasten at the intersection of vertical and horizontal wires wherever possible.
- .5 Lath across junctures of different materials to be reinforced with an additional strip of metal lath at least 200 mm wide.
- .6 Lap metal lath a minimum of 100mm at joints in the lath. Side laps shall be secured at all supports, and shall be tied at intervals not exceeding 150 mm (6") between supports.
- .7 Provide additional reinforcing 150 mm wide x 450 mm long strip of diamond mesh metal lath, diagonally at each corner of openings exceeding 150 mm in length in either direction. Centre lath on the corners of the opening and place at 45 degree angle.

3.4 STUCCO TRIM ACCESSORIES

- .1 Install trim accessories to lathed surfaces in accordance with Section 9.1 - Part 3, Item 10, as applicable. (See Section 1.3.2 regarding modifications to AWCC).
- .2 Place vertical control joints to create rectangular panels which do not exceed 13.5 m² (144 ft²) in size with no dimensions exceeding 5.5 m (18 ft.). Panel dimensions not to exceed a width to height ratio of 2.5 to 1. Locate control joints below window corners whenever possible. Location of control joints is to be laid out by the contractor and reviewed by the Consultant. Where back to back stucco stop joints are specifically noted on the drawings they are considered to act as control joints.
- .3 At vertical control joint locations, neatly cut intersecting horizontal perimeter stucco stops at outer flange. Do not cut through entire stucco stop. Wire lath is to have every 2nd horizontal wire cut at control joint location. Refer to details.
- .4 Install all stucco trim accessories to suit thickness of stucco base coat and finish coat in a manner that ensures a true, level and plumb stucco surface.
- .5 Install accessories and reveals in the longest possible lengths continuously. No termination of a section should occur within 600

- mm (24 inches) of an intersection, with the exception of pre-manufactured trim accessory joint intersections.
- .6 Install stucco stop continuously around flashings and other penetrations without cutting entire stucco stop whenever possible. Cut front flange and back leg only.
 - .7 Install insect screen as indicated in drawings to enclose the bottom edge of the insulation and drainage cavity. Fasten in place behind the furring, wrap the bottom edge of the insulation and drainage cavity and attached to the outside edge of the furring as detailed.
 - .8 All visible metal edges of stucco accessories (including stucco stop) to be painted after the application of stucco to match the finish stucco colour.

3.5 PREPARATION

- .1 Prepare the surfaces to receive stucco in accordance with AWCC Section 9.3 - Part 3, Item 3 as applicable.
- .2 Prior to commencement of work, review all conditions and thoroughly inspect all substrates and surfaces scheduled to receive stucco and report in writing to the Consultant any conditions or surfaces that will adversely affect proper installation of specified stucco system.
- .3 No work shall commence until all such adverse conditions and defects have been corrected and surfaces and conditions are acceptable. Commencement of work implies acceptance of surfaces or conditions to receive stucco.
- .4 Perform no stucco work when the ambient air and substrate temperatures are below 5°C (40°F) or above 38°C (100°F) for 24 hours before, during, and after stucco application.
- .5 Confirm all stucco panels are within the size and aspect ratio limitations noted in Specification Section 09205 prior to commencing work.
- .6 Do not use frozen materials or apply stucco materials to frozen surfaces or surfaces containing frost.
- .7 Verify that framing, sheathing, flashing paper and flashing assembly meets minimum Reference Standards noted and stucco installation requirements.
- .8 Ensure lath, furring, accessories and trim are tight and fastened securely in place and fixtures, conduits, pipes, cables and outlets are properly plugged, capped or covered before commencing stucco application.
- .9 Protect all adjacent surfaces and areas from and damage by stucco operations and make good any damage caused by failure to provide such protection.

- .10 Apply stucco to clean, adequately prepared surfaces free from dust, dirt or other deleterious substances.
- .11 Take necessary care to identify and protect adjacent surfaces from damage from stucco application.
- .12 Provide adequate protection from contaminants and the weather for substrates prior to application of stucco and for stucco coat applications. Maintain in place until stucco is adequately cured.

3.6 MIXING

- .1 Ensure mixer, hoses, pumping and other equipment are clean and free of contamination during mixing and application of materials.
- .2 All materials and ingredients used shall be clean and uncontaminated.
- .3 Do not use household detergents, plasticizers or other admixtures, except those permitted by Manufacturer.
- .4 Do not use frozen, caked or lumpy material and remove all contaminated materials from the job site.
- .5 Mix proportions by volume using standard accurate measuring devices and known volumes for all materials and full bag increments.
- .6 Use shovel count for measuring sand only if standardized first.
- .7 Sequential batches to be proportionally alike. Size batches for complete use within one hour after mixing.
- .8 Mix manufactured products in strict accordance with manufacturer's written instructions and unless otherwise approved, mechanically mix all ingredients.
- .9 Withhold 10% of mixing water until mixing is nearly complete, then add remainder as required to produce desired working consistency. Do not over water.

3.7 PROPORTIONING

- .1 Proportioning stucco basecoats in accordance with Manufacturer's written instructions.

3.8 APPLICATION OF STUCCO BASE COATS

- .1 Apply stucco base coats in accordance with Manufacturer's written instructions and this specification.
- .2 Apply stucco base coats to entire wall panel interrupted only at junctions of plaster planes, at openings or at control joints in one continuous operation using trowel or machine.
- .3 Apply first base coat (scratch coat) to completely embed lath to a minimum thickness of 10 mm (3/8") and thick enough to allow for a

uniform and shallow scoring of the surface to approx. 3 mm deep (1/8").

- .4 Scratch coat is to key in to the corner beads and stops uniformly so as not to result in any voids after brown coat is installed.
- .5 Allow first base coat (scratch coat) to cure before applying second basecoat (brown coat)
- .6 Apply second base coat (brown coat) to a maximum thickness of 10 mm (3/8") over a damped first coat with sufficient material and pressure to ensure a tight uniform bond to the first coat but not to deform or crack the first coat. If required, apply a fine spray of clean water to first coat, so as to dampen it only. Do not saturate. Allow water sheen to disappear before applying the second coat.
- .7 Second base coat (brown coat) application to bring the combined total system thickness to 19 mm (3/4").
- .8 Rod the second base coat (brown coat) to a true, even plane, filling surface defects with cement plaster and trowel-float surface uniformly after it has set and when moisture is still present in it. Follow by darbying to provide smooth surface for finish coat. The surfaced shall have no variation greater than 6 mm (1/4") in any direction under a 1524 mm (5') straight edge.
- .9 Uniformly cover corner wire with brown coat. Do not use corner wire as a screed.
- .10 Where existing stucco thickness does not conform to .6 above, notify Consultant for direction and correct as required.

3.9 CURING OF STUCCO BASE COATS

- .1 Protect stucco surfaces from uneven and excessive evaporation during hot, dry or windy weather.
- .2 Moist cure cement based stucco with clean water to maintain plaster uniformly moist.
- .3 Allow first base coat (scratch coat) to cure for a minimum of 24 hours before second base coat application proceeds.
- .4 Allow second base coat (brown coat) to cure for a minimum of 20 days and until the base coat has evidence of drying shrinkage cracks following application and prior to application of stucco finish coats. The second base coat cure time will be reviewed and modified by the Consultant depending on environmental conditions. Finish coats are not be applied on basecoats that have not gone through drying shrinkage.
- .5 Provide adequate protection (plastic sheets) to retard evaporation where extreme conditions occur.
- .6 Moist cure base coats only when exterior temperature is 5°C or above.

3.10 ACRYLIC STUCCO
FINISH COAT

- .1 Ensure that the surface temperature of substrate is above 5°C for a minimum of 24 hours during and after application of finish coat.
- .2 Approval to apply finish coat must be provided by the Consultant and is based on the cure time and drying cracking of the basecoat.
- .3 Ensure all future sealant joints are taped off.
- .4 Install selected finish coat in accordance with manufacturer's requirements.
- .5 Apply material in one continuous operation and/or finish entire sections of wall areas at one time. Interrupt application only at natural breaks in construction.
- .6 Avoid application of separate batches of finish side-by-side or application of finish coat materials in direct sunlight and excessive wind.
- .7 Spread an even coat of finish coat material using a trowel, working away from wet edge of material previously applied.
- .8 Refer to AWCC Section 9.3 - Part 3, Item 9 for additional recommendations regarding finish coat application.

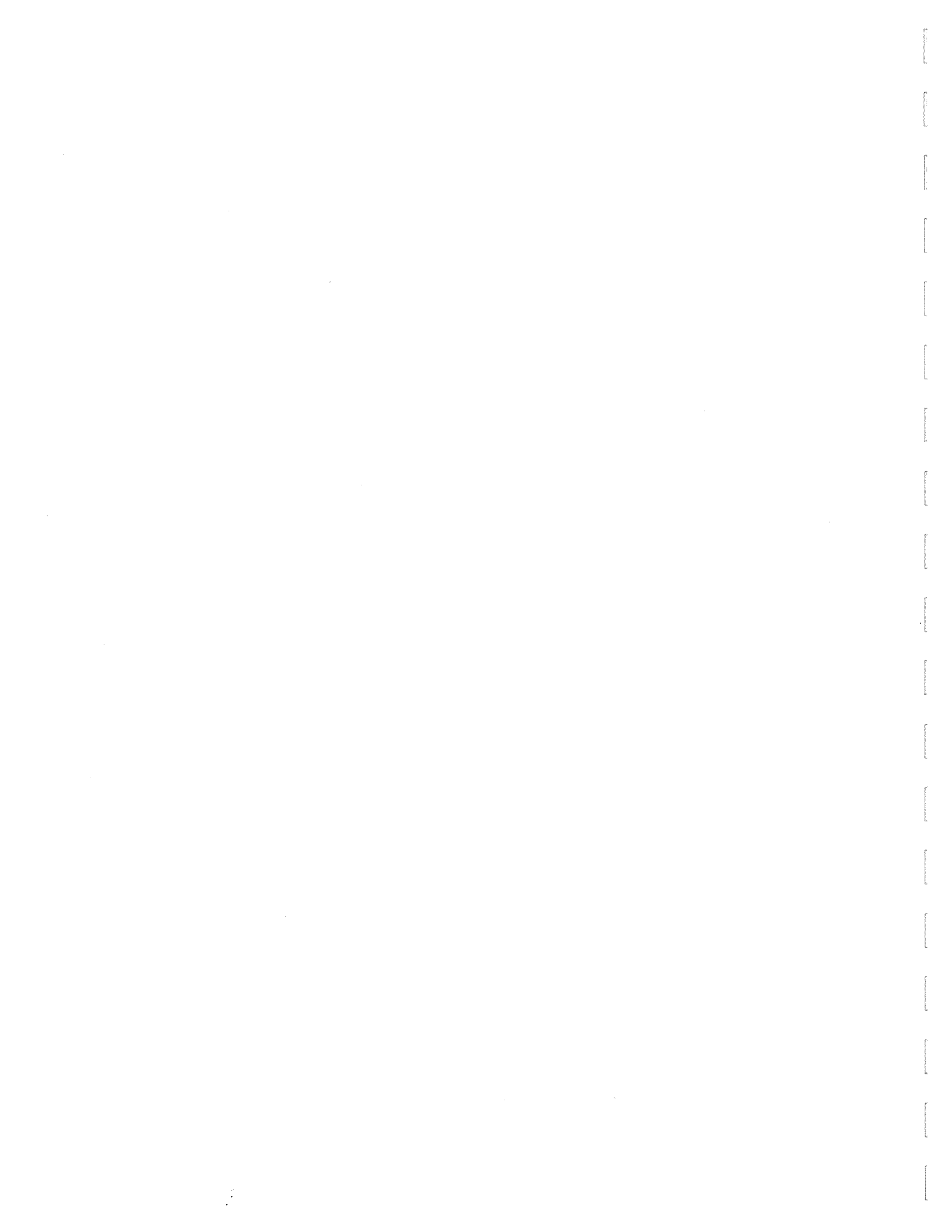
3.11 CURING OF FINISH
COAT

- .1 Cure finish coat material in accordance with manufacturer's system requirements
- .2 Provide adequate protection to retard evaporation where extreme conditions occur.

3.12 ADJUST AND CLEAN

- .1 Remove waste and excess material off site at completion of stucco work; repair and make good any defects to any other work caused by this application.
- .2 Promptly remove all droppings.

END OF SECTION



1 GENERAL

1.1 DESCRIPTION

- .1 The work described in this section includes exterior paint application.

1.2 REFERENCES

- .1 Master Painters and Decorators Association of B.C. Reference Manuals (Painting Specification Manual):
 - .1 New Surfaces - CPCA/MPDA Painting Specification Manual, latest edition
 - .2 Existing Surfaces - MPDA Maintenance Repainting Guide, latest edition

1.3 REQUIREMENTS INCLUDED

- .1 This section of work shall include all labour, materials, tools, scaffolds and other equipment services and supervision required to cover with paint the surfaces of the building or structure, the building services and accessories not otherwise protected or covered, as shown on the "Finish Schedule", to the full intent of the drawings and specifications.
- .2 All finished areas that are affected by the work (new and existing) are to be fully prepared and painted in accordance with this specification in colours to match existing.
- .3 All surfaces to receive painting are to be fully finished, suitable for the application of pre-treatments, surface preparation, priming and coating in accordance with the Painting Specification Manual

1.4 QUALITY CONTROL

- .1 Retain purchase orders, invoices and other documents to prove that material used in contract meets requirements of specification and produce when requested by Consultant.

1.5 QUALITY ASSURANCE

- .1 Conform to MPI's Painting Architectural Specification Manual and the Maintenance Repainting Manual, latest editions.
- .2 Qualification of the Manufacturer: The paint products of the Paint Manufacturer shall be listed in the Painting Specification Manual under "Paint Product Recommendation" section, or approved equivalent.
- .3 Qualification of Applicators: The contractor shall have a minimum of five (5) years proven satisfactory experience. This contractor shall maintain a qualified crew of painters throughout the duration of the work who shall be qualified to fully satisfy the requirements of this specification.

1.6 SAMPLES AND
MOCK-UPS

- .1 Submit samples in accordance with Section 01 11 55 - General Instructions as requested by the Consultant.
- .2 When requested by the Consultant, prepare and repaint designated surface, area or room to workmanship standards of the MPI Repainting Manual for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality for similar on-site repainting work.
- .3 Apply coating test area to an agreed mock-up location to confirm method of application, material compatibility, adherence, bond, texture, finish and colour for each paint colour and type. Test area to be a minimum of 1 square metre.

1.7 SUBMITTALS

- .1 Submit list of all painting materials to the Consultant for review prior to ordering materials
- .2 When requested, submit invoice list of all paint materials ordered for project work indicating manufacturer, types and quantities for verification and compliance with specification and design requirements.
- .3 At project completion, provide an itemized list complete with manufacturer, paint type and colour coding for all colours used for Owner's later use in maintenance.

1.8 DELIVERY AND
STORAGE

- .1 Deliver and store materials in manufacturer's original container, sealed with labels intact.
- .2 Ensure dry delivery and storage of materials and equipment at site.
- .3 Indicate on containers or wrappings:
 - .1 Manufacturer's name and address.
 - .2 Type of paint.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .4 Store materials and equipment in a well ventilated place with temperature range 10 to 30° C.
- .5 Where toxic and/or volatile / explosive / flammable materials are being used, provide adequate fireproof storage lockers and take all necessary precautions and post adequate warnings (e.g. no smoking) as required.
- .6 Take all necessary precautionary and safety measures to prevent fire hazards and spontaneous combustion and to protect the environment from hazard spills. Materials that constitute a fire hazard (paints, solvents, drop clothes, etc.) shall be stored in suitable closed and rated containers and removed from the site on a daily basis.

- .7 Comply with requirements of authorities having jurisdiction, in regard to the use, handling, storage and disposal of hazardous materials.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .2 Apply paint finishes only when temperature and ventilation at location of installation can be satisfactorily maintained within manufacturer's recommendations.
- .3 Substrate, ambient temperature and humidity must be within limits prescribed by manufacturer.
- .4 Provide temporary heating where permanent facilities are not available to maintain minimum recommended temperatures.
- .5 Apply paint finish only in areas where dust is no longer being generated by related construction operations such that airborne particles will not affect the quality of the finished surface.
- .6 Apply paint only when surface to be painted is dry, properly cured and adequately prepared.
- .7 Maximum moisture content of substrates as follows:
 - .1 Plaster and Wallboard - 12%
 - .2 Wood - 15%
 - .3 Concrete – 12%

1.10 EXISTING CONDITIONS

- .1 Investigate structural problems related to safe execution of preparation of structure to be painted and report unsatisfactory conditions to Consultant before beginning work.
- .2 Report to Consultant conditions of deteriorated materials found during preparation, not previously disclosed.
- .3 The exposed concrete elements of the building have some delaminated coatings and must be identified at the start of the work to ensure repairs are made well in advance of painting.

1.11 PROTECTION

- .1 Protect paint and painting equipment before use and during length of contract from climatic elements.
- .2 Protect structure from markings and other damage. Protect completed work from paint droppings. Use non-staining coverings.
- .3 Remove all electrical plates, surface hardware, fittings and fastenings, prior to painting operations. These items shall be carefully stored, cleaned and replaced on completion of work in each area. No solvent shall be used to clean hardware that will affect the finish of the hardware.

- .4 Provide for protection of passing pedestrians and the general public.
- .5 All ladders, scaffolds, lift equipment and general plant shall be securely locked when not in use to prevent access to the balconies, roofs or through windows by other parties than the Contractor.
- .6 Protect all exterior surfaces and areas, including landscaping, walks, drives, all adjacent building surfaces (including glass, aluminum surfaces, etc.) and equipment and any labels and signage from repainting operations and damage by drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.

1.12 SCHEDULING OF WORK

- .1 Submit work schedule starting and final completion dates for approval by Consultant.
- .2 Take measures necessary to complete work within approved scheduled time. Change in schedule must be approved by Consultant.
- .3 Co-ordinate execution with other work at site.

1.13 ALTERNATIVES

- .1 Products conforming to this specification must be identified in writing by contractor for review by Consultant.
- .2 Changing manufacturers' brands, sources of supply of painting materials from those previously approved must be approved by Consultant.
- .3 Request for alternative approval must be submitted in writing and be accompanied by full literature and recommendations from manufacturers concerned.

1.14 GUARANTEE

- .1 Furnish a two (2) year Maintenance Bond both in accordance with MPI Repainting Manual requirements. The Maintenance Bond shall be obtained from an approved bonding company and shall warrant that all repainting work has been performed in accordance with MPI Repainting Manual requirements.
- .2 All exterior repainting work shall be in accordance with MPI Repainting Manual requirements and shall be inspected by the Painting Association whether using the Painting Association Guarantee or the Maintenance Bond option.
- .3 The cost for such Painting Association inspections as well as either the Painting Association Guarantee or Maintenance Bond shall be included in the Base Bid Price and any Separate Pricing or Cost Plus items awarded to the Painting Contractor.
- .4 Painting Subcontractors choosing the Maintenance Bond option shall provide written proof of their ability to supply same at time of bidding.

1.15 MAINTENANCE
MATERIALS

- .1 At project completion, provide 4 litres (1 gallon) of each type and colour of paint from same production run (batch mix) used in unopened cans, properly labelled and identified for Owner's last use in maintenance. Store where directed.

2 PRODUCTS

2.1 MATERIALS

- .1 All materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be in accordance with the MPI Manuals "Approved Product" listing and shall be from a single manufacturer for each system used.
- .2 Other paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in the MPI Manuals and shall be compatible with other coating materials as required.
- .3 All materials and paint shall be lead and mercury free and shall have low VC or cure free of blemishes or sags.
- .4 Where required, paints and coatings shall meet flame spread and smoke developed ratings designated by local Code requirements and/or authorities having jurisdiction.

2.2 TOOLS AND
EQUIPMENT

- .1 Painting equipment to best trade standards for type of product and application.
- .2 The use of power tools to remove existing coatings from painted elements will not be permitted.

2.3 MIXING AND
TINTING

- .1 Unless otherwise specified, paints shall be ready-mixed. Re-mix prior to application to ensure colour and gloss
- .2 Paste, powder or catalysed paint mixes shall be mixed in strict accordance with manufacturer's written instructions
- .3 Perform all colour tinting operations prior to delivery of paint to site.
- .4 Where thinner is used, addition shall not exceed paint manufacturer's recommendations
- .5 Confirm with manufacturer that the addition of tinting components will not significantly affect performance characteristics

2.4 GLOSS AND SHEEN

- .1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:
 - .1 Flat or matte – 0 – 5 units at 60 degrees to a maximum of 10 units at 85 degrees.
 - .2 Eggshell, velvet or low lustre – 5 – 25 units at 60 degrees to a minimum of 10 units at 85 degrees
 - .3 Satin – 20 – 35 units at 60 degrees
 - .4 Semi-gloss – 35 – 65 units at 60 degrees
 - .5 Gloss – 65 units or greater.
- .2 Finish (i.e. gloss level) of all painted surfaces shall be as indicated by Consultant.

2.5 PAINTING AND FINISH SCHEDULE

- .1 Dimensional Lumber (includes, but not limited to, fascia boards and wood framing at Latrine Building):

EXT 6.2 Dimensional Lumber
REX 6.2A Latex

Full Prime	MPI 5	Alkyd Stain Blocking Priming
1st Coat	MPI 10	Exterior Latex, G1
2nd Coat	MPI 10	Exterior Latex, G1
- .2 Exposed Concrete Surfaces (for concrete surfaces already painted or coated with stucco finish):

REX 3.1 Concrete Vertical Surfaces
REX 3.1F Elastomeric

1st Coat	MPI 113	Elastomeric
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- .3 Wood Shingles and Shakes (includes, but not limited to, all cedar shingle roofs, except WW2 Hut Building):

EXT 6.6 Wood Shingles and Shakes
EXT 6.6C Solid Colour Stain

Full Prime	MPI 5	Alkyd / Oil Primer
1st Coat	MPI 14	Solid Stain
2nd Coat	MPI 14	Solid Stain

3 EXECUTION

3.1 CONDITION OF SURFACE

- .1 Prior to commencement of work of this section, thoroughly examine all conditions and surfaces scheduled to be repainted and report in writing to the Consultant any conditions or surfaces that will adversely affect work of this section.
- .2 No repainting or painting work to commence until all such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to the Consultant.

3.2 SURFACE PREPARATION

- .1 Prepare all surfaces in accordance with the requirements of MPI Manuals.
- .2 Protect all adjacent surfaces and areas from painting operations and damage by drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection
- .3 Remove and securely store all miscellaneous hardware and surface fittings and fastenings including by not limited to electrical plates, mechanical louvers, light fixtures and trim, mouldings, etc. prior to repainting and replace upon completion. Carefully clean and replace all such items upon completion of repainting work in each area. Do not use solvent or reactive cleaning agents on items that will mar or remove finishes.
- .4 Sand, clean dry etch, neutralize and/or test all surfaces under adequate illumination, ventilation and temperature requirements.
- .5 Wood, cedar shingles and millwork: All wood surfaces shall be clean and dry with moisture content readings of less than 15%. Remove all foreign matter prior to prime coat applications. Knots, pitch streaks and sappy sections shall be spot coated with sealer. Coat all sides of interior and exterior wood and all cut ends.
- .6 Mildew Removal: Scrub with a solution of T.S.P. and bleach, rinse with clear water and allow surface to dry completely.
- .7 Metal Flashing with Inorganic Zinc Rich Primer: Prepare as directed by applicator of zinc rich primer.
- .8 Custom Metal Fabrications
 - .1 Prepare as directed in Section 5.3 – Surface Preparation, MPI Architectural Painting Specification Manual.
 - .2 Ensure all soldering residue has been cleaned from the surface of the metal and neutralized.
- .9 Concrete surfaces:
 - .1 Prepare as directed in Section 3.1 – Surface Preparation, MPI Architectural Painting Specification Manual.
 - .2 Include power washing to clean off surface dirt.

3.3 PAINTING APPLICATION

- .1 Do not paint unless substrates are acceptable and/or until all environmental conditions (heating, ventilation, lighting, weather

conditions and precipitation, or completion of other work) are acceptable for application of products.

- .2 Cold weather painting, when temperatures are less than 10 degrees C, is only permitted when paints formulated for lower temperatures are used and manufacturer's limitations are observed for maximum humidity levels and minimum temperatures. Contractor to submit technical information regarding paint manufacturer's recommendations for cold weather work and protection.
- .3 Paint and repaint all surfaces requiring paint, stain or coating to minimum MPI Manual finish requirements with application methods in accordance with best trade practices for type and application of materials used.
- .4 Painting coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendation
- .5 Method of application and uniform coats of specified film thickness be in agreement with paint supplier and Consultant.
- .6 Apply each coat at the proper consistency.
- .7 Sand lightly and dust between coats to achieve an anchor for the next coat and to remove defects visible from a distance up to 1000 mm.
- .8 Do not apply finishes on surfaces that are not sufficiently dry. Unless manufacturer's directions state otherwise, each coat shall be sufficiently dry and hard before a following coat is applied.
- .9 Custom flashing fabrications
 - .1 Site preparation and painting will not be acceptable.
- .10 To avoid air entrapment in applied coats, apply materials in strict accordance with manufacturer's spread rates and application requirements.
- .11 Where touch-up painting is undertaken and found to be noticeable, the entire surface will require repainting from break to break or corner to corner.
- .12 All surfaces of cedar shingles are to be coated with specified stain and in accordance with applicable MPI standards prior to installation.

3.4 FIELD QUALITY CONTROL

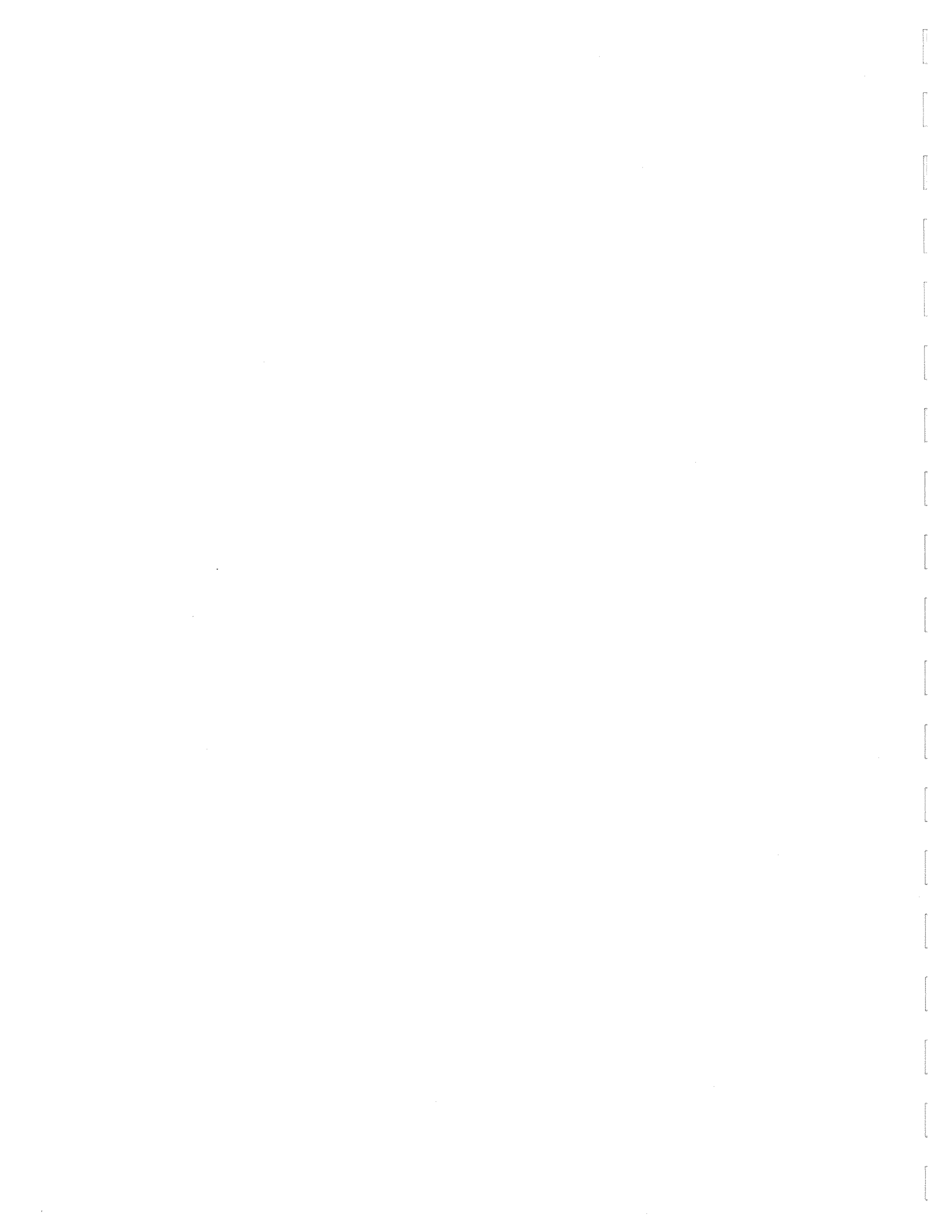
- .1 Painted, repainted and primed surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent:
 - .1 Runs, sags, hiding or shadowing by inefficient application methods
 - .2 Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles
 - .3 Damage due to touching before paint is sufficiently dry or any other contributory cause

- .4 Damage due to application on moist surfaces are caused by inadequate protection for the weather
- .5 Damage and/or contamination of paint due to window blown or air born contaminants
- .6 Evidence of poor paint bonding.
- .7 Painted, repainted or primed surfaces rejected by the Consultant shall be made good at the expense of the Contractor
- .2 Examine surface for adequate preparation.
- .3 Check all materials for correctness.

3.5 CLEAN-UP

- .1 Removal of all paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- .2 Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris
- .3 Remove combustible rubbish material and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.
- .4 Clean equipment and dispose of wash water / solvents as well as all other cleaning and protective materials, paints, thinners, paint removers/strippers, in accordance with the safety requirements of authorities having jurisdiction.
- .5 Protect area where paint has been applied and avoid scuffing newly applied paint.

END OF SECTION



Fort Rodd Hill – Roof Replacements
Project No.: R.081107.001
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APPENDIX 1



**Hazardous Building
Materials Assessment**

31 Buildings/Structures at the Fort
Rodd Hill National Historic Site, BC



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March 24, 2016

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HAZARDOUS BUILDING MATERIALS ASSESSMENT

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HAZARDOUS BUILDING MATERIALS ASSESSMENT

Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Public Works and Government Services Canada (PWGSC) to conduct hazardous building materials assessments within 31 buildings/structures (subject buildings) throughout the Fort Rodd Hill National Historic Site, BC. A list of the buildings assessed is included in Appendix A.

The purpose of the assessment was to check for potential hazardous building materials that may require special attention in accordance with the requirements of the *Canada Labour Code, Part II* (Canada Labour Code), the current version of British Columbia's *Occupational Health & Safety Regulation* (BC Reg. 296/97), as well as the Parks Canada Asbestos Management Guide (January 2014) and the Parks Canada Asbestos Management Standard (January 2014).

The hazardous building materials considered included asbestos-containing materials (ACMs), lead-containing materials including lead-containing paints (LCPs), polychlorinated biphenyls (PCBs), mercury-containing items, ozone-depleting substances (ODSs), mould or moisture affected building materials, and silica.

Based on Stantec's visual assessment and on the laboratory analyses performed on samples collected, hazardous building materials were identified within many of the subject buildings.

A summary of our findings and recommendations is presented below. It should be noted that this summary is subject to the same restrictions and limitations as presented in Section 3.0 (Assessment Limitations) and Section 6.0 (Closure). The information provided is to be read in conjunction with the remainder of this report.

NOTE: Where particular hazardous building materials are not listed in the following table, they were not identified in that particular building.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Summary of Identified Hazardous Building Materials	
Building Name	Identified Hazardous Building Materials
Admin Garage and Admin Apartment	<p>Lead</p> <ul style="list-style-type: none"> • Yellow coloured paint on interior walls of the admin apartment kitchen is lead-containing. • White coloured paint on the interior trims of the admin apartment is lead-containing. • Yellow coloured paint on the exterior stucco is lead-containing. • Lead is expected to be present in older electrical wiring materials and sheathing, solder used on domestic water lines, solder used in bell fittings for cast iron pipes, solder used in electrical equipment and vent and pipe flashings. <p>PCBs</p> <ul style="list-style-type: none"> • Fluorescent light fixtures of older vintage (one observed) may have PCB-containing ballasts. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury vapour is expected to be present in the light tubes within the five fluorescent light fixtures observed. • Mercury may also be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in stucco, plaster, gypsum and the concrete foundation of the subject building.
Casemate Barracks	<p>Lead</p> <ul style="list-style-type: none"> • Red coloured paint on the wood pillars and trims of the barracks are lead containing. • Grey coloured paint on the coal store and the oil store door and trim is lead containing. • Yellow coloured paint on window frames of the barracks is lead containing. • Lead is expected to be present in older electrical wiring materials and sheathing, solder used on domestic water lines, solder used in bell fittings for cast iron pipes, and vent and pipe flashings. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury may be present in paints and adhesives. <p>Mould/Moisture</p> <ul style="list-style-type: none"> • Moisture-staining on walls adjacent to gutter ends was observed on the side of the roof of the Provisional Store. If gutters are not functioning or draining properly, adjacent building materials may become wet, creating conditions conducive to mould growth. • As the structure is exposed to regular rainwater, moss and fungal growth are present on wood elements, which is typical. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in concrete walls, floors and ceilings of the subject buildings.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Summary of Identified Hazardous Building Materials	
Building Name	Identified Hazardous Building Materials
Battery Command Post	<p>Lead</p> <ul style="list-style-type: none"> • Grey coloured paint on the shutters is lead-containing. • Red coloured paint on the windows is lead-containing. • Black coloured paint on the railing is lead-containing. • Lead is expected to be present in older electrical wiring materials and sheathing and solder used in electrical equipment. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in the concrete walls, floors and ceilings of the subject building.
Belmont Battery	<p>Asbestos</p> <ul style="list-style-type: none"> • Black roof mastic on vertical exhaust vent on roof throughout is asbestos-containing. <p>Lead</p> <ul style="list-style-type: none"> • White coloured paint on the exterior trims is lead-containing. • White coloured paint on interior walls of tower upper level is lead-containing. • Orange coloured paint on the exterior walls is lead-containing. • Black coloured paint on the interior trims throughout is lead-containing. • Green coloured paint on the trims throughout is lead-containing. • Grey coloured paint on the floors throughout is lead-containing. • White coloured paint on the interior walls throughout is lead-containing. • Red coloured paint on the floor of generator room on concrete slab is lead-containing. • Yellow coloured paint on the interior walls of lifting lobby is lead-containing. • Lead is expected to be present in older electrical wiring materials and sheathing, solder used on domestic water lines, solder used in bell fittings for cast iron pipes, solder used in electrical equipment and vent and pipe flashings. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in the concrete walls, floors and ceilings of the subject building.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Summary of Identified Hazardous Building Materials	
Building Name	Identified Hazardous Building Materials
Canteen	<p>Lead</p> <ul style="list-style-type: none"> • White coloured paint on the interior walls and ceiling is lead-containing. • White coloured paint on the exterior trims is lead-containing. • Yellow coloured paint on the interior wood siding is lead-containing. • Pale brown coloured paint on the interior walls of prep room is lead-containing. • Grey coloured paint on the exterior outhouse door is lead-containing. • Black coloured paint on interior ceiling beams is lead-containing. • Brown coloured paint on exterior window frames is lead-containing. • Lead is expected to be present in older electrical wiring materials and sheathing, solder used in bell fittings for cast iron pipes, solder used in electrical equipment and vent and pipe flashings. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury may also be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in the concrete walls, floors and ceiling of the subject buildings.
Collections Building	<p>Lead</p> <ul style="list-style-type: none"> • Lead is expected to be present in older electrical wiring materials and sheathing, solder used on domestic water lines, solder used in bell fittings for cast iron pipes, and vent and pipe flashings. <p>ODSs</p> <ul style="list-style-type: none"> • One air conditioning unit located on the exterior east side of the building (R-22). <p>Mercury</p> <ul style="list-style-type: none"> • Mercury vapour is expected to be present in the light tubes within the 20 fluorescent light fixtures observed. • Mercury may also be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in the concrete slab of the subject buildings.
Defensive Electric Light #1	<p>ACMs</p> <ul style="list-style-type: none"> • Black roofing material is asbestos-containing. <p>Lead</p> <ul style="list-style-type: none"> • Dark green coloured paint on the steel shutters is lead-containing. • Black coloured paint on the steel cage is lead-containing. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury may be present in adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in the concrete of the subject buildings.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Summary of Identified Hazardous Building Materials	
Building Name	Identified Hazardous Building Materials
Fisgard Lighthouse, Boathouse and Store House	<p>Lead</p> <ul style="list-style-type: none"> • White coloured paint on the exterior window sill of the lighthouse is lead containing. • Black coloured paint on the tower staircase cage of lighthouse is lead-containing • Green coloured paint on tower staircase of lighthouse is lead containing. • White coloured paint on the interior walls of tower staircase in lighthouse is lead containing. • Silver coloured paint on the interior steel panel of upper tower of lighthouse is lead containing. • White coloured paint on exterior window frame throughout lighthouse is lead containing. • Lead is expected to be present in older electrical wiring materials and sheathing, solder used on domestic water lines, solder used in bell fittings for cast iron pipes, solder used in electrical equipment and vent and pipe flashings. <p>PCBs</p> <ul style="list-style-type: none"> • PCBs may be present in the fluorescent light ballasts of the two light fixtures observed within the storehouse. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury vapour is likely to be present in the light tubes within the two fluorescent light fixtures observed in the storehouse. • Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in the concrete and brick mortar of lighthouse and storehouse.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Summary of Identified Hazardous Building Materials	
Building Name	Identified Hazardous Building Materials
Journey's End	<p>Asbestos</p> <ul style="list-style-type: none"> • Grey straight air-o-cell pipe insulation throughout the basement computer room ceiling space is asbestos-containing. • 9"x9" vinyl floor tile (tan with brown) in the second level west and east bathroom is asbestos-containing. • Tan vinyl sheet flooring in the second level west bathroom is asbestos-containing. • Tan vinyl sheet flooring on the stairs to basement is asbestos-containing. • Yellow vinyl sheet flooring in basement of laundry room is asbestos-containing. <p>Lead</p> <ul style="list-style-type: none"> • Red coloured paint on the exterior trim is lead-containing. • White coloured paint second level on west bathroom trim is lead-containing. • Yellow coloured paint second level on west bathroom walls is lead-containing. • Grey coloured paint on walls in office #2 is lead-containing. • Tan coloured paint on walls in main lobby is lead-containing. • Pink coloured paint on walls in room #104 is lead-containing. • Green coloured paint on walls in room #105 is lead-containing. • White coloured paint on walls by east stairs and throughout upper level corridor is lead-containing. • Tan coloured paint on walls of office #3 is lead-containing. • Dark yellow coloured paint on walls of office #1 is lead-containing. • Green coloured paint on walls of boiler room is lead-containing. • Lead is expected to be present in lead-acid batteries used in emergency lighting, older electrical wiring materials and sheathing, solder used on domestic water lines, solder used in bell fittings for cast iron pipes, solder used in electrical equipment, ceramic tile glaze and vent and pipe flashings. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in the concrete and mortar of the subject building.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Summary of Identified Hazardous Building Materials	
Building Name	Identified Hazardous Building Materials
Lower Battery	<p>Lead</p> <ul style="list-style-type: none"> • General lower battery–white coloured paint on the flag pole is lead-containing. • General lower battery–black coloured paint on the main gate, railings, and gates throughout is lead-containing. • Gun emplacements–black coloured paint on the gun emplacements is lead-containing. • Underground magazine–black coloured paint on the shelves and doors throughout is lead-containing. • Underground magazine–grey coloured paint on the doors throughout is lead-containing. • Artillery and small arms ammunition store–grey coloured paint on the trims throughout is lead-containing. • Guardhouse–white coloured paint on the interior walls throughout is lead-containing. • Guardhouse–grey coloured paint on the interior trims and lower walls throughout is lead-containing. • Guardhouse–yellow coloured paint on the window frames throughout is lead-containing. • Guardhouse–red coloured paint on the exterior trims throughout is lead-containing. • Guardhouse–blue coloured paint on the doors throughout is lead-containing. • Lead is expected to be present in older electrical wiring materials and sheathing, solder used on domestic water lines and in electrical equipment. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in the concrete walls, ceilings, and floors (foundation) of the buildings.
Maintenance Facilities	<p>Lead</p> <ul style="list-style-type: none"> • Grey coloured paint on the interior floor throughout FRH2 is lead-containing. • White coloured paint on the exterior doors of FRH2 is lead-containing. • Teal coloured paint on the corrugated siding throughout the exterior of FRH3 is lead-containing. • Green coloured paint on the corrugated siding throughout exterior of FRH4 is lead-containing. • Lead is expected to be present in older electrical wiring materials and sheathing, solder used on domestic water lines, solder used in bell fittings for cast iron pipes, solder used in electrical equipment and vent and pipe flashings. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury vapour is expected to be present in fluorescent light bulbs/tubes observed in approximately 20 fluorescent light fixtures present in various locations throughout. • Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in the concrete foundation of the Paint Shop (FRH2) building, and the slab concrete floor of Garage (FRH3).
5 O'Tentiks	No hazardous materials were identified during the assessment.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Summary of Identified Hazardous Building Materials	
Building Name	Identified Hazardous Building Materials
Parking Lot Washroom	<p>Lead</p> <ul style="list-style-type: none"> White coloured paint on the exterior trims is lead-containing. Lead is expected to be present in older electrical wiring materials and sheathing, solder used on domestic water lines, solder used in bell fittings for cast iron pipes, solder used in electrical equipment and vent and pipe flashings. <p>Mercury</p> <ul style="list-style-type: none"> Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> Silica is presumed to be present in the concrete slab floor, concrete block walls and brick mortar of the subject building.
Plotting Room	<p>Lead</p> <ul style="list-style-type: none"> Light blue coloured paint on the east wall of the plotting room is lead-containing. Yellow coloured paint on the east wall of the north office is lead-containing. Silver coloured paint on the metal door in corridor and on the exterior of the plotting room is lead-containing. Black coloured paint on the interior trims is lead-containing. Grey coloured paint on the interior floor at the entrance is lead-containing. Green coloured paint on the interior walls is lead-containing. White coloured paint on the exterior trim is lead-containing. Lead is expected to be present in older electrical wiring materials, solder used in electrical equipment. <p>PCB</p> <ul style="list-style-type: none"> PCBs may be present in the fluorescent light ballasts of the two light fixtures observed. <p>Mercury</p> <ul style="list-style-type: none"> Mercury vapour is likely to be present in the light tubes within the two fluorescent light fixtures observed. Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> Silica is presumed to be present in the concrete structure of the subject building.
Search Light #6	<p>Lead</p> <ul style="list-style-type: none"> Green coloured paint on the exterior is lead-containing. White coloured paint on the interior is lead-containing. <p>Mercury</p> <ul style="list-style-type: none"> Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> Silica is presumed to be present in the concrete structure of the subject building.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Summary of Identified Hazardous Building Materials	
Building Name	Identified Hazardous Building Materials
Search Light Emplacement #7	<p>Lead</p> <ul style="list-style-type: none"> • Red coloured paint on exterior walls is lead-containing. • Grey coloured paint on interior walls is lead-containing. • Black coloured paint on steel cage is lead-containing. • Brown coloured paint on wood canopy is lead-containing. • Lead is expected to be present in older electrical wiring materials and solder used in electrical equipment. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in concrete structure of the subject building.
Search Light Engine Room	<p>Lead</p> <ul style="list-style-type: none"> • Tan coloured paint on the interior wall is lead-containing. • Black coloured paint on the interior trim is lead-containing. • Light grey coloured paint on interior wall is lead-containing. • Grey colored paint on the interior floor is lead-containing. • Orange coloured paint on exterior wall is lead-containing. • Red coloured paint on the floor inside caged engine room is lead-containing. • Lead is expected to be present in older electrical wiring materials, solder used on domestic water lines, solder used in bell fittings for cast iron pipes and solder used in electrical equipment. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in the concrete comprising the entirety of the subject building.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Summary of Identified Hazardous Building Materials	
Building Name	Identified Hazardous Building Materials
Upper Battery	<p>Lead</p> <ul style="list-style-type: none"> • Black coloured paint on the garbage can outside main gate is lead-containing • Red coloured paint on the wood pillars and window sills throughout the guardhouse is lead-containing. • Brown coloured paint on the exterior window frames throughout the guardhouse is lead-containing. • Green coloured paint on the interior window sills throughout the guardhouse is lead-containing. • Grey coloured paint on the interior baseboards throughout the guardhouse is lead-containing. • Black coloured paint on the door of the guardhouse is lead-containing. • Black coloured paint on the steel stairs around gun emplacement is lead-containing. • Yellow coloured paint on the interior doors of the underground magazine is lead-containing. • Black coloured paint on the exterior window frames throughout the underground magazine is lead-containing. • Brown coloured paint on the door frames throughout the underground magazine is lead-containing. • Green coloured paint on the interior ceiling trims throughout the underground magazine is lead-containing. • Tan coloured paint on the interior walls throughout the underground magazine is lead-containing. • Green coloured paint on the steel window frame of the defensive electrical directing station is lead containing. • Light blue coloured paint on the interior walls of defensive electrical directing station is lead-containing. • Grey coloured paint on the exterior door of the electrical directing station is lead-containing. • White coloured paint on the flag pole is lead-containing. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in concrete throughout the Upper Battery.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Summary of Identified Hazardous Building Materials	
Building Name	Identified Hazardous Building Materials
Visitors Centre/Entrance Kiosk	<p>ACMs</p> <ul style="list-style-type: none"> • Grey window frame caulking throughout is asbestos-containing. • Grey caulking on base of wood columns throughout is asbestos-containing. • Black window pane caulking throughout is asbestos-containing. <p>Lead</p> <ul style="list-style-type: none"> • Red coloured paint on the exterior trims and columns is lead-containing. • Red coloured paint on the steel fencing is lead-containing. • Lead is expected to be present in older electrical wiring materials and sheathing and solder used in electrical equipment. <p>PCBs</p> <ul style="list-style-type: none"> • PCBs may be present in the fluorescent light ballasts of the approximately 10 light fixtures observed. As the ballasts were energized, they could not be inspected at the time of the assessment for health and safety reasons. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury vapour is expected to be present in the light tubes within the approximately 10 fluorescent light fixtures observed. • Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is presumed to be present in concrete foundation within the subject building.
Warrants Officer's Quarter	<p>Asbestos</p> <ul style="list-style-type: none"> • Black mastic on the base of one roof vent on northwest side of the building is asbestos-containing. <p>Lead</p> <ul style="list-style-type: none"> • Tan coloured paint on the interior trim throughout is lead-containing. • Yellow coloured paint on base boards throughout is lead-containing. • White coloured paint on the walls of outhouse is lead-containing. • Grey coloured paint on the concrete floors throughout is lead-containing. • White coloured paint on the exterior window sills is lead-containing. • Tan coloured paint on the exterior window frames is lead-containing. • Red coloured paint on the exterior downspouts is lead-containing. • Lead is expected to be present in older electrical wiring materials and sheathing and solder used in electrical equipment. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury may be present in paints and adhesives. <p>Mould</p> <ul style="list-style-type: none"> • Mould was observed on localized spots in the upstairs of the southeast bedroom ceiling. The suspected source of moisture is roof leaks. <p>Silica</p> <ul style="list-style-type: none"> • Silica is expected to be present in concrete foundation, brick siding and brick mortar of the subject building.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Summary of Identified Hazardous Building Materials	
Building Name	Identified Hazardous Building Materials
WWII Hut/Visitors Orientation Centre	<p>Lead</p> <ul style="list-style-type: none"> • Green coloured paint on exterior trim and doors is lead-containing. • Yellow coloured paint on exterior window frame trim is lead-containing. • White coloured paint on exterior wood paneling/siding is lead-containing. • Lead is expected to be present in older electrical wiring materials, solder used on domestic water lines, solder used in bell fittings for cast iron pipes and solder used in electrical equipment. <p>PCBs</p> <ul style="list-style-type: none"> • PCBs may be present in the fluorescent light ballasts of the approximately 10 light fixtures observed. <p>Mercury</p> <ul style="list-style-type: none"> • Mercury vapour is expected to be present in the light tubes within the approximately 10 fluorescent light fixtures observed. • Mercury may be present in paints and adhesives. <p>Silica</p> <ul style="list-style-type: none"> • Silica is expected to be present in concrete foundation of the subject building.

Building-by-building summaries of the identified hazardous building materials are provided in Appendix B through Appendix PP. General findings and recommendations pertaining to hazardous building materials within the subject buildings are provided in Section 4 and Section 5 of this report.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Introduction
March 24, 2016

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by Public Works and Government Services Canada (PWGSC) to conduct hazardous building materials assessments within the buildings associated with the following National Park sites in British Columbia:

- Fort Langley National Historic Site in Langley, BC (24 buildings)
- Gulf of Georgia Cannery in Richmond, BC (5 buildings)
- Fort Rodd Hill National Historic Site in Victoria, BC (31 buildings)
- Gulf Islands National Park on Vancouver, Saturna, Prevost, Pender, Russell, Mayne and Tumbo Island, BC (45 buildings)
- Pacific Rim National Park in and between Tofino, Ucluelet and Port Renfrew, BC (39 buildings)

The general locations of the National Park sites are indicated on Drawing A1 in Appendix A.

This report presents the findings of assessment activities within 31 buildings (subject buildings) throughout Fort Rodd Hill National Historic Site in Victoria, BC. An overall plan of Fort Rodd Hill National Historic Site which shows the locations of the buildings assessed is presented in drawings in Appendix A. In addition, a list of the buildings included in this assessment is also provided in Appendix A.

The purpose of the assessment was to check for potential hazardous building materials that may require special attention in accordance with the requirements of the *Canada Labour Code, Part II* (Canada Labour Code), the current version of British Columbia's *Occupational Health & Safety Regulation* (BC Reg. 296/97) as well as the Parks Canada Asbestos Management Guide (January 2014) and the Parks Canada Asbestos Management Standard (January 2014).

The hazardous building materials considered included asbestos-containing materials (ACMs), lead-containing materials including lead-containing paints (LCPs), polychlorinated biphenyls (PCBs), mercury-containing items, ozone-depleting substances (ODSs), mould or moisture affected building materials, and silica.

The site work was conducted by David Siemens and Steve Chou of Stantec from June 22 to June 26, 2015.

1.1 UNDERSTANDING OF THE PROJECT

Stantec understands that the subject buildings were constructed during time periods when hazardous building materials were commonly used in construction, and that information pertaining to the identity, location and approximate extent of hazardous building materials (if any) within the subject buildings is either not on-file or outdated. As such, and in accordance with the Parks Canada Asbestos Management Guide (January 2014), the Parks Canada Asbestos Management Directive (January 2014), the Canada Labour Code and BC Reg. 296/97



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pertaining to identifying hazards associated with hazardous building materials in the workplace, PWGSC commissioned this assessment on behalf of Parks Canada.

A list of the buildings included in this assessment is included in Appendix A.

2.0 SCOPE AND METHODOLOGY

David Siemens and Steve Chou of Stantec conducted visual assessments within the subject buildings from June 22 to June 26, 2015. Site work was conducted in general compliance with the requirements of the Canada Labour Code, BC Reg. 296/97 and Stantec's Safe Work Practices (SWPs).

Mechanical systems, structures and finishes of the subject buildings were visually examined to determine the suspected presence of ACMs, lead including LCPs, PCBs, mercury, ODSs, mould, and silica. Where building materials were suspected but not confirmed to contain asbestos or lead (in paint) samples were collected for analysis to confirm or deny the presence of these hazardous materials. Based on analytical results, visually similar materials were referenced to specific analyzed samples to reduce the number of samples collected.

Additional background information and the methodology used for the determination of presence or absence of each specific hazardous material considered in this assessment are outlined in the following sections.

2.1 ASBESTOS

The common use of friable (materials which, when dry, can be easily crumbled or powdered by hand pressure) ACMs in construction generally ceased voluntarily in the mid-1970s but was only banned through legislation by the late 1980s. Friable asbestos was used in many building products, primarily high temperature insulations, spray-applied structural fireproofing, and a material known as vermiculite that was commonly used as block wall insulation and may be contaminated with asbestos fibres. Asbestos was also used in many non-friable manufactured products such as floor tiles, ceiling tiles, Transite cement products, and various other construction materials. Some cement products currently used in the construction of buildings may still contain asbestos.

The presence of asbestos in federal workplaces, and pertaining to federally regulated workers is governed by the Canada Labour Code. The presence of asbestos in the workplace in British Columbia pertaining to provincially regulated workers is governed by BC Reg. 296/97. As both federally regulated workers and provincially regulated workers (e.g., contractors) are expected to carry out work activities within the subject buildings, and as the provincial regulations are generally more prescriptive pertaining to asbestos (and generally include the requirements noted in the Canada Labour Code), this assessment was conducted to meet the requirements of BC Reg. 296/97.



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According to the current version of BC Reg. 296/97, asbestos-containing material (ACM) means any material containing at least 0.5% asbestos, or vermiculite insulation with any asbestos.

Based on these criteria, a visual assessment of accessible areas was undertaken in order to check for the presence of materials suspected of containing asbestos. Locations to collect discrete bulk asbestos samples of suspect building materials were identified. Samples of representative materials were then collected at these locations.

Multiple samples were collected from each "homogenous application" of observed suspected ACMs (materials suspected to contain asbestos that are uniform in material type, colour, texture application and estimated installation date) and submitted to EMSL Canada Inc. (EMSL) in Mississauga, Ontario for analysis of asbestos content using polarized light microscopy (PLM) with dispersion staining, in accordance with the United States Environmental Protection Agency (EPA) 600/R-93/116 method.

The number of samples to be collected for each homogenous application of a suspected ACM was based on accepted occupational hygiene standards and protocols, along with the assessor's experience and understanding of the consistency of that building material's application.

EMSL's analytical laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

2.1.1 Sample Results Interpretation

When asbestos is detected in concentrations greater than 0.5% in one of the samples within a set that was collected to represent a "homogenous application" of a particular material (or detected in any concentration, in a set of samples collected for applications of vermiculite), the entire sample set and the entire application of that material was then considered to be an ACM.

In addition to the above, a "positive stop" option was used during the laboratory analysis of the building material samples submitted for asbestos analysis. The "positive stop" option is utilized by the laboratory when asbestos is detected at a concentration of greater than 1% in one of the samples within a set that was collected to represent a "homogenous application" of that material. At this point, further analysis of subsequent samples within the set is deemed to be unnecessary (as the entire set will be considered an ACM, per above), and the remainder of the samples within the set are not analyzed.

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2.1.2 Potential Asbestos-Containing Vermiculite Insulation

As part of the assessment, Stantec assessed the subject buildings for areas where vermiculite insulation, a potential ACM, would likely be present. This included making note of and assessing attic spaces, floor cavities and masonry or brick walls, which are typical areas where vermiculite is found. Regarding this portion of the assessment, the following should be noted:

- Where masonry or brick walls were observed, destructive assessment (drilling) was not conducted to assess the cavity for the presence of vermiculite.
- Where non-vermiculite attic insulation (e.g., fiberglass) was observed, inspection for the presence of vermiculite under the other insulation was conducted only at the attic access point (not throughout the attic).

2.1.3 Asbestos Sampling Quality Assurance/Quality Control

Sampling activities pertaining to asbestos were conducted in accordance with Stantec's SWPs, which take into account current provincial regulations pertaining to such work (i.e., sampling procedures, required number of samples, and laboratory analytical procedures).

Representative bulk samples were collected of accessible suspect ACMs in sufficient quantities for laboratory analyses. Suspect ACM 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.

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.

2.2 LEAD

Lead may be used in its pure metallic form or combined chemically with other elements to form lead compounds. Metallic lead is used to make products such as electric storage batteries, ammunition, lead solder, radiation shields, pipes, and sheaths for electric cables. Metallic lead is sometimes combined with other metals such as copper, tin, and antimony as lead alloys for use in the manufacture of a variety of metal products. Lead is commonly found in buildings in the solder used on copper domestic pipes, in the caulking on bell fittings of cast iron drainage pipes and in electrical equipment.

The presence of lead-containing materials (other than paint) was assessed through visual means.

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With respect to paint, the lead content of interior paint was limited to 0.5% by weight (equivalent to 5,000 mg/kg or ppm) in 1976 under the Federal *Hazardous Products Act*, which governs the import, export and distribution of hazardous products in Canada. In 2005, the *Hazardous Products Act* had reduced the criteria for surface coatings (including paint) to 600 mg/kg (600 ppm) to define them as "lead-containing". This criterion has since (2010) been reduced to 90 ppm.

However, with respect to potential lead exposures associated with disturbance to surfaces coated with lead-containing products, WorkSafeBC has compiled a manual titled *Lead-Containing Paint and Coatings: Preventing Exposure in the Construction Industry*, (Lead Guideline) which defines a "lead-containing surface coating material" and indicates that "...the improper removal of lead paint containing 600 mg/kg lead results in airborne lead concentrations that exceed half of the exposure limit". As such, Stantec will reference this value (600 ppm) in defining paints as "lead-containing".

Based on this criterion, samples of suspected LCPs were collected from major paint applications, and were collected to substrate, where possible, in sufficient quantity to conduct analyses for total lead content. Samples collected were placed into separate, sealed, and labeled polyethylene bags, and submitted to EMSL for analyses of total lead content using Flame Atomic Absorption Spectrometry AAS (SW 846 3050B*/7000B).

EMSL's analytical laboratory is also accredited by the American Industrial Hygiene Association (AIHA) Environmental Lead Laboratory Approval Program.

2.3 POLYCHLORINATED BIPHENYLS

PCBs were used widely as coolants and lubricants in transformers, capacitors, and other electrical equipment. In fluorescent fixtures, PCBs were usually found within the small capacitors inside the ballast that controls the lamp. The Federal Chlorobiphenyls Regulation, SOR/91-152, prohibited the use of PCBs in electrical equipment manufactured after July 1, 1980.

The presence of PCB-containing equipment was assessed through visual means. With respect to fluorescent lamp ballasts, due to the risk of electrical shock associated with dismantling operating fixtures, fluorescent lamp ballasts were not removed to view identification numbers/information.

The total number of fluorescent lamp fixtures that may have ballasts that contain PCBs was approximated for each building assessed.

Suspected PCB-containing electrical equipment can be visually inspected and compared to the Environment Canada reference guide entitled *Identification of Lamp Ballasts Containing PCBs, Report EPS 2/CC/2*, dated August 1991 (PCB Guide).

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2.4 MERCURY

Mercury is commonly found in buildings as mercury vapour lighting, thermostats/thermometers with mercury-containing glass ampoules, electrical switches and can also be found in minor amounts in fluorescent lamp tubes and vapour bulbs and may be present in stable forms in adhesives. Exposure to mercury in federal workplaces is governed by the Canada Labour Code, while provincially it is governed by BC Reg. 296/97.

The presence of mercury and mercury-containing equipment was assessed through visual means.

2.5 MOULD

Moist building materials may provide suitable conditions for mould growth, and the removal of building materials impacted by mould growth may require workers with specific training and experience using work procedures that have been developed to protect workers and work areas from exposure to elevated concentrations of airborne mould.

The presence of suspect visible mould was assessed through visual means and sampling. Material observed with dark-coloured staining and/or a textured and discoloured appearance is described as "suspect mould". Mould identified visually is defined as "suspect mould" unless it is confirmed as mould by laboratory analysis.

2.5.1 Mould Reference Guidelines

With respect to mould and/or moisture, the visual assessment procedures utilized during this project were based on the recommendations provided in the documents listed below:

- Standard Construction Document CCA 82 *Mould Guidelines for the Canadian Construction Industry*, Canadian Construction Association, 2004 (referred to as CCA 82)
- *Guidelines on Assessment and Remediation of Fungi in Indoor Environment*, New York City Department of Health, Bureau of Environmental and Occupational Disease Epidemiology, April 2000 (referred to as the NYC Guidelines)
- *Fungal Contamination in Public Buildings: Health Effects and Investigation Methods*, Federal-Provincial Committee on Environmental and Occupational Health, 2004 (referred to as the Health Canada Guide)
- *Indoor Air Quality in Office Buildings: A Technical Guide*, Report of the Federal-Provincial Advisory Committee on Environmental and Occupational Health, 1995 (referred to as the IAQ Guide)
- *Bioaerosols: Assessment and Control*, American Conference of Governmental Industrial Hygienists (ACGIH), 1999 (referred to as the ACGIH Report)

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2.6 OZONE-DEPLETING SUBSTANCES

Chlorofluorocarbons (CFCs) and other ODSs are often found in refrigeration units associated with air-conditioning or other refrigeration equipment. In September 1987, 47 countries agreed to the Montreal Protocol on Substances that Deplete the Ozone Layer. ODSs are regulated in BC 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) and the Federal Halocarbon Regulations, 2003 (FHR 2003).

The presence of ODSs and equipment containing these materials was assessed through visual means.

2.7 SILICA

Silica, also referred to as free crystalline silica, is found in concrete, cement, mortar, ceramic wall and floor tiles, stucco finishes and acoustic ceiling tiles. Prolonged exposure to, and inhalation of free crystalline silica, may result in respiratory disease known as silicosis, which is characterized by progressive fibrosis of the inner lung tissue and marked shortness of breath or impaired lung function.

Exposure to silica dust is governed by BC Reg. 296/97. According to both legislative instruments, the time-weighted average exposure limit for airborne silica dust is 0.025 mg/m³.

The presence of silica was assessed through visual means.

3.0 ASSESSMENT LIMITATIONS

In preparation of this report, Stantec used professional judgment based on experience. The work was conducted in accordance with generally accepted professional standards. Stantec relied on information gathered during the site investigation and laboratory analytical reports.

This report reflects the observations made within accessed areas of the subject buildings and the results of analyses performed on specific materials sampled during the assessment. Analytical results reflect the sampled materials at the specific sample locations.

Sampling was conducted pertaining to suspected ACMs and suspected LCPs only. The assessment for the presence of other hazardous building materials was visual in nature, and was conducted pertaining to readily visible surfaces within accessible spaces only. Concealed spaces were inspected via existing access panels, where present. Interior and exterior finishes, solid ceilings, walls, flooring and structural elements were not removed to access concealed areas.

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It should be noted that the following building locations, although included in the proposed scope of work, were not accessed during the project due to security restrictions or the lack of keys required to provide access. As such, limited comments, if any, will be made regarding the presence, extent and/or condition of hazardous building materials in the following areas:

- Belmont Battery Lower Tower Level (door sealed from heat expansion)
- Search Light Engine Room: Oil Storage Room on west side of the building and South East Storage room (no keys provided)

In addition to the above, and due to limitations on the agreed to scope of work for this project as well as physical limitations in accessing concealed areas and limitations associated with working in occupied/operational spaces, there are specific limitations to the information that can be provided to each hazardous building material considered in this assessment, as outlined in the following sub-sections.

3.1 ASBESTOS

Suspected ACMs that were not sampled include, but are not limited to, the following (where present, based on building construction or as otherwise noted):

- Roofing materials associated with buildings where the roof could not be accessed safely with the equipment present on-site
- Sub-grade materials
- Interior components of mechanical equipment (e.g., inner linings or gaskets in boilers)
- Interior components of heating, ventilation and air conditioning (HVAC) units
- Heat protection materials inside mechanical installations (e.g., gaskets) and light fixtures (e.g., paper backing in sealed incandescent fixtures)
- Flooring material concealed beneath ceramic tile, brickwork, hardwood flooring, and/or concealed beneath existing sub-floors
- Drywall and/or wall plaster and associated finish materials concealed behind new and/or additional walls or ceilings
- Woven tape inside duct connection joints or inner ducting insulation
- Materials within wall cavities, hard ceiling cavities or crawlspaces
- Insulation materials inside fire doors

If encountered during renovation, demolition or other activities, any suspected ACMs not identified within this report should be presumed to contain asbestos and handled as such until otherwise proven, through analytical testing.

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3.2 LEAD

Assessment for the presence of lead or lead-containing materials was visual in nature, and was conducted pertaining to readily visible surfaces within accessible spaces of the subject buildings only. The presence of lead or lead-containing materials in inaccessible areas not assessed included, but was not limited to: ceiling spaces, wall cavities, crawlspaces, and buried materials.

With respect to paint, samples of suspected LCPs were collected within the subject buildings only from surfaces of major paint applications where visually different paint colours and/or types were identified. 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.

Attempts were made to represent all layers of paint in the samples collected. 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 will be presumed to be the same, regardless of differing sub surface paints, if any.

3.3 POLYCHLORINATED BIPHENYLS

Due to height restrictions and the risk of electrical shock in handling operational light fixtures, the ballasts present in the fixtures observed within the subject buildings were not removed for comparison to the PCB Guide. The visible labels of ballasts in several fixtures were inspected for comparison to the PCB Guide.

Conclusions and recommendations regarding the presence of PCBs within the subject buildings are based on Stantec's limited observations in combination with information provided by staff regarding lighting renovations (where requested by Stantec based on observations) and is presented to provide guidance regarding the likelihood that PCB-containing equipment is or is not present within the subject buildings. The exact extent and/or number of fluorescent lamp ballasts containing PCBs, if any, within the subject buildings will not be commented on.

3.4 MERCURY

Visual assessment for the presence of mercury-containing equipment within the subject buildings was conducted in accessible areas only. The presence of mercury or mercury-containing equipment in inaccessible areas includes, but is not limited to: ceiling spaces, wall cavities, and crawlspaces, or as internal parts of HVAC mechanisms.

3.5 MOULD

Visual assessment for the presence of suspected visible mould and/or suitable conditions for mould growth (e.g., moist and/or water-stained building materials) were conducted in accessed portions of the subject buildings only. The assessment was not intrusive in nature and included visual assessment of exposed surfaces and closer inspection of known problem areas.



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The conclusions made in this report provide description(s) of the potential source(s) of moisture within the subject buildings that may have led to suitable conditions for mould growth, only in those cases where potential source(s) of moisture were identified. These conclusions will not necessarily identify all sources of moisture leading to suitable conditions for mould growth within the subject buildings or within the impacted area(s).

This assessment does not constitute a building envelope/building systems assessment, which would include an intrusive investigation to assess the internal condition, potential moisture sources, and expected remaining service life of the various components and systems comprising the envelope of a building.

3.6 OZONE DEPLETING SUBSTANCES

Visual assessment for the presence of ODSs within the subject buildings was conducted in accessible areas only. The presence of ODS-containing equipment in inaccessible areas including, but not limited to, ceiling spaces, wall cavities and crawlspaces, was not assessed. In addition, portable equipment that may contain ODSs (refrigerators, drink coolers, etc.) was not considered as part of this assessment.

3.7 SILICA

Visual assessment for the presence of silica-containing materials within the subject building was conducted in accessible areas only. The presence of potential silica-containing materials in inaccessible areas including, but not limited to, ceiling spaces and wall cavities was not assessed.

4.0 FINDINGS

The results of our assessment are provided on a building-by-building basis in Appendices B through V. Each Appendix contains the following (where applicable):

- Separate sections with written summaries of findings pertaining to each hazardous building material, including the following:
 - Information regarding the building including the reported intent for that particular building (e.g., continued operations and maintenance)
 - A listing of suspect materials observed
 - Tables that provide summaries of the sample types, locations, and analytical results
 - Interpretations of observations and/or sample analytical results
- Photographs of identified hazardous building materials, where available
- Information pertaining to condition evaluation of identified hazardous building materials
- Recommendations for identified hazardous building materials found to be in "non-compliant" condition (e.g. damaged ACMs, mould-impacted materials, etc.)

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- Floor plan drawings for the subject building, which include locations of the samples collected during this assessment, and locations of identified hazardous building materials (where practical)
- Copies of the analytical certificates for all suspected ACM samples collected
- Copies of the analytical certificates for all suspected LCP samples collected

It should be noted that evaluation of condition of identified ACMs was conducted using terminology and classifications as outlined in the *Parks Canada Asbestos Management Directive* (2012), and considered the friability of the material (terminology relating to how easily fibres can be released), condition (good, fair and poor) and accessibility of the material.

5.0 GENERAL RECOMMENDATIONS

Building-specific recommendations pertaining to the identified hazardous building materials that require action are provided in Appendices B through V. General recommendations pertaining to management of identified hazardous building materials in good condition are provided below.

5.1 ASBESTOS

For buildings/structures with identified ACMs, Stantec recommends the following with regards to meeting the requirements of the Canada Labour Code), BC Reg. 296/97, the *Parks Canada Asbestos Management Guide* (January 2014) and the *Parks Canada Asbestos Management Standard* (January 2014) as they pertain to managing asbestos in the workplace and/or managing asbestos during renovation/demolition projects:

- Asbestos-containing materials that may be impacted during renovations and/or demolition activities should be removed prior to the renovation and/or demolition activities.
- Prior to renovation and/or demolition activities that would disturb them, undertake testing of presumed ACMs (materials that were previously un-tested, but are presumed to contain asbestos based on application and vintage) that may be impacted to determine their asbestos content. Confirmed asbestos materials should be handled accordingly.
- Identified ACMs in good condition can be managed in place in accordance with the requirements of the *Parks Canada Asbestos Management Guide* (January 2014) and the *Parks Canada Asbestos Management Standard* (January 2014).
- Should a material suspected to contain asbestos fibres become uncovered during renovation and/or demolition activities, 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 asbestos fibres are present. Confirmed asbestos materials should be handled in accordance with applicable guidelines and regulations.
- Suspected ACMs deemed visually similar to the ACMs identified in this report (on a building-by-building basis) should be considered asbestos-containing and handled as such, unless proven otherwise, through analytical testing.

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- Asbestos-containing cement pipe may be present below ground—caution should be used if excavation is required.
- If masonry block walls are to be impacted by renovation and/or demolition work, and these walls have not been checked for the presence of vermiculite insulation, intrusive assessments for vermiculite should be undertaken prior to renovation/or demolition work. If vermiculite insulation is suspected to be present, this material should be treated as an ACM until testing can show otherwise.
- Ensure asbestos containing waste is handled, stored, and disposed of in accordance with the requirements of the Federal Transportation of Dangerous Goods Regulation and the British Columbia Hazardous Waste Regulation (BC Reg. 63/88).

5.2 LEAD

Lead-containing materials, including paints, can be managed in place, where in good condition.

If LCPs or other lead-containing equipment/materials within the subject buildings are to be disturbed and/or removed, ensure compliance with the following:

- Exposure protection requirements of the BC Reg. 296/97
- Disposal requirements of the British Columbia Hazardous Waste Regulation (BC Reg. 63/88)
- Transportation requirements of the Federal Transportation of Dangerous Goods Regulation

Corrective action or remedial work on paint applications containing any concentration of lead should be undertaken in a manner so as to avoid generating fine particulate matter or dust (i.e., avoid sanding). Airborne lead dust or fumes should not exceed the BC Reg. 296/97 8-hour Occupational Exposure Limit (OEL) of 0.05 milligram per cubic metre (mg/m³) during the removal of paints and products containing any concentration of lead. The use of personal protective equipment is recommended to reduce the potential for over-exposure to lead dust. This can be achieved by:

- Providing workers with protective clothing and PPE or devices as necessary to protect the worker against the hazards to which the worker may be exposed
- Providing workers with adequate and training in the care and use of clothing, equipment or device before wearing or using it
- Wetting the surface of the materials to prevent dust emissions
- Providing workers with washing facilities with clean water, soap and individual towels to properly wash prior to exiting the work area

To avoid the inhalation of lead, it is essential to have the following control methods in place:

- Engineering controls
- Work practices and hygiene practices
- Respirators and personal protective equipment
- Training

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The work tasks required and the ways in which lead-containing materials (including paints) will be impacted will determine the appropriate respirators, measures and procedures that should be followed to protect workers from lead exposure.

5.3 POLYCHLORINATED BIPHENYLS

Fluorescent lamp ballasts that may contain PCBs can be managed in place, where these items are operating and in good condition. No further action is currently required until such time that renovation or demolition activities are to be conducted, or until 2025, when PCB-containing ballasts will require removal and disposal.

When decommissioned, verify the PCB content of fluorescent lamp ballasts as per the Environment and Climate Change Canada publication *Identification of Lamp Ballasts Containing PCBs*, 1991. PCB-containing items identified for removal and disposal should be handled, transported, stored and disposed of in accordance with the following:

- Disposal requirements of the British Columbia Hazardous Waste Regulation (BC Reg. 63/88)
- Transportation requirements of the Federal Transportation of Dangerous Goods Regulation
- Federal PCB Regulations (SOR/2008-273)

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. Confirmed PCBs should be handled in accordance with Federal Regulation SOR/2008-273 and BC Reg. 63/88.

5.4 MERCURY

Identified mercury-containing items can be managed in place, therefore no further action is recommended at this time. Mercury vapour within light fixtures and liquid mercury in thermostat switches pose no risk to workers or occupants provided the mercury containers remain intact and undisturbed.

Complete removal of mercury-containing equipment is required prior to renovation or demolition activities that may disturb the equipment. When mercury-containing items (e.g., fluorescent light bulbs/tubes, thermostats) are removed, ensure all mercury waste is handled, stored and disposed of in accordance with the disposal requirements of the following:

- Disposal requirements of the British Columbia Hazardous Waste Regulation (BC Reg. 63/88)
- Transportation requirements of the Federal Transportation of Dangerous Goods Regulation

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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/m³ 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.

5.5 MOULD

In general, mould-impacted building materials will require action (e.g. abatement/removal or cleaning). Recommendations pertaining to mould are provided in the building-by-building information included in Appendices B through V.

5.6 OZONE DEPLETING SUBSTANCES

ODS-containing/ODS-Containing identified can be managed in place and must be serviced by licensed refrigeration technicians (as defined in the Federal Halocarbon Regulations).

When refrigeration equipment that is suspect or confirmed ODS-containing is decommissioned, it should be emptied and inspected by licensed refrigeration technician (as defined in the Federal Halocarbon Regulations).

If ODS-containing equipment is identified (e.g., pad-mounted air conditioning units associated with the main building) and is to be removed during demolition activities, ODSs must be handled, recycled, stored, and/or disposed of in accordance with the requirements of the following:

- British Columbia *Waste Management Act*—Ozone Depleting Substances and Other Halocarbons Regulation (BC Reg. 387/99 as amended by BC Reg. 109/2002)
- Transportation requirements of the Federal Transportation of Dangerous Goods Regulation
- Federal Halocarbons Regulations

5.7 SILICA

When silica-containing materials are to be removed during demolition activities, 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 (0.025 mg/m³). This would include, but not be limited to, the following:

- Providing workers with respiratory protection
- Wetting the surface of the materials to prevent dust emissions
- Providing workers with facilities to properly wash prior to exiting the work area
- Providing dust control to mitigate the potential for demolition dust to escape from the work area into public and/or adjacent areas

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Closure
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6.0 CLOSURE

This report has been prepared by Stantec Consulting Ltd. for the sole benefit of Public Works and Government Services Canada. Any use that a third party makes of this report, or any reliance on decisions to be made based on it, is the responsibility of such third parties. Stantec Consulting Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The conclusions presented represent the best judgment of the assessor based on current environmental, health and safety standards and the site conditions observed on the dates cited within this report. This report is based on, and limited by, circumstances and conditions stated herein, and on information available at the time of preparation of the report. Due to the limited nature of the investigation and the limited data available, Stantec Consulting Ltd. cannot warrant against undiscovered environmental, health and/or safety liabilities. It is possible that additional, concealed hazardous materials may become evident during renovation and/or demolition activities within the subject buildings.

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

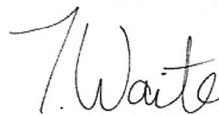
We trust that the report meets your current requirements. Should you have any questions or concerns regarding the above, please do not hesitate to contact the undersigned.

Respectfully submitted,

STANTEC CONSULTING LTD.



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KW/TW/SB/tt

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**APPENDIX A
BUILDING LIST**

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix A Building List
March 24, 2016

Appendix A BUILDING LIST

Appendix	Building Name	Year of Construction
B	Admin Garage and Apartment	1934
C	Casemate Barracks	1898
D	Battery Command Post	1943
E	Belmont Battery	1898
F	Canteen	1900
G	Collections Building	2004
H	Defensive Electric Light #1	1903
I	Fisgard Lighthouse, Boathouse and Storehouse	1860-1960
J	Journey's End	1932
K	Lower Battery	1898
L	Maintenance Facilities	1980s
M	O'Tentiks	2014
N	Parking Lot Washroom	1986
O	Plotting Room	1941
P	Search Light #6	n/a
Q	Search Light Emplacement #7	1940
R	Search Light Engine Room	1900s
S	Upper Battery	1895-1898
T	Visitors Centre/Entrance Kiosk	1991
U	Warrant's Officers Quarter	1897
V	WW2 Hut/Visitors Orientation Centre	1939



LEGEND

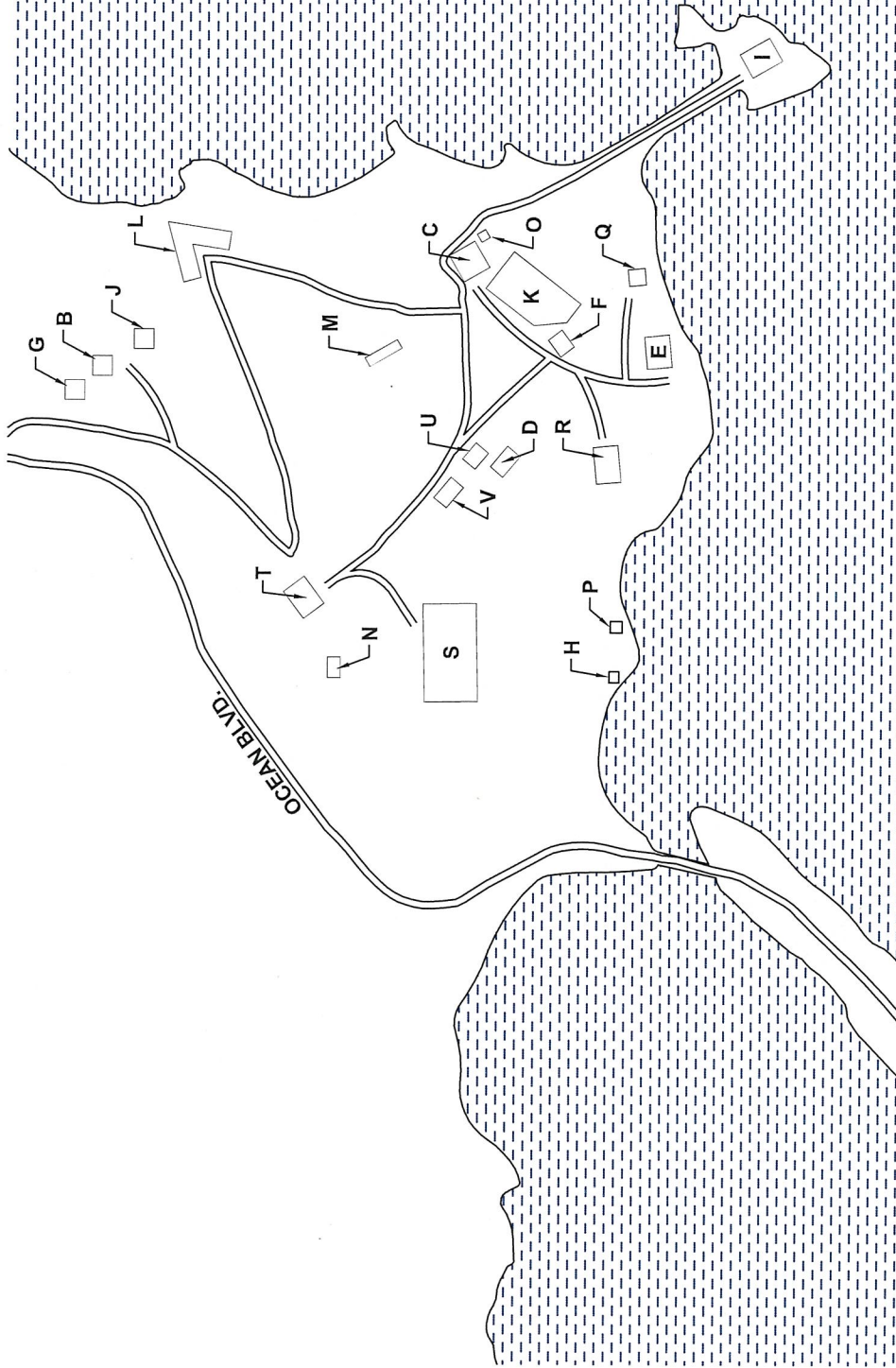
- FORT LANGLEY NATIONAL HISTORIC SITE
- GULF OF GEORGIA CANNERY
- FORT RODD HILL NATIONAL HISTORIC SITE
- GULF ISLANDS NATIONAL PARK
- PACIFIC RIM NATIONAL PARK

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

SITE LOCATIONS
 SOUTH COAST NATIONAL PARKS OF CANADA
 SOUTH COAST OF BRITISH COLUMBIA

Project No.: 123220330	Dwg. No.:
Scale: N.T.S.	1
Date: 15/10/03	
Dwn. By: CD_DM	
App'd By: TW	





NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330 Scale: N.T.S. Date: 16/03/18 Dwn. By: CD_DM App'd By: TW		Dwg. No.: <h1 style="text-align: center;">1</h1>	
SITE PLAN FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES 603 FORT RODD HILL ROAD, VICTORIA, BC			



APPENDIX B
FINDINGS AND RECOMMENDATIONS—
ADMIN GARAGE AND APARTMENT



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix B Findings and Recommendations—Admin Garage and Admin Apartment
March 24, 2016

Appendix B FINDINGS AND RECOMMENDATIONS—ADMIN GARAGE AND ADMIN APARTMENT

The Admin Garage and Admin Apartment are separate parts of a single building that was reportedly constructed in 1934. The building is two-story structure, with the Admin Garage comprising the main level and the furnished Admin Apartment on the second level.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

The following areas were not accessed, for the reasons indicated:

- Roof (lack of safe access)

As such, limited comments, if any, will be provided regarding the presence, quantity or condition of hazardous building materials within the above-noted areas.

B.1 ASBESTOS

Stantec identified and sampled the following suspected ACMs:

- Vinyl sheet flooring
- Sealants, caulking and putties
- Plaster
- Drywall joint fill compound
- Stucco

Twenty-three samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table B-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix B Findings and Recommendations—Admin Garage and Admin Apartment
March 24, 2016

**Table B-1 Suspected ACM Sample Collection and Analysis Summary
Admin Garage and Admin Apartment, Fort Rodd Hill National Historic Site,
BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
Admin Apartment			
AA-VSF-01	Brown vinyl sheet flooring	Floor of Kitchen	None detected
AA-FS-01A	White floor sealant	Along the seam of kitchen cabinet	None detected
AA-FS-01B	White floor sealant	Along the seam of kitchen cabinet	None detected
AA-FS-01C	White floor sealant	Along the seam of kitchen cabinet	None detected
AA-PL-01A	Plaster	South east wall of south bedroom	None detected
AA-PL-01B	Plaster	North wall of laundry room	None detected
AA-PL-01C	Plaster	West wall of living room	None detected
AA-PL-01D	Plaster	North wall of north bedroom	None detected
AA-PL-01E	Plaster	East wall of south bedroom	None detected
AA-JFC-01A	Joint filling compound	Interior closet wall of north bedroom	None detected
AA-JFC-01B	Joint filling compound	Interior closet wall of north bedroom	None detected
AA-JFC-01C	Joint filling compound	Interior closet wall of north bedroom	None detected
Admin Garage			
AG-S-01A	Stucco	West side of the building	None detected
AG-S-01B	Stucco	West side of the building	None detected
AG-S-01C	Stucco	West side of the building	None detected
AG-S-01D	Stucco	East side of the building	None detected
AG-S-01E	Stucco	East side of the building	None detected
AG-WPC-01A	Grey window pane caulking	Exterior window on the east side of the building between pane and frame	None detected
AG-WPC-01B	Grey window pane caulking	Exterior window on the east side of the building between pane and frame	None detected
AG-WPC-01C	Grey window pane caulking	Exterior window on the north side of the building between pane and frame	None detected
AG-EPP-01A	Black electrical penetration putty	Covering top of electrical conduit on north east corner of the building	None detected
AG-EPP-01A	Black electrical penetration putty	Covering top of electrical conduit on north east corner of the building	None detected
AG-EPP-01A	Black electrical penetration putty	Covering top of electrical conduit on north east corner of the building	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix B Findings and Recommendations—Admin Garage and Admin Apartment
March 24, 2016

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, no ACMs were identified.

B.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes
- Solder used in electrical equipment
- Vent and pipe flashings

With respect to paint, 10 paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table B-2, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table B-2 Suspected LCP Sample Collection and Analysis Summary
Admin Garage and Admin Apartment, Fort Rodd Hill National Historic Site,
BC**



Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
Admin Apartment				
AA-PB-01	Yellow	Admin Apartment—Interior wall of kitchen	930	Yes
AA-PB-02	White	Admin Apartment—Interior wall of laundry room	230	No
AA-PB-03	Blue	Admin Apartment—Interior wall of living room	380	No
AA-PB-04	White	Admin Apartment—Interior trim of north bedroom	1200	Yes
AA-PB-05	Baby blue	Admin Apartment—Interior wall of north bedroom	<110	No
AA-PB-06	Lime green	Admin Apartment—Interior wall of south bedroom	90	No
AA-PB-07	Beige	Admin Apartment—Interior wall of bathroom	280	No
Admin Garage				
AG-PB-08	Red	Admin Garage—Exterior trim	450	No
AG-PB-09	White	Admin Garage—Interior wall	210	No
AG-PB-10	Yellow	Admin Garage—Exterior stucco	950	Yes

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix B Findings and Recommendations—Admin Garage and Admin Apartment
 March 24, 2016

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table B-3, below were identified as LCPs.

**Table B-3 Summary of Identified LCPs
 Admin Garage and Admin Apartment, Fort Rodd Hill National Historic Site,
 BC**

Identified LCP Description	Photo
<p>Yellow coloured paint on the interior walls of the Admin Apartment kitchen.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p> <p>White coloured paint on the interior trims.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Yellow colored paint on the exterior stucco.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

B.3 POLYCHLORINATED BIPHENYLS

The majority of fluorescent light fixtures throughout were observed to have high-efficiency light tubes. The ballasts within such fixtures are not suspected to contain PCBs.

Fluorescent light fixtures of older vintage (one observed) may have PCB-containing ballasts.

B.4 MERCURY

Mercury vapour is expected to be present in fluorescent light bulbs/tubes observed in five (5) fluorescent light fixtures.



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix B Findings and Recommendations—Admin Garage and Admin Apartment
March 24, 2016

Mercury may also be present in paints and adhesives.

B.5 MOULD

No mould/moisture-impacted building materials were observed during the assessment.

B.6 OZONE-DEPLETING SUBSTANCES

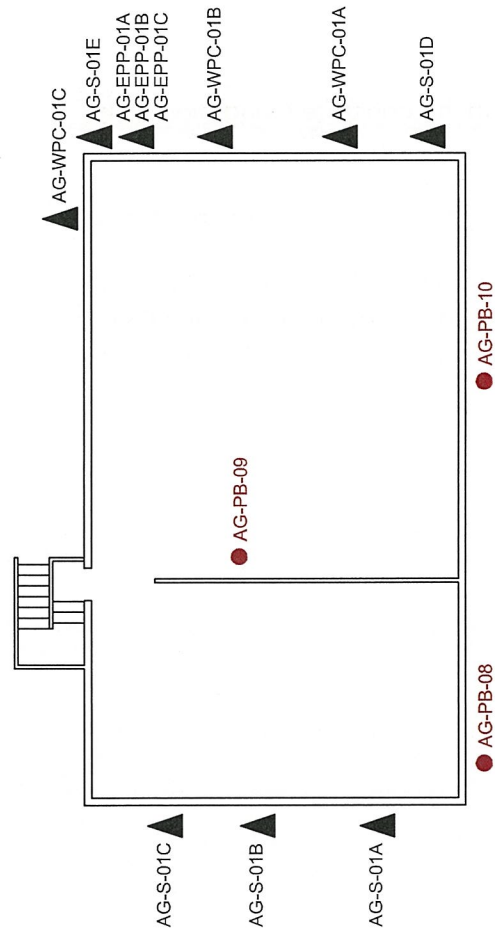
Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

B.7 SILICA

Silica is presumed to be present in stucco, plaster, gypsum and the concrete foundation of the subject building.

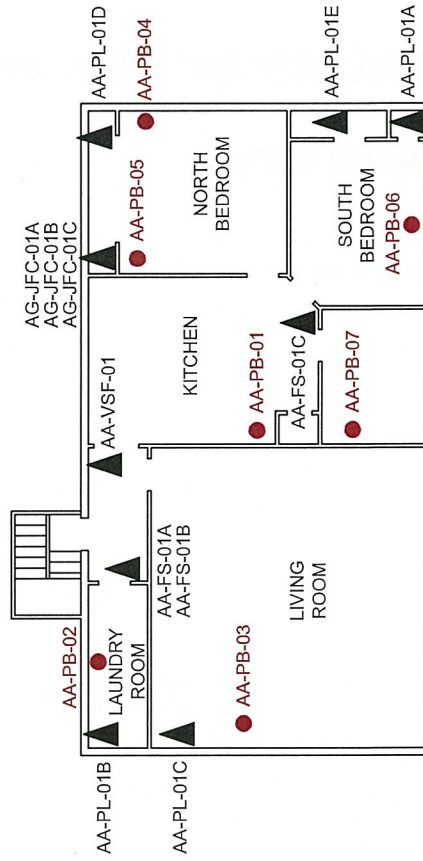
B.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



MAIN LEVEL ADMIN GARAGE

● AG-PB-08 ● AG-PB-10



SECOND LEVEL ADMIN APARTMENT

ADMIN GARAGE (AG) AND ADMIN APARTMENT (AA)

LEGEND

- ▲ BULK SAMPLE LOCATION
- PAINT CHIP SAMPLE LOCATION

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400		Dwg. No.:
Scale:	N.T.S.	24
Date:	15/08/28	
Dwn. By:	CD VM	SL2015080208
App'd By:	TW	
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC		
Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA		



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<http://www.EMSL.com> / torontolab@emsl.com

EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
Project ID:

Attn: Steve Chou
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6
Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015
Proj: 123220330.400.100/Fort Rodd Hill

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: AA-VSF-01 **Lab Sample ID:** 551507781-0219
Sample Description: Floor of Kitchen/Brown vinyl sheet flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: AA-FS-01A **Lab Sample ID:** 551507781-0220
Sample Description: Along the seam of kitchen cabinet /White floor sealent

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: AA-FS-01B **Lab Sample ID:** 551507781-0221
Sample Description: Along the seam of kitchen cabinet/White floor sealent

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: AA-FS-01C **Lab Sample ID:** 551507781-0222
Sample Description: Along the seam of kitchen cabinet/White floor sealent

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: AA-PL-01A **Lab Sample ID:** 551507781-0223
Sample Description: South east wall of south bedroom/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: AA-PL-01B **Lab Sample ID:** 551507781-0224
Sample Description: North wall of laundry room/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray/White	0%	100%	None Detected	

Client Sample ID: AA-PL-01C **Lab Sample ID:** 551507781-0225
Sample Description: West wall of living room/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: AA-PL-01D **Lab Sample ID:** 551507781-0226

Sample Description: North wall of north bedroom/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: AA-PL-01E **Lab Sample ID:** 551507781-0227

Sample Description: East wall of south bedroom/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: AA-JFC-01A **Lab Sample ID:** 551507781-0228

Sample Description: Interior closet wall of north bedroom /Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: AA-JFC-01B **Lab Sample ID:** 551507781-0229

Sample Description: Interior closet wall of north bedroom/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: AA-JFC-01C **Lab Sample ID:** 551507781-0230

Sample Description: Interior closet wall of north bedroom/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: AG-S-01A **Lab Sample ID:** 551507781-0231

Sample Description: West side of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: AG-S-01B **Lab Sample ID:** 551507781-0232

Sample Description: West side of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: AG-S-01C **Lab Sample ID:** 551507781-0233

Sample Description: West side of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: AG-S-01D **Lab Sample ID:** 551507781-0234
Sample Description: East side of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray/White	0%	100%	None Detected	

Client Sample ID: AG-S-01E **Lab Sample ID:** 551507781-0235
Sample Description: East side of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray/White	0%	100%	None Detected	

Client Sample ID: AG-WPC-01A **Lab Sample ID:** 551507781-0236
Sample Description: Ext. window on E.side of bldg btwn pane & frame/Grey window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Red	0.0%	100%	None Detected	

Client Sample ID: AG-WPC-01B **Lab Sample ID:** 551507781-0237
Sample Description: Ext. window on E.side of bldg btwn pane & frame/Grey window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Red	0.0%	100%	None Detected	

Client Sample ID: AG-WPC-01C **Lab Sample ID:** 551507781-0238
Sample Description: Ext. window on N.side of bldg btwn pane & frame/Grey window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Red	0.0%	100%	None Detected	

Client Sample ID: AG-EPP-01A **Lab Sample ID:** 551507781-0239
Sample Description: Covering top of electrical conduit on N.east/corner of the bldg/ Black electrical penetration putty

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: AG-EPP-01B **Lab Sample ID:** 551507781-0240
Sample Description: Covering top of electrical conduit on N.east/corner of the bldg/ Black electrical penetration putty

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: AG-EPP-01C **Lab Sample ID:** 551507781-0241
Sample Description: Covering top of electrical conduit on N.east/corner of the bldg/ Black electrical penetration putty

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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):

Jon Delos Santos	PLM (5) PLM Grav. Reduction (1)
Nicole Dimou	PLM Grav. Reduction (5)
Nicole Yeo	PLM Grav. Reduction (2)
Romeo Samson	PLM (8) PLM Grav. Reduction (2)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 07/28/2015 11:57:46

**EMSL Canada Inc.**

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EMSL Canada Or 551507777
 CustomerID: 55JACQ30L
 CustomerPO: 123220330
 ProjectID:

Attn: **Steve Chou** Phone: (604) 412-3004
Stantec Consulting, Ltd. Fax:
500 - 4730 Kingsway Received: 07/20/15 11:06 AM
Burnaby, BC V5H 0C6 Collected:
 Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
AA-PB-01 Site: INTERIOR WALL OF KITCHEN Desc: YELLOW	551507777-0140		7/24/2015	930 ppm
AA-PB-02 Site: INTERIOR WALL OF LAUNDRY ROOM Desc: WHITE	551507777-0141		7/24/2015	230 ppm
AA-PB-03 Site: INTERIOR WALL OF LIVING ROOM Desc: BLUE	551507777-0142		7/24/2015	380 ppm
AA-PB-04 Site: INTERIOR TRIM OF NORTH BEDROOM Desc: WHITE	551507777-0143		7/24/2015	1200 ppm
AA-PB-05 Site: INTERIOR WALL OF NORTH BEDROOM Desc: BABY BLUE Insufficient sample to meet reporting limit.	551507777-0144		7/24/2015	<110 ppm
AA-PB-06 Site: INTERIOR WALL OF SOUTH BEDROOM Desc: LIME GREEN	551507777-0145		7/24/2015	90 ppm
AA-PB-07 Site: INTERIOR WALL OF BATHROOM Desc: BEIGE	551507777-0146		7/24/2015	280 ppm
AG-PB-08 Site: EXTERIOR TRIM Desc: RED	551507777-0147		7/24/2015	450 ppm
AG-PB-09 Site: INTERIOR WALL Desc: WHITE	551507777-0148		7/24/2015	210 ppm
AG-PB-10 Site: EXTERIOR STUCCO Desc: YELLOW	551507777-0149		7/24/2015	950 ppm

 Lisa Podzyhun
 or other approved signatory

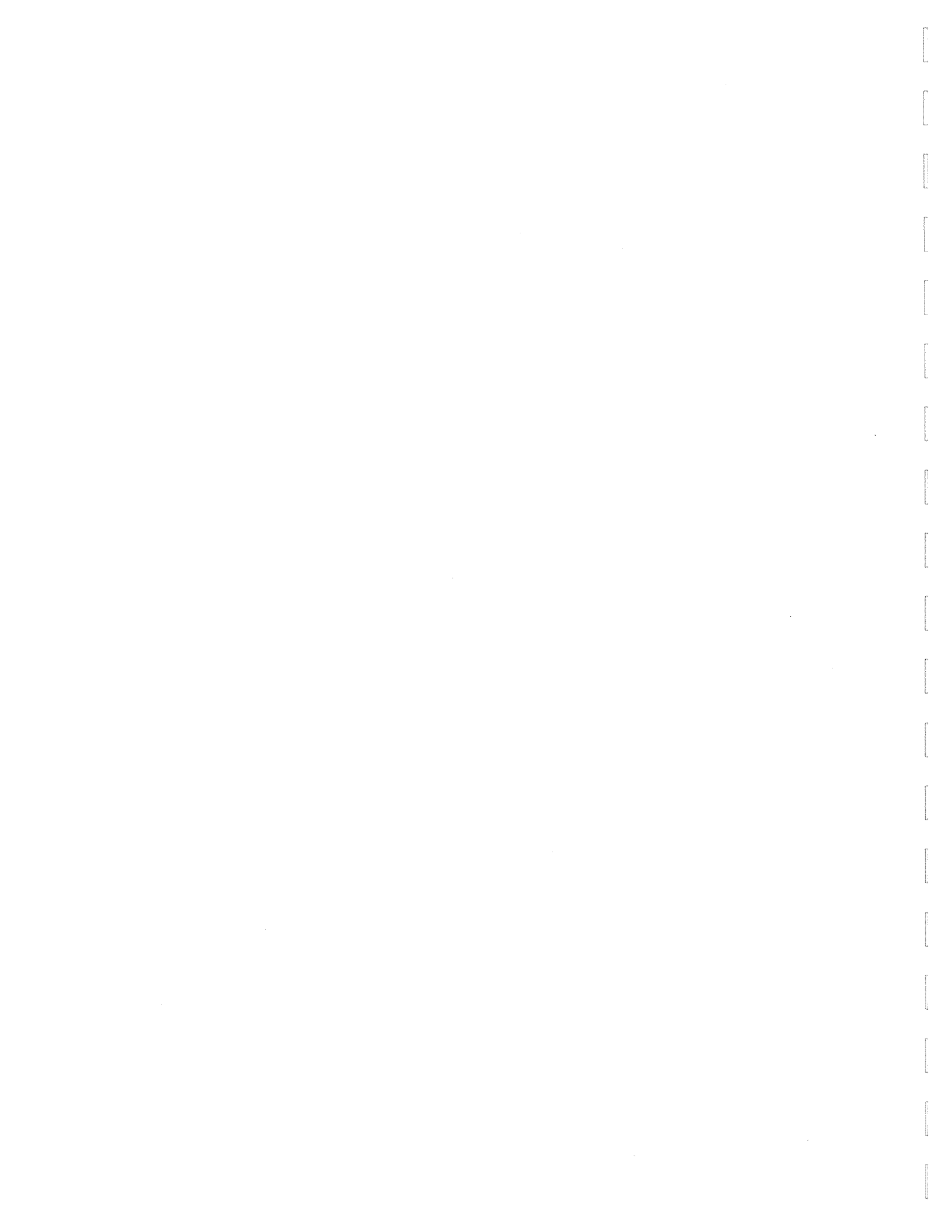
*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:23:00



APPENDIX C
FINDINGS AND RECOMMENDATIONS—
CASEMATE BARRACKS



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix D Findings and Recommendations—Battery Command Post
March 24, 2016

Appendix D FINDINGS AND RECOMMENDATIONS—BATTERY COMMAND POST

The Battery Command Post was reportedly constructed in 1943 and is a small outdoor concrete structure.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

D.1 ASBESTOS

Stantec identified and sampled the following suspected ACMs:

- Roofing material
- Caulking

Six samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table D-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

**Table D-1 Suspected ACM Sample Collection and Analysis Summary
Battery Command Post ,Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
BCP-WC-01A	White window caulking	Exterior between pane and frame	None detected
BCP-WC-01B	White window caulking	Exterior between pane and frame	None detected
BCP-WC-01C	White window caulking	Exterior between pane and frame	None detected
BCP-Roof-01A	Black roof material	Roof of structure	None detected
BCP-Roof-01B	Black roof material	Roof of structure	None detected
BCP-Roof-01C	Black roof material	Roof of structure	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix D Findings and Recommendations—Battery Command Post
March 24, 2016

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, no ACMs were identified.

D.2 LEAD

Lead is expected to be present in the following:

- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes

With respect to paint, four paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table D-2, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table D-2 Suspected LCP Sample Collection and Analysis Summary
Battery Command Post ,Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
BCP-PB-01	Grey	Shutter	7,600	Yes
BCP-PB-02	Red	Window	950	Yes
BCP-PB-03	Black	Railing	100,000	Yes
BCP-PB-04	Red	Interior walls	<90	Yes

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table D-3, below were identified as LCPs.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix D Findings and Recommendations—Battery Command Post
March 24, 2016

**Table D-3 Summary of Identified LCPs
Battery Command Post, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Grey colored paint on the shutters. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Red colored paint on the window "frames". This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Black colored paint on the railing. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix D Findings and Recommendations—Battery Command Post
March 24, 2016

D.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing equipment was observed.

D.4 MERCURY

Equipment and/or items that contain mercury were not observed.

Mercury may also be present in paints and adhesives.

D.5 MOULD

Suspect mould or moisture-impacted building materials were not observed at the time of the assessment.

D.6 OZONE-DEPLETING SUBSTANCES

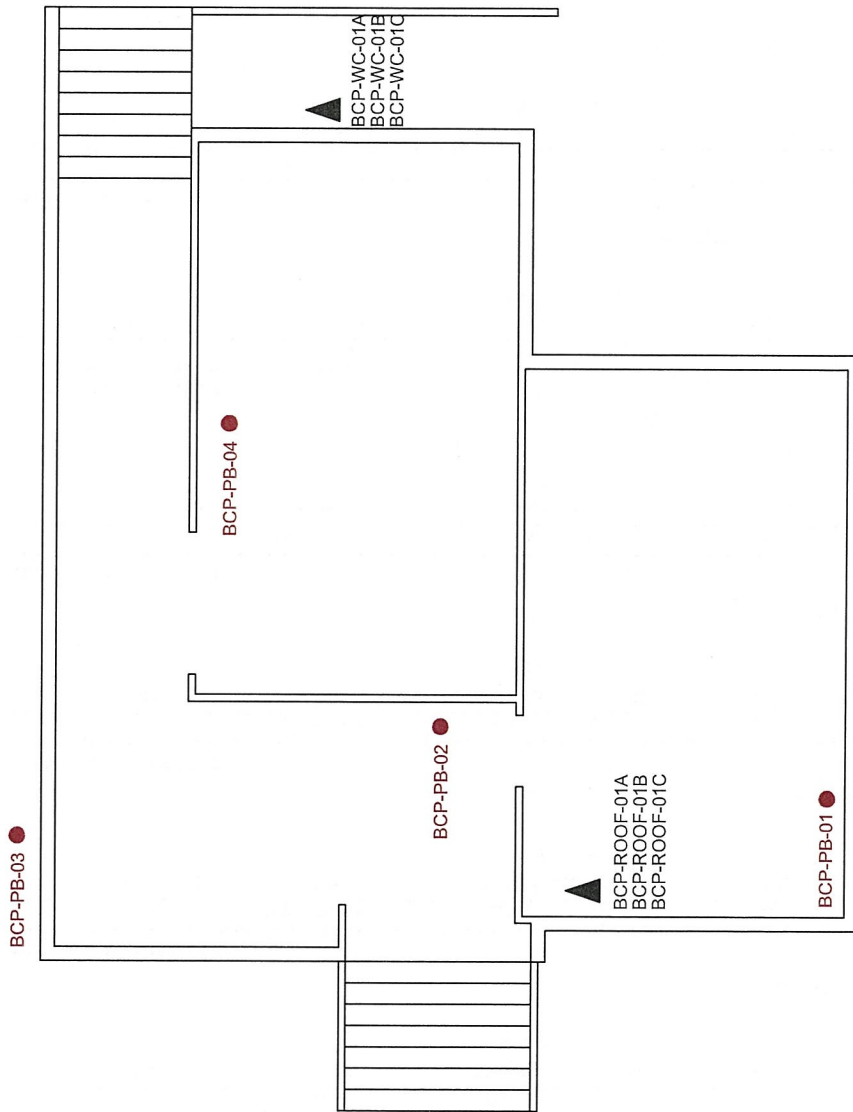
Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

D.7 SILICA

Silica is presumed to be present in the concrete walls floors and ceilings of the subject building.

D.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



BATTERY COMMAND POST (BCP)

LEGEND

- ▲ BULK SAMPLE LOCATION
- PAINT CHIP SAMPLE LOCATION

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400		Dwg. No.:	10	
Scale:	N.T.S.			
Date:	15/08/28			
Dwn. By:	CD VM	SL2015080194		
App'd By:	TW			
<p>FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS</p> <p>FORT RODD HILL AND FISGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC</p> <p>Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA</p>				



EMSL Canada Inc.

2756 Slough Street Mississauga, ON L4T 1G3
Phone/Fax: 289-997-4602 / (289) 997-4607
<http://www.EMSL.com> / torontolab@emsl.com

EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
Project ID:

Attn: Steve Chou
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6

Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015

Proj: 123220330.400.100/Fort Rodd Hill

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: BCP-WC-01A

Lab Sample ID: 551507781-0096

Sample Description: Exterior between pane and frame/White window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: BCP-WC-01B

Lab Sample ID: 551507781-0097

Sample Description: Exterior between pane and frame/White window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: BCP-WC-01C

Lab Sample ID: 551507781-0098

Sample Description: Exterior between pane and frame/White window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: BCP-Roof-01A

Lab Sample ID: 551507781-0099

Sample Description: Roof of structure/Black roof material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: BCP-Roof-01B

Lab Sample ID: 551507781-0100

Sample Description: Roof of structure/Black roof material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: BCP-Roof-01C

Lab Sample ID: 551507781-0101

Sample Description: Roof of structure/Black roof material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	



EMSL Canada Inc.

2756 Slough Street Mississauga, ON L4T 1G3
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<http://www.EMSL.com> / torontolab@emsl.com

EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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):

Jon Delos Santos	PLM (1)
	PLM Grav. Reduction (1)
Nicole Dimou	PLM Grav. Reduction (2)
Nicole Yeo	PLM Grav. Reduction (1)
Romeo Samson	PLM Grav. Reduction (1)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 07/28/2015 21:57:46



EMSL Canada Inc.

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EMSL Canada Or 551507777
CustomerID: 55JACQ30L
CustomerPO: 123220330
ProjectID:

Attn: **Steve Chou**
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6

Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
BCP-PB-01 Site: SHUTTER Desc: GREY	551507777-0097	7/23/2015	7/23/2015	7600 ppm
BCP-PB-02 Site: WINDOW Desc: RED	551507777-0098	7/23/2015	7/23/2015	950 ppm
BCP-PB-03 Site: RAILING Desc: BLACK	551507777-0099	7/23/2015	7/23/2015	100000 ppm
BCP-PB-04 Site: INTERIOR WALL Desc: RED	551507777-0100	7/23/2015	7/23/2015	<90 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:04:33

APPENDIX D
FINDINGS AND RECOMMENDATIONS—
BATTERY COMMAND POST



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix D Findings and Recommendations—Battery Command Post
March 24, 2016

Appendix D FINDINGS AND RECOMMENDATIONS—BATTERY COMMAND POST

The Battery Command Post was reportedly constructed in 1943 and is a small outdoor concrete structure.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

D.1 ASBESTOS

Stantec identified and sampled the following suspected ACMs:

- Roofing material
- Caulking

Six samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table D-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

**Table D-1 Suspected ACM Sample Collection and Analysis Summary
Battery Command Post ,Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
BCP-WC-01A	White window caulking	Exterior between pane and frame	None detected
BCP-WC-01B	White window caulking	Exterior between pane and frame	None detected
BCP-WC-01C	White window caulking	Exterior between pane and frame	None detected
BCP-Roof-01A	Black roof material	Roof of structure	None detected
BCP-Roof-01B	Black roof material	Roof of structure	None detected
BCP-Roof-01C	Black roof material	Roof of structure	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix D Findings and Recommendations—Battery Command Post
March 24, 2016

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, no ACMs were identified.

D.2 LEAD

Lead is expected to be present in the following:

- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes

With respect to paint, four paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table D-2, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table D-2 Suspected LCP Sample Collection and Analysis Summary
Battery Command Post ,Fort Rodd Hill National Historic Site, BC**




Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
BCP-PB-01	Grey	Shutter	7,600	Yes
BCP-PB-02	Red	Window	950	Yes
BCP-PB-03	Black	Railing	100,000	Yes
BCP-PB-04	Red	Interior walls	<90	Yes

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table D-3, below were identified as LCPs.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix D Findings and Recommendations—Battery Command Post
March 24, 2016

**Table D-3 Summary of Identified LCPs
Battery Command Post, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Grey colored paint on the shutters. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Red colored paint on the window "frames". This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Black colored paint on the railing. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix D Findings and Recommendations—Battery Command Post
March 24, 2016

D.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing equipment was observed.

D.4 MERCURY

Equipment and/or items that contain mercury were not observed.

Mercury may also be present in paints and adhesives.

D.5 MOULD

Suspect mould or moisture-impacted building materials were not observed at the time of the assessment.

D.6 OZONE-DEPLETING SUBSTANCES

Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

D.7 SILICA

Silica is presumed to be present in the concrete walls floors and ceilings of the subject building.

D.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.

APPENDIX E
FINDINGS AND RECOMMENDATIONS—
BELMONT BATTERY



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix E Findings and Recommendations—Belmont Battery
March 24, 2016

Appendix E FINDINGS AND RECOMMENDATIONS— BELMONT BATTERY

The Belmont Battery was reportedly constructed in 1898 and is a two story concrete building with a steel tower on the North West side of the building. There is also the remains of a former building that reportedly burnt down on the south west side of the Belmont Battery.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

The following areas were not accessed, for the reasons indicated:

- Lower tower level (door sealed)

As such, limited comments, if any, will be provided regarding the presence, quantity or condition of hazardous building materials within the above-noted areas.

E.1 ASBESTOS

Stantec identified and sampled the following suspected ACMs:

- Roofing material
- Textured flooring
- Mastics, sealants and caulking
- Vinyl sheet flooring

Twenty-eight samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table E-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached at to this Appendix.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix E Findings and Recommendations—Belmont Battery
March 24, 2016

**Table E-1 Suspected ACM Sample Collection and Analysis Summary
Belmont Battery, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
Belmont Battery			
BB-RT-01A	Roofing tar	Roof flashing of artillery store	0.30%
BB-RT-01B	Roofing tar	Roof flashing of artillery store	Not analyzed
BB-RT-01C	Roofing tar	Roof flashing of artillery store	Not analyzed
BB-RT-02A	Roofing tar	East side of lifting lobby roof under concrete	None detected
BB-RT-02B	Roofing tar	East side of lifting lobby roof under concrete	None detected
BB-RT-02C	Roofing tar	East side of lifting lobby roof under concrete	None detected
BB-RS-01A	Roofing shingle	Roof of artillery store	None detected
BB-RS-01B	Roofing shingle	Roof of artillery store	None detected
BB-RS-01C	Roofing shingle	Roof of crew shelter room	None detected
BB-NSF-01A	No-slip textured flooring	By stairs leading to main artillery	None detected
BB-NSF-01B	No-slip textured flooring	By stairs leading to main artillery	None detected
BB-NSF-01C	No-slip textured flooring	By stairs leading to main artillery	None detected
BB-RM-01A	Black roof mastic	Vertical exhaust vent on roof of crew shelter room	None detected
BB-RM-01B	Black roof mastic	Vertical exhaust vent on roof of crew shelter room	None detected
BB-RM-01C	Black roof mastic	Vertical exhaust vent on roof of crew shelter room	5% Chrysotile
BB-CS-01A	Grey concrete sealant	West exterior wall of paint store	None detected
BB-CS-01B	Grey concrete sealant	West exterior wall of paint store	None detected
BB-CS-01C	Grey concrete sealant	West exterior wall of paint store	None detected
BB-VSF-01	Brown vinyl sheet flooring	Floor of crew shelter room	None detected
BB-CC-01A	White caulking	Ceiling between steel panels	None detected
BB-CC-01B	White caulking	Ceiling between steel panels	None detected
BB-CC-01C	White caulking	Ceiling between steel panels	None detected
Remains from Burnt Building			
BuB-BS-01A	Burnt building shingle	North west of Belmont Battery	None detected
BuB-BS-01B	Burnt building shingle	North west of Belmont Battery	None detected
BuB-BS-01C	Burnt building shingle	North west of Belmont Battery	None detected
BuB-SOIL-01A	Soil sample collected from the burnt building	North west of Belmont Battery	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT


Appendix E Findings and Recommendations—Belmont Battery
 March 24, 2016

**Table E-1 Suspected ACM Sample Collection and Analysis Summary
 Belmont Battery, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
BuB-SOIL-01B	Soil sample collected from the burnt building	North west of Belmont Battery	None detected
BuB-SOIL-01C	Soil sample collected from the burnt building	North west of Belmont Battery	None detected

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, the material presented in Table E-2, below were identified as ACMs.

**Table E-2 Summary of Identified ACMs
 Belmont Battery, Fort Rodd Hill National Historic Site, BC**

Identified ACM Description and Condition Information		Photo
Black roof mastic on vertical exhaust vents on roof		
Friability	Non-friable	
Condition	Good	
Content	5% Chrysotile	

E.1.1 Materials with less than 0.5% Asbestos

It should be noted that one sample of black tar on roof flashings was identified to contain asbestos in a concentration less than 0.5%. Although the subsequent two samples were erroneously not analyzed by the lab, applicable regulations and guidance documents in BC (e.g., the BC Asbestos Guide) indicate that one sample of each distinct type of roofing material is sufficient to appropriately characterize it. Based on this result (asbestos content less than 0.5%) and the limited extent of the material, the black tar on roof flashings is not considered to be an ACM.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix E Findings and Recommendations—Belmont Battery
March 24, 2016

E.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes
- Solder used in electrical equipment
- Vent and pipe flashings

With respect to paint, 11 paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table E-3, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table E-3 Suspected LCP Sample Collection and Analysis Summary
Belmont Battery, Fort Rodd Hill National Historic Site, BC**




Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
BB-PB-01	White	West exterior trims	70,000	Yes
BB-PB-02	White	Interior wall of tower upper level	20,000	Yes
BB-PB-03	Orange	West exterior trims of paint store	22,000	Yes
BB-PB-04	Black	Interior trims of lifting lobby	2,000	Yes
BB-PB-05	Green	Steel structure of tower	28,000	Yes
BB-PB-06	Green	Door trim of paint store	15,000	Yes
BB-PB-07	Dark green	Interior walls of paint store	410	No
BB-PB-08	Grey	Floor of paint store	42,000	Yes
BB-PB-09	White	Interior walls of paint store	20,000	Yes
BB-PB-10	Red	Floor of generator room on concrete slab	63,000	Yes
BB-PB-11	Yellow	Interior walls of lifting lobby	45,000	Yes

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table E-4, below were identified as LCPs.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix E Findings and Recommendations—Belmont Battery
March 24, 2016

**Table E-4 Summary of Identified LCPs
Belmont Battery, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>White coloured paint on the exterior trims (lower arrow).</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p> <p>Green colored paint on steel structure of the tower (upper arrow).</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph of a multi-level tower structure. The lower levels are painted white, and the upper levels are painted green. Two white arrows point to the white paint on the lower level and the green paint on the upper level.
<p>White coloured paint on the interior walls of the tower upper level.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph of the interior of the tower's upper level. The walls are painted white. A white arrow points to the white paint on the wall.
<p>Orange colored paint on the exterior walls.</p> <p>Although worn from the surface in many locations, this paint was observed to generally be in good condition, (not bubbling, flaking or peeling).</p>	 A close-up photograph of an exterior wall. The wall is painted orange, but there is a section of white paint at the bottom. A white arrow points to the white paint.



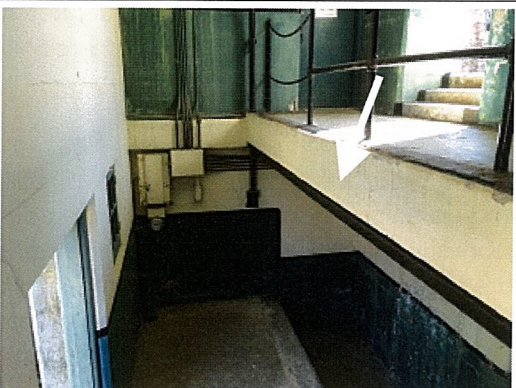
HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix E Findings and Recommendations—Belmont Battery
March 24, 2016

Identified LCP Description	Photo
<p>Black colored paint on the interior trims throughout. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Green colored paint on trim throughout. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Grey colored paint on floors throughout. This paint was observed to be in poor condition (bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix E Findings and Recommendations—Belmont Battery
March 24, 2016

Identified LCP Description	Photo
<p>White colored paint on interior walls throughout This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph showing a corner of an interior wall. The wall is covered in white paint. To the right, there is a doorway leading to a darker area. A white arrow points to the wall above the doorway.
<p>Red colored paint on the floor of generator room on concrete slab. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A close-up photograph of a concrete floor. A section of the floor is painted red. A white arrow points to the red paint.
<p>Yellow colored paint on interior walls of lifting lobby. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph of an interior space, likely a lifting lobby. The walls are painted yellow. There are some pipes and a railing visible. A white arrow points to the yellow wall.

E.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing electrical equipment was observed.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix E Findings and Recommendations—Belmont Battery
March 24, 2016

E.4 MERCURY

Equipment and/or items that contain mercury were not observed.

Mercury may also be present in paints and adhesives.

E.5 MOULD

Suspect mould or moisture-impacted building materials were not observed at the time of the assessment.

E.6 OZONE-DEPLETING SUBSTANCES

Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

E.7 SILICA

Silica is presumed to be present in the concrete walls, floors and ceiling of the subject building.

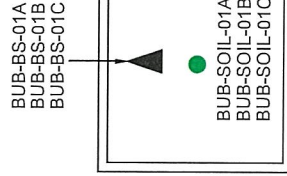
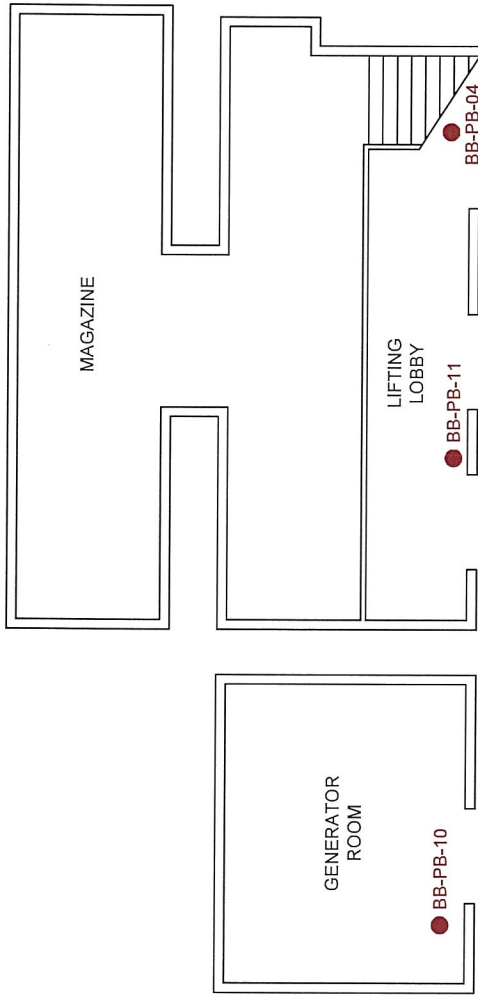
E.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.

E.8.1 Lead

Lead-containing paint observed in poor condition on the grey floors throughout should be cleaned-up and/or addressed to mitigate potential for additional deterioration and dispersal of lead-containing paint chips/dust. Consideration should be given to re-painting surfaces to mitigate the potential for additional deterioration and hazards associated with the lead-containing paint chips/dust that may be created. If re-painting is completed, appropriate precautions to protect workers and work areas from exposure to lead will be required during painting preparation activities.

Provisions for worker protection and waste disposal related to the above are included in Section 5.2 of the main body of this report.

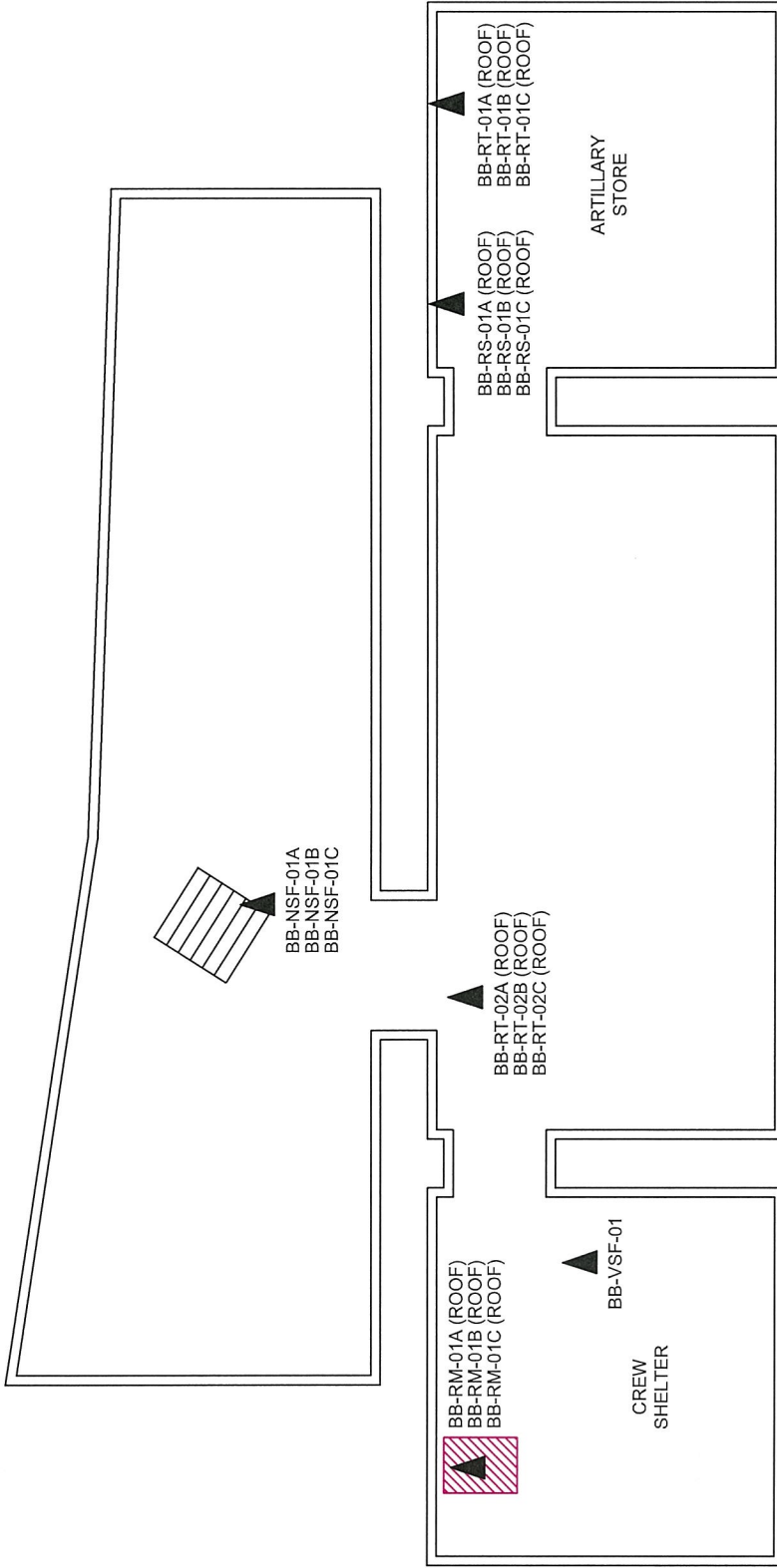


LEGEND

- BULK SAMPLE LOCATION
- PAINT CHIP SAMPLE LOCATION
- TEM SAMPLE LOCATION

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400		Dwg. No.:	
Scale: N.T.S.	Date: 16/03/23	2	
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS		Dwn. By: CD VM/DM	
FORT RODD HILL AND FISGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA		App'd By: TW	
603 FORT RODD HILL ROAD, VICTORIA, BC			
Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA			



BELMONT BATTERY (UPPER LEVEL)

LEGEND

- BULK SAMPLE LOCATION
- ASBESTOS-CONTAINING MASTIC ON VERTICAL EXHAUST VENT

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400		Dwg. No.:
Scale: N.T.S.	1	
Date: 15/08/28		
Dwn. By: CD VM		
App'd By: TW		
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FISGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC		
Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA		



EMSL Canada Inc.

2756 Slough Street Mississauga, ON L4T 1G3
Phone/Fax: 289-997-4602 / (289) 997-4607
<http://www.EMSL.com> / torontolab@emsl.com

EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
Project ID:

Attn: Steve Chou
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6
Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015
Proj: 123220330.400.100/Fort Rodd Hill

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: BB-RT-01A **Lab Sample ID:** 551507781-0062

Sample Description: Roof flashing of artillery store/Roof Tar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	99.7%	0.30% Chrysotile	

Client Sample ID: BB-RT-01B **Lab Sample ID:** 551507781-0063

Sample Description: Roof flashing of artillery store/Roof Tar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015					Stop Positive (Not Analyzed)

Client Sample ID: BB-RT-01C **Lab Sample ID:** 551507781-0064

Sample Description: Roof flashing of artillery store/Roof Tar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015					Stop Positive (Not Analyzed)

Client Sample ID: BB-RT-02A **Lab Sample ID:** 551507781-0065

Sample Description: East side of lifting lobby roof under concrete/Roof Tar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: BB-RT-02B **Lab Sample ID:** 551507781-0066

Sample Description: East side of lifting lobby roof under concrete/Roof Tar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: BB-RT-02C **Lab Sample ID:** 551507781-0067

Sample Description: East side of lifting lobby roof under concrete/Roof Tar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	

Client Sample ID: BB-RS-01A **Lab Sample ID:** 551507781-0068

Sample Description: Roof of artillery store/Roof shingle

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: BB-RS-01B **Lab Sample ID:** 551507781-0069
Sample Description: Roof of artillery store/Roof shingle

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: BB-RS-01C **Lab Sample ID:** 551507781-0070
Sample Description: Roof of crew shelter room/Roof shingle

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	

Client Sample ID: BB-NSF-01A **Lab Sample ID:** 551507781-0071
Sample Description: By stairs leading to main artillery /No-slip textured floor

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: BB-NSF-01B **Lab Sample ID:** 551507781-0072
Sample Description: By stairs leading to main artillery/No-slip textured floor

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: BB-NSF-01C **Lab Sample ID:** 551507781-0073
Sample Description: By stairs leading to main artillery/No-slip textured floor

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	

Client Sample ID: BB-RM-01A **Lab Sample ID:** 551507781-0074
Sample Description: Vertical exhaust vent on roof of crew shelter room/Black roof mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	

Client Sample ID: BB-RM-01B **Lab Sample ID:** 551507781-0075
Sample Description: Vertical exhaust vent on roof of crew shelter room/Black roof mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	

Client Sample ID: BB-RM-01C **Lab Sample ID:** 551507781-0076
Sample Description: Vertical exhaust vent on roof of crew shelter room/Black roof mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Black	0%	95%	5% Chrysotile	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: BB-CS-01A **Lab Sample ID:** 551507781-0077
Sample Description: West exterior wall of paint store/Grey concrete sealant

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: BB-CS-01B **Lab Sample ID:** 551507781-0078
Sample Description: West exterior wall of paint store/Grey concrete sealant

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: BB-CS-01C **Lab Sample ID:** 551507781-0079
Sample Description: West exterior wall of paint store/Grey concrete sealant

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: BB-VSF-01 **Lab Sample ID:** 551507781-0080
Sample Description: Floor of crew shelter room/Brown vinyl sheet flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Brown	0.0%	100%	None Detected	

Client Sample ID: BB-CC-01A **Lab Sample ID:** 551507781-0081
Sample Description: Ceiling between steel panels/White caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/White/Red	0.0%	100%	None Detected	

Client Sample ID: BB-CC-01B **Lab Sample ID:** 551507781-0082
Sample Description: Ceiling between steel panels/White caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/White/Red	0.0%	100%	None Detected	

Client Sample ID: BB-CC-01C **Lab Sample ID:** 551507781-0083
Sample Description: Ceiling between steel panels/White caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/White/Red	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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):

Jon Delos Santos	PLM (1) PLM Grav. Reduction (3)
Nicole Dimou	PLM Grav. Reduction (8)
Nicole Yeo	PLM Grav. Reduction (2)
Romeo Samson	PLM Grav. Reduction (6)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 07/28/2015 21:57:46



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CustomerPO: 123220330
ProjectID:

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Burnaby, BC V5H 0C6

Phone: (604) 412-3004
Fax:
Received: 07/21/15 11:18 AM
Analysis Date: 7/28/2015
Collected:

Project: 123220330.400.100, FORT RODD HILL

**Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by PLM
via EPA 600/R-93/116 section 2.3**

SAMPLE ID	DESCRIPTION	APPEARANCE	% MATRIX MATERIAL	% NON-ASBESTOS FIBERS	ASBESTOS TYPES
BuB-BS-01A 551507850-0001	NORTH WEST OF BELMONT BATTERY - BURNT BUILDING SHINGLE	Brown/Black Non-Fibrous Heterogeneous	100	None	No Asbestos Detected
BuB-BS-01B 551507850-0002	NORTH WEST OF BELMONT BATTERY - BURNT BUILDING SHINGLE	Brown/Black Non-Fibrous Heterogeneous	100	None	No Asbestos Detected
BuB-BS-01C 551507850-0003	NORTH WEST OF BELMONT BATTERY - BURNT BUILDING SHINGLE	Brown/Black Non-Fibrous Heterogeneous	100	None	No Asbestos Detected

Analyst(s)
Matthew Greco (3)


Matthew Davis
or other approved signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported 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. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. This report contains data that is (are) not covered by the NVLAP accreditation. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.
Samples analyzed by EMSL Analytical, Inc. Carle Place, NY NVLAP Lab Code 101048-10, NY ELAP 11469

Initial report from 07/28/2015 18:00:40



EMSL Analytical, Inc.

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500-4730 KINGSWAY
BURNABY, BC, V5H 0C6
Phone: 604-396-6791
Fax: 0
Project: 123220330.400.100 FORT RODD HILL

Customer ID: 55JACQ30L
Customer PO: Unavailable
Received: 8/4/15 12:00 AM
EMSL Order: 551507851
Analysis Date: 8/18/2015
Report Date: 8/18/2015

TEM Mass Analysis- Reporting Limit 0.1 %

Asbestos Analysis in Soil Samples via Modified EPA 600/R-93/ 116 Method Utilizing Analytical Electron Microscopy (Section 2.5.5.2) with Milling

<i>Client Sample ID</i>	<i>Location</i>	<i>Mineral Type(s)</i>	<i># of Structures Detected</i>	<i>Analytical Sensitivity %</i>	<i>Asbestos Weight %</i>	<i>Comments</i>
EMSL Sample ID						
<i>BUB-SOIL-01A</i> 551507851-0001	<i>North West Of Belmont Battery</i>	No Asbestos Detected		0.1	< 0.1	
<i>BUB-SOIL-01B</i> 551507851-0002	<i>North West Of Belmont Battery</i>	No Asbestos Detected		0.1	< 0.1	
<i>BUB-SOIL-01C</i> 551507851-0003	<i>North West Of Belmont Battery</i>	No Asbestos Detected		0.1	< 0.1	

0.25

Analyst

Approved Signatory

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 is not responsible for sample collection activities or analytical method limitations. Interpretation and use of results are the responsibility of the client



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Phone: 604-396-6791
Fax: 0
Project: 123220330.400.100 FORT RODD HILL

Customer ID: 55JACQ30L
Customer PO: Unavailable
Received: 8/4/15 12:00 AM
EMSL Order: 551507851
Analysis Date: 8/18/2015
Report Date: 8/18/2015

TEM Mass Analysis- Reporting Limit 0.1 %

Asbestos Analysis in Soil Samples via Modified EPA 600/R-93/ 116 Method Utilizing Analytical Electron Microscopy (Section 2.5.5.2) with Milling

<i>Client Sample ID</i>	<i>Location</i>	<i>Mineral Type(s)</i>	<i># of Structures Detected</i>	<i>Analytical Sensitivity %</i>	<i>Asbestos Weight %</i>	<i>Comments</i>
-------------------------	-----------------	------------------------	---------------------------------	---------------------------------	--------------------------	-----------------

0.25

Analyst

Approved

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Phone: 604-396-6791
Fax: 0

Project: 123220330.400.100 FORT RODD HILL

Customer ID: 55JACQ30L
Customer PO: Unavailable
Received: 8/4/15 12:00 AM
EMSL Order: 551507851
Analysis Date: 8/18/2015
Report Date: 8/18/2015

TEM Mass Analysis- Reporting Limit 0.1 %

Asbestos Analysis in Soil Samples via Modified EPA 600/R-93/ 116 Method Utilizing Analytical Electron Microscopy (Section 2.5.5.2) with Milling

<i>Client Sample ID</i>	<i>Location</i>	<i>Mineral Type(s)</i>	<i># of Structures Detected</i>	<i>Analytical Sensitivity %</i>	<i>Asbestos Weight %</i>	<i>Comments</i>
-------------------------	-----------------	------------------------	---------------------------------	---------------------------------	--------------------------	-----------------

0.25

Analyst

Approved Signatory

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Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
BB-PB-01 Site: WEST EXTERIOR TRIM Desc: WHITE	551507777-0067		7/23/2015	70000 ppm
BB-PB-02 Site: INTERIOR WALL OF TOWER UPPER LEVEL Desc: WHITE	551507777-0068		7/23/2015	20000 ppm
BB-PB-03 Site: WEST EXTERIOR TRIM OF PAINT STORE Desc: ORANGE	551507777-0069		7/23/2015	22000 ppm
BB-PB-04 Site: INTERIOR TRIM OF LIFTING LOBBY Desc: BLACK	551507777-0070		7/23/2015	2000 ppm
BB-PB-05 Site: STEEL STRUCTURE OF TOWER Desc: GREEN	551507777-0071		7/23/2015	28000 ppm
BB-PB-06 Site: DOOR TRIM OF PAINT STORE Desc: GREEN	551507777-0072		7/23/2015	15000 ppm
BB-PB-07 Site: INTERIOR WALL OF PAINT STORE Desc: DARK GREEN	551507777-0073		7/23/2015	410 ppm
BB-PB-08 Site: FLOOR OF PAINT STORE Desc: GREY	551507777-0074		7/23/2015	42000 ppm
BB-PB-09 Site: INTERIOR WALL OF PAINT STORE Desc: WHITE	551507777-0075		7/23/2015	20000 ppm
BB-PB-10 Site: FLOOR OF GENERATOR ROOM ON CONCRETE SLAB Desc: RED	551507777-0076		7/23/2015	63000 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:49:06



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Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
BB-PB-11	551507777-0077	7/23/2015		45000 ppm
Site: INTERIOR WALL OF LIFTING LOBBY Desc: YELLOW MS outside UCL.				

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:49:06

APPENDIX F
FINDINGS AND RECOMMENDATIONS—
CANTEEN



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix F Findings and Recommendations—Canteen
March 24, 2016

Appendix F FINDINGS AND RECOMMENDATIONS— CANTEEN

The Canteen was reportedly constructed in the 1900 and is a single level steel framed concrete building with an outhouse attached to the south side of the building.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

F.1 ASBESTOS

Stantec identified and sampled the following suspected ACMs:

- Caulking
- Roofing material

Six samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table F-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

**Table F-1 Suspected ACM Sample Collection and Analysis Summary
Canteen, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
C-WPC-01A	Grey window pane caulking	Exterior north window between pane and frame	None detected
C-WPC-01B	Grey window pane caulking	Exterior north window between pane and frame	None detected
C-WPC-01C	Grey window pane caulking	Exterior north window between pane and frame	None detected
C-Roof-01A	Black roofing material	Roof of building	None detected
C-Roof-01B	Black roofing material	Roof of building	None detected
C-Roof-01C	Black roofing material	Roof of building	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix F Findings and Recommendations—Canteen
March 24, 2016

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, no ACMs were identified.

F.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes
- Solder used in electrical equipment
- Vent and pipe flashings

With respect to paint, seven paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table F-2, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table F-2 Suspected LCP Sample Collection and Analysis Summary
Canteen, Fort Rodd Hill National Historic Site, BC**

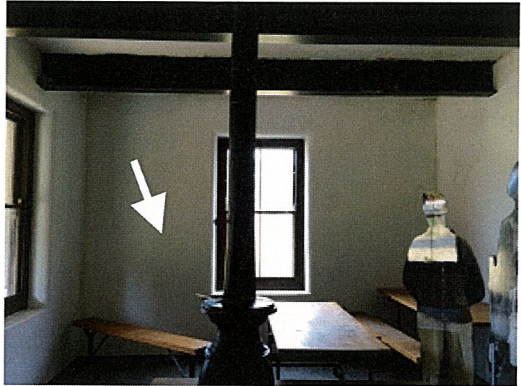
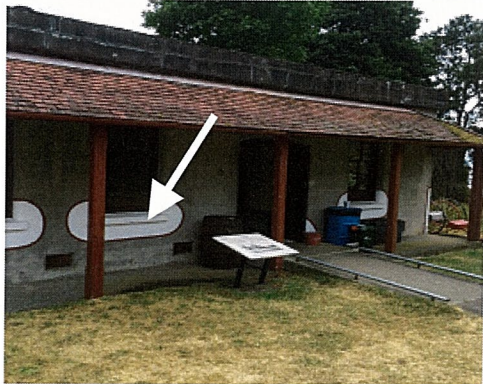
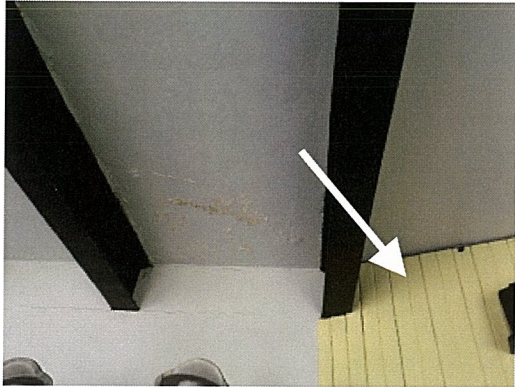
Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
C-PB-01	White	Interior wall	64,000	Yes
C-PB-02	White	Exterior trim	1,800	Yes
C-PB-03	Yellow	Interior wall on wood siding	160,000	Yes
C-PB-04	Pale brown	Interior wall of prep room on wood siding	120,000	Yes
C-PB-05	Grey	Exterior outhouse door	3,000	Yes
C-PB-06	Black	Interior ceiling beam	3,300	Yes
C-PB-07	Brown	Exterior window frame	110,000	Yes

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table F-3, below were identified as LCPs.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix F Findings and Recommendations—Canteen
March 24, 2016

**Table F-3 Summary of Identified LCPs
Canteen, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>White coloured paint on the interior walls and ceiling. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>White coloured paint on the exterior trims. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Yellow colored paint on the interior wood siding. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix F Findings and Recommendations—Canteen
March 24, 2016

Identified LCP Description	Photo
<p>Pale brown colored paint on the interior walls of prep room. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	<p>No photo available</p>
<p>Grey colored paint on the exterior outhouse door. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Black colored paint on interior ceiling beams. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Brown colored paint on exterior window frames. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix F Findings and Recommendations—Canteen
March 24, 2016

F.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing electrical equipment was observed.

F.4 MERCURY

Equipment and/or items that contain mercury were not observed.

Mercury may also be present in paints and adhesives.

F.5 MOULD

Suspect mould or moisture-impacted building materials were not observed at the time of the assessment.

F.6 OZONE-DEPLETING SUBSTANCES

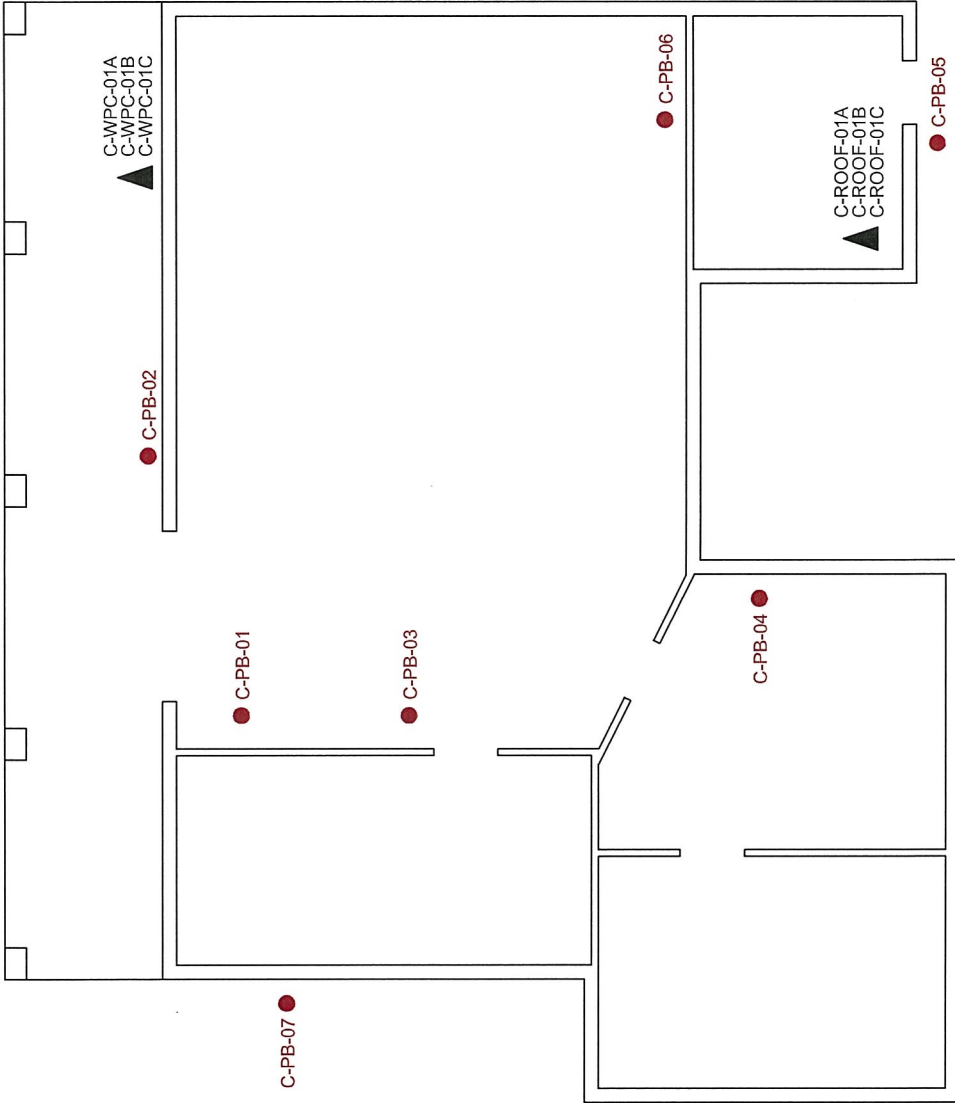
Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

F.7 SILICA

Silica is presumed to be present in the concrete walls, floors and ceiling of the subject building.

F.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



LEGEND
 ▲ BULK SAMPLE LOCATION
 ● PAINT CHIP SAMPLE LOCATION

CANTEEN (C)

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400 Scale: N.T.S. Date: 15/08/28 Dwn. By: CD VM SL2015080206 App'd By: TW		Dwg. No.: <h1>22</h1> 
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC		
Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA		



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
Project ID:

Attn: Steve Chou
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6
Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015
Proj: 123220330.400.100/Fort Rodd Hill

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: C-WPC-01A **Lab Sample ID:** 551507781-0056

Sample Description: Exterior north window between pane and frame/Grey window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: C-WPC-01B **Lab Sample ID:** 551507781-0057

Sample Description: Exterior north window between pane and frame/Grey window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: C-WPC-01C **Lab Sample ID:** 551507781-0058

Sample Description: Exterior north window between pane and frame/Grey window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: C-Roof-01A **Lab Sample ID:** 551507781-0059

Sample Description: Roof of building/Black roofing material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: C-Roof-01B **Lab Sample ID:** 551507781-0060

Sample Description: Roof of building/Black roofing material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: C-Roof-01C **Lab Sample ID:** 551507781-0061

Sample Description: Roof of building/Black roofing material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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):

Jon Delos Santos PLM (2)
Nicole Dimou PLM Grav. Reduction (2)
Nicole Yeo PLM Grav. Reduction (2)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 07/28/2015 21:57:46



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EMSL Canada Or 551507777
CustomerID: 55JACQ30L
CustomerPO: 123220330
ProjectID:

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Burnaby, BC V5H 0C6

Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
C-PB-01 Site: INTERIOR WALL Desc: WHITE	551507777-0060		7/23/2015	64000 ppm
C-PB-02 Site: EXTERIOR TRIM Desc: WHITE	551507777-0061		7/23/2015	1800 ppm
C-PB-03 Site: INTERIOR WALL ON WOOD SIDING Desc: YELLOW	551507777-0062		7/23/2015	160000 ppm
C-PB-04 Site: INTERIOR WALL OF PREP ROOM ON WOOD SIDING Desc: PALE BROWN	551507777-0063		7/23/2015	120000 ppm
C-PB-05 Site: EXTERIOR OUTHOUSE DOOR Desc: GREY	551507777-0064		7/23/2015	3000 ppm
C-PB-06 Site: INTERIOR CEILING BEAM Desc: BLACK	551507777-0065		7/23/2015	3300 ppm
C-PB-07 Site: EXTERIOR WINDOW FRAME Desc: BROWN	551507777-0066		7/23/2015	110000 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:46:26

APPENDIX G
FINDINGS AND RECOMMENDATIONS—
COLLECTIONS BUILDING



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix G Findings and Recommendations—Collections building
March 24, 2016

Appendix G FINDINGS AND RECOMMENDATIONS— COLLECTIONS BUILDING

The Collections Building was reportedly constructed in 2004 and is a one story wood frame building with high vaulted ceilings and a gated canopy.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

The following area was not accessed, for the reason indicated:

- Roof (lack of safe access)

As such, limited comments, if any, will be provided regarding the presence, quantity or condition of hazardous building materials within the above-noted areas.

G.1 ASBESTOS

Although unlikely to contain asbestos given the construction date for the building, Stantec identified and sampled the following material that could potentially contain asbestos:

- Duct mastic

Three samples of the above-noted suspected ACM were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table G-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

**Table G-1 Suspected ACM Sample Collection and Analysis Summary
Collections Building, Fort Rod Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
COLB-DM-01A	Grey duct mastic	Mechanical room	None detected
COLB-DM-01B	Grey duct mastic	Mechanical room	None detected
COLB-DM-01C	Grey duct mastic	Mechanical room	None detected



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix G Findings and Recommendations—Collections building
March 24, 2016

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, no ACMs were identified.

G.2 LEAD

Lead is expected to be present in the following:

- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes
- Solder used in electrical equipment
- Vent and pipe flashings

With respect to paint, three paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table G-2, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table G-2 Suspected LCP Sample Collection and Analysis Summary
Collections Building ,Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
COLB-PB-01	White	Interior wall	<90	No
COLB-PB-02	Red	Exterior trim	<90	No
COLB-PB-03	White	Exterior wall	90	No

Based on our observations and on our interpretations of suspected LCP sample analytical results, no LCPs were identified.

G.3 POLYCHLORINATED BIPHENYLS

Based on the construction date of the building, PCB-containing items are not suspected to be present.

G.4 MERCURY

Mercury vapour is expected to be present in fluorescent light bulbs/tubes observed in 20 fluorescent light fixtures. Mercury may also be present in paints and adhesives.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix G Findings and Recommendations—Collections building
March 24, 2016

G.5 MOULD

No mould or moisture-impacted building materials were observed during the assessment.

G.6 OZONE-DEPLETING SUBSTANCES

The following equipment was identified by labels to be ODS-containing:

- One air conditioning unit located on the exterior east side of the building (R-22, amount not specified)

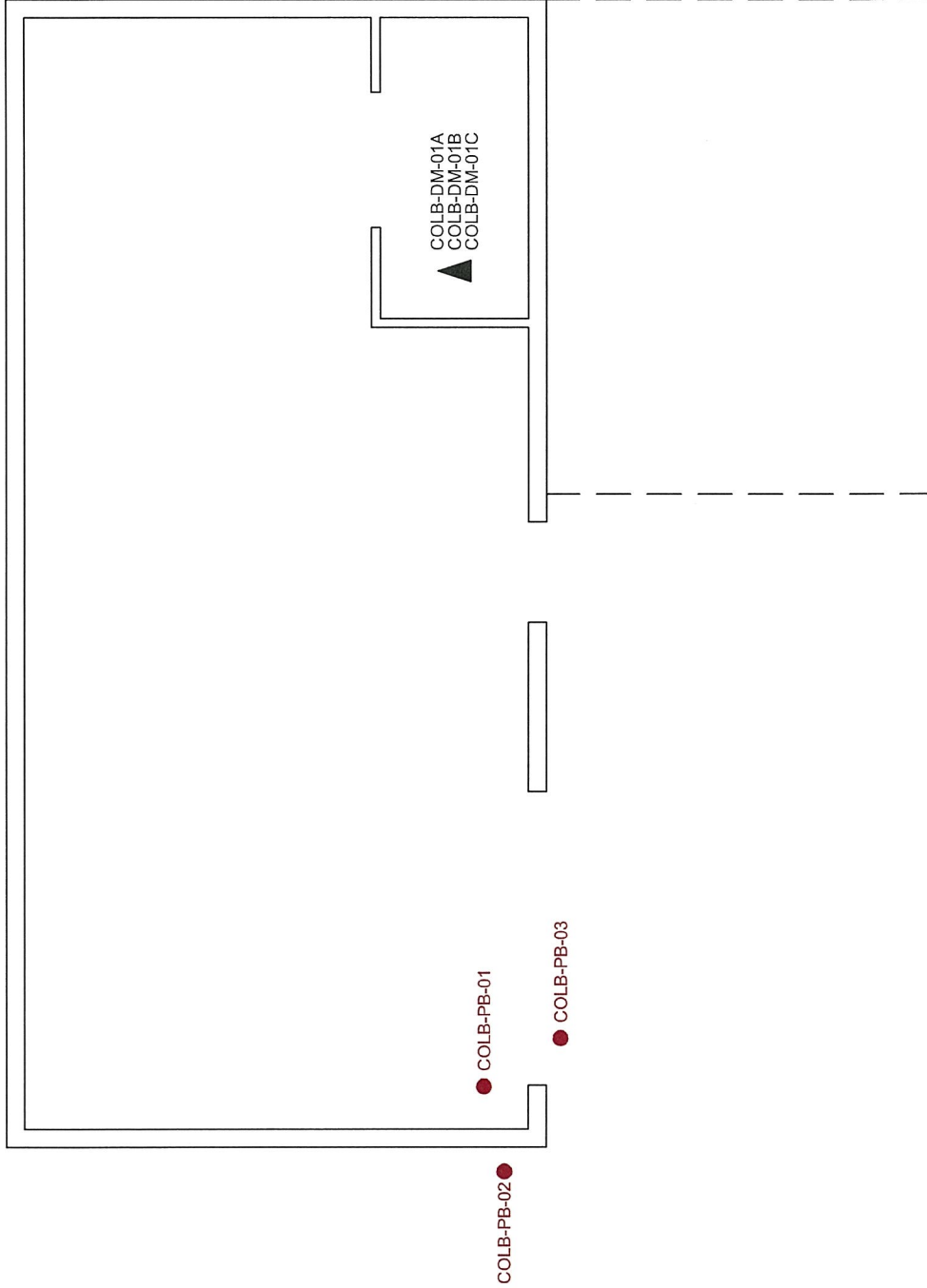
The locations of the confirmed ODS-containing equipment are indicated in the floor plan drawings attached to this appendix.

G.7 SILICA




Silica is presumed to be present in the concrete slab of the subject building.

G.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



LEGEND

-  BULK SAMPLE LOCATION
-  PAINT CHIP SAMPLE LOCATION
-  CONFIRMED ODS-CONTAINING AIR-CONTAINING UNIT

COLLECTIONS BUILDING (COLB)

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

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Date: 15/10/29		
Dwn. By: CD VMDM		
App'd By: TW		
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS		
FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC		
Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA		
		



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Customer ID: 55JACQ30L
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Project ID:

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Collected:
Received: 7/20/2015
Analyzed: 7/28/2015
Proj: 123220330.400.100/Fort Rodd Hill

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: COLB-DM-01A **Lab Sample ID:** 551507781-0161
Sample Description: Mechanical room /Grey duct mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: COLB-DM-01B **Lab Sample ID:** 551507781-0162
Sample Description: Mechanical room/Grey duct mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: COLB-DM-01C **Lab Sample ID:** 551507781-0163
Sample Description: Mechanical room/Grey duct mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Analyst(s):

Jon Delos Santos PLM Grav. Reduction (1)
Romeo Samson PLM Grav. Reduction (2)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 07/28/2015 21:57:46



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Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
COLB-PB-01 Site: INTERIOR WALL Desc: WHITE	551507777-0119		7/24/2015	<90 ppm
COLB-PB-02 Site: EXTERIOR TRIM Desc: RED	551507777-0120		7/24/2015	<90 ppm
COLB-PB-03 Site: EXTERIOR WALL Desc: WHITE	551507777-0121		7/24/2015	90 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:14:07

APPENDIX H
FINDINGS AND RECOMMENDATIONS—
DEFENSIVE ELECTRIC LIGHT #1



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix H Findings and Recommendations—Defensive Electric Light #1
March 24, 2016

Appendix H FINDINGS AND RECOMMENDATIONS— DEFENSIVE ELECTRIC LIGHT #1

Defensive Electrical Light #1 was reportedly constructed in 1903 and is an outdoor concrete structure.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

H.1 ASBESTOS

Stantec identified and sampled the following suspected ACM:

- Roofing material

Three samples of the above-noted suspected ACM were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, location and analytical results is presented in Table H-4, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

**Table H-1 Suspected ACM Sample Collection and Analysis Summary
Defensive Electric Light #1, Fort Rodd Hill National Historic Site, BC**


Sample Number	Material Description	Sample Location	Result (%/type asbestos)
DEL1-RM-01A	Black roofing material	Roof	4.3% Chrysotile
DEL1-RM-01B	Black roofing material	Roof	Positive Stop (Not Analyzed)
DEL1-RM-01C	Black roofing material	Roof	Positive Stop (Not Analyzed)

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, the material presented in Table H-2, below were identified as an ACM.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix H Findings and Recommendations—Defensive Electric Light #1
March 24, 2016

**Table H-2 Summary of Identified ACMs
Defensive Electric Light #1, Fort Rodd Hill National Historic Site, BC**

Identified ACM Description and Condition Information		Photo
Black roofing material		
Friability	Non-friable	
Condition	Good	
Content	4.3% Chrysotile	

H.2 LEAD

Lead-containing items (other than paint) were not observed.

With respect to paint, two paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table H-3, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table H-3 Suspected LCP Sample Collection and Analysis Summary
Defensive Electric Light #1, Fort Rodd Hill National Historic Site, BC**


Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
DEL1-PB-01	Dark Green	Steel shutters	8,300	Yes
DEL1-PB-02	Black	Steel cage	920	Yes

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table H-4, below were identified as LCPs.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix H Findings and Recommendations—Defensive Electric Light #1
March 24, 2016

**Table H-4 Summary of Identified LCPs
Defensive Electric Light #1, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
Dark green coloured paint on the steel shutters. This paint was observed to be in good condition (not bubbling, flaking or peeling).	
Black coloured paint on the steel cage. This paint was observed to be in good condition (not bubbling, flaking or peeling).	No picture is available

H.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing electrical equipment was observed.

H.4 MERCURY

Equipment and/or items that contain mercury were not observed. Mercury may also be present in paints and adhesives.

H.5 MOULD

Suspect mould or moisture-impacted building materials were not observed at the time of the assessment.

H.6 OZONE-DEPLETING SUBSTANCES

Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

H.7 SILICA

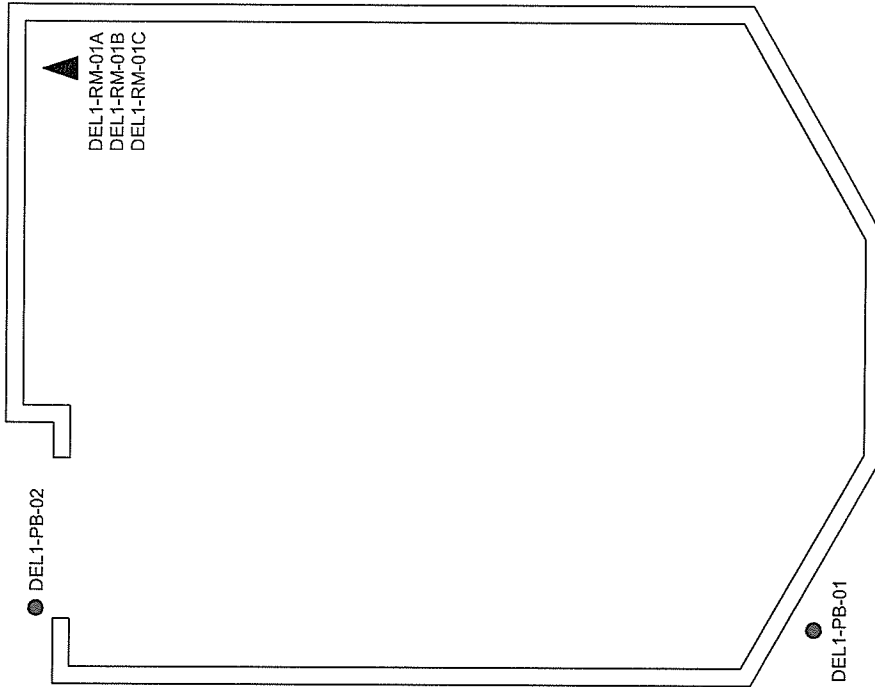
Silica is presumed to be present in the concrete comprising the entirety of the subject building.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix H Findings and Recommendations—Defensive Electric Light #1
March 24, 2016

H.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



LEGEND

▲ BULK SAMPLE LOCATION

● PAINT CHIP SAMPLE LOCATION

DEFENSIVE ELECTRICAL LIGHT 1 (DEL1)

NOTES: 1. THE BLACK ROOFING MATERIAL IS ASBESTOS-CONTAINING.
 2. THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

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Scale:	N.T.S.			
Date:	15/10/29			
Dwn. By:	CD VM/DM			
App'd By:	TW			
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC PUBLIC WORKS AND GOVERNMENT SERVICES CANADA				
Client:				



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Phone: (604) 412-3004
Fax:
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Received: 7/20/2015
Analyzed: 7/27/2015
Proj: 123220330.400.100/Fort Rodd Hill

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: DEL1-RM-01A **Lab Sample ID:** 551507781-0084
Sample Description: Roof/Black roofing material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	95.7%	4.3% Chrysotile	

Client Sample ID: DEL1-RM-01B **Lab Sample ID:** 551507781-0085
Sample Description: Roof/Black roofing material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015				Positive Stop (Not Analyzed)	

Client Sample ID: DEL1-RM-01C **Lab Sample ID:** 551507781-0086
Sample Description: Roof/Black roofing material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015				Positive Stop (Not Analyzed)	

Analyst(s):
Nicole Dimou PLM Grav. Reduction (1)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

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EMSL Canada Or 551507777
CustomerID: 55JACQ30L
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ProjectID:

Attn: **Steve Chou**
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Burnaby, BC V5H 0C6

Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
DEL1-PB-01	551507777-0081		7/24/2015	8300 ppm
	Site: STEEL SHUTTERS Desc: DARK GREEN			
DEL1-PB-02	551507777-0082		7/23/2015	920 ppm
	Site: STEEL CAGE Desc: BLACK MS outside UCL.			

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:52:41



APPENDIX I
FINDINGS AND RECOMMENDATIONS—
FISGARD LIGHTHOUSE, BOATHOUSE AND
STOREHOUSE



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix I Findings and Recommendations—Fisgard lighthouse, Boathouse and Storehouse
March 24, 2016

Appendix I FINDINGS AND RECOMMENDATIONS—FISGARD LIGHTHOUSE, BOATHOUSE AND STOREHOUSE

The construction dates and descriptions for the Fisgard Lighthouse, Boathouse and Storehouse are as follows:

- The Fisgard Lighthouse was built in 1860 and is a two story building with a spiral staircase leading to a lighthouse. The exterior mainly consists of brick, while the interior has drywall walls and ceilings, with hardwood floors.
- The Fisgard Boathouse was built in 1960 and is a small wooden shed.
- The Fisgard Storehouse was built in 1960 and is a small brick building with wood interior walls and floors.

The results of the assessment for each of the considered hazardous materials within the buildings are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

The following area was not accessed, for the reason indicated:

- Fisgard Lighthouse roof (lack of safe access)

As such, limited comments, if any, will be provided regarding the presence, quantity or condition of hazardous building materials within the above-noted areas.

I.1 ASBESTOS

Stantec identified and sampled the following suspected ACMs:

- Caulkings and mastic
- Plaster
- Floor leveler
- Vinyl sheet flooring
- Textured flooring
- Roofing paper

Twenty-eight samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix I Findings and Recommendations—Fisgard lighthouse, Boathouse and Storehouse
March 24, 2016

A summary of the sample types, locations and analytical results is presented in Table I-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached at to this Appendix.

**Table I-1 Suspected ACM Sample Collection and Analysis Summary
Fisgard Lighthouse, Boathouse and Storehouse, Fort Rodd Hill National
Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
Lighthouse			
FLH-WC-01A(Tower)	Grey window caulking	Interior of upper tower between steel frame and pane	None detected
FLH-WC-01B (Tower)	Grey window caulking	Interior of upper tower between steel frame and pane	None detected
FLH-WC-01C(Tower)	Grey window caulking	Interior of upper tower between steel frame and pane	None detected
FLH-WC-01A	Grey window caulking	Exterior window on east side of building between wood frame and pane	None detected
FLH-WC-01B	Grey window caulking	Exterior window on east side of building between wood frame and pane	None detected
FLH-WC-01C	Grey window caulking	Exterior window on east side of building between wood frame and pane	None detected
FLH-PL-01A	Plaster	Ground level – north east corner of tower room	None detected
FLH-PL-01B	Plaster	Ground level – north east corner of tower room	None detected
FLH-PL-01C	Plaster	Ground level – north east corner of tower room	None detected
FLH-FL-01A	Brown floor leveler	Upper tower floor	None detected
FLH-FL-01B	Brown floor leveler	Upper tower floor	None detected
FLH-FL-01C	Brown floor leveler	Upper tower floor	None detected
FLH-WM-01A	Grey wall mastic	Upper tower wall finish	None detected
FLH-WM-01B	Grey wall mastic	Upper tower wall finish	None detected
FLH-WM-01C	Grey wall mastic	Upper tower wall finish	None detected
FLH-WFC-01A	White window frame caulking	Exterior window on east side of building between frame and bricks	None detected
FLH-WFC-01B	White window frame caulking	Exterior window on east side of building between frame and bricks	None detected
FLH-WFC-01C	White window frame caulking	Exterior window on east side of building between frame and bricks	None detected
FLH-VSF-01	Brown vinyl sheeting flooring	Upper tower floor behind hatch	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix I Findings and Recommendations—Fisgard lighthouse, Boathouse and Storehouse
March 24, 2016

**Table I-1 Suspected ACM Sample Collection and Analysis Summary
Fisgard Lighthouse, Boathouse and Storehouse, Fort Rodd Hill National
Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
Storehouse			
FSH-TF-01A	Green textured flooring	North side of house on ramp	None detected
FSH-TF-01B	Green textured flooring	North side of house on ramp	None detected
FSH-TF-01C	Green textured flooring	North side of house on ramp	None detected
Boathouse			
FBH-WFC-01A	Grey window frame caulking	Exterior window on the east side of the building between frame and bricks	None detected
FBH-WFC-01B	Grey window frame caulking	Exterior window on the east side of the building between frame and bricks	None detected
FBH-WFC-01C	Grey window frame caulking	Exterior window on the east side of the building between frame and bricks	None detected
FBH-RP-01A	Black roofing paper	East side of the building under roof shingle	None detected
FBH-RP-01B	Black roofing paper	East side of the building under roof shingle	None detected
FBH-RP-01C	Black roofing paper	East side of the building under roof shingle	None detected

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, no ACMs were identified.

I.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes
- Solder used in electrical equipment
- Vent and pipe flashings

With respect to paint, 10 paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table I-2, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix I Findings and Recommendations—Fisgard lighthouse, Boathouse and Storehouse
March 24, 2016

**Table I-2 Suspected LCP Sample Collection and Analysis Summary
Fisgard Lighthouse, Boathouse and Storehouse, Fort Rodd Hill National
Historic Site, BC**



Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
Lighthouse				
FLH-PB-01	Red	Exterior bricks	240	No
FLH-PB-02	White	Exterior window sill	55,000	Yes
FLH-PB-03	Black	Tower staircase cage	640	Yes
FLH-PB-04	Green	Tower staircase	50,000	Yes
FLH-PB-05	White	Interior wall of tower staircase	67,000	Yes
FLH-PB-06	Silver	Interior steel panel of upper tower	290,000	Yes
FLH-PB-07	Grey	Exterior door of north west entrance	470	No
FLH-PB-08	White	Exterior window frame on west side of the building	180	Yes
Storehouse				
FSH-PB-10	Red	Exterior bricks	<90	No
Boathouse				
FBH-PB-09	White	Exterior wood siding	<90	No

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table I-3, below were identified as LCPs.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix I Findings and Recommendations—Fisgard lighthouse, Boathouse and Storehouse
March 24, 2016


**Table I-3 Summary of Identified LCPs
Fisgard Lighthouse, Boathouse and Storehouse, Fort Rodd Hill National
Historic Site, BC**

Identified LCP Description	Photo
<p>White coloured paint on the exterior window sills of the Lighthouse. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Black coloured paint on the tower staircase cage (upper arrow). This paint was observed to be in good condition (not bubbling, flaking or peeling).</p> <p>Green coloured paint on the tower staircase (middle arrow). This paint was observed to be in good condition (not bubbling, flaking or peeling).</p> <p>White coloured paint on the interior walls of tower staircase (lower arrow). This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix I Findings and Recommendations—Fisgard lighthouse, Boathouse and Storehouse
March 24, 2016

Table I-3 Summary of Identified LCPs
Fisgard Lighthouse, Boathouse and Storehouse, Fort Rodd Hill National Historic Site, BC

Identified LCP Description	Photo
<p>Silver coloured paint on the interior steel panel of upper tower.</p> <p>This paint was observed to be in good condition overall, with localized areas of flaking.</p>	

I.3 POLYCHLORINATED BIPHENYLS

PCBs may be present in the fluorescent light ballasts of the two light fixtures observed within the Fisgard Storehouse.

No suspected PCB-containing electrical equipment was observed in the Fisgard Lighthouse or the Fisgard Boathouse.

I.4 MERCURY

Mercury vapour is likely to be present in the light tubes within the two fluorescent light fixtures observed in the Fisgard Storehouse.

No suspected mercury-containing items were observed in the Fisgard Lighthouse or the Fisgard Boathouse.

Mercury may also be present in paints and adhesives.

I.5 MOULD

Suspect mould or moisture-impacted building materials were not observed at the time of the assessment.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix I Findings and Recommendations—Fisgard lighthouse, Boathouse and Storehouse
March 24, 2016

I.6 OZONE-DEPLETING SUBSTANCES

Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

I.7 SILICA

Silica is presumed to be present in the concrete and brick mortar of the Fisgard Lighthouse and Storehouse.

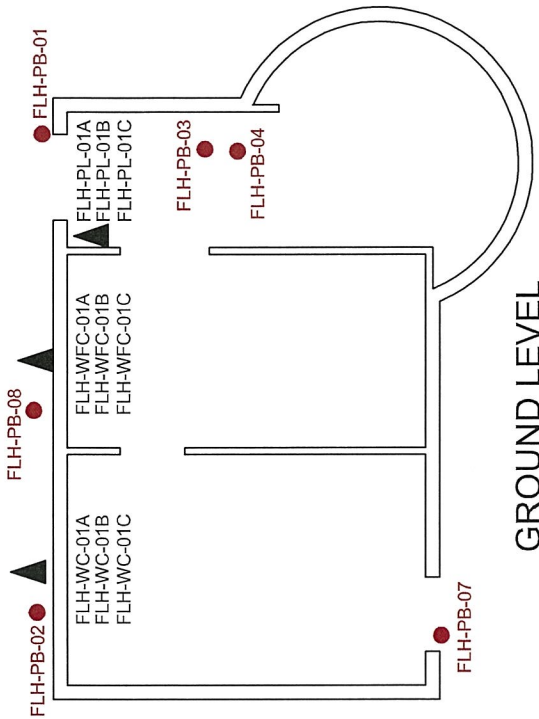
I.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.

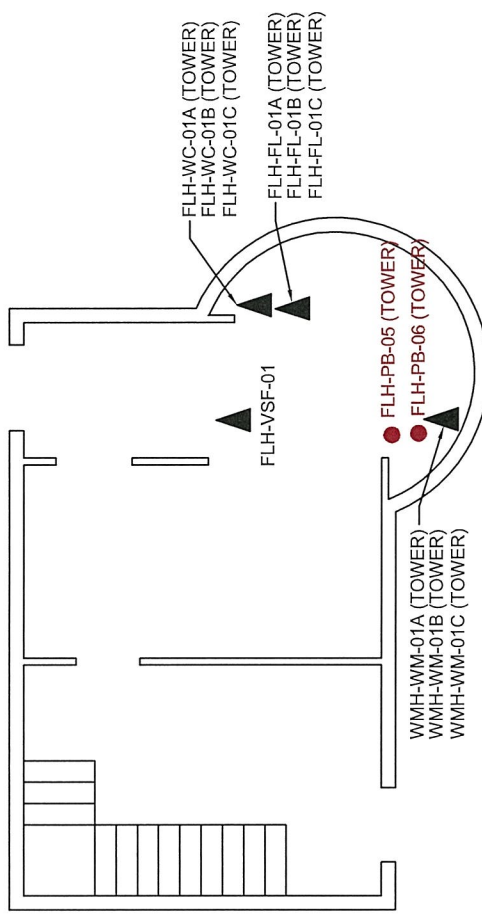
I.8.1 Lead

Lead-containing paint observed in fair condition throughout the upper tower should be cleaned-up and/or addressed to mitigate potential for additional deterioration and dispersal of lead-containing paint chips/dust. Consideration should be given to re-painting surfaces to mitigate the potential for additional deterioration and hazards associated with the lead-containing paint chips/dust that may be created. If re-painting is completed, appropriate precautions to protect workers and work areas from exposure to lead will be required during painting preparation activities.

Provisions for worker protection and waste disposal related to the above are included in Section 5.2 of the main body of this report.



GROUND LEVEL



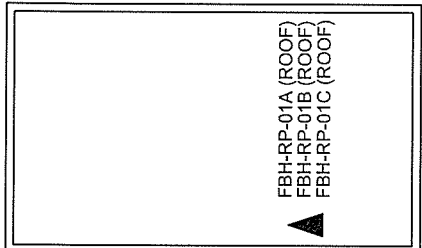
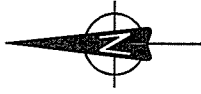
UPPER TOWER

FIGGARD LIGHTHOUSE (FL)

LEGEND
 ▲ BULK SAMPLE LOCATION
 ● PAINT CHIP SAMPLE LOCATION

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC PUBLIC WORKS AND GOVERNMENT SERVICES CANADA	Project No.: 123220330.400	Dwg. No.: 5	
	Scale: N.T.S.	App'd By: TW	
	Date: 16/03/23	Client:	
	Dwn. By: CD VM/DM		



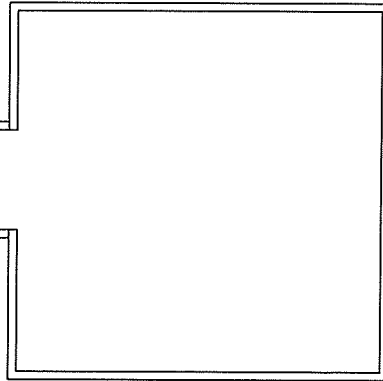
FBH-WFC-01A
FBH-WFC-01B
FBH-WFC-01C

FBH-RP-01A (ROOF)
FBH-RP-01B (ROOF)
FBH-RP-01C (ROOF)

FBH-PB-09

FIGGARD BOAT HOUSE

FSH-TF-01A
FSH-TF-01B
FSH-TF-01C



FSH-PB-10

FIGGARD STORE HOUSE

FIGGARD BOAT HOUSE (FBH) AND FIGGARD SHED (FSH)

LEGEND

- BULK SAMPLE LOCATION
- PAINT CHIP SAMPLE LOCATION

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400		Dwg. No.:	6	Stantec
Scale:	N.T.S.			
Date:	16/03/23			
Dwn. By:	CD VM/DM			
App'd By:	TW			
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC PUBLIC WORKS AND GOVERNMENT SERVICES CANADA				
Client:				



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500 - 4730 Kingsway
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Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015

Proj: 123220330.400.100/Fort Rodd Hill

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: FLH-WC-01A **Lab Sample ID:** 551507781-0102

Sample Description: Interior of upper tower between steel frame & pane/Grey window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: FLH-WC-01B **Lab Sample ID:** 551507781-0103

Sample Description: Interior of upper tower between steel frame & pane/Grey window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: FLH-WC-01C **Lab Sample ID:** 551507781-0104

Sample Description: Interior of upper tower between steel frame & pane/Grey window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: FLH-WC-01A **Lab Sample ID:** 551507781-0105

Sample Description: Ext. window on E.side of bldg. btwn wood frame/& pane/ Grey window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: FLH-WC-01B **Lab Sample ID:** 551507781-0106

Sample Description: Ext. window on E.side of bldg. btwn wood frame/& pane/ Grey window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: FLH-WC-01C **Lab Sample ID:** 551507781-0107

Sample Description: Ext. window on E.side of bldg. btwn wood frame/& pane/ Grey window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray/White	0%	100%	None Detected	

Client Sample ID: FLH-PL-01A **Lab Sample ID:** 551507781-0108

Sample Description: Ground level – north east corner of tower room/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	



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Customer ID: 55JACQ30L
Customer PO: 123220330
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: FLH-PL-01B **Lab Sample ID:** 551507781-0109

Sample Description: Ground level – north east corner of tower room/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: FLH-PL-01C **Lab Sample ID:** 551507781-0110

Sample Description: Ground level – north east corner of tower room/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: FLH-FL-01A **Lab Sample ID:** 551507781-0111

Sample Description: Upper tower floor/Brown floor leveler

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Brown	0%	100%	None Detected	

Client Sample ID: FLH-FL-01B **Lab Sample ID:** 551507781-0112

Sample Description: Upper tower floor/Brown floor leveler

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Brown	0%	100%	None Detected	

Client Sample ID: FLH-FL-01C **Lab Sample ID:** 551507781-0113

Sample Description: Upper tower floor/Brown floor leveler

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Brown/Gray	0%	100%	None Detected	

Client Sample ID: FLH-WM-01A **Lab Sample ID:** 551507781-0114

Sample Description: Upper tower wall finish/Grey wall mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: FLH-WM-01B **Lab Sample ID:** 551507781-0115

Sample Description: Upper tower wall finish/Grey wall mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: FLH-WM-01C **Lab Sample ID:** 551507781-0116

Sample Description: Upper tower wall finish/Grey wall mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: FLH-WFC-01A **Lab Sample ID:** 551507781-0117

Sample Description: Ext. window on E.side of bldg btwn frame & bricks/White window frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	White/Red	0.0%	100%	None Detected	

Client Sample ID: FLH-WFC-01B **Lab Sample ID:** 551507781-0118

Sample Description: Ext. window on E.side of bldg btwn frame & bricks/White window frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	White/Red	0.0%	100%	None Detected	

Client Sample ID: FLH-WFC-01C **Lab Sample ID:** 551507781-0119

Sample Description: Ext. window on E.side of bldg btwn frame & bricks/White window frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	White/Red	0.0%	100%	None Detected	

Client Sample ID: FLH-VSF-01 **Lab Sample ID:** 551507781-0120

Sample Description: Upper tower floor behind hatch/Brown vinyl sheeting flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Brown/Gray	0.0%	100%	None Detected	

Client Sample ID: FSH-TF-01A **Lab Sample ID:** 551507781-0121

Sample Description: North side of house on ramp/Green textured flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Green	0.0%	100%	None Detected	

Client Sample ID: FSH-TF-01B **Lab Sample ID:** 551507781-0122

Sample Description: North side of house on ramp/Green textured flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Green	0.0%	100%	None Detected	

Client Sample ID: FSH-TF-01C **Lab Sample ID:** 551507781-0123

Sample Description: North side of house on ramp/Green textured flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Green	0.0%	100%	None Detected	

Client Sample ID: FBH-WFC-01A **Lab Sample ID:** 551507781-0124

Sample Description: Ext. window on E.side of bldg btwn frame & bricks/Gray window frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: FBH-WFC-01B **Lab Sample ID:** 551507781-0125
Sample Description: Ext. window on E.side of bldg btwn frame & bricks/Grey window frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: FBH-WFC-01C **Lab Sample ID:** 551507781-0126
Sample Description: Ext. window on E.side of bldg btwn frame & bricks/Grey window frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: FBH-RP-01A **Lab Sample ID:** 551507781-0127
Sample Description: East side of the building under roof shingle/Black roofing paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Black	0.0%	100%	None Detected	

Client Sample ID: FBH-RP-01B **Lab Sample ID:** 551507781-0128
Sample Description: East side of the building under roof shingle/Black roofing paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Black	0.0%	100%	None Detected	

Client Sample ID: FBH-RP-01C **Lab Sample ID:** 551507781-0129
Sample Description: East side of the building under roof shingle/Black roofing paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Black	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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):

Jon Delos Santos	PLM (5)
	PLM Grav. Reduction (3)
Nicole Dimou	PLM Grav. Reduction (5)
Nicole Yeo	PLM Grav. Reduction (2)
Romeo Samson	PLM (4)
	PLM Grav. Reduction (9)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 07/28/2015 21:57:46

**EMSL Canada Inc.**

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EMSL Canada Or 551507777
 CustomerID: 55JACQ30L
 CustomerPO: 123220330
 ProjectID:

Attn: **Steve Chou** Phone: (604) 412-3004
Stantec Consulting, Ltd. Fax:
500 - 4730 Kingsway Received: 07/20/15 11:06 AM
Burnaby, BC V5H 0C6 Collected:
 Project: **FORT ROD HILL/123220330.400.100**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
FLH-PB-01 Site: EXTERIOR BRICKS Desc: RED	551507777-0101		7/23/2015	240 ppm
FLH-PB-02 Site: EXTERIOR WINDOW SILL Desc: WHITE	551507777-0102		7/23/2015	55000 ppm
FLH-PB-03 Site: TOWER STAIRCASE Desc: BLACK	551507777-0103		7/23/2015	640 ppm
FLH-PB-04 Site: TOWER STAIRCASE Desc: GREEN	551507777-0104		7/23/2015	50000 ppm
FLH-PB-05 Site: INTERIOR WALL OF TOWER STAIRCASE Desc: WHITE	551507777-0105		7/23/2015	67000 ppm
FLH-PB-06 Site: INTERIOR STEEL PANEL OF UPPER TOWER Desc: SILVER	551507777-0106		7/23/2015	290000 ppm
FLH-PB-07 Site: EXTERIOR DOOR OF NORTH WEST ENTRANCE Desc: GREY	551507777-0107		7/23/2015	470 ppm
FLH-PB-08 Site: EXTERIOR WINDOW FRAME ON WEST SIDE OF THE BUILDING Desc: WHITE	551507777-0108		7/23/2015	180 ppm
FBH-PB-09 Site: EXTERIOR WOOD SIDING Desc: WHITE	551507777-0109		7/23/2015	<90 ppm
FSH-PB-10 Site: EXTERIOR BRICKS Desc: RED	551507777-0110		7/23/2015	<90 ppm


 Lisa Podzyhun
 or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the ALHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:07:15



APPENDIX J
FINDINGS AND RECOMMENDATIONS—
JOURNEY'S END



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix J Findings and Recommendations—Journey's End
March 24, 2016

Appendix J FINDINGS AND RECOMMENDATIONS— JOURNEY'S END

The Journey's End was reportedly constructed in 1932 and is a three level wood frame building consisting of a main level, a second level and a partial crawlspace.

The typical structural components and finishes associated with this building consists of stucco exterior walls, vinyl floor tiles/sheet flooring and interior plaster/drywall walls and ceilings.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

The following area was not accessed, for the reason indicated:

- Roof (lack of safe access)

As such, limited comments, if any, will be provided regarding the presence, quantity or condition of hazardous building materials within the above-noted areas.

J.1 ASBESTOS

Stantec identified and sampled the following suspected ACMs:

- Plaster and plaster texture coat
- Piping insulation
- Attic paper
- Brick mortar
- Drywall joint compound
- Putty, mastic, and caulking
- Vinyl floor tile
- Vinyl sheet flooring
- Roofing shingle
- Stucco

Sixty-one samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix J Findings and Recommendations—Journey's End
March 24, 2016

A summary of the sample types, locations and analytical results is presented in Table J-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

**Table J-1 Suspected ACM Sample Collection and Analysis Summary
Journey's End, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
JE-TC-01A	Plaster texture coat	Main level -north wall of room #104	None detected
JE-TC-01B	Plaster texture coat	Main level -North wall of room #103	None detected
JE-TC-01C	Plaster texture coat	Main level -South wall of room #105	None detected
JE-TC-01D	Plaster texture coat	Main level -South wall of room#107	None detected
JE-TC-01E	Plaster texture coat	Main level -West wall of room#105	None detected
JE-PL-01A	Plaster	Upstairs – North wall of west bathroom	None detected
JE-PL-01B	Plaster	Upstairs – North wall of office #5	None detected
JE-PL-01C	Plaster	Upstairs – North wall of office #3	None detected
JE-PL-01D	Plaster	Main level - west wall of room#109	None detected
JE-PL-01E	Plaster	Main level – west wall of east staircase	None detected
JE-PL-01F	Plaster – Skim Coat	Basement – ceiling of boiler room	None detected
JE-PL-01F	Plaster – Rough Coat	Basement – ceiling of boiler room	None detected
JE-PL-01G	Plaster – Skim Coat	Basement – ceiling of storage room	None detected
JE-PL-01G	Plaster – Rough Coat	Basement – ceiling of boiler room	None detected
JE-PI-01A	Grey air-o-cell pipe insulation	Basement – north side of the computer room in ceiling space	40% Chrysotile
JE-PI-01B	Grey air-o-cell pipe insulation	Basement – north side of the computer room in ceiling space	Stop positive (not analyzed)
JE-PI-01C	Grey air-o-cell pipe insulation	Basement – north side of the computer room in ceiling space	Stop positive (not analyzed)
JE-AP-01A	Black attic paper	Attic – beneath ceiling insulation	None detected
JE-AP-01B	Black attic paper	Attic – beneath ceiling insulation	None detected
JE-AP-01C	Black attic paper	Attic – beneath ceiling insulation	None detected
JE-M-01A	Brick mortar	Basement – north wall of boiler room	None detected
JE-M-01B	Brick mortar	Basement – north wall of boiler room	None detected
JE-M-01C	Brick mortar	Basement – north wall of boiler room	None detected
JE-M-01D	Brick mortar	Basement – north wall of storage room	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix J Findings and Recommendations—Journey's End
March 24, 2016

**Table J-1 Suspected ACM Sample Collection and Analysis Summary
Journey's End, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
JE-M-01E	Brick mortar	Basement – north wall of storage room	None detected
JE-JFC-01A	Joint filling compound	Basement – east wall of boiler room	None detected
JE-JFC-01B	Joint filling compound	Basement – north wall of boiler room	None detected
JE-JFC-01C	Joint filling compound	Basement – north wall of boiler room	None detected
JE-DPP-01A	Red duct penetration putty	Basement – south wall of boiler room	None detected
JE-DPP-01B	Red duct penetration putty	Basement – south wall of boiler room	None detected
JE-DPP-01C	Red duct penetration putty	Basement – south wall of boiler room	None detected
JE-VFT-01A	9"x9" vinyl floor tile tan with brown	Upstairs- northwest bathroom	10.0% Chrysotile
JE-VFT-01B	9"x9" vinyl floor tile tan with brown	Upstairs –east bathroom	Positive Stop (not analyzed)
JE-VFT-02A	Tan 12"x12" pattern	Basement - top layer in computer room	None detected
JE-VFT-03A	Black vinyl floor tile	Basement - second layer under sample (JE-VFT-02A) in computer room	None detected
JE-VSF-01A	Tan vinyl sheet flooring	Upstairs – west bathroom	4.3% Chrysotile
JE-VSF-02A	Dark tan with blue vinyl sheet flooring	Upstairs – closet of south east bathroom	None detected
JE-VSF-03A	Blue vinyl sheet flooring	Main level – room #109	None detected
JE-VSF-04A	Tan vinyl sheet flooring	Main level – stairs to basement	1.4% Chrysotile
JE-VSF-05A	Green with red vinyl sheet flooring	Main level – room#102	None detected
JE-VSF-06A	Yellow vinyl sheet flooring	Basement – laundry room	14.5% Chrysotile
JE-VSF-07A	Tan vinyl sheet flooring	Basement – third layer under sample (JE-VFT-03A) in computer room	None detected
JE-PP-01A	Black penetration putty	North west exterior wall of computer room and boiler room	None detected
JE-PP-01B	Black penetration putty	North west exterior wall of computer room and boiler room	None detected
JE-PP-01C	Black penetration putty	North west exterior wall of computer room and boiler room	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix J Findings and Recommendations—Journey's End
March 24, 2016

**Table J-1 Suspected ACM Sample Collection and Analysis Summary
Journey's End, Fort Rodd Hill National Historic Site, BC**




Sample Number	Material Description	Sample Location	Result (%/type asbestos)
JE-RM-01A	Black roof mastic	Main entrance roof of building under shingle	None detected
JE-RM-01B	Black roof mastic	Main entrance roof of building under shingle	None detected
JE-RM-01C	Black roof mastic	Main entrance roof of building under shingle	None detected
JE-WPC-01A	Grey window pane caulking	Basement - exterior window of computer room	None detected
JE-WPC-01B	Grey window pane caulking	Basement - Exterior window of computer room	None detected
JE-WPC-01C	Grey window pane caulking	Basement - Exterior window of computer room	None detected
JE-DFC-01A	Door frame caulking	Exterior between frame and stone masonry of boiler room	None detected
JE-DFC-01B	Door frame caulking	Exterior between frame and stone masonry of boiler room	None detected
JE-DFC-01C	Door frame caulking	Exterior between frame and stone masonry of boiler room	None detected
JE-RMat-01A	Black roof material (shingle)	Main entrance on the roof	None detected
JE-RMat-01B	Black roof material (shingle)	Main entrance on the roof	None detected
JE-RMat-01C	Black roof material (shingle)	Main entrance on the roof	None detected
JE-S-01A	Stucco	South side of the building	None detected
JE-S-01B	Stucco	South west corner of the building	None detected
JE-S-01C	Stucco	West side of the building	None detected
JE-S-01D	Stucco	North east corner of the building	None detected
JE-S-01E	Stucco	East side of the building	None detected
JE-S-01F	Stucco	South east corner of the building	None detected
JE-S-01G	Stucco	South east corner of the building	None detected

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, the materials presented in Table J-2, below were identified as ACMs.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix J Findings and Recommendations—Journey's End
 March 24, 2016


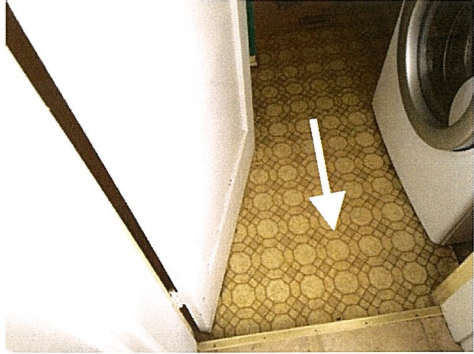
**Table J-2 Summary of Identified ACMs
 Journey's End, Fort Rodd Hill National Historic Site, BC**

Identified ACM Description and Condition Information		Photo
Grey straight air-o-cell pipe insulation throughout the basement computer room ceiling space		
Friability	Friable	
Condition	Good	
Content	40% Chrysotile	
9"x9" vinyl floor tile (tan with brown) in the 2 nd level west and east bathrooms		
Friability	Non-friable	
Condition	Good	
Content	10% Chrysotile	
Tan vinyl sheet flooring in the 2 nd level west bathroom		
Friability	Non-friable in-situ (paper backing can become friable during removal)	
Condition	Good	
Content	4.3% Chrysotile	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix J Findings and Recommendations—Journey's End
March 24, 2016

**Table J-2 Summary of Identified ACMs
Journey's End, Fort Rodd Hill National Historic Site, BC**

Identified ACM Description and Condition Information		Photo
Tan vinyl sheet flooring on the stairs to basement		
Friability	Non-friable in-situ (paper backing can become friable during removal)	
Condition	Good	
Content	1.4% Chrysotile	
Yellow vinyl sheet flooring in basement of laundry room		
Friability	Non-friable in-situ (paper backing can become friable during removal)	
Condition	Good	
Content	14.5% Chrysotile	

J.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes
- Solder used in electrical equipment
- Ceramic tile glaze
- Vent and pipe flashings

With respect to paint, 16 paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix J Findings and Recommendations—Journey's End
March 24, 2016

results is presented in Table J-3, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table J-3 Suspected LCP Sample Collection and Analysis Summary
Journey's End, Fort Rodd Hill National Historic Site, BC**




Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
JE-PB-01	Red	Exterior trim	<790	Potential
JE-PB-02	Yellow	Exterior on stucco	100	No
JE-PB-03	White	Upstairs – west bathroom trim	22,000	Yes
JE-PB-04	Tan	Main Level – wall in lobby	980	Yes
JE-PB-05	Pink	Main Level – wall in room#104	22,000	Yes
JE-PB-06	Orange	Main Level – wall in room#103	480	No
JE-PB-07	Green	Main Level – wall in room#105	680	No
JE-PB-08	Pink	Main Level – wall in room#104	780	No
JE-PB-09	Yellow	Main Level – Wall in room#109	<120	No
JE-PB-10	White	Upstairs – east wall by east stairs	1,000	Yes
JE-PB-11	Yellow	Upstairs – west bathroom wall	33,000	Yes
JE-PB-12	Grey	Upstairs – wall in office #2	2,400	Yes
JE-PB-13	Tan	Upstairs – wall in office #3	3,000	Yes
JE-PB-14	Dark Yellow	Upstairs – wall in office #1	1,400	Yes
JE-PB-15	White	Basement – wall in storage room	<90	No
JE-PB-16	Green	Basement – wall in boiler room	2,000	Yes

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table J-4, below were identified as actual or potential LCPs.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix J Findings and Recommendations—Journey's End
 March 24, 2016

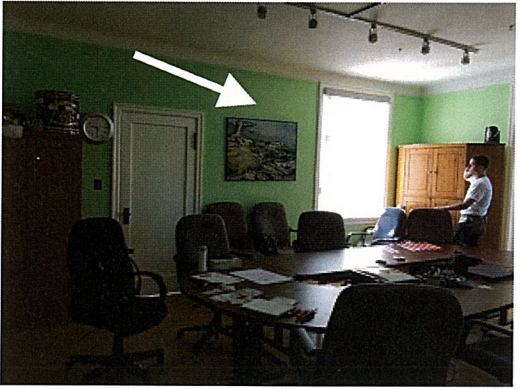

**Table J-4 Summary of Identified LCPs
 Journey's End, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Red coloured paint on exterior trim (potential LCP – not enough paint available to achieve detection limit <600 ppm).</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>White coloured paint on 2nd level west bathroom walls and trims (top arrow).</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p> <p>Grey colored paint on walls of office #2 (bottom arrow).</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Tan coloured paint on walls in main lobby.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix J Findings and Recommendations—Journey's End
March 24, 2016

**Table J-4 Summary of Identified LCPs
Journey's End, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Pink colored paint on walls in room #104 . This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Green colored paint on walls in room #105. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>White colored paint on walls by east stairs and throughout upper level corridor. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix J Findings and Recommendations—Journey's End
March 24, 2016

**Table J-4 Summary of Identified LCPs
Journey's End, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Tan colored paint on walls of office #3 . This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Dark yellow colored paint on walls of office #1.. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Green colored paint on walls of boiler room. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

J.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing electrical equipment was observed.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix J Findings and Recommendations—Journey's End
March 24, 2016

J.4 MERCURY

Equipment and/or items that contain mercury were not observed. Mercury may also be present in paints and adhesives.

J.5 MOULD

Suspect mould or moisture-impacted building materials were not observed at the time of the assessment.

J.6 OZONE-DEPLETING SUBSTANCES

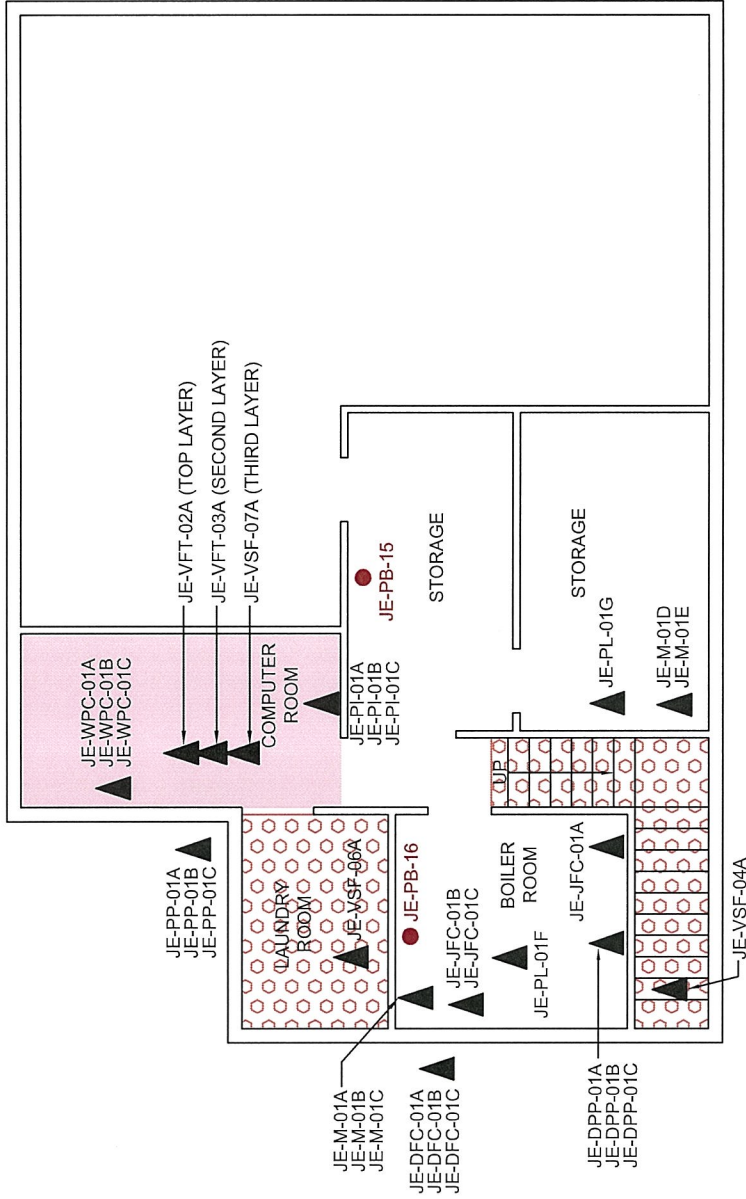
Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

J.7 SILICA

Silica is presumed to be present in the concrete, cinderblock walls and brick mortar of the subject building.

J.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



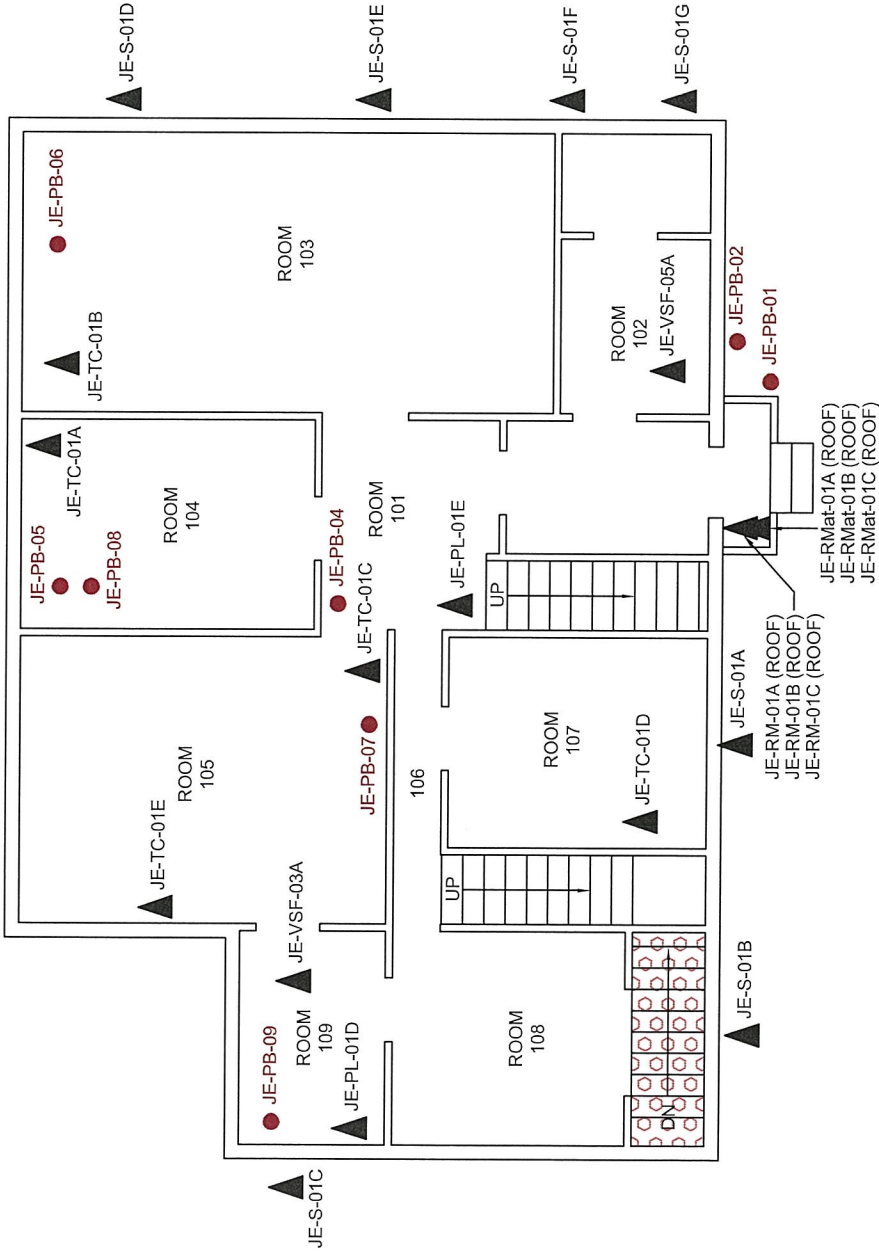
JOURNEY'S END (BASEMENT)

LEGEND

- BULK SAMPLE LOCATION
- PAINT CHIP SAMPLE LOCATION
- ASBESTOS-CONTAINING SHEET FLOORING
- ASBESTOS-CONTAINING GREY AIR-O-CELL PIPE INSULATION SUSPECTED THROUGHOUT CEILING SPACE

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD., REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400		Dwg. No.:	7	
Scale:	N.T.S.			
Date:	16/03/19			
Dwn. By:	CD VM/DM			
App'd By:	TW			
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FISGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC PUBLIC WORKS AND GOVERNMENT SERVICES CANADA				
Client:				



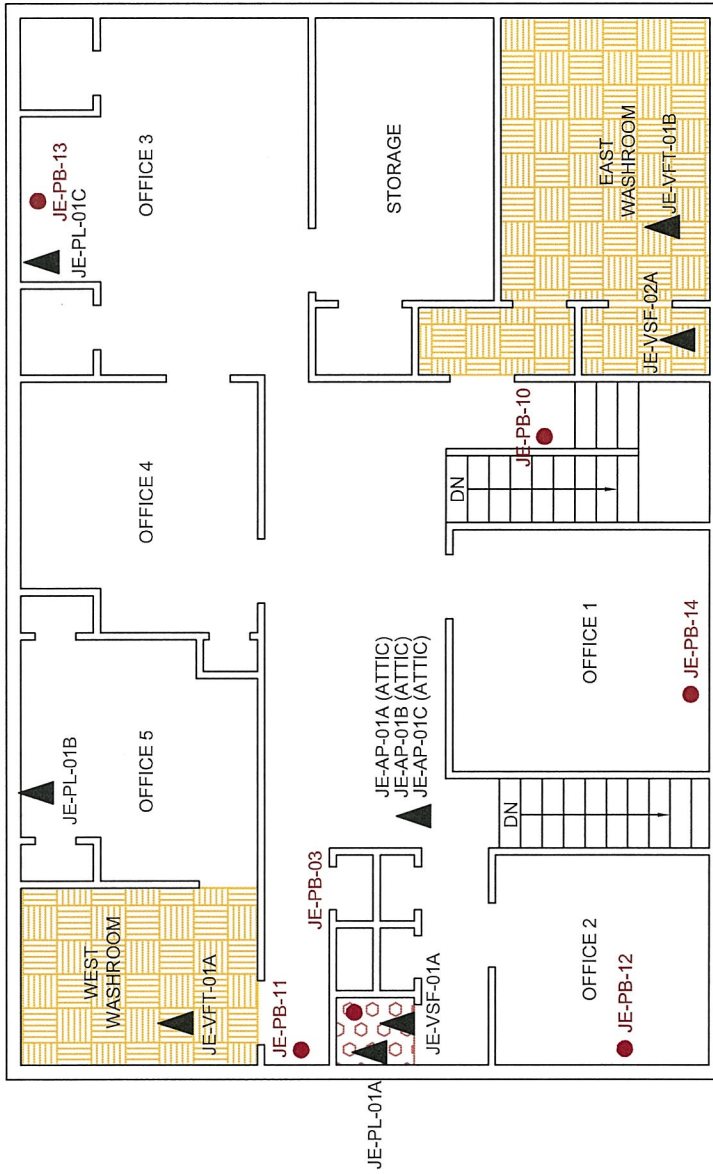
LEGEND

- ▲ BULK SAMPLE LOCATION
- PAINT CHIP SAMPLE LOCATION
- ▨ ASBESTOS-CONTAINING SHEET FLOORING





JOURNEY'S END (MAIN LEVEL)

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400		Dwg. No.:	8	Stantec
Scale:	N.T.S.			
Date:	16/03/19			
Dwn. By:	CD VM/DM			
App'd By:	TW			
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC PUBLIC WORKS AND GOVERNMENT SERVICES CANADA				
Client:				



LEGEND

-  BULK SAMPLE LOCATION
-  PAINT CHIP SAMPLE LOCATION
-  ASBESTOS-CONTAINING VINYL SHEET FLOORING
-  ASBESTOS-CONTAINING FLOOR TILE

JOURNEY'S END (SECOND LEVEL)

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD., REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC PUBLIC WORKS AND GOVERNMENT SERVICES CANADA		Project No.: 123220330.400 Scale: N.T.S. Date: 16/03/18 Dwn. By: CD VMDM App'd By: TW	Dwg. No.: 9 
		Client:	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
Project ID:

Attn: Steve Chou
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6
Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015
Proj: 123220330.400.100/Fort Rodd Hill

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: JE-TC-01A **Lab Sample ID:** 551507781-0271

Sample Description: Main level -north wall of room #104/Plaster texture coat

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray/Pink	0%	100%	None Detected	

Client Sample ID: JE-TC-01B **Lab Sample ID:** 551507781-0272

Sample Description: Main level -North wall of room #103/Plaster texture coat

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: JE-TC-01C **Lab Sample ID:** 551507781-0273

Sample Description: Main level -South wall of room #105/Plaster texture coat

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: JE-TC-01D **Lab Sample ID:** 551507781-0274

Sample Description: Main level -South wall of room#107/Plaster texture coat

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray/White	0%	100%	None Detected	

Client Sample ID: JE-TC-01E **Lab Sample ID:** 551507781-0275

Sample Description: Main level -West wall of room#105/Plaster texture coat

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White/Green	0%	100%	None Detected	

Client Sample ID: JE-PL-01A **Lab Sample ID:** 551507781-0276

Sample Description: Upstairs - North wall of west bathroom/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: JE-PL-01B **Lab Sample ID:** 551507781-0277

Sample Description: Upstairs - North wall of office #5/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: JE-PL-01C **Lab Sample ID:** 551507781-0278

Sample Description: Upstairs - North wall of office #3/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: JE-PL-01D **Lab Sample ID:** 551507781-0279

Sample Description: Main level - west wall of room#109/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: JE-PL-01E **Lab Sample ID:** 551507781-0280

Sample Description: Main level -west wall of east staircase/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: JE-PL-01F-Skim Coat **Lab Sample ID:** 551507781-0281

Sample Description: Basement -ceiling of boiler room/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: JE-PL-01F-Rough Coat **Lab Sample ID:** 551507781-0281A

Sample Description: Basement -ceiling of boiler room/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: JE-PL-01G-Skim Coat **Lab Sample ID:** 551507781-0282

Sample Description: Basement -ceiling of west storage room/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: JE-PL-01G-Rough Coat **Lab Sample ID:** 551507781-0282A

Sample Description: Basement -ceiling of west storage room/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: JE-PI-01A **Lab Sample ID:** 551507781-0283

Sample Description: Bsmt- N.side of the computer rm in ceiling space /Grey air-o-cell pipe insulation

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	60%	40% Chrysotile	



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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: JE-PI-01B **Lab Sample ID:** 551507781-0284
Sample Description: Bsmt- N.side of the computer rm in ceiling space /Grey air-o-cell pipe insulation

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015					Stop Positive (Not Analyzed)

Client Sample ID: JE-PI-01C **Lab Sample ID:** 551507781-0285
Sample Description: Bsmt- N.side of the computer rm in ceiling space /Grey air-o-cell pipe insulation

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015					Stop Positive (Not Analyzed)

Client Sample ID: JE-AP-01A **Lab Sample ID:** 551507781-0286
Sample Description: Attic - beneath ceiling insulation/Black attic paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Brown/Black	30%	70%	None Detected	

Client Sample ID: JE-AP-01B **Lab Sample ID:** 551507781-0287
Sample Description: Attic - beneath ceiling insulation/Black attic paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Brown/Black	30%	70%	None Detected	

Client Sample ID: JE-AP-01C **Lab Sample ID:** 551507781-0288
Sample Description: Attic - beneath ceiling insulation/Black attic paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Brown/Black	70%	30%	None Detected	

Client Sample ID: JE-M-01A **Lab Sample ID:** 551507781-0289
Sample Description: Basement -north wall of boiler room/Brick mortar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: JE-M-01B **Lab Sample ID:** 551507781-0290
Sample Description: Basement -north wall of boiler room/Brick mortar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: JE-M-01C **Lab Sample ID:** 551507781-0291
Sample Description: Basement -north wall of boiler room/Brick mortar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	



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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: JE-M-01D **Lab Sample ID:** 551507781-0292

Sample Description: Basement- north wall of west storage room/Brick mortar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: JE-M-01E **Lab Sample ID:** 551507781-0293

Sample Description: Basement- north wall of west storage room/Brick mortar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: JE-JFC-01A **Lab Sample ID:** 551507781-0294

Sample Description: Basement – east wall of east storage room/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: JE-JFC-01B **Lab Sample ID:** 551507781-0295

Sample Description: Basement – north wall of west storage room/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: JE-JFC-01C **Lab Sample ID:** 551507781-0296

Sample Description: Basement – north wall of west storage room/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White/Black	0%	100%	None Detected	

Client Sample ID: JE-DPP-01A **Lab Sample ID:** 551507781-0297

Sample Description: Basement – south wall of boiler room/Red duct penetration putty

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Red	0.0%	100%	None Detected	

Client Sample ID: JE-DPP-01B **Lab Sample ID:** 551507781-0298

Sample Description: Basement – south wall of boiler room/Red duct penetration putty

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Red	0.0%	100%	None Detected	

Client Sample ID: JE-DPP-01C **Lab Sample ID:** 551507781-0299

Sample Description: Basement – south wall of boiler room/Red duct penetration putty

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Red	0.0%	100%	None Detected	



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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: JE-VFT-01A **Lab Sample ID:** 551507781-0300

Sample Description: Upstairs-north west bathroom/9"x9" vinyl floor tile tan with brown

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	90.0%	10.0% Chrysotile	

Client Sample ID: JE-VFT-01B **Lab Sample ID:** 551507781-0301

Sample Description: Upstairs-south east bathroom/Tan with brown

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015				Positive Stop (Not Analyzed)	

Client Sample ID: JE-VFT-02A **Lab Sample ID:** 551507781-0302

Sample Description: Basement- top layer in computer room/Tan 12"x12" pattern

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Black	0.0%	100%	None Detected	

Client Sample ID: JE-VFT-03A **Lab Sample ID:** 551507781-0303

Sample Description: Bsmt-2nd layer under sample (JE-VFT-02A)/in computer rm/ Black vinyl floor tile

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black/Blue	0.0%	100%	None Detected	

Client Sample ID: JE-VSF-01A **Lab Sample ID:** 551507781-0304

Sample Description: Upstairs- west bathroom/Tan vinyl sheet flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	95.7%	4.3% Chrysotile	

Client Sample ID: JE-VSF-02A **Lab Sample ID:** 551507781-0305

Sample Description: Upstairs -closet of south east bathroom/Dark tan with blue vinyl sheet flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Red	0.0%	100%	None Detected	

Client Sample ID: JE-VSF-03A **Lab Sample ID:** 551507781-0306

Sample Description: Main level - room #109/Blue vinyl sheet flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Various/Green	0.0%	100%	None Detected	

Client Sample ID: JE-VSF-04A **Lab Sample ID:** 551507781-0307

Sample Description: Main level - stairs to basement/Tan vinyl sheet flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	98.6%	1.4% Chrysotile	



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Client Sample ID: JE-VSF-05A **Lab Sample ID:** 551507781-0308

Sample Description: Main level - room#102/Green with red vinyl sheet flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: JE-VSF-06A **Lab Sample ID:** 551507781-0309

Sample Description: Basement - laundry room/Yellow vinyl sheet flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	85.5%	14.5% Chrysotile	

Client Sample ID: JE-VSF-07A **Lab Sample ID:** 551507781-0310

Sample Description: Bsmt-3rd layer under sample(JE-VFT-03A)/in computer rm/ Tan vinyl sheet flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Tan	0.0%	100%	None Detected	

Client Sample ID: JE-PP-01A **Lab Sample ID:** 551507781-0311

Sample Description: NW exterior wall of computer rm & boiler rm/Black penetration putty

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: JE-PP-01B **Lab Sample ID:** 551507781-0312

Sample Description: NW exterior wall of computer rm & boiler rm/Black penetration putty

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: JE-PP-01C **Lab Sample ID:** 551507781-0313

Sample Description: NW exterior wall of computer rm & boiler rm/Black penetration putty

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: JE-RM-01A **Lab Sample ID:** 551507781-0314

Sample Description: Main entrance roof of building under shingle/Black roof mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	White/Black	0.0%	100%	None Detected	

Client Sample ID: JE-RM-01B **Lab Sample ID:** 551507781-0315

Sample Description: Main entrance roof of building under shingle/Black roof mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	White/Black	0.0%	100%	None Detected	



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Client Sample ID: JE-RM-01C **Lab Sample ID:** 551507781-0316

Sample Description: Main entrance roof of building under shingle/Black roof mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	White/Black	0.0%	100%	None Detected	

Client Sample ID: JE-WPC-01A **Lab Sample ID:** 551507781-0317

Sample Description: Ext. window of computer rm on E.side of the bldg/Grey window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray/Red	0%	100%	None Detected	

Client Sample ID: JE-WPC-01B **Lab Sample ID:** 551507781-0318

Sample Description: Ext. window of computer rm on E.side of the bldg/Grey window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Red	0.0%	100%	None Detected	

Client Sample ID: JE-WPC-01C **Lab Sample ID:** 551507781-0319

Sample Description: Ext. window of computer rm on E.side of the bldg/Grey window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Red	0.0%	100%	None Detected	

Client Sample ID: JE-DFC-01A **Lab Sample ID:** 551507781-0320

Sample Description: Ext. btwn frame & stone masonry of boiler rm /Door frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: JE-DFC-01B **Lab Sample ID:** 551507781-0321

Sample Description: Ext. btwn frame & stone masonry of boiler rm /Door frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: JE-DFC-01C **Lab Sample ID:** 551507781-0322

Sample Description: Ext. btwn frame & stone masonry of boiler rm /Door frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: JE-RMat-01A **Lab Sample ID:** 551507781-0323

Sample Description: Main entrance on the roof /Black roof material (shingle)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Red/Black	0.0%	100%	None Detected	



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Client Sample ID: JE-RMat-01B **Lab Sample ID:** 551507781-0324
Sample Description: Main entrance on the roof/Black roof material (shingle)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Red/Black	0.0%	100%	None Detected	

Client Sample ID: JE-RMat-01C **Lab Sample ID:** 551507781-0325
Sample Description: Main entrance on the roof/Black roof material (shingle)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Red/Black	0.0%	100%	None Detected	

Client Sample ID: JE-S-01A **Lab Sample ID:** 551507781-0326
Sample Description: South side of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: JE-S-01B **Lab Sample ID:** 551507781-0327
Sample Description: South west corner of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: JE-S-01C **Lab Sample ID:** 551507781-0328
Sample Description: West side of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: JE-S-01D **Lab Sample ID:** 551507781-0329
Sample Description: North east corner of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: JE-S-01E **Lab Sample ID:** 551507781-0330
Sample Description: East side of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray/White	0%	100%	None Detected	

Client Sample ID: JE-S-01F **Lab Sample ID:** 551507781-0331
Sample Description: South east corner of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray/White	0%	100%	None Detected	



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Client Sample ID: JE-S-01G

Lab Sample ID: 551507781-0332

Sample Description:

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Analyst(s):

Jon Delos Santos PLM (19)
PLM Grav. Reduction (3)
Nicole Dimou PLM Grav. Reduction (13)
Nicole Yeo PLM Grav. Reduction (2)
Romeo Samson PLM (18)
PLM Grav. Reduction (6)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Report amended: 10/28/2015 15:17:12 Replaces initial report from: 07/28/2015 21:57:46 Reason Code: Data Entry-Change to Sample ID

**EMSL Canada Inc.**

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 CustomerID: 55JACQ30L
 CustomerPO: 123220330
 ProjectID:

Attn: **Steve Chou**
Stantec Consulting, Ltd.
500 - 4730 Kingsway
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Phone: (604) 412-3004
 Fax:
 Received: 07/20/15 11:06 AM
 Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
JE-PB-01 Site: EXTERIOR TRIM Desc: RED Insufficient sample to meet reporting limit.	551507777-0163	7/24/2015		<790 ppm
JE-PB-02 Site: EXTERIOR ON STUCCO Desc: YELLOW	551507777-0164	7/24/2015		100 ppm
JE-PB-03 Site: UPSTAIRS - WEST BATHROOM TRIM Desc: WHITE	551507777-0165	7/24/2015		22000 ppm
JE-PB-04 Site: MAIN LEVEL - WALL IN LOBBY Desc: TAN	551507777-0166	7/24/2015		980 ppm
JE-PB-05 Site: MAIN LEVEL - WALL IN ROOM#104 Desc: PINK	551507777-0167	7/24/2015		22000 ppm
JE-PB-06 Site: MAIN LEVEL - WALL IN ROOM#103 Desc: ORANGE	551507777-0168	7/24/2015		480 ppm
JE-PB-07 Site: MAIN LEVEL - WALL IN ROOM#105 Desc: GREEN	551507777-0169	7/24/2015		680 ppm
JE-PB-08 Site: MAIN LEVEL - WALL IN ROOM#104 Desc: PINK	551507777-0170	7/24/2015		780 ppm
JE-PB-09 Site: MAIN LEVEL - WALL IN ROOM#109 Desc: YELLOW Insufficient sample to reach reporting limit.	551507777-0171	7/24/2015		<120 ppm
JE-PB-10 Site: UPSTAIRS - EAST WALL BY EAST STAIRS Desc: WHITE	551507777-0172	7/23/2015		1000 ppm

Lisa Podzyhun
 or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:45:49

**EMSL Canada Inc.**

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EMSL Canada Or 551507777
 CustomerID: 55JACQ30L
 CustomerPO: 123220330
 ProjectID:

Attn: **Steve Chou** Phone: (604) 412-3004
Stantec Consulting, Ltd. Fax:
500 - 4730 Kingsway Received: 07/20/15 11:06 AM
Burnaby, BC V5H 0C6 Collected:
 Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
JE-PB-11 UPSTAIRS - WEST BATHROOM WALL Desc: YELLOW	551507777-0173	7/23/2015	Site: 7/23/2015	33000 ppm
JE-PB-12 UPSTAIRS - WALL IN OFFICE#2 Desc: GREY	551507777-0174	7/23/2015	Site: 7/23/2015	2400 ppm
JE-PB-13 UPSTAIRS - WALL IN OFFICE#3 Desc: TAN	551507777-0175	7/23/2015	Site: 7/23/2015	3000 ppm
JE-PB-14 UPSTAIRS - WALL IN OFFICE#1 Desc: DARK YELLOW	551507777-0176	7/23/2015	Site: 7/23/2015	1400 ppm
JE-PB-15 BASEMENT - WALL IN STORAGE ROOM Desc: WHITE	551507777-0177	7/23/2015	Site: 7/23/2015	<90 ppm
JE-PB-16 BASEMENT - WALL IN BOILER ROOM Desc: GREEN	551507777-0178	7/23/2015	Site: 7/23/2015	2000 ppm

RPD outside UCL and MS outside LCL. Sample#551507777-0166/-0170/-0171.

Lisa Podzyhun
 or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:45:49



APPENDIX K
FINDINGS AND RECOMMENDATIONS—
LOWER BATTERY

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix K Findings and Recommendations—Lower Battery
March 24, 2016

Appendix K FINDINGS AND RECOMMENDATIONS—LOWER BATTERY

The Lower Battery was reportedly constructed in 1898 and consists of a Guardhouse, Artillery Store, Small Arms Ammunition Store, Oil Store, Water Tank, two Gun Emplacements, and an Underground Magazine. The area is enclosed by concrete perimeter walls.

The typical structural components and finishes associated with these buildings and structures consist of concrete walls, ceilings and floors (except the Guardhouse, which has plaster interior walls and a wood canopy).

The results of the assessment for each of the considered hazardous materials within the buildings are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

The following area was not accessed, for the reason indicated:

- Inside of Oil Store (no access)

K.1 ASBESTOS

Suspected ACMs were not observed pertaining to the small arms ammunition store, oil store, water tank, the two gun emplacements or the underground magazine.

Stantec identified and sampled the following suspected ACMs in the artillery store and the guard house:

- Caulking and sealant
- Roofing material
- Plaster

Fourteen samples (some containing multiple layers) of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table K-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached at to this Appendix.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix K Findings and Recommendations—Lower Battery
March 24, 2016

**Table K-1 Suspected ACM Sample Collection and Analysis Summary
Lower Battery, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
Artillery Store			
LBAS-Roof-01A	Black roofing material	Roof of Artillery Store	None detected
LBAS-Roof-01B	Black roofing material	Roof of Artillery Store	None detected
LBAS-Roof-01C	Black roofing material	Roof of Artillery Store	None detected
Guard House			
LBGH-WPC-01A	White window pane caulking	East window of guard house under canopy between frame and pane	None detected
LBGH-WPC-01B	White window pane caulking	Central window of guard house under canopy between frame and pane	None detected
LBGH-WPC-01C	White window pane caulking	West window of guard house under canopy between frame and pane	None detected
LBGH-Roof-01A	Black roofing material	Roof of guard house	None detected
LBGH-Roof-01B	Black roofing material	Roof of guard house	None detected
LBGH-Roof-01C	Black roofing material	Roof of guard house	None detected
LBGH-PL-01A-Skim Coat	Plaster in poor condition (cracked, flaking and peeling)	North west wall of guard house common room	None detected
LBGH-PL-01A-Rough Coat	Plaster in poor condition (cracked, flaking and peeling)	North west wall of guard house common room	None detected
LBGH-PL-01B-Skim Coat	Plaster in poor condition (cracked, flaking and peeling)	North west wall of guard house common room	None detected
LBGH-PL-01B-Rough Coat	Plaster in poor condition (cracked, flaking and peeling)	North west wall of guard house common room	None detected
LBGH-PL-01C-Skim Coat	Plaster in poor condition (cracked, flaking and peeling)	North west wall of guard house common room	None detected
LBGH-PL-01C-Rough Coat	Plaster in poor condition (cracked, flaking and peeling)	North west wall of guard house common room	None detected
LBGH-PL-01D-Skim Coat	Plaster in poor condition (cracked, flaking and peeling)	North west wall of guard house common room	None detected
LBGH-PL-01D-Rough Coat	Plaster in poor condition (cracked, flaking and peeling)	North west wall of guard house common room	None detected
LBGH-PL-01E-Skim Coat	Plaster in poor condition (cracked, flaking and peeling)	North west wall of guard house common room	None detected
LBGH-PL-01E-Rough Coat	Plaster in poor condition (cracked, flaking and peeling)	North west wall of common room	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix K Findings and Recommendations—Lower Battery
March 24, 2016

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, no ACMS were identified.

K.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes

With respect to paint, 14 paint chip samples were obtained from the predominant suspected LCP applications within the buildings. A summary of the sample types, locations and analytical results is presented in Table K-2, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table K-2 Suspected LCP Sample Collection and Analysis Summary
Lower Battery, Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
Lower Battery (General)				
LB-PB-02	White	Flag pole between east and west gun emplacement	1,300	Yes
LB-PB-03	Black	Main gate	50,000	Yes
Gun Emplacements				
LB-PB-01	Black	West gun emplacement	31,000	Yes
Underground Magazine				
LBUM-PB-01	Black	Shelf on south wall	3,200	Yes
LBUM-PB-02	Grey	Door	280,000	Yes
LBUM-PB-03	White	Interior wall	190	No
Small Arms Ammunition Store/Artillery Store				
LBGH-PB-01	Grey	Interior Trim	1,000	Yes
Guardhouse				
LBGH-PB-02	Black	Interior trim	390	No
LBGH-PB-03	White	Interior wall	3,400	Yes

HAZARDOUS BUILDING MATERIALS ASSESSMENT



Appendix K Findings and Recommendations—Lower Battery
March 24, 2016

**Table K-2 Suspected LCP Sample Collection and Analysis Summary
Lower Battery, Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
LBGH-PB-04	Grey	Interior wall	3,900	Yes
LBGH-PB-05	Yellow	Window frame	2,800	Yes
LBGH-PB-06	White	Window sill	<90	No
LBGH-PB-07	Red	Exterior red trim	9,700	Yes
LBGH-PB-08	Blue	Exterior west door	3,000	Yes

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table K-3, below were identified as an LCP.

**Table K-3 Summary of Identified LCPs
Lower Battery, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>General Lower Battery - white coloured paint on the flag pole. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>General Lower Battery - black coloured paint on the main gate, railings, and gates throughout. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix K Findings and Recommendations—Lower Battery
 March 24, 2016




**Table K-3 Summary of Identified LCPs
 Lower Battery, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Gun Emplacements - black colored paint on the gun emplacements.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Underground Magazine - black coloured paint on the shelves and doors throughout.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Underground Magazine - grey colored paint on the doors throughout.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix K Findings and Recommendations—Lower Battery
March 24, 2016



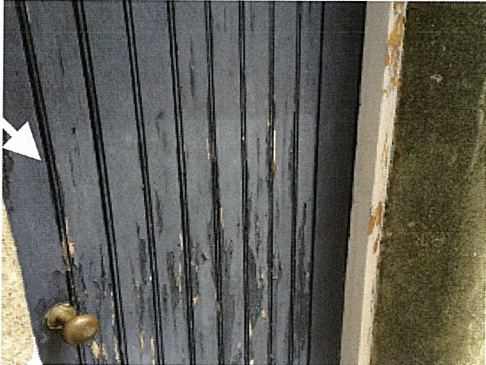
**Table K-3 Summary of Identified LCPs
Lower Battery, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Artillery and Small Arms Ammunition Store - grey colored paint on the trims throughout.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Guardhouse - white colored paint on the interior walls throughout.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Guardhouse - grey coloured paint on the lower walls throughout.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix K Findings and Recommendations—Lower Battery
March 24, 2016

**Table K-3 Summary of Identified LCPs
Lower Battery, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Guardhouse - yellow coloured paint on the window frames throughout.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Guardhouse - red coloured paint on the exterior trim throughout.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Guardhouse - blue coloured paint on the doors throughout.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

K.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing electrical equipment was observed.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix K Findings and Recommendations—Lower Battery
March 24, 2016

K.4 MERCURY

Equipment and/or items that contain mercury were not observed. Mercury may also be present in paints and adhesives.

K.5 MOULD

No mould or moisture-impacted building materials were observed during the assessment.

K.6 OZONE-DEPLETING SUBSTANCES

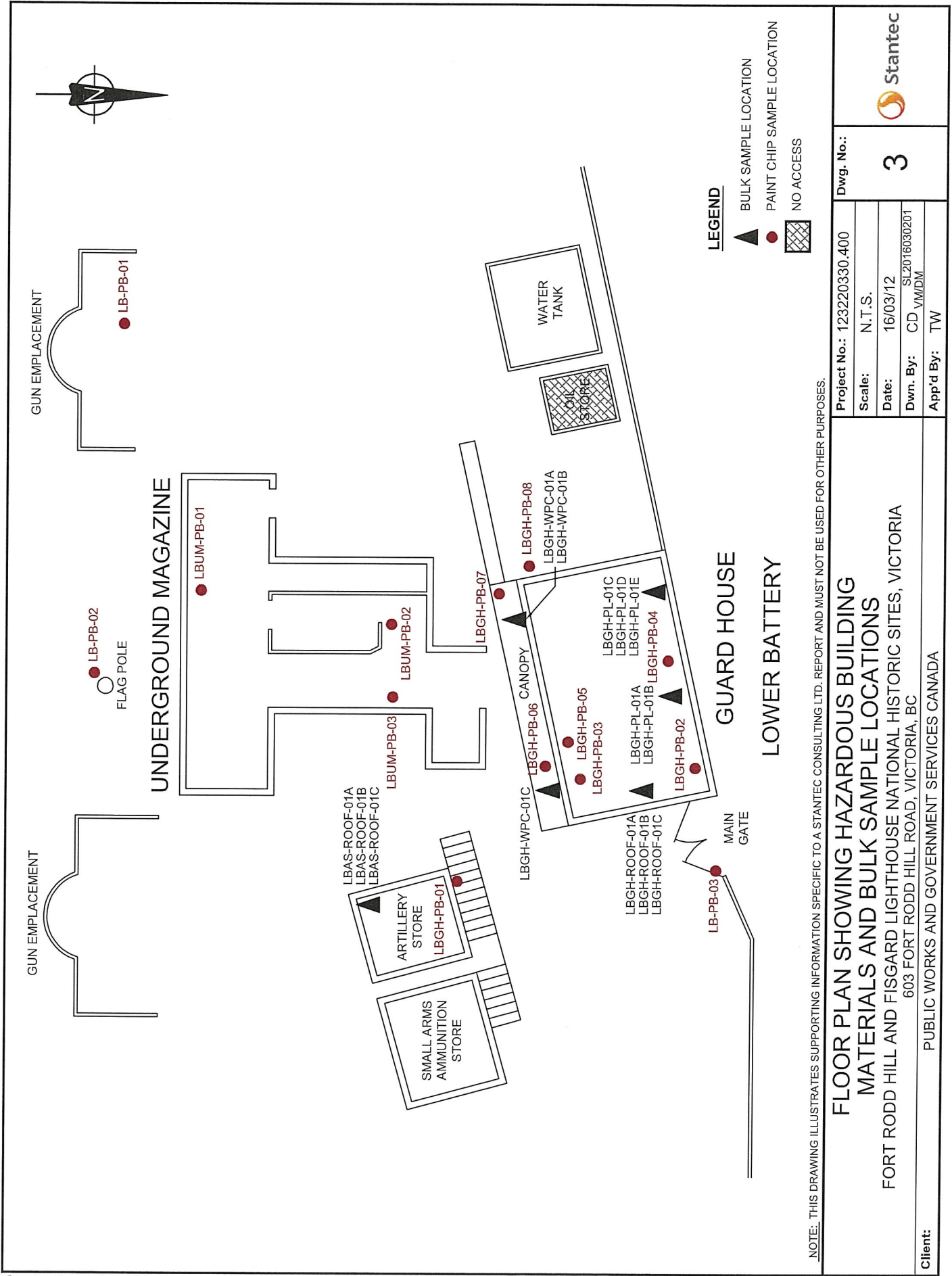
Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

K.7 SILICA

Silica is presumed to be present in the concrete walls, ceilings and floors (foundations) of the buildings.

K.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



Project No.: 123220330.400 Scale: N.T.S. Date: 16/03/12 Dwn. By: CD_VM/DM App'd By: TW		Dwg. No.: <h1 style="text-align: center;">3</h1>	
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA			



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Customer ID: 55JACQ30L
Customer PO: 123220330
Project ID:

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500 - 4730 Kingsway
Burnaby, BC V5H 0C6

Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015

Proj: 123220330.400.100/Fort Rodd Hill

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: LBAS-Roof-01A **Lab Sample ID:** 551507781-0030

Sample Description: Roof of building/Black roofing material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Black	0.0%	100%	None Detected	

Client Sample ID: LBAS-Roof-01B **Lab Sample ID:** 551507781-0031

Sample Description: Roof of building/Black roofing material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Black	0.0%	100%	None Detected	

Client Sample ID: LBAS-Roof-01C **Lab Sample ID:** 551507781-0032

Sample Description: Roof of building/Black roofing material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Black	0.0%	100%	None Detected	

Client Sample ID: LBGH-WPC-01A **Lab Sample ID:** 551507781-0033

Sample Description: East window under canopy between frame and pane/White window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/White	0.0%	100%	None Detected	

Client Sample ID: LBGH-WPC-01B **Lab Sample ID:** 551507781-0034

Sample Description: Central window under canopy between frame and pane/White window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/White	0.0%	100%	None Detected	

Client Sample ID: LBGH-WPC-01C **Lab Sample ID:** 551507781-0035

Sample Description: West window under canopy between frame and pane/White window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/White	0.0%	100%	None Detected	

Client Sample ID: LBGH-Roof-01A **Lab Sample ID:** 551507781-0036

Sample Description: Roof of building/Black roofing material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: LBGH-Roof-01B **Lab Sample ID:** 551507781-0037
Sample Description: Roof of building/Black roofing material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: LBGH-Roof-01C **Lab Sample ID:** 551507781-0038
Sample Description: Roof of building/Black roofing material

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	

Client Sample ID: LBGH-PL-01A-Skim Coat **Lab Sample ID:** 551507781-0039
Sample Description: North west wall of common room/Plaster in poor condition (cracked, flaking and peeling)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: LBGH-PL-01A-Rough Coat **Lab Sample ID:** 551507781-0039A
Sample Description: North west wall of common room/Plaster in poor condition (cracked, flaking and peeling)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: LBGH-PL-01B-Skim Coat **Lab Sample ID:** 551507781-0040
Sample Description: North west wall of common room/Plaster in poor condition (cracked, flaking and peeling)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: LBGH-PL-01B-Rough Coat **Lab Sample ID:** 551507781-0040A
Sample Description: North west wall of common room/Plaster in poor condition (cracked, flaking and peeling)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: LBGH-PL-01C-Skim Coat **Lab Sample ID:** 551507781-0041
Sample Description: North west wall of common room/Plaster in poor condition (cracked, flaking and peeling)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: LBGH-PL-01C-Rough Coat **Lab Sample ID:** 551507781-0041A
Sample Description: North west wall of common room/Plaster in poor condition (cracked, flaking and peeling)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: LBGH-PL-01D-Skim Coat **Lab Sample ID:** 551507781-0042
Sample Description: North west wall of common room/Plaster in poor condition (cracked, flaking and peeling)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: LBGH-PL-01D-Rough Coat **Lab Sample ID:** 551507781-0042A
Sample Description: North west wall of common room/Plaster in poor condition (cracked, flaking and peeling)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: LBGH-PL-01E-Skim Coat **Lab Sample ID:** 551507781-0043
Sample Description: North west wall of common room/Plaster in poor condition (cracked, flaking and peeling)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: LBGH-PL-01E-Rough Coat **Lab Sample ID:** 551507781-0043A
Sample Description: North west wall of common room/Plaster in poor condition (cracked, flaking and peeling)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Analyst(s):

- Jon Delos Santos PLM (4)
PLM Grav. Reduction (1)
- Nicole Dimou PLM Grav. Reduction (5)
- Nicole Yeo PLM Grav. Reduction (2)
- Romeo Samson PLM (6)
PLM Grav. Reduction (1)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Report amended: 10/28/2015 15:17:12 Replaces initial report from: 07/28/2015 21:57:46 Reason Code: Data Entry-Change to Sample ID



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Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
LBGH-PB-01 Site: INTERIOR TRIM Desc: GREY	551507777-0037		7/21/2015	1000 ppm
LBGH-PB-02 Site: INTERIOR TRIM Desc: BLACK	551507777-0038		7/21/2015	390 ppm
LBGH-PB-03 Site: INTERIOR WALL Desc: WHITE	551507777-0039		7/23/2015	3400 ppm
LBGH-PB-04 Site: INTERIOR WALL Desc: GREY	551507777-0040		7/23/2015	3900 ppm
LBGH-PB-05 Site: WINDOW FRAME Desc: YELLOW	551507777-0041		7/23/2015	2800 ppm
LBGH-PB-06 Site: WINDOW SILL Desc: WHITE	551507777-0042		7/23/2015	<90 ppm
LBGH-PB-07 Site: EXTERIOR WEST TRIM Desc: RED	551507777-0043		7/23/2015	9700 ppm
LBGH-PB-08 Site: EXTERIOR WEST DOOR Desc: BLUE	551507777-0044		7/23/2015	3000 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:41:11



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CustomerPO: 123220330
ProjectID:

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Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
LB-PB-01 Site: WEST GUN EMPLACEMENT Desc: BLACK	551507777-0031	7/21/2015		31000 ppm
LB-PB-02 Site: FLAG POLE BETWEEN EAST AND WEST GUN EMPLACEMENT Desc: WHITE	551507777-0032	7/21/2015		1300 ppm
LB-PB-03 Site: MAIN GATE Desc: BLACK	551507777-0033	7/21/2015		50000 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:37:19



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EMSL Canada Or 551507777
CustomerID: 55JACQ30L
CustomerPO: 123220330
ProjectID:

Attn: **Steve Chou**
Stantec Consulting, Ltd.
500 - 4730 Kingsway
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Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
LBUM-PB-01 Site: SHELF ON SOUTH WALL Desc: BLACK	551507777-0034		7/21/2015	3200 ppm
LBUM-PB-02 Site: DOOR Desc: GREY	551507777-0035		7/21/2015	280000 ppm
LBUM-PB-03 Site: INTERIOR WALL Desc: WHITE	551507777-0036		7/21/2015	190 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:39:45



APPENDIX L
FINDINGS AND RECOMMENDATIONS—
MAINTENANCE FACILITIES



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix L Findings and Recommendations—Maintenance Facilities
March 24, 2016

Appendix L FINDINGS AND RECOMMENDATIONS— MAINTENANCE FACILITIES

The Maintenance Facilities were reportedly constructed in the 1980s. The Maintenance Facilities are comprised of the following buildings/structures:

- Paint shop (FRH2)
- Garage (FRH3)
- Paint Shop (FRH4)
- Chemical Storage
- North Shed

The results of the assessment for each of the considered hazardous materials within the buildings are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

The following areas were not accessed, for the reasons indicated:

- Paint shop (FRH2) roof (lack of safe access)
- Garage (FRH3) roof (lack of safe access)
- Paint shop (FRH4) roof (lack of safe access)

As such, limited comments, if any, will be provided regarding the presence, quantity or condition of hazardous building materials within the above-noted areas.

L.1 ASBESTOS

Suspected ACMs were not observed pertaining to the chemical storage or the north shed.

Stantec identified and sampled the following suspected ACMs within the other buildings:

- Textured finish
- Wall penetration sealants
- Drywall joint compound
- Vinyl floor tile
- Caulking and mastic

Thirty-one samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix L Findings and Recommendations—Maintenance Facilities
March 24, 2016

A summary of the sample types, locations and analytical results is presented in Table L-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

**Table L-1 Suspected ACM Sample Collection and Analysis Summary
Maintenance Facilities, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
Paint Shop (FRH2)			
FRH2-TF-01A	Green texture finish	Ramp on south side of the building	None detected
FRH2-TF-01B	Green texture finish	Ramp on south side of the building	None detected
FRH2-TF-01C	Green texture finish	Ramp on south side of the building	None detected
FRH2-WP-01A	Black wall penetration	North west corner of the building	None detected
FRH2-WP-01B	Black wall penetration	North west corner of the building	None detected
FRH2-WP-01C	Black wall penetration	North west corner of the building	None detected
FRH2-JFC-01A	Joint filling compound	East wall of south washroom	None detected
FRH2-JFC-01B	Joint filling compound	West wall of kitchen	None detected
FRH2-JFC-01C	Joint filling compound	East wall of kitchen	None detected
FRH2-JFC-01D	Joint filling compound	North wall of kitchen	None detected
FRH2-JFC-01E	Joint filling compound	East wall of office	None detected
FRH2-VFT-01A	Brown smeared vinyl floor tile	Floor of south washroom	None detected
FRH2-VFT-01B	Brown smeared vinyl floor tile	Floor of entrance hallway	None detected
FRH2-VSF-01	Tan squared pattern vinyl sheet flooring	Small patch in south west corner of work shop	None detected
Garage (FRH3)			
FRH3-DFC-01A	White door frame caulking	North east door on exterior between frame and paneling	None detected
FRH3-DFC-01B	White door frame caulking	North east door on exterior between frame and panelling	None detected
FRH3-DFC-01C	White door frame caulking	North east door on exterior between frame and panelling	None detected
Paint Shop (FRH4)			
FRH4-TF-01A	Green texture finish	Ramp on east side of the building	None detected
FRH4-TF-01B	Green texture finish	Ramp on east side of the building	None detected
FRH4-TF-01C	Green texture finish	Ramp on east side of the building	None detected
FRH4-DM-01A	Grey duct mastic	Exterior north west corner of the building	None detected
FRH4-DM-01B	Grey duct mastic	Exterior north west corner of the building	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix L Findings and Recommendations—Maintenance Facilities
March 24, 2016

**Table L-1 Suspected ACM Sample Collection and Analysis Summary
Maintenance Facilities, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
FRH4-DM-01C	Grey duct mastic	Exterior north west corner of the building	None detected
FRH4-WP-01A	Grey wall penetration	Exterior north west corner of the building	None detected
FRH4-WP-01B	Grey wall penetration	Exterior north west corner of the building	None detected
FRH4-WP-01C	Grey wall penetration	Exterior north west corner of the building	None detected
FRH4-JFC-01A	Joint filling compound	West wall of the building	None detected
FRH4-JFC-01B	Joint filling compound	West interior wall of storage room	None detected
FRH4-JFC-01C	Joint filling compound	West interior wall of storage room	None detected
FRH4-JFC-01D	Joint filling compound	North interior wall of building	None detected
FRH4-JFC-01E	Joint filling compound	West interior wall or building	None detected

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, no ACMs were identified.

L.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes
- Solder used in electrical equipment
- Vent and pipe flashings

With respect to paint, 13 paint chip samples were obtained from the predominant suspected LCP applications within the buildings. A summary of the sample types, locations and analytical results is presented in Table L-2, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix L Findings and Recommendations—Maintenance Facilities
 March 24, 2016

**Table L-2 Suspected LCP Sample Collection and Analysis Summary
 Maintenance Facilities, Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
Paint Shop (FR2)				
FRH2-PB-01	Grey	Interior floor of office	3,500	Yes
FRH2-PB-02	Green	Exterior deck on south side of the building	<90	No
FRH2-PB-03	Teal	Exterior corrugated siding	<250	No
FRH2-PB-04	White	Exterior bathroom door on south side of the building	640	Yes
FRH2-PB-05	White	Interior wall	<230	No
Garage (FR3)				
FRH3-PB-01	Teal	Exterior corrugated siding	620	Yes
Paint Shop (FRH4)				
FRH4-PB-01	White	Interior wall	160	No
FRH4-PB-02	Grey	Interior floor	<170	No
FRH4-PB-03	Green	Deck on east side of the building	200	No
FRH4-PB-04	Green	Exterior corrugated siding	650	Yes
FRH4-PB-05	White	Exterior door on east side of the building	<140	No
Chemical Storage				
CS-PB-01	Green	Exterior of storage unit	<380	No
North Shed				
NS-PB-01	Green	Exterior of shed	440	No




Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table L-3, below were identified as LCPs.



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix L Findings and Recommendations—Maintenance Facilities
March 24, 2016

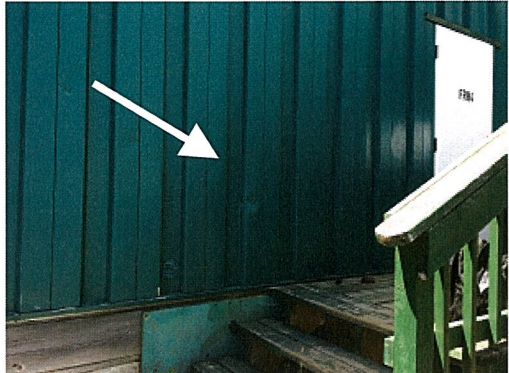
**Table L-3 Summary of Identified LCPs
Maintenance Facilities, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Grey colored paint on the interior floor throughout FRH2. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph of an interior floor. The floor is a dark grey color. A white arrow points to the floor surface. In the background, there are cardboard boxes and a paint bucket.
<p>White coloured paint on the exterior doors of FRH2. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph of an exterior door. The door is white. A white arrow points to the door. There are signs on the door, including a red sign that says "PRICES VARYING FROM \$1.99 TO \$2.99".
<p>Teal coloured paint on the corrugated siding throughout the exterior of FRH3. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph of the exterior of a building. The building has teal-colored corrugated siding. A white arrow points to the siding. There is a white door on the building.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix L Findings and Recommendations—Maintenance Facilities
March 24, 2016

**Table L-3 Summary of Identified LCPs
Maintenance Facilities, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Green coloured paint on the corrugated siding throughout exterior of FRH4. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

L.3 POLYCHLORINATED BIPHENYLS

The majority of fluorescent light fixtures throughout were observed to have high-efficiency light tubes. The ballasts within such fixtures are not suspected to contain PCBs. Other suspected PCB-containing electrical equipment was not observed.

L.4 MERCURY

Mercury vapour is expected to be present in fluorescent light bulbs/tubes observed in approximately 20 fluorescent light fixtures present in various locations throughout the buildings.

Mercury may also be present in paints and adhesives.

L.5 MOULD

No mould or moisture-impacted building materials were observed during the assessment.

L.6 OZONE-DEPLETING SUBSTANCES

Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

L.7 SILICA

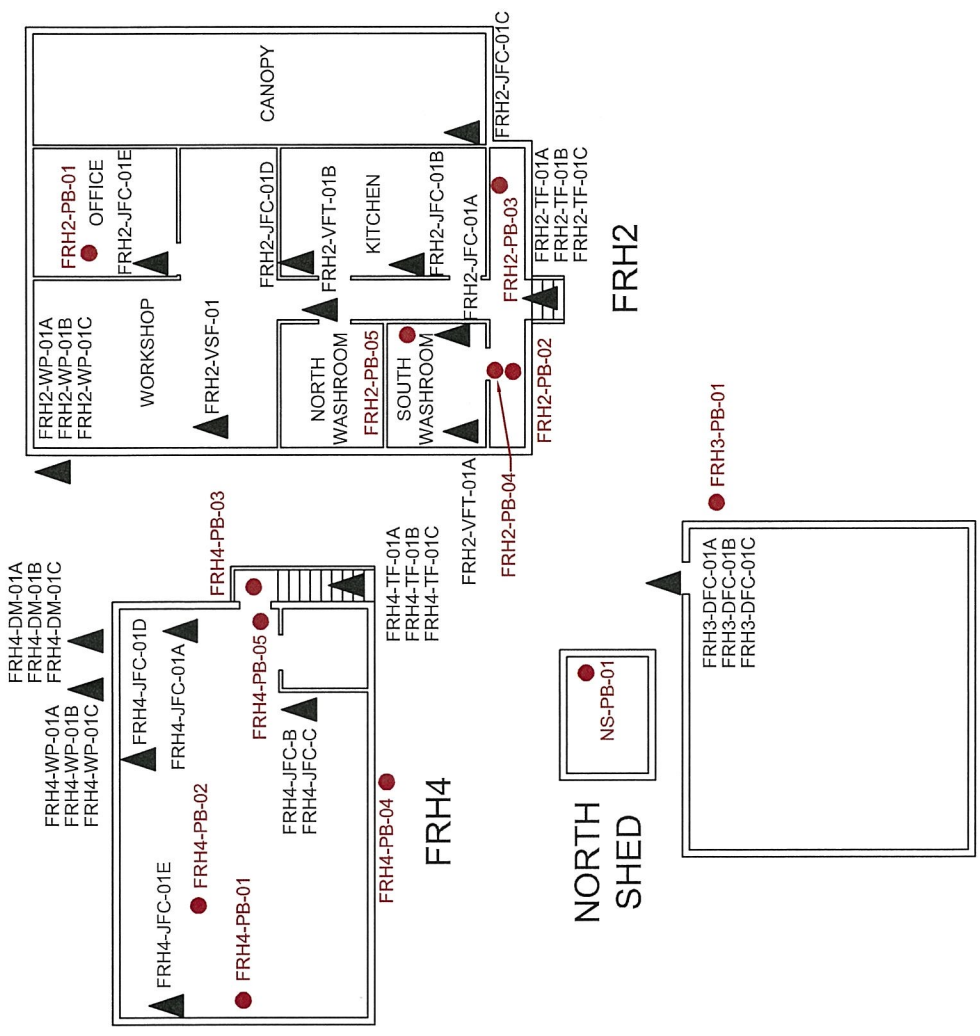
Silica is presumed to be present in the concrete foundation of the Paint Shop (FRH2) building, and the slab concrete floor of the Garage (FRH3).

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix L Findings and Recommendations—Maintenance Facilities
March 24, 2016

L.8 RECOMMENDATIONS

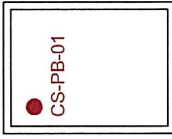
In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



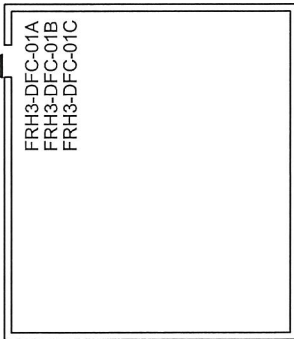
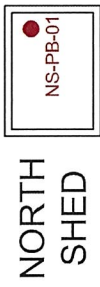
CHEMICAL STORAGE

LEGEND

- ▲ BULK SAMPLE LOCATION
- PAINT CHIP SAMPLE LOCATION



MAINTENANCE FACILITIES



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400		Dwg. No.: 11	
Scale:	N.T.S.		
Date:	15/10/29		
Dwn. By:	CD vmi/dm		
App'd By:	TW		
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC			
Client:		PUBLIC WORKS AND GOVERNMENT SERVICES CANADA	



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Customer PO: 123220330
Project ID:

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Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015
Proj: 123220330.400.100/Fort Rodd Hill

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: FRH2-TF-01A **Lab Sample ID:** 551507781-0242

Sample Description: Ramp on south side of the building/Green texture finish

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Green	0.0%	100%	None Detected	

Client Sample ID: FRH2-TF-01B **Lab Sample ID:** 551507781-0243

Sample Description: Ramp on south side of the building/Green texture finish

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Green	0.0%	100%	None Detected	

Client Sample ID: FRH2-TF-01C **Lab Sample ID:** 551507781-0244

Sample Description: Ramp on south side of the building/Green texture finish

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Green	0.0%	100%	None Detected	

Client Sample ID: FRH2-WP-01A **Lab Sample ID:** 551507781-0245

Sample Description: North west corner of the building/Black wall penetration

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black/Green	0.0%	100%	None Detected	

Client Sample ID: FRH2-WP-01B **Lab Sample ID:** 551507781-0246

Sample Description: North west corner of the building/Black wall penetration

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black/Green	0.0%	100%	None Detected	

Client Sample ID: FRH2-WP-01C **Lab Sample ID:** 551507781-0247

Sample Description: North west corner of the building/Black wall penetration

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black/Green	0.0%	100%	None Detected	

Client Sample ID: FRH2-JFC-01A **Lab Sample ID:** 551507781-0248

Sample Description: East wall of south washroom/Joint filling compound

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	



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Customer ID: 55JACQ30L
Customer PO: 123220330
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: FRH2-JFC-01B **Lab Sample ID:** 551507781-0249
Sample Description: West wall of kitchen/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: FRH2-JFC-01C **Lab Sample ID:** 551507781-0250
Sample Description: East wall of kitchen/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: FRH2-JFC-01D **Lab Sample ID:** 551507781-0251
Sample Description: North wall of kitchen/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: FRH2-JFC-01E **Lab Sample ID:** 551507781-0252
Sample Description: East wall of office/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: FRH2-VFT-01A **Lab Sample ID:** 551507781-0253
Sample Description: Floor of south washroom/Brown smeared vinyl floor tile

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Green	0.0%	100%	None Detected	

Client Sample ID: FRH2-VFT-01B **Lab Sample ID:** 551507781-0254
Sample Description: Floor of entrance hallway/Brown smeared vinyl floor tile

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Green	0.0%	100%	None Detected	

Client Sample ID: FRH2-VSF-01 **Lab Sample ID:** 551507781-0255
Sample Description: Small patch in south west corner of work shop/Tan squared pattern vinyl sheet flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/White	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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):

Jon Delos Santos PLM (2)
Nicole Dimou PLM Grav. Reduction (7)
Nicole Yeo PLM Grav. Reduction (2)
Romeo Samson PLM (3)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

(Initial report from: 07/28/2015 21:57:46)



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Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015

Proj: 123220330.400.100/Fort Rodd Hill

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: FRH3-DFC-01A

Lab Sample ID: 551507781-0256

Sample Description: N.east door on exterior btwn frame & paneling/White door frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Green	0.0%	100%	None Detected	

Client Sample ID: FRH3-DFC-01B

Lab Sample ID: 551507781-0257

Sample Description: N.east door on exterior btwn frame & paneling/White door frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Green	0.0%	100%	None Detected	

Client Sample ID: FRH3-DFC-01C

Lab Sample ID: 551507781-0258

Sample Description: N.east door on exterior btwn frame & paneling/White door frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Green	0.0%	100%	None Detected	

Analyst(s):

Jon Delos Santos PLM Grav. Reduction (1)
Romeo Samson PLM Grav. Reduction (2)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 07/28/2015 21:57:46



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Analyzed: 7/28/2015
Proj: 123220330.400.100/Fort Rodd Hill

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: FRH4-TF-01A **Lab Sample ID:** 551507781-0259
Sample Description: Ramp on east side of the building/Green texture finish

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Green	0.0%	100%	None Detected	

Client Sample ID: FRH4-TF-01B **Lab Sample ID:** 551507781-0260
Sample Description: Ramp on east side of the building/Green texture finish

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Green	0.0%	100%	None Detected	

Client Sample ID: FRH4-TF-01C **Lab Sample ID:** 551507781-0261
Sample Description: Ramp on east side of the building/Green texture finish

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Green	0.0%	100%	None Detected	

Client Sample ID: FRH4-DM-01A **Lab Sample ID:** 551507781-0262
Sample Description: Exterior north west corner of the building/Grey duct mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: FRH4-DM-01B **Lab Sample ID:** 551507781-0263
Sample Description: Exterior north west corner of the building/Grey duct mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: FRH4-DM-01C **Lab Sample ID:** 551507781-0264
Sample Description: Exterior north west corner of the building/Grey duct mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: FRH4-WP-01A **Lab Sample ID:** 551507781-0265
Sample Description: Exterior north west corner of the building/Grey wall penetration

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Green	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: FRH4-WP-01B **Lab Sample ID:** 551507781-0266

Sample Description: Exterior north west corner of the building/Grey wall penetration

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Green	0.0%	100%	None Detected	

Client Sample ID: FRH4-WP-01C **Lab Sample ID:** 551507781-0267

Sample Description: Exterior north west corner of the building/Grey wall penetration

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray/Green	0.0%	100%	None Detected	

Client Sample ID: FRH4-JFC-01A **Lab Sample ID:** 551507781-0268

Sample Description: West wall of the building/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: FRH4-JFC-01B **Lab Sample ID:** 551507781-0269

Sample Description: West interior wall of storage room/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: FRH4-JFC-01C **Lab Sample ID:** 551507781-0270

Sample Description: West interior wall of storage room/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: FRH4-JFC-01D **Lab Sample ID:** 551507781-0337

Sample Description: NOT ON COC

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: FRH4-JFC-01E **Lab Sample ID:** 551507781-0338

Sample Description: NOT ON COC

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	



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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):

Jon Delos Santos	PLM (2)
	PLM Grav. Reduction (1)
Nicole Dimou	PLM Grav. Reduction (7)
Nicole Yeo	PLM Grav. Reduction (1)
Romeo Samson	PLM (3)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 07/28/2015 21:57:46

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Phone: (604) 412-3004
 Fax:
 Received: 07/20/15 11:06 AM
 Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
FRH2-PB-01 Site: INTERIOR FLOOR OF OFFICE Desc: GREY	551507777-0150	7/24/2015		3500 ppm
FRH2-PB-02 Site: EXTERIOR DECK ON SOUTH SIDE OF THE BUILDING Desc: GREEN	551507777-0151	7/24/2015		<90 ppm
FRH2-PB-03 Site: EXTERIOR CORRUGATED SIDING Desc: TEAL Insufficient sample to meet reporting limit.	551507777-0152	7/24/2015		<250 ppm
FRH2-PB-04 Site: EXTERIOR BATHROOM DOOR ON SOUTH SIDE OF BUILDING Desc: WHITE RPD outside UCL and MS outside LCL	551507777-0153	7/24/2015		640 ppm
FRH2-PB-05 Site: INTERIOR WALL Desc: WHITE RPD outside UCL and MS outside LCL	551507777-0154	7/24/2015		<230 ppm

 Lisa Podzyhun
 or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:26:57



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Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
FRH3-PB-01	551507777-0155		7/24/2015	620 ppm
Site: EXTERIOR CORRUGATED SIDING Desc: TEAL RPD outside UCL and MS outside LCL				

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.
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Initial report from 07/27/2015 10:29:18



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Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
FRH4-PB-01 Site: INTERIOR WALL Desc: WHITE	551507777-0156	7/24/2015		160 ppm
FRH4-PB-02 Site: INTERIOR FLOOR Desc: GREY Insufficient sample to meet reporting limit.	551507777-0157	7/24/2015		<170 ppm
FRH4-PB-03 Site: DECK ON EAST SIDE OF THE BUILDING Desc: GREEN	551507777-0158	7/24/2015		200 ppm
FRH4-PB-04 Site: EXTERIOR CORRUGATED SIDING Desc: GREEN	551507777-0159	7/24/2015		650 ppm
FRH4-PB-05 Site: EXTERIOR DOOR ON EAST SIDE OF THE BUILDING Desc: WHITE Insufficient sample to reach reporting limit.	551507777-0160	7/24/2015		<140 ppm

RPD outside UCL and MS outside LCL. Sample#551507777-0156/-0158/-0160.

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:31:26



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Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
NS-PB-01	551507777-0162		7/24/2015	440 ppm
Site: EXTERIOR Desc: GREEN RPD outside UCL and MS outside LCL				

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:42:22



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Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
CS-PB-01	551507777-0161 Site: EXTERIOR Desc: GREEN Insufficient sample to reach reporting limit. RPD outside UCL and MS outside LCL		7/24/2015	<380 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:42:14

APPENDIX M
FINDINGS AND RECOMMENDATIONS—
FIVE O'TENTIKS

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix M Findings and Recommendations—Five O'Tentiks
March 24, 2016

Appendix M FINDINGS AND RECOMMENDATIONS— FIVE O'TENTIKS

The following O'Tentiks were reportedly constructed in 2014. Each consists of a wood frame and suspended vinyl structure, named and numbered as follows:

- O'Tentik # 1—Nature
- O'Tentik # 2—First Nation
- O'Tentik # 3—Dunsmuir
- O'Tentik # 4—Military
- O'Tentik # 5—Fisgard

The results of the assessment for each of the considered hazardous materials within the buildings are provided in the following sub-sections.

M.1 ASBESTOS

Suspect ACMs were not observed.

M.2 LEAD

Suspect lead and LCP applications were not observed.

M.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing electrical equipment was observed.

M.4 MERCURY

No suspected mercury-containing items were observed.

M.5 MOULD

Suspect mould or moisture-impacted building materials were not observed at the time of the assessment.

M.6 OZONE-DEPLETING SUBSTANCES

Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix M Findings and Recommendations—Five O’Tentiks
March 24, 2016

M.7 SILICA

No suspect silica-containing materials were observed.

M.8 RECOMMENDATIONS

As no hazardous building materials were identified no recommendations have been developed.

APPENDIX N
FINDINGS AND RECOMMENDATIONS—
PARKING LOT WASHROOM

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix N Findings and Recommendations—Parking lot washroom
March 24, 2016

Appendix N FINDINGS AND RECOMMENDATIONS— PARKING LOT WASHROOM

The Parking Lot Washroom was reportedly constructed in 1986 and is a one story wood frame building consisting of a women's and men's washroom.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

N.1 ASBESTOS

Stantec identified and sampled the following suspected ACMs:

- Stucco
- Caulking
- Roofing materials

Fourteen samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table N-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

**Table N-1 Suspected ACM Sample Collection and Analysis Summary
Parking Lot Washroom, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
PLWR-Stucco-01A	Stucco	North east corner of the building	None detected
PLWR-Stucco-01B	Stucco	North side of the building	None detected
PLWR-Stucco-01C	Stucco	South side of the building	None detected
PLWR-Stucco-01D	Stucco	South east corner of the building	None detected
PLWR-Stucco-01E	Stucco	South east corner of the building	None detected
PLWR-DFC-01A	White door frame caulking	Men's washroom door between stucco and frame	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix N Findings and Recommendations—Parking lot washroom
March 24, 2016

**Table N-1 Suspected ACM Sample Collection and Analysis Summary
Parking Lot Washroom, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
PLWR-DFC-01B	White door frame caulking	Men's washroom door between stucco and frame	None detected
PLWR-DFC-01C	White door frame caulking	Men's washroom door between stucco and frame	None detected
PLWR-RP-01A	Black roof paper	Under roof shingle on south east side of the building roof	None detected
PLWR-RP-01B	Black roof paper	Under roof shingle on south east side of the building roof	None detected
PLWR-RP-01C	Black roof paper	Under roof shingle on south east side of the building roof	None detected
PLWR-RS-01A	Black roof shingle	South east side of the building roof	None detected
PLWR-RS-01B	Black roof shingle	South east side of the building roof	None detected
PLWR-RS-01C	Black roof shingle	South east side of the building roof	None detected

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, no ACMs were identified.

N.1.1 Potential for Vermiculite Insulation

Vermiculite insulation may be present in masonry block walls, which are present in walls within the subject building. Destructive testing would be required to determine the presence or absence of this potential ACM.

N.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes
- Solder used in electrical equipment
- Vent and pipe flashings

With respect to paint, six paint chip sample was obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table N-2, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP sample submitted is attached to this Appendix.



HAZARDOUS BUILDING MATERIALS ASSESSMENT


Appendix N Findings and Recommendations—Parking lot washroom
March 24, 2016

**Table N-2 Suspected LCP Sample Collection and Analysis Summary
Parking Lot Washroom, Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
PLWR-PB-01	Tan	Exterior stucco	<250	No
PLWR-PB-02	White	Exterior trim	6,100	Yes
PLWR-PB-03	Red	Exterior trim	420	No
PLWR-PB-04	White	Interior wall of men's washroom	<90	No
PLWR-PB-05	Yellow	Door of men's washroom	210	No
PLWR-PB-06	White	Door frame of men's washroom	540	No

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table N-3, below were identified as LCPs.

**Table N-3 Summary of Identified LCPs
Parking Lot Washroom, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
White colored paint on the exterior trims. This paint was observed to be in good condition (not bubbling, flaking or peeling).	

N.3 POLYCHLORINATED BIPHENYLS

No suspect PCB-containing electrical equipment was observed

N.4 MERCURY

Equipment and/or items that contain mercury were not observed. Mercury may also be present in paints and adhesives.



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix N Findings and Recommendations—Parking lot washroom
March 24, 2016

N.5 MOULD

No mould or moisture-impacted building materials were observed during the assessment.

N.6 OZONE-DEPLETING SUBSTANCES

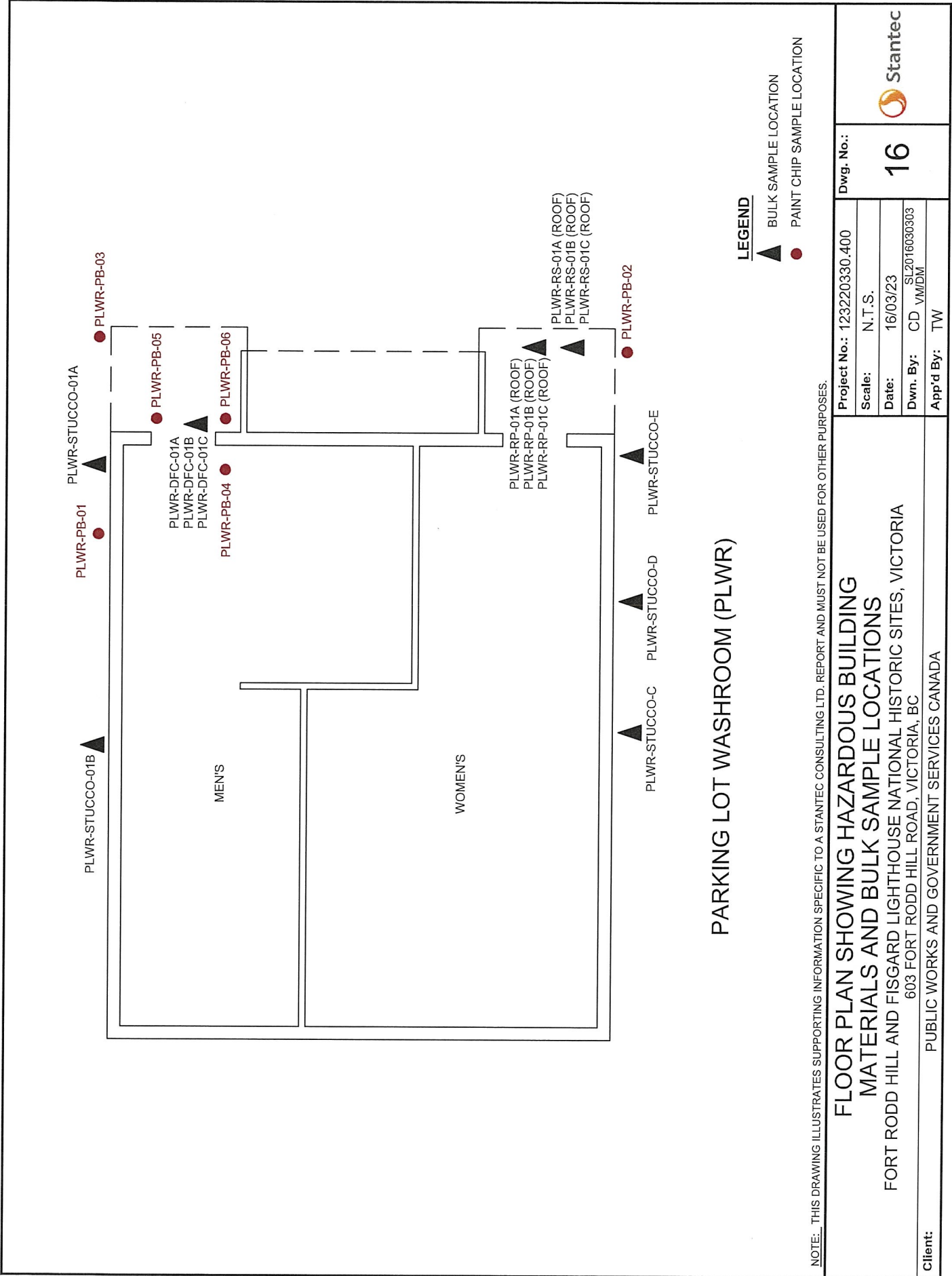
Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

N.7 SILICA

Silica is presumed to be present in the concrete slab floor, concrete block walls and brick mortar of the subject building.

N.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



PARKING LOT WASHROOM (PLWR)

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400		Dwg. No.:	16	Stantec
Scale:	N.T.S.			
Date:	16/03/23			
Dwn. By:	CD VM/DM			
App'd By:	TW			
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FISGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA				



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Customer PO: 123220330
Project ID:

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Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015

Proj: 123220330.400.100/Fort Rodd Hill

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: PLWR-Stucco-01A **Lab Sample ID:** 551507781-0194

Sample Description: North east corner of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: PLWR-Stucco-01B **Lab Sample ID:** 551507781-0195

Sample Description: North side of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: PLWR-Stucco-01C **Lab Sample ID:** 551507781-0196

Sample Description: South side of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: PLWR-Stucco-01D **Lab Sample ID:** 551507781-0197

Sample Description: South east corner of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: PLWR-Stucco-01E **Lab Sample ID:** 551507781-0198

Sample Description: South east corner of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: PLWR-DFC-01A **Lab Sample ID:** 551507781-0199

Sample Description: Men's washroom door between stucco and frame/White door frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/White	0.0%	100%	None Detected	

Client Sample ID: PLWR-DFC-01B **Lab Sample ID:** 551507781-0200

Sample Description: Men's washroom door between stucco and frame/White door frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/White	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: PLWR-DFC-01C **Lab Sample ID:** 551507781-0201

Sample Description: Men's washroom door between stucco and frame/White door frame caulking

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/White	0.0%	100%	None Detected	

Client Sample ID: PLWR-RP-01A **Lab Sample ID:** 551507781-0202

Sample Description: Under roof shingle on south east side of bldg roof/Black roof paper

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: PLWR-RP-01B **Lab Sample ID:** 551507781-0203

Sample Description: Under roof shingle on south east side of bldg roof/Black roof paper

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: PLWR-RP-01C **Lab Sample ID:** 551507781-0204

Sample Description: Under roof shingle on south east side of bldg roof/Black roof paper

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	

Client Sample ID: PLWR-RS-01A **Lab Sample ID:** 551507781-0205

Sample Description: South east side of the building roof/Black roof shingle

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: PLWR-RS-01B **Lab Sample ID:** 551507781-0206

Sample Description: South east side of the building roof/Black roof shingle

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: PLWR-RS-01C **Lab Sample ID:** 551507781-0207

Sample Description: South east side of the building roof/Black roof shingle

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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):

Jon Delos Santos PLM (2)
PLM Grav. Reduction (1)
Nicole Dimou PLM Grav. Reduction (4)
Nicole Yeo PLM Grav. Reduction (2)
Romeo Samson PLM (3)
PLM Grav. Reduction (2)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 07/28/2015 21:57:46



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Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
PLWR-PB-01 Site: EXTERIOR STUCCO Desc: TAN Insufficient sample to meet reporting limit.	551507777-0129		7/24/2015	<250 ppm
PLWR-PB-02 Site: EXTERIOR TRIM Desc: WHITE	551507777-0130		7/24/2015	6100 ppm
PLWR-PB-03 Site: EXTERIOR TRIM Desc: RED	551507777-0131		7/24/2015	420 ppm
PLWR-PB-04 Site: INTERIOR WALL OF MEN'S WASHROOM Desc: WHITE	551507777-0132		7/24/2015	<90 ppm
PLWR-PB-05 Site: DOOR OF MEN'S WASHROOM Desc: YELLOW	551507777-0133		7/24/2015	210 ppm
PLWR-PB-06 Site: DOOR FRAME OF MEN'S WASHROOM Desc: WHITE	551507777-0134		7/24/2015	540 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:19:43

APPENDIX O
FINDINGS AND RECOMMENDATIONS—
PLOTTING ROOM

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix O Findings and Recommendations—Plotting Room
March 24, 2016

Appendix O FINDINGS AND RECOMMENDATIONS— PLOTING ROOM

The plotting room was reportedly constructed in 1941 and is built underground. It consists of concrete walls and ceilings, with a mixture of concrete and hardwood floors.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

O.1 ASBESTOS

Suspected ACMs were not observed

O.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used in electrical equipment

With respect to paint, eight paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table O-1, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table O-1 Suspected LCP Sample Collection and Analysis Summary
Plotting Room , Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
PR-PB-01	Light blue	East wall of plotting room	1,700	Yes
PR-PB-02	Yellow	East wall of north office	110,000	Yes
PR-PB-03	Brown	South exterior wall	210	No
PR-PB-04	Silver	Metal door in corridor	64,000	Yes
PR-PB-05	Black	Interior trim	1,200	Yes

HAZARDOUS BUILDING MATERIALS ASSESSMENT



Appendix O Findings and Recommendations—Plotting Room
 March 24, 2016

**Table O-1 Suspected LCP Sample Collection and Analysis Summary
 Plotting Room , Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
PR-PB-06	Grey	Interior floor	22,000	Yes
PR-PB-07	Green	Interior wall	23,000	Yes
PR-PB-08	White	Interior wall	1,200	Yes

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table O-2, below were identified as LCPs.




**Table N-2 Summary of Identified LCPs
 Plotting Room , Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Light blue coloured paint on the east wall of the plotting room.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Yellow coloured paint on the east wall of the north office.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix O Findings and Recommendations—Plotting Room
 March 24, 2016

**Table N-2 Summary of Identified LCPs
 Plotting Room , Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Silver coloured paint on the metal doors in corridor and on the exterior of the plotting room (left arrow). This paint was observed to be in good condition (not bubbling, flaking or peeling).</p> <p>Black coloured paint on the interior trims (right arrow). This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Grey coloured paint on the floor at the entrance. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Green coloured paint on the interior walls (right arrow). This paint was observed to be in good condition (not bubbling, flaking or peeling).</p> <p>White coloured paint on the exterior trim (left arrow). This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

O.3 POLYCHLORINATED BIPHENYLS

PCBs may be present in the fluorescent light ballasts of the two light fixtures observed.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix O Findings and Recommendations—Plotting Room
March 24, 2016

O.4 MERCURY

Mercury vapour is likely to be present in the light tubes within the two fluorescent light fixtures observed. Mercury may also be present in paints and adhesives.

O.5 MOULD

No mould or moisture-impacted building materials were observed during the assessment.

O.6 OZONE-DEPLETING SUBSTANCES

Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

O.7 SILICA

Silica is presumed to be present in the concrete structure of the subject building.

O.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



PLOTTING ROOM (PR)

LEGEND

● PAINT CHIP SAMPLE LOCATION

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400		Dwg. No.:	13	
Scale:	N.T.S.			
Date:	15/08/28			
Dwn. By:	CD VM	SL2015080197		
App'd By:	TW			
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FISGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA				



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Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
PR-PB-01 Site: EAST WALL OF PLOTTING ROOM Desc: LIGHT BLUE	551507777-0052	7/23/2015		1700 ppm
PR-PB-02 Site: EAST WALL OF NORTH OFFICE Desc: YELLOW	551507777-0053	7/23/2015		110000 ppm
PR-PB-03 Site: SOUTH EXTERIOR WALL Desc: BROWN	551507777-0054	7/23/2015		210 ppm
PR-PB-04 Site: METAL DOOR IN CORRIDOR Desc: SILVER	551507777-0055	7/23/2015		64000 ppm
PR-PB-05 Site: INTERIOR TRIM Desc: BLACK	551507777-0056	7/23/2015		1200 ppm
PR-PB-06 Site: INTERIOR FLOOR Desc: GREY	551507777-0057	7/23/2015		22000 ppm
PR-PB-07 Site: INTERIOR WALL Desc: GREEN	551507777-0058	7/23/2015		23000 ppm
PR-PB-08 Site: INTERIOR WALL Desc: WHITE	551507777-0059	7/23/2015		1200 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:44:31

APPENDIX P
FINDINGS AND RECOMMENDATIONS—
SEARCH LIGHT #6

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix P Findings and Recommendations—Search Light #6
March 24, 2016

Appendix P FINDINGS AND RECOMMENDATIONS—SEARCH LIGHT #6

The construction date of the search light #6 is unknown, although it appears to be of a pre-1990 vintage. The building is an outdoor concrete structure with steel shutters.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

P.1 ASBESTOS

Suspected ACMs were not observed.

P.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used in electrical equipment

With respect to paint, three paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table P-1, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table P-1 Suspected LCP Sample Collection and Analysis Summary
Search Light #6, Fort Rodd Hill National Historic Site, BC**



Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
SL6-PB-01	Green	Exterior wall	81,000	Yes
SL6-PB-02	Black	Steel cage	<90	No
SL6-PB-03	White	Interior wall	23,000	Yes

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table P-2, below were identified as LCPs.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix P Findings and Recommendations—Search Light #6
March 24, 2016

**Table P-2 Summary of Identified LCPs
Search Light #6, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Green coloured paint on the exterior. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>White coloured paint on the interior. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

P.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing electrical equipment was observed.

P.4 MERCURY

Equipment and/or items that contain mercury were not observed. Mercury may also be present in paints and adhesives.

P.5 MOULD

No mould or moisture-impacted building materials were observed during the assessment.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix P Findings and Recommendations—Search Light #6
March 24, 2016

P.6 OZONE-DEPLETING SUBSTANCES

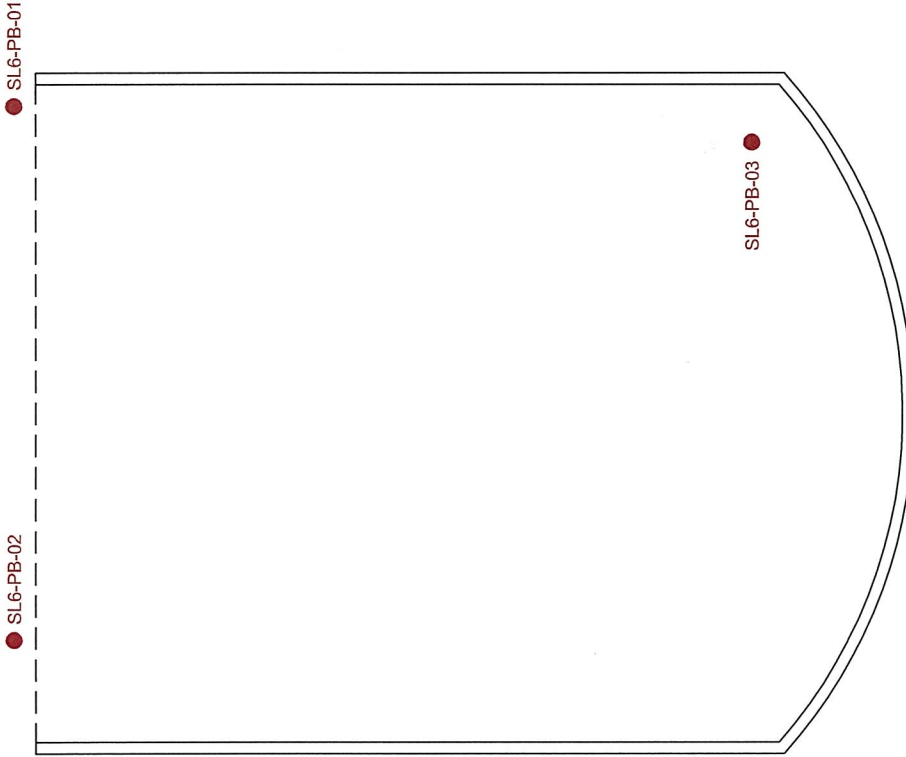
Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

P.7 SILICA

Silica is presumed to be present in the concrete structure of the searchlight.

P.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



SEARCH LIGHT 6 (SL6)

LEGEND

- PAINT CHIP SAMPLE LOCATION

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Project No.: 123220330.400		Dwg. No.:
Scale: N.T.S.		
Date: 15/08/28		
Dwn. By: CD VM		
App'd By: TW		
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGGARD LIGHHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC		
Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA		
		 21



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Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
SL6-PB-01 Site: EXTERIOR WALL Desc: GREEN	551507777-0078		7/24/2015	81000 ppm
SL6-PB-02 Site: STEEL CAGE Desc: BLACK	551507777-0079		7/24/2015	<90 ppm
SL6-PB-03 Site: INTERIOR WALL Desc: WHITE	551507777-0080		7/24/2015	23000 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:50:57



APPENDIX Q
FINDINGS AND RECOMMENDATIONS—
SEARCH LIGHT EMPLACEMENT #7

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix Q Findings and Recommendations—Search Light Emplacement #7
March 24, 2016

Appendix Q FINDINGS AND RECOMMENDATIONS—SEARCH LIGHT EMPLACEMENT #7

Search light emplacement #7 was reportedly constructed in 1940 and is an outdoor camouflaged concrete structure with steel shutters and a wood canopy.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

Q.1 ASBESTOS

Suspected ACMs were not observed.

Q.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used in electrical equipment

With respect to paint, six paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table Q-1, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table Q-1 Suspected LCP Sample Collection and Analysis Summary
Search Light Emplacement #7, Fort Rodd Hill National Historic Site, BC**


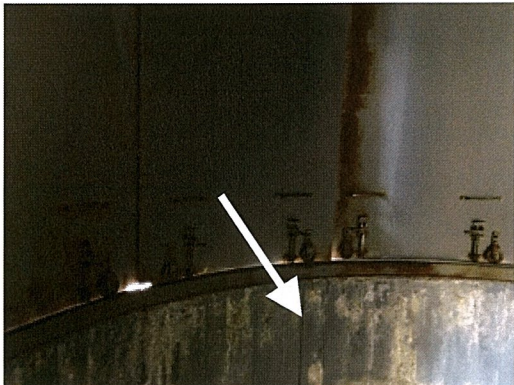
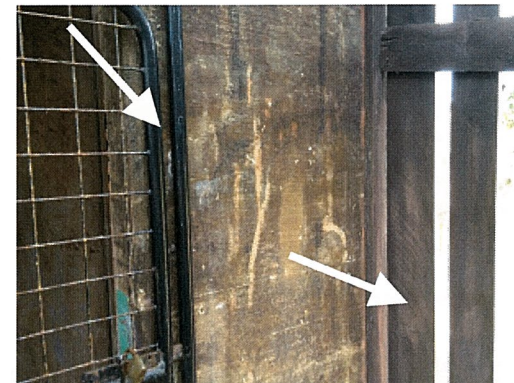
Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
SE-PB-01	Red	Exterior	1,100	Yes
SE-PB-02	Brown	Exterior	170	No
SE-PB-03	Grey	Interior	51,000	Yes
SE-PB-04	Black	Steel cage	1,900	Yes
SE-PB-05	Red	Steel fence	240	No
SE-PB-06	Brown	Wood canopy	1,400	Yes

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix Q Findings and Recommendations—Search Light Emplacement #7
March 24, 2016

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table Q-2, below were identified as LCPs.

**Table Q-2 Summary of Identified LCPs
Search Light #6, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Red coloured paint on exterior walls. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph of the exterior wall of a wooden building. The wall is covered in vertical wooden planks, many of which are painted a bright red color. A white arrow points to a specific spot on the red-painted plank.
<p>Grey coloured paint on interior walls. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph of the interior wall of a building. The wall is painted a dark grey color. A white arrow points to a section of the wall.
<p>Black coloured paint on steel cage (left arrow). This paint was observed to be in good condition (not bubbling, flaking or peeling).</p> <p>Brown coloured paint on wood canopy (right arrow). This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph showing two different areas. On the left, a white arrow points to a black-painted steel cage. On the right, a white arrow points to a brown-painted wood canopy.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix Q Findings and Recommendations—Search Light Emplacement #7
March 24, 2016

Q.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing electrical equipment was observed.

Q.4 MERCURY

Equipment and/or items that contain mercury were not observed. Mercury may also be present in paints and adhesives.

Q.5 MOULD

No mould or moisture-impacted building materials were observed during the assessment.

Q.6 OZONE-DEPLETING SUBSTANCES

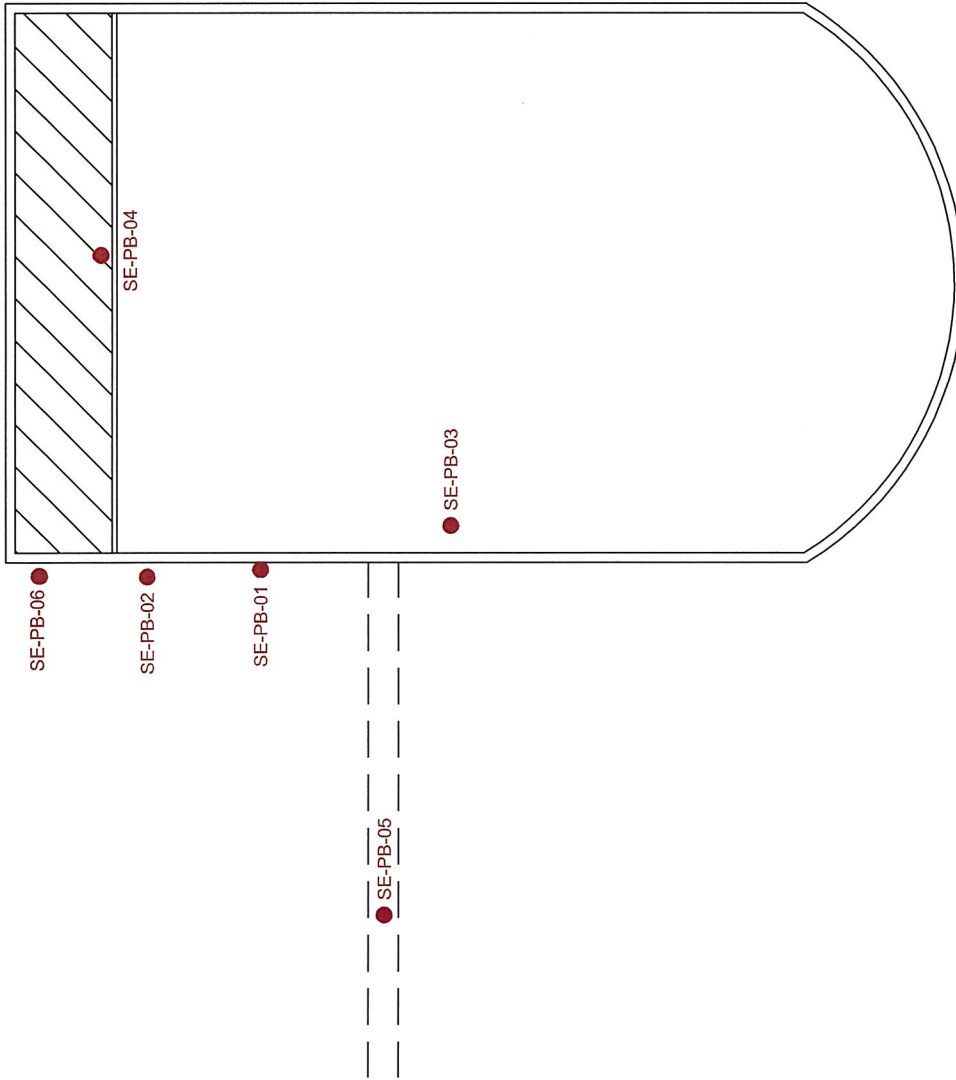
Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

Q.7 SILICA

Silica is presumed to be present in the concrete structure of the searchlight.

Q.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



LEGEND

● PAINT CHIP SAMPLE LOCATION

SEARCH LIGHT EMPLACEMENT 7 (SE)

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400 Scale: N.T.S. Date: 15/08/28 Dwn. By: CD VM SL2015080198 App'd By: TW		Dwg. No.: <h1 style="text-align: center;">14</h1>
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGSARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC		
Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA		



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Phone: (604) 412-3004
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Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
SE-PB-01 Site: EXTERIOR Desc: RED	551507777-0091	7/23/2015		1100 ppm
SE-PB-02 Site: EXTERIOR Desc: BROWN	551507777-0092	7/24/2015		170 ppm
SE-PB-03 Site: INTERIOR Desc: GREY	551507777-0093	7/24/2015		51000 ppm
SE-PB-04 Site: STEEL CAGE Desc: BLACK	551507777-0094	7/23/2015		1900 ppm
SE-PB-05 Site: STEEL FENCE Desc: RED	551507777-0095	7/24/2015		240 ppm
SE-PB-06 Site: WOOD CANOPY Desc: BROWN	551507777-0096	7/23/2015		1400 ppm

MS outside UCL. Sample#551507777-0091/-0094.

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:00:18



APPENDIX R
FINDINGS AND RECOMMENDATIONS—
SEARCH LIGHT ENGINE ROOM

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix R Findings and Recommendations—Search Light Engine Room
March 24, 2016

Appendix R FINDINGS AND RECOMMENDATIONS—SEARCH LIGHT ENGINE ROOM

The search light engine room was reportedly constructed in the 1900s and is a concrete building used for storage.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

The following areas were not accessed, for the reasons indicated:

- Roof (lack of safe access)
- Search Light Engine Cistern on west side of the building (no access)
- South east storage room (no access)

As such, limited comments, if any, will be provided regarding the presence, quantity or condition of hazardous building materials within the above-noted areas.

R.1 ASBESTOS

Stantec identified and sampled the following suspected ACMs:

- Textured flooring
- Caulking
- Roof tar

Nine samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table R-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix R Findings and Recommendations—Search Light Engine Room
March 24, 2016

**Table R-1 Suspected ACM Sample Collection and Analysis Summary
Search Light Engine Room, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
SER-TF-01A	Black texture flooring	Floor of main corridor	None detected
SER-TF-01B	Black texture flooring	Floor of main corridor	None detected
SER-TF-01C	Black texture flooring	Floor of main corridor	None detected
WPC-01A	Grey window pane caulking	Exterior window	<0.25% Chrysotile
WPC-01B	Grey window pane caulking	Exterior window	None detected
WPC-01C	Grey window pane caulking	Exterior window	None detected
SER-RT-01A	Black roof tar	North side of building wall	None detected
SER-RT-01B	Black roof tar	North side of building wall	None detected
SER-RT-01C	Black roof tar	North side of building wall	None detected

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, no ACMs were identified.

R.1.1 Materials with less than 0.5% Asbestos

It should be noted that one sample of grey window pane caulking was identified to contain asbestos in a concentration less than the limit of quantification (less than 0.25%), and no asbestos was detected in the other two samples of this material. As the limit of quantification was less than 0.5%, and as the number of samples collected for the homogenous application of this material would be considered sufficient to appropriately characterize it based on published provincial standards published (i.e., the BC Asbestos Guide), the window pane caulking is not considered to be an ACM.

R.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes
- Solder used in electrical equipment

With respect to paint, eight paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table R-2, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix R Findings and Recommendations—Search Light Engine Room
 March 24, 2016

**Table R-2 Suspected LCP Sample Collection and Analysis Summary
 Search Light Engine Room, Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
SER-PB-01	White	Exterior trim	<90	No
SER-PB-02	Dark Grey	Exterior of main door	310	No
SER-PB-03	Tan	Interior wall	32,000	Yes
SER-PB-04	Black	Interior trim	24,000	Yes
SER-PB-05	Light Grey	Interior wall	64,000	Yes
SER-PB-06	Grey	Interior Floor	17,000	Yes
SER-PB-07	Orange	Exterior wall	4,500	Yes
SER-PB-08	Red	Floor inside caged engine room	97,000	Yes

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table R-3, below were identified as LCPs.


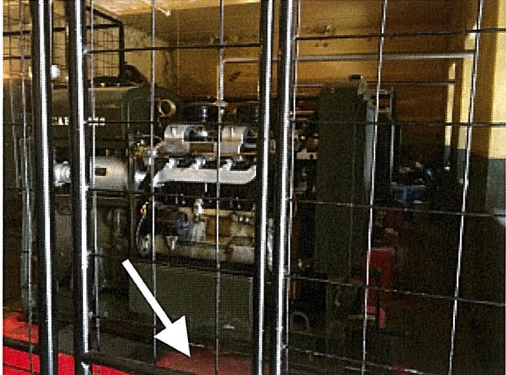
**Table R-3 Summary of Identified LCPs
 Search Light Engine Room, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Tan colored paint on the interior walls (right arrow).</p> <p>Black colored paint on the interior trim (left arrow).</p> <p>Light grey colored paint on the interior walls (middle arrow).</p> <p>Grey coloured paint on interior floors (bottom arrow).</p> <p>These paints were observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix R Findings and Recommendations—Search Light Engine Room
March 24, 2016

**Table R-3 Summary of Identified LCPs
Search Light Engine Room, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Orange colored paint on the exterior wall. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Red colored paint on the floor inside caged engine room. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

R.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing electrical equipment was observed.

R.4 MERCURY

Equipment and/or items that contain mercury were not observed.

Mercury may also be present in paints and adhesives.

R.5 MOULD

No mould or moisture-impacted building materials were observed during the assessment.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix R Findings and Recommendations—Search Light Engine Room
March 24, 2016

R.6 OZONE-DEPLETING SUBSTANCES

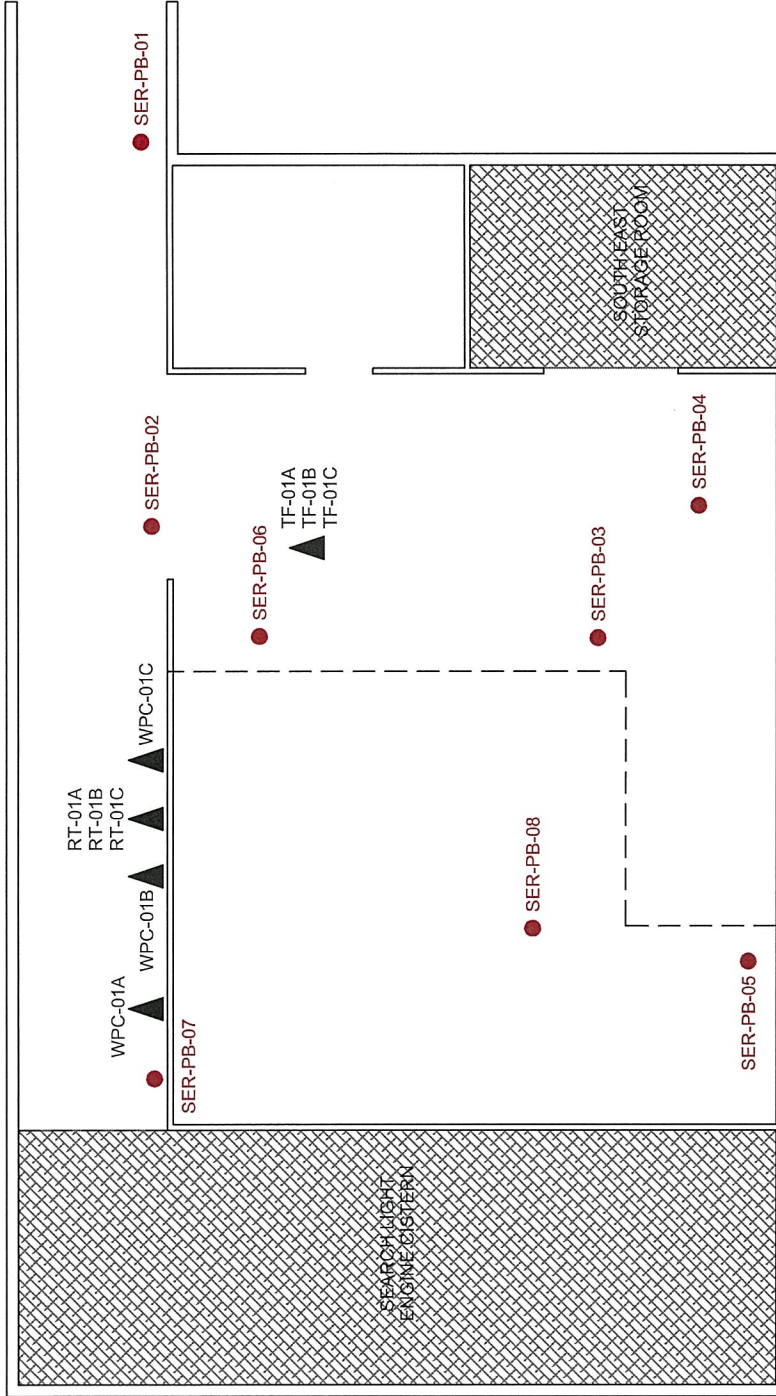
Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

R.7 SILICA

Silica is presumed to be present in the concrete comprising the entirety of the subject building.

R.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



LEGEND

- ▲ BULK SAMPLE LOCATION
- PAINT CHIP SAMPLE LOCATION
- ▨ NO ACCESS

SEARCH LIGHT ENGINE ROOM (SER)

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400		Dwg. No.:	19	
Scale:	N.T.S.			
Date:	16/03/23			
Dwn. By:	CD VMDM			
App'd By:	TW			

FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS
 FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA
 603 FORT RODD HILL ROAD, VICTORIA, BC

Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA



EMSL Canada Inc.

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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
Project ID:

Attn: Steve Chou
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6

Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015

Proj: 123220330.400.100/Fort Rodd Hill

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: SER-TF-01A

Lab Sample ID: 551507781-0087

Sample Description: Floor of main corridor/Black texture flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: SER-TF-01B

Lab Sample ID: 551507781-0088

Sample Description: Floor of main corridor/Black texture flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: SER-TF-01C

Lab Sample ID: 551507781-0089

Sample Description: Floor of main corridor/Black texture flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	

Client Sample ID: WPC-01A

Lab Sample ID: 551507781-0090

Sample Description: Exterior window/Grey window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	<0.25% Chrysotile	

Client Sample ID: WPC-01B

Lab Sample ID: 551507781-0091

Sample Description: Exterior window/Grey window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: WPC-01C

Lab Sample ID: 551507781-0092

Sample Description: Exterior window/Grey window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: SER-RT-01A

Lab Sample ID: 551507781-0093

Sample Description: North side of building wall/Black roof tar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: SER-RT-01B **Lab Sample ID:** 551507781-0094
Sample Description: North side of building wall/Black roof tar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: SER-RT-01C **Lab Sample ID:** 551507781-0095
Sample Description: North side of building wall/Black roof tar

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	

Analyst(s):
Nicole Dimou PLM Grav. Reduction (6)
Nicole Yeo PLM Grav. Reduction (3)

Reviewed and approved by:


Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0
Initial report from: 07/28/2015 11:57:46

**EMSL Canada Inc.**

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EMSL Canada Or 551507777
 CustomerID: 55JACQ30L
 CustomerPO: 123220330
 ProjectID:

Attn: **Steve Chou**
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6

Phone: (604) 412-3004
 Fax:
 Received: 07/20/15 11:06 AM
 Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
SER-PB-01 Site: EXTERIOR TRIM Desc: WHITE	551507777-0083		7/23/2015	<90 ppm
SER-PB-02 Site: EXTERIOR OF MAIN DOOR Desc: DARK GREY	551507777-0084		7/23/2015	310 ppm
SER-PB-03 Site: INTERIOR WALL Desc: TAN	551507777-0085		7/24/2015	32000 ppm
SER-PB-04 Site: INTERIOR TRIM Desc: BLACK	551507777-0086		7/23/2015	24000 ppm
SER-PB-05 Site: INTERIOR WALL Desc: LIGHT GREY	551507777-0087		7/24/2015	64000 ppm
SER-PB-06 Site: INTERIOR FLOOR Desc: GREY	551507777-0088		7/23/2015	17000 ppm
SER-PB-07 Site: EXTERIOR WALL Desc: ORANGE	551507777-0089		7/23/2015	4500 ppm
SER-PB-08 Site: FLOOR INSIDE CAGED ENGINE ROOM Desc: RED	551507777-0090		7/24/2015	97000 ppm

MS outside UCL. Sample#551507777-0083/-0084/-0086/-0088/-0089.

Lisa Podzyhun
 or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:57:07

APPENDIX S
FINDINGS AND RECOMMENDATIONS—
UPPER BATTERY



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix S Findings and Recommendations—Upper Battery
March 24, 2016

Appendix S FINDINGS AND RECOMMENDATIONS—UPPER BATTERY

The upper battery was reportedly constructed between 1895 and 1898 and consists of guardhouse, telephone exchange “north hut”, defensive electrical light directing station, underground magazine and gun emplacement. The area is also enclosed by concrete perimeter walls.

The typical structural components and finishes associated with these buildings consist of concrete walls, ceilings and floors (except the guardhouse, which has plaster interior walls and wood canopy).

The results of the assessment for each of the considered hazardous materials within the buildings of the Upper Battery are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

S.1 ASBESTOS

No suspected ACMs were observed pertaining to the Gun Emplacement. With respect to the other buildings, Stantec identified and sampled the following suspected ACMs:

- Plaster
- Skim coat
- Caulking
- Texture coat
- Roofing material

Thirty-three samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table S-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix S Findings and Recommendations—Upper Battery
March 24, 2016

**Table S-1 Suspected ACM Sample Collection and Analysis Summary
Upper Battery, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
Guardhouse			
UBG-PL-A (skim coat)	Plaster in poor condition (cracked, flaking and peeling) under skim coat	North west corner in lower wall of the common room	None detected
UBG-PL-A (rough coat)	Plaster in poor condition (cracked, flaking and peeling) under skim coat	North west corner in lower wall of the common room	None detected
UBG-PL-B	Plaster in poor condition (cracked, flaking and peeling) under skim coat	North west corner in lower wall of the common room	None detected
UBG-PL-C	Plaster in poor condition (cracked, flaking and peeling) under skim coat	North west corner in lower wall of the common room	None detected
UBG-PL-D	Plaster in poor condition (cracked, flaking and peeling) under skim coat	North west corner in lower wall of the common room	None detected
UBG-PL-E	Plaster in poor condition (cracked, flaking and peeling) under skim coat	North west corner in lower wall of the common room	None detected
UBG-SK-A	Skim coat	North west corner in lower wall of the common room	None detected
UBG-SK-B	Skim coat	North west corner in lower wall of the common room	None detected
UBG-SK-C	Skim coat	North west corner in lower wall of the common room	None detected
UBG-WC-01A	Grey exterior window caulking	South window of canopy	None detected
UBG-WC-01B	Grey exterior window caulking	Central window of canopy	None detected
UBG-WC-01C	Grey exterior window caulking	North window of canopy	None detected
Underground Magazine			
UBUM-WC-01A	White exterior window caulking	Lamp room window	None detected
UBUM-WC-01B	White exterior window caulking	Crew shelter window	None detected
UBUM-WC-01C	White exterior window caulking	Crew shelter window	None detected
UBUM-EXT-TXT-01A	Exterior texture	Entrance wall	None detected
UBUM-EXT-TXT-01B	Exterior texture	Entrance wall	None detected
UBUM-EXT-TXT-01C	Exterior texture	Entrance wall	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix S Findings and Recommendations—Upper Battery
March 24, 2016

**Table S-1 Suspected ACM Sample Collection and Analysis Summary
Upper Battery, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
UBUM-EXT-TXT-01D	Exterior texture	Entrance wall	None detected
UBUM-EXT-TXT-01E	Exterior texture	Entrance wall	None detected
UBUM-EXT-TXT-01F	Exterior texture	Entrance wall	None detected
UBUM-EXT-TXT-01G	Exterior texture	Entrance wall	None detected
Defensive Electrical Light Directing Station			
DELDS-WFC-01A	Grey window frame caulking	Central window	None detected
DELDS-WFC-01B	Grey window frame caulking	Central window	None detected
DELDS-WFC-01C	Grey window frame caulking	Central window	None detected
DELDS-Roof-01A	Black roofing material	Roof of building	None detected
DELDS-Roof-01B	Black roofing material	Roof of building	None detected
DELDS-Roof-01C	Black roofing material	Roof of building	<0.25% Chrysotile
Telephone Exchange "North Hut"			
UBNH-Roof-01A	Black roofing material	Roof of building	None detected
UBNH-Roof-01B	Black roofing material	Roof of building	None detected
UBNH-Roof-01C	Black roofing material	Roof of building	None detected
UBNH-WC-01A	Grey exterior window caulking	Between frame and pane	None detected
UBNH-WC-01B	Grey exterior window caulking	Between frame and pane	None detected
UBNH-WC-01C	Grey exterior window caulking	Between frame and pane	None detected

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, no ACMs were identified.

Note: materials with asbestos detected at concentrations less than 0.5% are not considered ACMs.

S.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix S Findings and Recommendations—Upper Battery
March 24, 2016

- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes
- Vent and pipe flashings

With respect to paint, 30 paint chip samples were obtained from the predominant suspected LCP applications within the other buildings. A summary of the sample types, locations and analytical results is presented in Table S-2, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table S-2 Suspected LCP Sample Collection and Analysis Summary
Upper Battery, Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
Upper Battery - General				
UB-PB-01	Black	Steel garbage box outside the Upper Battery main gate	<250	No
UB-PB-02	Red	Wooden electrical box north of the Upper Battery main gate	<90	No
UB-PB-03	Black	Main gate	610	Yes
Guardhouse				
UBG-PB-01	White	Exterior window sill on concrete	210	No
UBG-PB-02	Red	Exterior wood pillar supporting canopy	34,000	Yes
UBG-PB-03	Brown	Exterior window frame	9,100	Yes
UBG-PB-04	Black	Exterior black window	550	No
UBG-PB-05	Green	Interior window sill	2,100	Yes
UBG-PB-06	White	Interior wall	<90	No
UBG-PB-07	Pink	Interior upper wall trim	530	No
UBG-PB-08	Brown	Interior kitchen wall	280	No
UBG-PB-09	Yellow	Interior wall	580	No
UBG-PB-10	Grey	Interior baseboard	24,000	Yes
UBG-PB-11	Lime green	Interior window sill	370	No
UBG-PB-12	Black	Main door	10,000	Yes
Gun Emplacement and Underground Mezzanine				
UBUM-PB-01	Black	Steel stairs around gun emplacement	1,200	Yes
UBUM-PB-02	Yellow	Interior door	73,000	Yes

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix S Findings and Recommendations—Upper Battery
March 24, 2016

**Table S-2 Suspected LCP Sample Collection and Analysis Summary
Upper Battery, Fort Rodd Hill National Historic Site, BC**

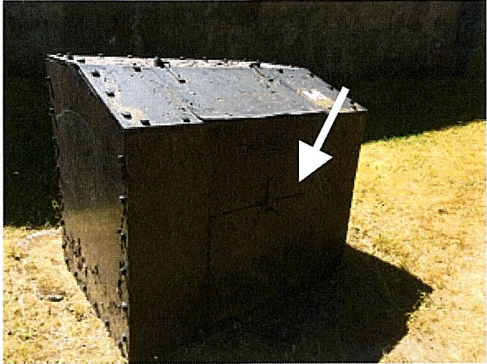

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
UBUM-PB-03	Black	Exterior window frame	3,800	Yes
UBUM-PB-04	Brown	Exterior door frame	160,000	Yes
UBUM-PB-05	White	Interior ceiling	<100	No
UBUM-PB-06	Green	Interior ceiling trim	43,000	Yes
UBUM-PB-07	Tan	Interior wall	4,200	Yes
UBUM-PB-08	Grey	Grey door east of gun emplacement	<110	No
UBUM-PB-09	Black	Exterior railing	<90	No
UBUM-PB-10	White	Exterior wall	<90	No
Defensive Electrical Directing Station				
DELDS-PB-01	Green	Steel window frame	19,000	Yes
DELDS-PB-02	Light blue	Interior wall	150,000	Yes
DELDS-PB-03	Grey	Exterior door	100,000	Yes
DELDS-PB-04	White	Flag pole	3,000	Yes
Telephone Exchange "North Hut"				
UBNH-PB-01	White	Interior wall	190	No

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table S-3, below are identified as LCPs.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix S Findings and Recommendations—Upper Battery
March 24, 2016

**Table S-3 Summary of Identified LCPs
Upper Battery, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Black coloured paint on the garbage can outside main gate.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Red coloured paint on the wood pillars and window sills throughout the Guardhouse.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix S Findings and Recommendations—Upper Battery
March 24, 2016

**Table S-3 Summary of Identified LCPs
Upper Battery, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Brown coloured paint on the exterior window frames throughout the Guardhouse.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph showing the exterior of a window frame. The frame is dark brown and appears to be made of wood or metal. A white arrow points to the bottom edge of the frame, highlighting the brown paint. The surrounding wall is light-colored and shows some texture.
<p>Green coloured paint on the interior window sills throughout the Guardhouse.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph showing the interior of a window. The window sill is painted a dark green color. A white arrow points to the green paint on the sill. The window glass is visible, showing a view of the outdoors.
<p>Grey coloured paint on the interior baseboards throughout the Guardhouse.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	 A photograph showing the interior of a room. The floor is made of dark wood. A white arrow points to a grey-painted baseboard along the wall. A wooden table with black legs is visible in the foreground.
<p>Black coloured paint on the door of the Guardhouse.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	<p>Photo not available.</p>

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix S Findings and Recommendations—Upper Battery
 March 24, 2016

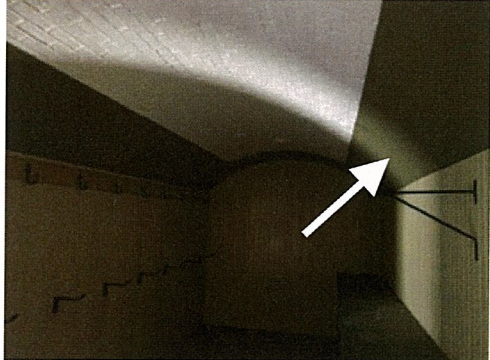


**Table S-3 Summary of Identified LCPs
 Upper Battery, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Black coloured paint on the steel stairs around Gun Emplacement.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Yellow coloured paint on the interior doors of the Underground Magazine.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p> <p>AND</p> <p>Black coloured paint on the exterior window frames throughout the Underground Magazine.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Brown coloured paint on the door frames throughout the Underground Magazine.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix S Findings and Recommendations—Upper Battery
 March 24, 2016


**Table S-3 Summary of Identified LCPs
 Upper Battery, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Green coloured paint on the interior ceiling trims throughout the Underground Magazine.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Tan coloured paint on the interior walls throughout the Underground Magazine.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Green coloured paint on the steel window frame of the Defensive Electrical Directing Station.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p> <p>AND</p> <p>Light blue coloured paint on the interior walls of the Defensive Electrical Directing Station.</p> <p>This paint was observed to be in fair condition (flaking and peeling in some locations).</p>	
<p>Grey coloured paint on the exterior door of the Electrical Directing Station.</p> <p>This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	<p>Photo not available.</p>

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix S Findings and Recommendations—Upper Battery
March 24, 2016

**Table S-3 Summary of Identified LCPs
Upper Battery, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>White coloured paint on the flag pole. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

S.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing electrical equipment was observed.

S.4 MERCURY

Equipment and/or items that contain mercury were not observed.

Mercury may also be present in paints and adhesives.

S.5 MOULD

No mould or moisture-impacted building materials were observed during the assessment.

S.6 OZONE-DEPLETING SUBSTANCES

No suspected ODS-containing equipment was observed.

S.7 SILICA

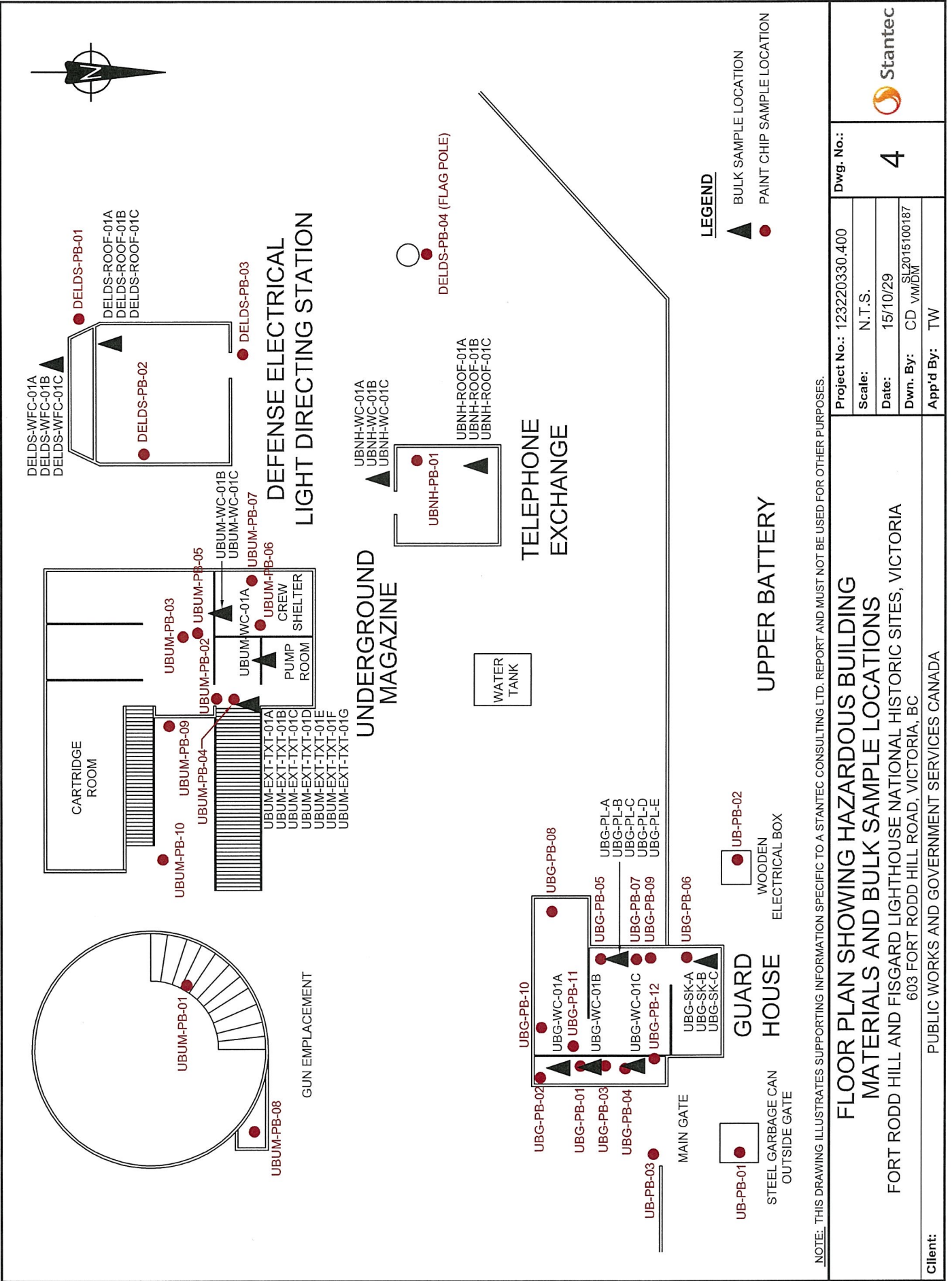
Silica is presumed to be present in the concrete throughout the Upper Battery.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix S Findings and Recommendations—Upper Battery
March 24, 2016

S.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400 Scale: N.T.S. Date: 15/10/29 Dwn. By: CD <small>SL2015100187</small> App'd By: TW		Dwg. No.: 4	
		Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA	

FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS
FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA
 603 FORT RODD HILL ROAD, VICTORIA, BC



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Customer PO: 123220330
Project ID:

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Stantec Consulting, Ltd.
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Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015

Proj: 123220330.400.100/Fort Rodd Hill

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: UBG-PL-01A-Skim Coat **Lab Sample ID:** 551507781-0001

Sample Description: North west corner in lower wall of the common room/Plaster in poor condition (cracked, flaking and peeling) under skim coat

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: UBG-PL-01A-Rough Coat **Lab Sample ID:** 551507781-0001A

Sample Description: North west corner in lower wall of the common room/Plaster in poor condition (cracked, flaking and peeling) under skim coat

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: UBG-PL-01B **Lab Sample ID:** 551507781-0002

Sample Description: North west corner in lower wall of the common room/Plaster in poor condition (cracked, flaking and peeling) under skim coat

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: UBG-PL-01C **Lab Sample ID:** 551507781-0003

Sample Description: North west corner in lower wall of the common room/Plaster in poor condition (cracked, flaking and peeling) under skim coat

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: UBG-PL-01D **Lab Sample ID:** 551507781-0004

Sample Description: North west corner in lower wall of the common room/Plaster in poor condition (cracked, flaking and peeling) under skim coat

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: UBG-PL-01E **Lab Sample ID:** 551507781-0005

Sample Description: North west corner in lower wall of the common room/Plaster in poor condition (cracked, flaking and peeling) under skim coat

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: UBG-SK-01A **Lab Sample ID:** 551507781-0006

Sample Description: North west corner in lower wall of the common room/Skim coat

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	



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Customer PO: 123220330
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: UBG-SK-01B **Lab Sample ID:** 551507781-0007

Sample Description: North west corner in lower wall of the common room/Skim coat

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: UBG-SK-01C **Lab Sample ID:** 551507781-0008

Sample Description: North west corner in lower wall of the common room/Skim coat

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: UBG-WC-01A **Lab Sample ID:** 551507781-0009

Sample Description: South window of canopy/Grey exterior window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: UBG-WC-01B **Lab Sample ID:** 551507781-0010

Sample Description: Central window of canopy/Grey exterior window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: UBG-WC-01C **Lab Sample ID:** 551507781-0011

Sample Description: North window of canopy/Grey exterior window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Analyst(s):

- Jon Delos Santos PLM (3)
- Nicole Dimou PLM Grav. Reduction (2)
- Nicole Yeo PLM Grav. Reduction (1)
- Romeo Samson PLM (6)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

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(Initial report from: 07/28/2015 21:57:46)



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Analyzed: 7/28/2015
Proj: 123220330.400.100/Fort Rodd Hill

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: UBUM-WC-01A **Lab Sample ID:** 551507781-0012
Sample Description: Lamp room window/White exterior window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: UBUM-WC-01B **Lab Sample ID:** 551507781-0013
Sample Description: Crew shelter window/White exterior window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: UBUM-WC-01C **Lab Sample ID:** 551507781-0014
Sample Description: Crew shelter window/White exterior window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: UBUM-EXT-TXT-01A **Lab Sample ID:** 551507781-0015
Sample Description: Entrance wall/Exterior texture

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: UBUM-EXT-TXT-01B **Lab Sample ID:** 551507781-0016
Sample Description: Entrance wall/Exterior texture

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: UBUM-EXT-TXT-01C **Lab Sample ID:** 551507781-0017
Sample Description: Entrance wall/Exterior texture

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: UBUM-EXT-TXT-01D **Lab Sample ID:** 551507781-0333
Sample Description: NOT ON COC

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	



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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: UBUM-EXT-TXT-01E

Lab Sample ID: 551507781-0334

Sample Description: NOT ON COC

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: UBUM-EXT-TXT-01F

Lab Sample ID: 551507781-0335

Sample Description: NOT ON COC

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: UBUM-EXT-TXT-01G

Lab Sample ID: 551507781-0336

Sample Description: NOT ON COC

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Analyst(s):

- Jon Delos Santos PLM (4)
- Nicole Dimou PLM Grav. Reduction (2)
- Nicole Yeo PLM Grav. Reduction (1)
- Romeo Samson PLM (3)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

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Received: 7/20/2015
Analyzed: 7/28/2015

Proj: 123220330.400.100/Fort Rodd Hill

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: DELDS-WFC-01A

Lab Sample ID: 551507781-0018

Sample Description: Central window/Grey window frame caulking

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: DELDS-WFC-01B

Lab Sample ID: 551507781-0019

Sample Description: Central window/Grey window frame caulking

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: DELDS-WFC-01C

Lab Sample ID: 551507781-0020

Sample Description: Central window/Grey window frame caulking

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: DELDS-Roof-01A

Lab Sample ID: 551507781-0021

Sample Description: Roof of building/Black roofing material

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: DELDS-Roof-01B

Lab Sample ID: 551507781-0022

Sample Description: Roof of building/Black roofing material

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: DELDS-Roof-01C

Lab Sample ID: 551507781-0023

Sample Description: Roof of building/Black roofing material

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
400 PLM PtCt Grav. Red.	7/28/2015	Black	0.0%	100%	<0.25% Chrysotile	



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Customer ID: 55JACQ30L
Customer PO: 123220330
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):

Jon Delos Santos PLM Grav. Reduction (1)
Nicole Dimou PLM Grav. Reduction (2)
Nicole Yeo 400 PLM PtCt Grav. Red (1)
Romeo Samson PLM Grav. Reduction (2)

Reviewed and approved by:

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Received: 7/20/2015
Analyzed: 7/28/2015

Proj: 123220330.400.100/Fort Rodd Hill

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: UBNH-Roof-01A

Lab Sample ID: 551507781-0024

Sample Description: Roof of building/Black roofing material

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Black	0.0%	100%	None Detected	

Client Sample ID: UBNH-Roof-01B

Lab Sample ID: 551507781-0025

Sample Description: Roof of building/Black roofing material

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	

Client Sample ID: UBNH-Roof-01C

Lab Sample ID: 551507781-0026

Sample Description: Roof of building/Black roofing material

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM	7/28/2015	Black	0%	100%	None Detected	

Client Sample ID: UBNH-WC-01A

Lab Sample ID: 551507781-0027

Sample Description: Between frame and pane/Grey exterior window caulking

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: UBNH-WC-01B

Lab Sample ID: 551507781-0028

Sample Description: Between frame and pane/Grey exterior window caulking

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: UBNH-WC-01C

Lab Sample ID: 551507781-0029

Sample Description: Between frame and pane/Grey exterior window caulking

TEST	Analyzed		Non-Asbestos		Asbestos	Comment
	Date	Color	Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	



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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):

- Jon Delos Santos PLM (1)
- Nicole Dimou PLM Grav. Reduction (3)
- Romeo Samson PLM Grav. Reduction (2)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

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Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
UB-PB-01 Site: STEEL GARBAGE BOX OUTSIDE THE UPPER BATTERY Desc: MAIN GATE - BLACK Insufficient sample to meet reporting limit.	551507777-0001		7/21/2015	<250 ppm
UB-PB-02 Site: WOODEN ELECTRICAL BOX NORTH OF THE UPPER BATTERY Desc: MAIN GATE - RED	551507777-0002		7/21/2015	<90 ppm
UB-PB-03 Site: MAIN GATE Desc: BLACK	551507777-0003		7/21/2015	610 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845,08

Initial report from 07/27/2015 09:31:24

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Phone: (604) 412-3004
 Fax:
 Received: 07/20/15 11:06 AM
 Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
UBG-PB-01 Site: EXTERIOR WINDOW SILL ON CONCRETE Desc: WHITE	551507777-0004	7/21/2015		210 ppm
UBG-PB-02 Site: EXTERIOR WOOD PILLAR SUPPORTING CANOPY Desc: RED	551507777-0005	7/21/2015		34000 ppm
UBG-PB-03 Site: EXTERIOR WINDOW FRAME Desc: BROWN	551507777-0006	7/21/2015		9100 ppm
UBG-PB-04 Site: EXTERIOR BLACK WINDOW Desc: BLACK	551507777-0007	7/21/2015		550 ppm
UBG-PB-05 Site: INTERIOR WINDOW SILL Desc: GREEN	551507777-0008	7/21/2015		2100 ppm
UBG-PB-06 Site: INTERIOR WALL Desc: WHITE	551507777-0009	7/21/2015		<90 ppm
UBG-PB-07 Site: INTERIOR UPPER WALL TRIM Desc: PINK	551507777-0010	7/21/2015		530 ppm
UBG-PB-08 Site: INTERIOR KITCHEN WALL Desc: BROWN	551507777-0011	7/21/2015		280 ppm
UBG-PB-09 Site: INTERIOR WALL Desc: YELLOW	551507777-0012	7/21/2015		580 ppm
UBG-PB-10 Site: INTERIOR BASEBOARD Desc: GREY	551507777-0013	7/21/2015		24000 ppm
UBG-PB-11 Site: INTERIOR WINDOW SILL Desc: LIME GREEN	551507777-0014	7/21/2015		370 ppm

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Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:32:57



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Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
UBG-PB-12	551507777-0015		7/21/2015	10000 ppm
	Site: MAIN DOOR			
	Desc: BLACK			

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Initial report from 07/27/2015 09:32:57



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Collected:

Project: **FORT ROD HILL/123220330.400.100**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
UBUM-PB-01 Site: STEEL STAIRS AROUND GUN EMPLACEMENT Desc: BLACK	551507777-0016	7/21/2015		1200 ppm
UBUM-PB-02 Site: INTERIOR DOOR Desc: YELLOW	551507777-0017	7/21/2015		73000 ppm
UBUM-PB-03 Site: EXTERIOR WINDOW FRAME Desc: BLACK	551507777-0018	7/21/2015		3800 ppm
UBUM-PB-04 Site: EXTERIOR DOOR FRAME Desc: BROWN	551507777-0019	7/21/2015		160000 ppm
UBUM-PB-05 Site: INTERIOR CEILING Desc: WHITE Insufficient sample to meet reporting limit.	551507777-0020	7/21/2015		<100 ppm
UBUM-PB-06 Site: INTERIOR CEILING TRIM Desc: GREEN	551507777-0021	7/21/2015		43000 ppm
UBUM-PB-07 Site: INTERIOR WALL Desc: TAN	551507777-0022	7/21/2015		4200 ppm
UBUM-PB-08 Site: GREY DOOR EAST OF GUN EMPLACEMENT Desc: GREY Insufficient sample to meet reporting limit.	551507777-0023	7/21/2015		<110 ppm
UBUM-PB-09 Site: EXTERIOR RAILING Desc: BLACK	551507777-0024	7/21/2015		<90 ppm
UBUM-PB-10 Site: EXTERIOR WALL Desc: WHITE	551507777-0025	7/21/2015		<90 ppm

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Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:34:26



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Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
DELDS-PB-01 Site: STEEL WINDOW FRAME Desc: GREEN	551507777-0026		7/21/2015	19000 ppm
DELDS-PB-02 Site: INTERIOR WALL Desc: LIGHT BLUE	551507777-0027		7/21/2015	150000 ppm
DELDS-PB-03 Site: EXTERIOR DOOR Desc: GREY	551507777-0028		7/21/2015	100000 ppm
DELDS-PB-04 Site: FLAG POLE Desc: WHITE	551507777-0029		7/21/2015	3000 ppm

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Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 09:35:52



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Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
UBNH-PB-01	551507777-0030 Site: INTERIOR WALL Desc: WHITE		7/21/2015	190 ppm

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Initial report from 07/27/2015 09:37:13

APPENDIX T
FINDINGS AND RECOMMENDATIONS—
VISITORS CENTRE/ENTRANCE KIOSK



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix T Findings and Recommendations—Visitors Centre/Entrance Kiosk
March 24, 2016

Appendix T FINDINGS AND RECOMMENDATIONS—VISITORS CENTRE/ENTRANCE KIOSK

The Visitors Centre/Entrance Kiosk was reportedly constructed in 1991 and is a single story wood frame structure. The typical structural components and finishes associated with this building consist of stucco exterior walls vinyl sheeting flooring and interior drywalls with textured ceilings.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

T.1 ASBESTOS

Stantec identified and sampled the following suspected ACMs:

- Caulkings
- Stucco
- Roofing materials
- Vinyl sheet flooring
- Textured ceiling
- Drywall joint compound

Thirty samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table T-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix T Findings and Recommendations—Visitors Centre/Entrance Kiosk
March 24, 2016

**Table T-1 Suspected ACM Sample Collection and Analysis Summary
Visitors Centre/Entrance Kiosk, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
VC-WC-01A	Grey window frame caulking	Kiosk window on north side of the building	0.66% Chrysotile
VC-WC-01B	Grey window frame caulking	Kiosk window on north side of the building	Positive stop (not analyzed)
VC-WC-01C	Grey window frame caulking	Kiosk window on north side of the building	Positive stop (not analyzed)
VC-Stucco-01A	Stucco	North west corner of the building	None detected
VC-Stucco-01B	Stucco	North west corner wall of the building	None detected
VC-Stucco-01C	Stucco	West wall of the kiosk	None detected
VC-Stucco-01D	Stucco	West wall of the kiosk	None detected
VC-Stucco-01E	Stucco	North wall of the kiosk	None detected
VC-DFC-01A	Door frame caulking	Main entrance double door between frame and panelling	None detected
VC-DFC-01B	Door frame caulking	Main entrance double door between frame and panelling	None detected
VC-DFC-01C	Door frame caulking	Main entrance double door between frame and panelling	None detected
VC-PC-01A	Grey caulking	Base of wood column on north side of the building	0.53% Chrysotile
VC-PC-01B	Grey caulking	Base of wood column on north side of the building	Positive stop (not analyzed)
VC-PC-01C	Grey caulking	Base of wood column on north side of the building	Positive stop (not analyzed)
VC-RS-01A	Roof shingle	North side of the building roof	None detected
VC-RS-01B	Roof shingle	North side of the building roof	None detected
VC-RS-01C	Roof shingle	North side of the building roof	None detected
VC-WPC-01A	Black window pane caulking	East window of kiosk between pane and frame	0.81% Chrysotile
VC-WPC-01B	Black window pane caulking	East window of kiosk between pane and frame	Positive stop (not analyzed)
VC-WPC-01C	Black window pane caulking	East window of kiosk between pane and frame	Positive stop (not analyzed)
VC-RP-01A	Black roof paper	Under roof shingle on north side of the building roof	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

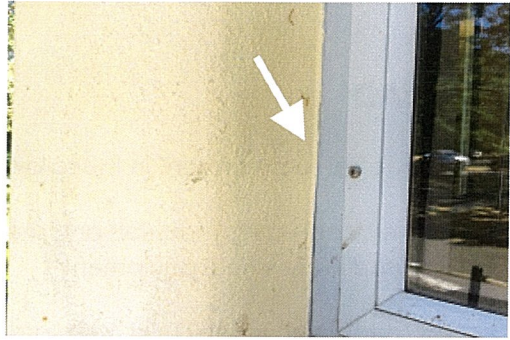
Appendix T Findings and Recommendations—Visitors Centre/Entrance Kiosk
 March 24, 2016

**Table T-1 Suspected ACM Sample Collection and Analysis Summary
 Visitors Centre/Entrance Kiosk, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
VC-RP-01B	Black roof paper	Under roof shingle on north side of the building roof	None detected
VC-RP-01C	Black roof paper	Under roof shingle on north side of the building roof	None detected
VC-VSF-01	Brown vinyl sheet flooring	Floor by south east exit	None detected
VC-TC-01A	White textured ceiling	Ceiling of south east office	None detected
VC-TC-01B	White textured ceiling	Ceiling of south east office	None detected
VC-TC-01C	White textured ceiling	Ceiling of south east office	None detected
VC-JFC-01A	Joint filling compound	South interior wall of kiosk room	None detected
VC-JFC-01B	Joint filling compound	South interior wall of kiosk room	None detected
VC-JFC-01C	Joint filling compound	South wall of south east office	None detected

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, the materials presented in Table T-2, below were identified as ACMs.


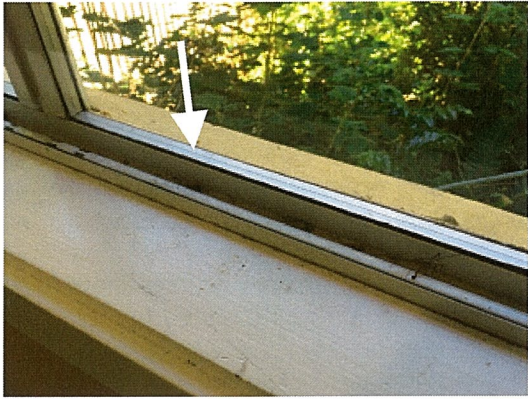
**Table T-2 Summary of Identified ACMs
 Visitors Centre/Entrance Kiosk, Fort Rodd Hill National Historic Site, BC**

Identified ACM Description and Condition Information		Photo
Grey window frame caulking throughout		
Friability	Non-friable	
Condition	Good	
Content	0.66% Chrysotile	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix T Findings and Recommendations—Visitors Centre/Entrance Kiosk
 March 24, 2016

**Table T-2 Summary of Identified ACMs
 Visitors Centre/Entrance Kiosk, Fort Rodd Hill National Historic Site, BC**

Identified ACM Description and Condition Information		Photo
Grey caulking on base of wood columns throughout		
Friability	Non-friable	
Condition	Good	
Content	0.53% Chrysotile	
Black window pane caulking throughout.		
Friability	Non-friable	
Condition	Good	
Content	0.81% Chrysotile	

T.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used in electrical equipment

With respect to paint, seven paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table T-3, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.



HAZARDOUS BUILDING MATERIALS ASSESSMENT


Appendix T Findings and Recommendations—Visitors Centre/Entrance Kiosk
 March 24, 2016

**Table T-3 Suspected LCP Sample Collection and Analysis Summary
 Visitors Centre/Entrance Kiosk, Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
VC-PB-01	Tan	Interior wall of theatre room	<96	No
VC-PB-02	Tan	Main entrance double doors	<300	No
VC-PB-03	Yellow	Exterior wall	<90	No
VC-PB-04	Red	Wood column on north side of the building	690	Yes
VC-PB-05	Red	Steel fencing	2,400	Yes
VC-PB-06	Grey	Wall of admin office	<90	No
VC-PB-07	White	Frame of main entrance door	<130	No

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table T-4, below were identified as LCPs.


**Table T-4 Summary of Identified LCPs
 Visitors Centre/Entrance Kiosk, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
Red coloured paint on the exterior trim and columns. This paint was observed to be in good condition (not bubbling, flaking or peeling).	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix T Findings and Recommendations—Visitors Centre/Entrance Kiosk
March 24, 2016

**Table T-4 Summary of Identified LCPs
Visitors Centre/Entrance Kiosk, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Red coloured paint on the steel fencing. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

T.3 POLYCHLORINATED BIPHENYLS

PCBs may be present in the fluorescent light ballasts of the approximately 10 light fixtures observed. As the ballasts were energized, they could not be inspected at the time of the assessment for health and safety reasons.

T.4 MERCURY

Mercury vapour is likely to be present in the light tubes within the approximately 10 fluorescent light fixtures observed. Mercury may also be present in paints and adhesives.

T.5 MOULD

No mould or moisture-impacted building materials were observed during the assessment.

T.6 OZONE-DEPLETING SUBSTANCES

Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

T.7 SILICA

Silica is presumed to be present in the concrete foundation of the subject building.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix T Findings and Recommendations—Visitors Centre/Entrance Kiosk
March 24, 2016

T.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



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Collected:
Received: 7/20/2015
Analyzed: 7/28/2015
Proj: 123220330.400.100/Fort Rodd Hill

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: VC-WC-01A **Lab Sample ID:** 551507781-0164

Sample Description: Kiosk window on north side of the building/Grey window frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	99.3%	0.66% Chrysotile	

Client Sample ID: VC-WC-01B **Lab Sample ID:** 551507781-0165

Sample Description: Kiosk window on north side of the building/Grey window frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015					Positive Stop (Not Analyzed)

Client Sample ID: VC-WC-01C **Lab Sample ID:** 551507781-0166

Sample Description: Kiosk window on north side of the building/Grey window frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015					Positive Stop (Not Analyzed)

Client Sample ID: VC-Stucco-01A **Lab Sample ID:** 551507781-0167

Sample Description: North west corner of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: VC-Stucco-01B **Lab Sample ID:** 551507781-0168

Sample Description: North west corner wall of the building/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: VC-Stucco-01C **Lab Sample ID:** 551507781-0169

Sample Description: West wall of the kiosk/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	

Client Sample ID: VC-Stucco-01D **Lab Sample ID:** 551507781-0170

Sample Description: West wall of the kiosk/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Gray	0%	100%	None Detected	



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Customer ID: 55JACQ30L
Customer PO: 123220330
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: VC-Stucco-01E **Lab Sample ID:** 551507781-0171

Sample Description: North wall of the kiosk/Stucco

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: VC-DFC-01A **Lab Sample ID:** 551507781-0172

Sample Description: Main entrance double door btwn frame & panelling/Door frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: VC-DFC-01B **Lab Sample ID:** 551507781-0173

Sample Description: Main entrance double door btwn frame & panelling/Door frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: VC-DFC-01C **Lab Sample ID:** 551507781-0174

Sample Description: Main entrance double door btwn frame & panelling/Door frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: VC-PC-01A **Lab Sample ID:** 551507781-0175

Sample Description: base of wood column on north side of the building /Grey caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	99.5%	0.53% Chrysotile	

Client Sample ID: VC-PC-01B **Lab Sample ID:** 551507781-0176

Sample Description: base of wood column on north side of the building/Grey caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015				Positive Stop (Not Analyzed)	

Client Sample ID: VC-PC-01C **Lab Sample ID:** 551507781-0177

Sample Description: base of wood column on north side of the building/Grey caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015				Positive Stop (Not Analyzed)	

Client Sample ID: VC-RS-01A **Lab Sample ID:** 551507781-0178

Sample Description: north side of the building roof/Roof shingle

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: VC-RS-01B **Lab Sample ID:** 551507781-0179
Sample Description: north side of the building roof/Roof shingle

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: VC-RS-01C **Lab Sample ID:** 551507781-0180
Sample Description: north side of the building roof/Roof shingle

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	

Client Sample ID: VC-WPC-01A **Lab Sample ID:** 551507781-0181
Sample Description: East window of kiosk between pane and frame/Black window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	99.2%	0.81% Chrysotile	

Client Sample ID: VC-WPC-01B **Lab Sample ID:** 551507781-0182
Sample Description: East window of kiosk between pane and frame/Black window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015				Positive Stop (Not Analyzed)	

Client Sample ID: VC-WPC-01C **Lab Sample ID:** 551507781-0183
Sample Description: East window of kiosk between pane and frame/Black window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015				Positive Stop (Not Analyzed)	

Client Sample ID: VC-RP-01A **Lab Sample ID:** 551507781-0184
Sample Description: Under roof shingle on north side of the bldg roof/Black roof paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: VC-RP-01B **Lab Sample ID:** 551507781-0185
Sample Description: Under roof shingle on north side of the bldg roof/Black roof paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: VC-RP-01C **Lab Sample ID:** 551507781-0186
Sample Description: Under roof shingle on north side of the bldg roof/Black roof paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	



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Customer ID: 55JACQ30L
Customer PO: 123220330
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: VC-VSF-01 **Lab Sample ID:** 551507781-0187
Sample Description: Floor by south east exit/Brown vinyl sheet flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: VC-TC-01A **Lab Sample ID:** 551507781-0188
Sample Description: Ceiling of south east office/White textured ceiling

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: VC-TC-01B **Lab Sample ID:** 551507781-0189
Sample Description: Ceiling of south east office/White textured ceiling

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: VC-TC-01C **Lab Sample ID:** 551507781-0190
Sample Description: Ceiling of south east office/White textured ceiling

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: VC-JFC-01A **Lab Sample ID:** 551507781-0191
Sample Description: South interior wall of kiosk room/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: VC-JFC-01B **Lab Sample ID:** 551507781-0192
Sample Description: South interior wall of kiosk room/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: VC-JFC-01C **Lab Sample ID:** 551507781-0193
Sample Description: South wall of south east office/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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):

Jon Delos Santos PLM (6)
Nicole Dimou PLM Grav. Reduction (6)
Nicole Yeo PLM Grav. Reduction (2)
Romeo Samson PLM (8)
PLM Grav. Reduction (2)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 07/28/2015 21:57:46



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CustomerID: 55JACQ30L
CustomerPO: 123220330
ProjectID:

Attn: **Steve Chou**
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6

Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
VC-PB-01 Site: INTERIOR WALL OF THEATRE ROOM Desc: TAN Insufficient sample to meet reporting limit.	551507777-0122	7/24/2015		<96 ppm
VC-PB-02 Site: MAIN ENTRANCE DOUBLE DOORS Desc: TAN Insufficient sample to meet reporting limit.	551507777-0123	7/24/2015		<300 ppm
VC-PB-03 Site: EXTERIOR WALL Desc: YELLOW	551507777-0124	7/24/2015		<90 ppm
VC-PB-04 Site: WOOD COLUMN ON NORTH SIDE OF THE BUILDING Desc: RED	551507777-0125	7/24/2015		690 ppm
VC-PB-05 Site: STEEL FENCING Desc: RED	551507777-0126	7/24/2015		2400 ppm
VC-PB-06 Site: WALL OF ADMIN OFFICE Desc: GREY	551507777-0127	7/24/2015		<90 ppm
VC-PB-07 Site: FRAME OF MAIN ENTRANCE DOOR Desc: WHITE Insufficient sample to meet reporting limit.	551507777-0128	7/24/2015		<130 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:16:36

APPENDIX U
FINDINGS AND RECOMMENDATIONS—
WARRANTS OFFICER'S QUARTER

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix U Findings and Recommendations—Warrant's officer's Quarter
March 24, 2016

Appendix U FINDINGS AND RECOMMENDATIONS— WARRANT'S OFFICER'S QUARTER

The Warrant's Officer's Quarter was reportedly constructed in 1897 and is a two level wood frame building with an outdoor enclosed storage space at the east side of the building.

The typical structural components and finishes associated with this building consist of brick exterior walls, hardwood/concrete flooring and interior plaster walls and ceilings.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

The following areas were not accessed, for the reasons indicated:

- Roof (lack of safe access)
- North west corner room of main level (no access)

As such, limited comments, if any, will be provided regarding the presence, quantity or condition of hazardous building materials within the above-noted areas.

U.1 ASBESTOS

Stantec identified and sampled the following suspected ACMs:

- Plaster
- Floor leveling compound
- Insulation paper
- Flooring paper
- Caulkings, sealants and mastics

Thirty-one samples of the above-noted suspected ACMs (some with multiple layers) were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table U-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix U Findings and Recommendations—Warrant's officer's Quarter
March 24, 2016

**Table U-1 Suspected ACM Sample Collection and Analysis Summary
Warrant Officer's Quarter, Fort Rodd Hill National Historic Site, BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
WOQ-PL-01A	Plaster	Upstairs – east wall of north west bedroom	None detected
WOQ-PL-01B	Plaster	Upstairs – south wall of south east bedroom	None detected
WOQ-PL-01C	Plaster	Upstairs – north wall of stairs	None detected
WOQ-PL-01D	Plaster	Main floor – west wall of south west bedroom	None detected
WOQ-PL-01E	Plaster	Main floor – north wall of north west room	None detected
WOQ-PL-01F-Skim Coat	Plaster	Main floor – interior wall of stairs	None detected
WOQ-PL-01F-Rough Coat	Plaster	Main floor – interior wall of stairs	None detected
WOQ-PL-01G-Skim Coat	Plaster	Main floor – north wall of stairs	None detected
WOQ-PL-01G-Rough Coat	Plaster	Main floor – north wall of stairs	None detected
WOQ-LC-01A	Leveling compound	Upstairs – Base of heater/radiator of south east bedroom	None detected
WOQ-LC-01B	Leveling compound	Upstairs – base of heater/radiator of south west storage room	None detected
WOQ-LC-01C	Leveling compound	Upstairs – base of heater/radiator of south west storage room	None detected
WOQ-IP-01A	Black insulation paper	Attic space below insulation	None detected
WOQ-IP-01B	Black insulation paper	Attic space below insulation	None detected
WOQ-IP-01C	Black insulation paper	Attic space below insulation	None detected
WOQ-PF-01A	Blue paper	Upstairs - hardwood floor of hallway	None detected
WOQ-PF-01B	Blue paper	Upstairs - hardwood floor of hallway	None detected
WOQ-PF-01C	Blue paper	Upstairs - hardwood floor of hallway	None detected
WOQ-HC-01A	Yellow heater caulking	Upstairs – between heater/radiator and the wall of south east bedroom	None detected
WOQ-HC-01B	Yellow heater caulking	Upstairs – between heater/radiator and the wall of south east bedroom	None detected
WOQ-HC-01C	Yellow heater caulking	Upstairs – between heater/radiator and the wall of south east bedroom	None detected
WOQ-WFC-01A	Yellow window frame caulking	Exterior window on east side of the building between bricks and frame	None detected

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix U Findings and Recommendations—Warrant's officer's Quarter
March 24, 2016

**Table U-1 Suspected ACM Sample Collection and Analysis Summary
Warrant Officer's Quarter, Fort Rodd Hill National Historic Site, BC**

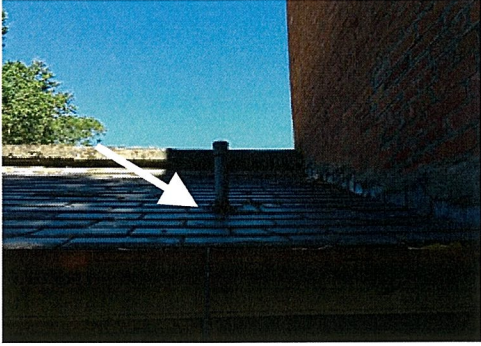
Sample Number	Material Description	Sample Location	Result (%/type asbestos)
WOQ-WFC-01B	Yellow window frame caulking	Exterior window on east side of the building between bricks and frame	None detected
WOQ-WFC-01C	Yellow window frame caulking	Exterior window on east side of the building between bricks and frame	None detected
WOQ-DC-01A	Grey caulking	Lower part of downspout on south side of the building	None detected
WOQ-DC-01B	Grey caulking	Lower part of downspout on south side of the building	None detected
WOQ-DC-01C	Grey caulking	Lower part of downspout on south side of the building	None detected
WOQ-WC-01A	White window caulking	Exterior window on north side of the building between frame and pane	None detected
WOQ-WC-01B	White window caulking	Exterior window on east side of the building between frame and pane	None detected
WOQ-WC-01C	White window caulking	Exterior window on east side of the building between frame and pane	None detected
WOQ-VM-01A	Black vent mastic	Roof of outhouse on northwest side of the building	1.5% Chrysotile
WOQ-VM-01B	Black vent mastic	Roof of outhouse on northwest side of the building	Positive Stop (not analyzed)
WOQ-VM-01C	Black vent mastic	Roof of outhouse on northwest side of the building	Positive Stop (not analyzed)

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, the material presented in Table U-2, below was identified as an ACM.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix U Findings and Recommendations—Warrant's officer's Quarter
March 24, 2016

**Table J-2 Summary of Identified ACMs
Warrant Officer's Quarter, Fort Rodd Hill National Historic Site, BC**

Identified ACM Description and Condition Information		Photo
Black mastic on the base of one (1) roof vent on north west side of the building		
Friability	Non-friable	
Condition	Good	
Content	1.5% Chrysotile	

U.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes
- Vent and pipe flashings

With respect to paint, eight paint chip samples were obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table U-3, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table U-3 Suspected LCP Sample Collection and Analysis Summary
Warrant Officer's Quarter, Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
WOQ-PB-01	Tan	Upstairs - interior trim	5,300	Yes
WOQ-PB-02	Yellow	Upstairs – base board of south east bedroom	5,700	Yes
WOQ-PB-03	White	Main floor – interior walls of gift shop	<90	No
WOQ-PB-04	White	Main floor – wall of outhouse	12,000	Yes
WOQ-PB-05	Grey	Main floor – floor of north west room	1,300	Yes

HAZARDOUS BUILDING MATERIALS ASSESSMENT


Appendix U Findings and Recommendations—Warrant's officer's Quarter
March 24, 2016

**Table U-3 Suspected LCP Sample Collection and Analysis Summary
Warrant Officer's Quarter, Fort Rodd Hill National Historic Site, BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
WOQ-PB-06	White	Exterior window sill on east side of the building	2,100	Yes
WOQ-PB-07	Tan	Exterior window frame on east side of the building	22,000	Yes
WOQ-PB-08	Red	Downspout on south side of the building	14,000	Yes

Based on our observations and on our interpretations of suspected LCP sample analytical results, the material presented in Table U-4, below are identified as LCPs.




**Table U-4 Summary of Identified LCPs
Warrant Officers Quarters, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
Tan coloured paint on interior trim throughout. This paint was observed to be in good condition (not bubbling, flaking or peeling).	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix U Findings and Recommendations—Warrant's officer's Quarter
March 24, 2016

**Table U-4 Summary of Identified LCPs
Warrant Officers Quarters, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>Yellow coloured paint on base boards throughout. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>White coloured paint on walls of the outhouse. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Grey coloured paint on concrete floors throughout. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix U Findings and Recommendations—Warrant's officer's Quarter
March 24, 2016

**Table U-4 Summary of Identified LCPs
Warrant Officers Quarters, Fort Rodd Hill National Historic Site, BC**

Identified LCP Description	Photo
<p>White coloured paint on exterior window sills. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Tan coloured paint on exterior window frames. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	
<p>Red coloured paint on exterior downspouts. This paint was observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix U Findings and Recommendations—Warrant's officer's Quarter
March 24, 2016

U.3 POLYCHLORINATED BIPHENYLS

No suspected PCB-containing electrical equipment was observed.


U.4 MERCURY

Equipment and/or items that contain mercury were not observed. Mercury may also be present in paints and adhesives.

U.5 MOULD

The observations pertaining to mould and/or moisture that were made during this assessment are summarized in Table U-5 below.

**Table U-5 Mould/Moisture Observations Summary
Warrant Officer's Quarter, Fort Rodd Hill National Historic Site, BC**

Building Area	Observation	Suspected Source of Moisture	Photo
Southeast bedroom	Localized spots of moisture staining on ceilings throughout the room – each comprising less than 1 square foot	Roof leaks	

U.6 OZONE-DEPLETING SUBSTANCES

Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

U.7 SILICA

Silica is presumed to be present in the concrete foundation and brick siding and brick mortar of the subject building.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

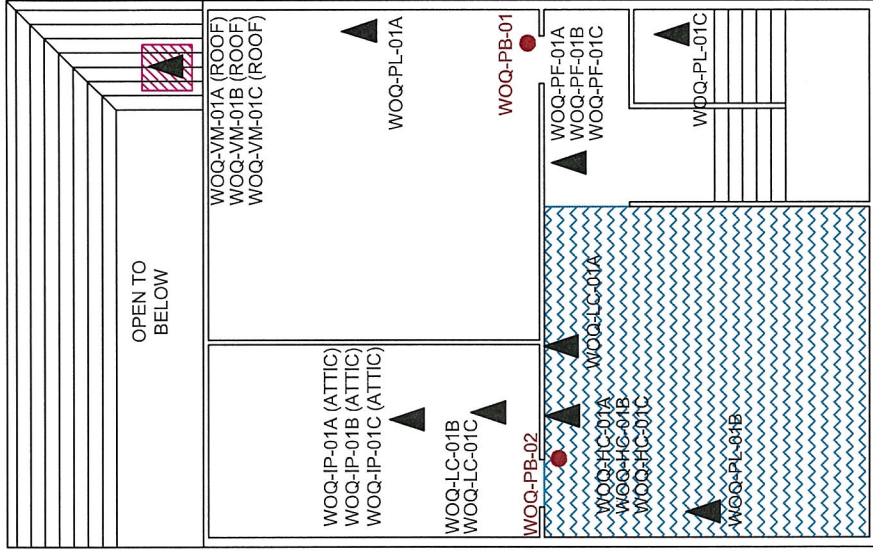
Appendix U Findings and Recommendations—Warrant's officer's Quarter
March 24, 2016

U.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.

U.8.1 Mould

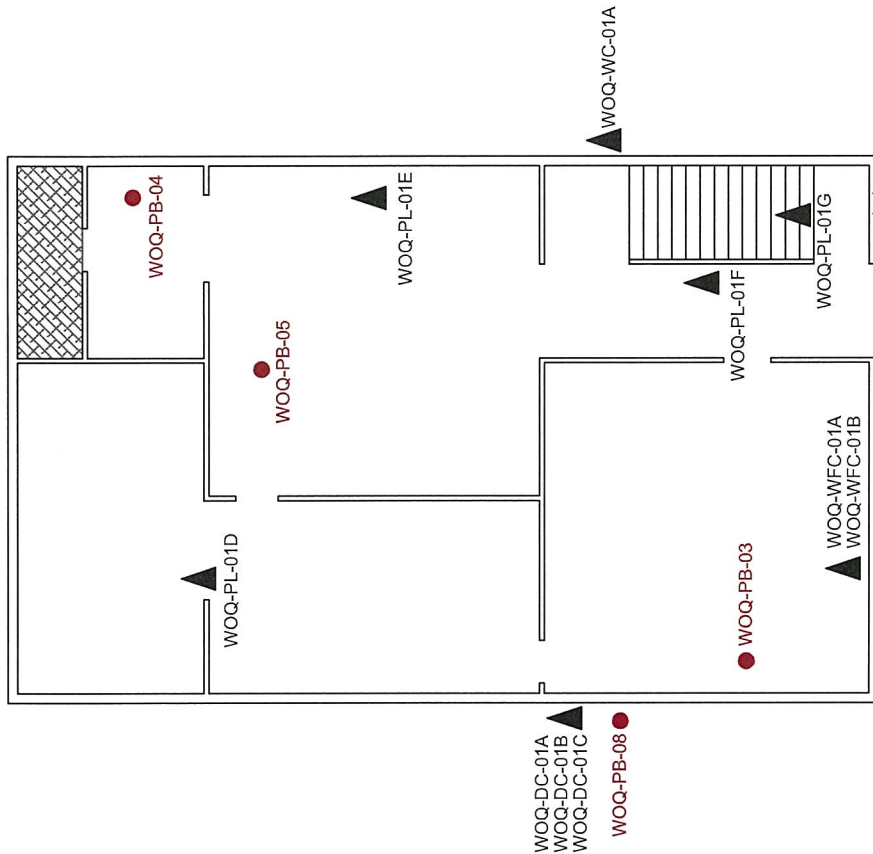
An intrusive mould assessment should be completed to assess the concealed conditions in the southwest bedroom ceiling space, and to assess for the potential source of moisture such that it can be corrected. In the interim, the ceilings in this area should be monitored for current moisture and/or mould growth. If mould growth is observed, more urgency should be placed on having the area assessed in support of abatement initiatives.



LEGEND

- ▲ BULK SAMPLE LOCATION
- PAINT CHIP SAMPLE LOCATION
- ▨ NO ACCESS
- ▨ ASBESTOS-CONTAINING BLACK VENT MASTIC ON ROOF
- ▨ MOISTURE - STAINED CEILINGS IN LOCALIZED SPOTS COMPRISING LESS THAN 1 ft²

SECOND LEVEL



MAIN LEVEL

WARRANT'S OFFICER'S QUARTER (WOQ)

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Project No.: 123220330.400		Dwg. No.: 12	
Scale:	N.T.S.		
Date:	16/03/23		
Dwn. By:	CD vMIDM		
App'd By:	TW		
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC			
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA			
Client:			



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
Project ID:

Attn: Steve Chou
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6
Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015
Proj: 123220330.400.100/Fort Rodd Hill

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: WOQ-PL-01A **Lab Sample ID:** 551507781-0130

Sample Description: Upstairs – east wall of north west bedroom/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: WOQ-PL-01B **Lab Sample ID:** 551507781-0131

Sample Description: Upstairs – south wall of south east bedroom/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: WOQ-PL-01C **Lab Sample ID:** 551507781-0132

Sample Description: Upstairs – north wall of stairs/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: WOQ-PL-01D **Lab Sample ID:** 551507781-0133

Sample Description: Main floor – west wall of south west bedroom/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: WOQ-PL-01E **Lab Sample ID:** 551507781-0134

Sample Description: Main floor – north wall of north west room/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: WOQ-PL-01F-Skim Coat **Lab Sample ID:** 551507781-0135

Sample Description: Main floor – interior wall of stairs/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: WOQ-PL-01F-Rough Coat **Lab Sample ID:** 551507781-0135A

Sample Description: Main floor – interior wall of stairs/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: WOQ-PL-01G-Skim Coat **Lab Sample ID:** 551507781-0136
Sample Description: Main floor – north wall of stairs/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: WOQ-PL-01G-Rough Coat **Lab Sample ID:** 551507781-0136A
Sample Description: Main floor – north wall of stairs/Plaster

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray	0%	100%	None Detected	

Client Sample ID: WOQ-LC-01A **Lab Sample ID:** 551507781-0137
Sample Description: Upstairs-Base of heater/radiator of S.E bedroom/Leveling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Brown	0%	100%	None Detected	

Client Sample ID: WOQ-LC-01B **Lab Sample ID:** 551507781-0138
Sample Description: Upstairs-base of heater/radiator of S.W storage rm/Leveling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Brown	0%	100%	None Detected	

Client Sample ID: WOQ-LC-01C **Lab Sample ID:** 551507781-0139
Sample Description: Upstairs-base of heater/radiator of S.W storage rm/Leveling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Brown/Gray	0%	100%	None Detected	

Client Sample ID: WOQ-IP-01A **Lab Sample ID:** 551507781-0140
Sample Description: Attic space below insulation/Black insulation paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Brown/Black	30%	70%	None Detected	

Client Sample ID: WOQ-IP-01B **Lab Sample ID:** 551507781-0141
Sample Description: Attic space below insulation/Black insulation paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Brown/Black	30%	70%	None Detected	

Client Sample ID: WOQ-IP-01C **Lab Sample ID:** 551507781-0142
Sample Description: Attic space below insulation/Black insulation paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Brown/Black	90%	10%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: WOQ-PF-01A **Lab Sample ID:** 551507781-0143

Sample Description: Upstairs - hardwood floor of hallway/Blue paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Blue	35%	65%	None Detected	

Client Sample ID: WOQ-PF-01B **Lab Sample ID:** 551507781-0144

Sample Description: Upstairs - hardwood floor of hallway/Blue paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	Blue	0%	100%	None Detected	

Client Sample ID: WOQ-PF-01C **Lab Sample ID:** 551507781-0145

Sample Description: Upstairs - hardwood floor of hallway/Blue paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Blue	80%	20%	None Detected	

Client Sample ID: WOQ-HC-01A **Lab Sample ID:** 551507781-0146

Sample Description: Upstairs-btwn heater/radiator & wall of SE bedroom/Yellow heater caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Tan	0.0%	100%	None Detected	

Client Sample ID: WOQ-HC-01B **Lab Sample ID:** 551507781-0147

Sample Description: Upstairs-btwn heater/radiator & wall of SE bedroom/Yellow heater caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray/Tan	0%	100%	None Detected	

Client Sample ID: WOQ-HC-01C **Lab Sample ID:** 551507781-0148

Sample Description: Upstairs-btwn heater/radiator & wall of SE bedroom/Yellow heater caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Tan	0.0%	100%	None Detected	

Client Sample ID: WOQ-WFC-01A **Lab Sample ID:** 551507781-0149

Sample Description: Ext. window on E.side of bldg btwn bricks & frame/Yellow window frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Tan	0%	100%	None Detected	

Client Sample ID: WOQ-WFC-01B **Lab Sample ID:** 551507781-0150

Sample Description: Ext. window on E.side of bldg btwn bricks & frame/Yellow window frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Tan	0.0%	100%	None Detected	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: WOQ-WFC-01C **Lab Sample ID:** 551507781-0151

Sample Description: Ext. window on E.side of bldg btwn bricks & frame/Yellow window frame caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Tan	0.0%	100%	None Detected	

Client Sample ID: WOQ-DC-01A **Lab Sample ID:** 551507781-0152

Sample Description: Lower part of downspout on south side of the bldg/Grey caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Red	0.0%	100%	None Detected	

Client Sample ID: WOQ-DC-01B **Lab Sample ID:** 551507781-0153

Sample Description: Lower part of downspout on south side of the bldg/Grey caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Red	0.0%	100%	None Detected	

Client Sample ID: WOQ-DC-01C **Lab Sample ID:** 551507781-0154

Sample Description: Lower part of downspout on south side of the bldg/Grey caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray/Red	0.0%	100%	None Detected	

Client Sample ID: WOQ-WC-01A **Lab Sample ID:** 551507781-0155

Sample Description: Ext. window on N.side of bldg btwn frame & pane/White window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: WOQ-WC-01B **Lab Sample ID:** 551507781-0156

Sample Description: Ext. window on E.side of bldg btwn frame & pane/White window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: WOQ-WC-01C **Lab Sample ID:** 551507781-0157

Sample Description: Ext. window on E.side of bldg btwn frame & pane/White window caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: WOQ-VM-01A **Lab Sample ID:** 551507781-0158

Sample Description: Roof of outhouse on north west side of the bldg/Black vent mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	98.5%	1.5% Chrysotile	



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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: WOQ-VM-01B

Lab Sample ID: 551507781-0159

Sample Description: Roof of outhouse on north west side of the bldg/Black vent mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015				Positive Stop (Not Analyzed)	

Client Sample ID: WOQ-VM-01C

Lab Sample ID: 551507781-0160

Sample Description: Roof of outhouse on north west side of the bldg/Black vent mastic

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015				Positive Stop (Not Analyzed)	

Analyst(s):

Jon Delos Santos	PLM (10) PLM Grav. Reduction (4)
Nicole Dimou	PLM Grav. Reduction (1)
Romeo Samson	PLM (10) PLM Grav. Reduction (6)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 07/28/2015 21:57:46

**EMSL Canada Inc.**

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 CustomerID: 55JACQ30L
 CustomerPO: 123220330
 ProjectID:

Attn: **Steve Chou**
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6

Phone: (604) 412-3004
 Fax:
 Received: 07/20/15 11:06 AM
 Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
WOQ-PB-01 Site: UPSTAIRS - INTERIOR TRIM Desc: TAN	551507777-0111	7/23/2015		5300 ppm
WOQ-PB-02 Site: UPSTAIRS - BASE BOARD OF SOUTH EAST BEDROOM Desc: YELLOW	551507777-0112	7/23/2015		5700 ppm
WOQ-PB-03 Site: MAIN FLOOR - INTERIOR WALLS OF GIFT SHOP Desc: WHITE	551507777-0113	7/23/2015		<90 ppm
WOQ-PB-04 Site: MAIN FLOOR - WALL OF OUTHOUSE Desc: WHITE	551507777-0114	7/23/2015		12000 ppm
WOQ-PB-05 Site: MAIN FLOOR - FLOOR OF NORTH WEST ROOM Desc: GREY	551507777-0115	7/24/2015		1300 ppm
WOQ-PB-06 Site: EXTERIOR WINDOW SILL ON EAST SIDE OF THE BUILDING Desc: WHITE	551507777-0116	7/24/2015		2100 ppm
WOQ-PB-07 Site: EXTERIOR WINDOW FRAME ON EAST SIDE OF BUILDING Desc: TAN	551507777-0117	7/24/2015		22000 ppm
WOQ-PB-08 Site: DOWNSPOUT ON SOUTH SIDE OF THE BUILDING Desc: RED	551507777-0118	7/24/2015		14000 ppm

Lisa Podzyhun
 or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:12:10

APPENDIX V
FINDINGS AND RECOMMENDATIONS—
WW2 HUT/VISITORS ORIENTATION CENTRE



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix V Findings and Recommendations—WWII HUT/Visitors Orientation centre
March 24, 2016

Appendix V FINDINGS AND RECOMMENDATIONS—WWII HUT/VISITORS ORIENTATION CENTRE

The WWII Hut/Visitors Orientation Centre was reportedly constructed in 1939 and is a one story wood building consisting of men's/women's washrooms and an occupied office space.

The typical structural components and finishes associated with this building consist of exterior wood panels, ceramic floor tiles/vinyl sheet flooring and interior drywall ceilings.

The results of the assessment for each of the considered hazardous materials within the building are provided in the following sub-sections.

Floor plan drawings, which include locations of the samples collected during this assessment and locations of identified hazardous building materials (where practical), are attached to this Appendix.

V.1 ASBESTOS

Stantec identified and sampled the following suspected ACMs:

- Vinyl sheet flooring
- Vinyl floor tile
- Roofing paper
- Caulking
- Drywall joint compound

Thirteen samples of the above-noted suspected ACMs were collected and submitted to EMSL for analysis of asbestos content and nature.

A summary of the sample types, locations and analytical results is presented in Table V-1, below. A copy of the certificate of analysis provided by EMSL for the suspected ACM samples submitted is attached to this Appendix.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix V Findings and Recommendations—WWII HUT/Visitors Orientation centre
March 24, 2016

**Table V-1 Suspected ACM Sample Collection and Analysis Summary
WWII Hut/Visitors Orientation Centre, Fort Rodd Hill National Historic Site,
BC**

Sample Number	Material Description	Sample Location	Result (%/type asbestos)
WWII-VSF-01	Green vinyl sheet flooring	2nd layer beneath rug in storage room of visitor orientation centre	None detected
WWII-VFT-01	12"by12" brown vinyl floor tile	Floor of visitor orientation centre	None detected
WWII-RP-01A	Black roof paper	Under roof shingle on east side of building roof	None detected
WWII-RP-01B	Black roof paper	Under roof shingle on east side of building roof	None detected
WWII-RP-01C	Black roof paper	Under roof shingle on east side of building roof	None detected
WWII-WPC-01A	Window pane caulking	Exterior window of visitor orientation centre on east side of the building between glass and pane	None detected
WWII-WPC-01B	Window pane caulking	Exterior window of visitor orientation centre on east side of the building between glass and pane	None detected
WWII-WPC-01C	Window pane caulking	Exterior window of women's washroom on east side of the building between glass and pane	None detected
WWII-JFC-01A	Joint filling compound	South interior wall of men's washroom	None detected
WWII-JFC-01B	Joint filling compound	North interior wall of men's washroom	None detected
WWII-JFC-01C	Joint filling compound	East interior wall of women's washroom	None detected
WWII-JFC-01D	Joint filling compound	North interior wall of storage room	None detected
WWII-JFC-01E	Joint filling compound	Counter of visitor orientation	None detected

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of suspected ACM sample analytical results, no ACMs were identified.

V.2 LEAD

Lead is expected to be present in the following:

- Older electrical wiring materials and sheathing
- Solder used on domestic water lines
- Solder used in bell fittings for cast iron pipes



HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix V Findings and Recommendations—WWII HUT/Visitors Orientation centre
March 24, 2016

- Solder used in electrical equipment
- Vent and pipe flashings
- Solder used in electrical equipment


With respect to paint, five paint chip sample was obtained from the predominant suspected LCP applications within the building. A summary of the sample types, locations and analytical results is presented in Table V-2, below. A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is attached to this Appendix.

**Table V-2 Suspected LCP Sample Collection and Analysis Summary
WWII Hut/Visitors Orientation Centre, Fort Rodd Hill National Historic Site,
BC**

Sample No.	Sample Colour	Sample Location	Lab Result (ppm)	Lead Containing (Yes/No)
WWII-PB-01	Yellow	Interior wall of visitor orientation centre	<190	No
WWII-PB-02	White	Interior wall of men's washroom	140	No
WWII-PB-03	Green	Exterior trim	1,500	Yes
WWII-PB-04	Yellow	Exterior window frame trim	4,000	Yes
WWII-PB-05	White	Exterior wood panelling	18,000	Yes

Based on our observations and on our interpretations of suspected LCP sample analytical results, the materials presented in Table V-3, below were identified as LCPs.

**Table V-3 Summary of Identified LCPs
WWII Hut/Visitors Orientation Centre, Fort Rodd Hill National Historic Site,
BC**

Identified LCP Description	Photo
<p>Green coloured paint on exterior trim and doors (top arrow).</p> <p>Yellow coloured paint on exterior window frame trim (middle arrow).</p> <p>White coloured paint on exterior wood paneling/siding (lower arrow).</p> <p>These paints were observed to be in good condition (not bubbling, flaking or peeling).</p>	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix V Findings and Recommendations—WWII HUT/Visitors Orientation centre
March 24, 2016

V.3 POLYCHLORINATED BIPHENYLS

PCBs may be present in the fluorescent light ballasts of the approximately 10 light fixtures observed. As the ballasts were energized, they could not be inspected at the time of the assessment for health and safety reasons.

V.4 MERCURY

Mercury vapour is expected to be present in fluorescent light bulbs/tubes observed in approximately 10 fluorescent light fixtures.

Mercury may also be present in paints and adhesives.

V.5 MOULD

No mould/moisture-impacted building materials were observed at the time of the assessment.

V.6 OZONE-DEPLETING SUBSTANCES

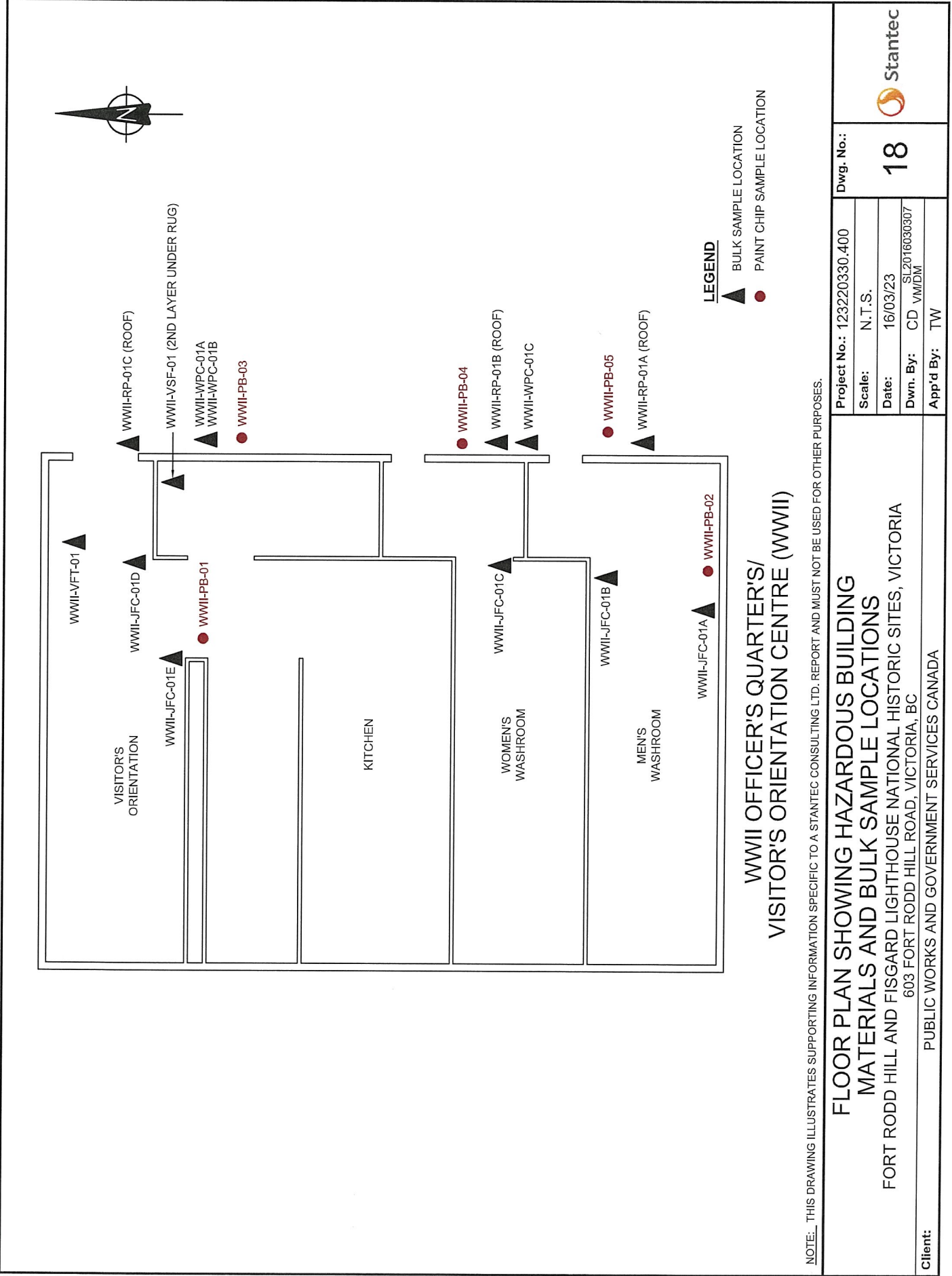
Building related cooling and refrigeration equipment suspected to be ODS-containing was not observed.

V.7 SILICA

Silica is presumed to be present in the concrete foundation of the subject building.

V.8 RECOMMENDATIONS

In general, identified hazardous building materials were observed to be in good condition and do not appear to require specific action to maintain compliance with applicable regulations for continued operations and maintenance. Refer to Section 5.0 of the main body of this report for applicable material-by-material general recommendations.



Project No.: 123220330.400		Dwg. No.:	18	Stantec
Scale:	N.T.S.			
Date:	16/03/23			
Dwn. By:	CD VM/DM			
App'd By:	TW			
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS FORT RODD HILL AND FIGGARD LIGHTHOUSE NATIONAL HISTORIC SITES, VICTORIA 603 FORT RODD HILL ROAD, VICTORIA, BC PUBLIC WORKS AND GOVERNMENT SERVICES CANADA				
Client:				



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EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
Project ID:

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Phone: (604) 412-3004
Fax:
Collected:
Received: 7/20/2015
Analyzed: 7/28/2015

Proj: 123220330.400.100/Fort Rodd Hill

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: WWII-VSF-01 **Lab Sample ID:** 551507781-0208

Sample Description: 2nd layer beneath rug in storage rm of visitor/orientation centre/ Green vinyl sheet flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	/arious/Blue/Greer	0.0%	100%	None Detected	

Client Sample ID: WWII-VFT-01 **Lab Sample ID:** 551507781-0209

Sample Description: Floor of visitor orientation centre/12"by12" brown vinyl floor tile

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Green	0.0%	100%	None Detected	

Client Sample ID: WWII-RP-01A **Lab Sample ID:** 551507781-0210

Sample Description: Under roof shingle on east side of building roof/Black roof paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: WWII-RP-01B **Lab Sample ID:** 551507781-0211

Sample Description: Under roof shingle on east side of building roof/Black roof paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Black	0.0%	100%	None Detected	

Client Sample ID: WWII-RP-01C **Lab Sample ID:** 551507781-0212

Sample Description: Under roof shingle on east side of building roof/Black roof paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Black	0.0%	100%	None Detected	

Client Sample ID: WWII-WPC-01A **Lab Sample ID:** 551507781-0213

Sample Description: Ext. window of visitor orientation centre on/E.side of the bldg btwn glass & pane/ Window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: WWII-WPC-01B **Lab Sample ID:** 551507781-0214

Sample Description: Ext. window of visitor orientation centre on/E.side of the bldg btwn glass & pane/ Window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/27/2015	Gray	0.0%	100%	None Detected	



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Customer ID: 55JACQ30L
Customer PO: 123220330
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: WWI1-WPC-01C **Lab Sample ID:** 551507781-0215

Sample Description: Ext. window of women's washroom on E. side of the bldg btwn glass & pane/ Window pane caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/28/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: WWI1-JFC-01A **Lab Sample ID:** 551507781-0216

Sample Description: South interior wall of men's washroom/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: WWI1-JFC-01B **Lab Sample ID:** 551507781-0217

Sample Description: North interior wall of men's washroom/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/24/2015	White	0%	100%	None Detected	

Client Sample ID: WWI1-JFC-01C **Lab Sample ID:** 551507781-0218

Sample Description: East interior wall of women's washroom/Joint filling compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	Gray/White	0%	100%	None Detected	

Client Sample ID: WWI1-JFC-01D **Lab Sample ID:** 551507781-0339

Sample Description: NOT ON COC

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	

Client Sample ID: WWI1-JFC-01E **Lab Sample ID:** 551507781-0340

Sample Description: NOT ON COC

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	7/28/2015	White	0%	100%	None Detected	



EMSL Canada Inc.

2756 Slough Street Mississauga, ON L4T 1G3
Phone/Fax: 289-997-4602 / (289) 997-4607
<http://www.EMSL.com> / torontolab@emsl.com

EMSL Canada Order 551507781
Customer ID: 55JACQ30L
Customer PO: 123220330
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):

Jon Delos Santos	PLM (3) PLM Grav. Reduction (1)
Nicole Dimou	PLM Grav. Reduction (6)
Nicole Yeo	PLM Grav. Reduction (1)
Romeo Samson	PLM (2)

Reviewed and approved by:



Matthew Davis
or Other Approved Signatory

None Detected = <0.5%. 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 of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 07/28/2015 21:57:46



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EMSL Canada Or 551507777
CustomerID: 55JACQ30L
CustomerPO: 123220330
ProjectID:

Attn: **Steve Chou**
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6

Phone: (604) 412-3004
Fax:
Received: 07/20/15 11:06 AM
Collected:

Project: FORT ROD HILL/123220330.400.100

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
WWII-PB-01 Site: INTERIOR WALL OF VISITOR ORIENTATION CENTRE Desc: YELLOW Insufficient sample to meet reporting limit.	551507777-0135		7/24/2015	<190 ppm
WWII-PB-02 Site: INTERIOR WALL OF MEN'S WASHROOM Desc: WHITE	551507777-0136		7/24/2015	140 ppm
WWII-PB-03 Site: EXTERIOR TRIM Desc: GREEN	551507777-0137		7/24/2015	1500 ppm
WWII-PB-04 Site: EXTERIOR WINDOW FRAME TRIM Desc: YELLOW	551507777-0138		7/24/2015	4000 ppm
WWII-PB-05 Site: EXTERIOR WOOD PANELLING Desc: WHITE	551507777-0139		7/24/2015	18000 ppm

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % 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 that 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 established by the AIHA-LAP, unless specifically indicated otherwise.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 07/27/2015 10:21:07

Fort Rodd Hill – Roof Replacements
Project No.: R.081107.001
Issued for Tender – August 2016

APPENDIX 2



Government
of Canada

Gouvernement
du Canada

Canada



Serving
GOVERNMENT,
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CANADIANS.

Federal Infrastructure Investments program

Signage guidelines

Signage guidelines for Federal Infrastructure Investments projects led or supported by Public Services and Procurement Canada



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1. Purpose

The purpose of these signage guidelines is to provide direction on how to identify Government of Canada projects funded by the Federal Infrastructure Investments (FII) program, in order to inform Canadians of the federal government's actions towards revitalizing public infrastructure for the benefit of all Canadians and to ensure their safety near project sites.

These guidelines align with the new [Policy on Communications and Federal Identity](#), which came into effect on May 11, 2016.

2. Roles and responsibilities

Public Services and Procurement Canada (PSPC) provides support and guidance to its 15 client departments¹, but it does not lead on their signage and look.

Client departments are responsible for identifying projects requiring signage and ensuring a cost-effective approach for project signage. They are also responsible for purchasing the signs for their own projects.

3. Guiding principles

As set out in the [Policy on Communications and Federal Identity](#), government communications products and activities are expected to be timely, accurate, clear, objective, non-partisan, cost-effective and in both official languages, and to meet the diverse information needs of the public.

Signage requirements for federal investments to infrastructure projects are being simplified to basic project signage, to align with Treasury Board of Canada Secretariat guidelines under the Federal Identity Program.

These corresponding guiding principles apply to all projects funded by the FII program:

a. *One asset, one sign*

Although some buildings, assets or lands might undergo many different projects over the course of the FII program, only one sign is required per building, asset or land at a time.

¹ Client departments are Agriculture and Agri-Food Canada, Canada Border Services Agency, Canadian Food Inspection Agency, Canadian Space Agency, Correctional Service Canada, Environment and Climate Change Canada, Fisheries and Oceans Canada, Health Canada, National Defence, National Research Council Canada, Natural Resources Canada, Parks Canada, Public Safety Canada, Royal Canadian Mounted Police and Transport Canada.

b. Timing

In order for signage to be timely, it is recommended that signs be installed upon the project start date.

c. Cost-effective signage

The following cost-effective recommendations are provided to assist client departments in identifying projects that would require signage, while taking into account the principles of sound stewardship and fiscal prudence.

It is recommended that [standard signage](#) be used for project sites as per these guidelines:

- Adherence to this dollar-value threshold to justify the use of signage:
 - Projects within the National Capital Region: valued at over \$500,000
 - Projects outside of the National Capital Region: valued at over \$100,000

When the project's dollar value is lower than the aforementioned threshold, a department may consider the following factors to justify signage:

- The project has significant economic benefits for the region and was highly anticipated by the local community.
 - The project has high strategic value to the Canadian business community (namely, commercial roads, bridges and other commercial infrastructure).
- Use of signage only for projects that will be visible to the general public (for example, work on a heating, ventilation and air conditioning system would not require signage)
 - Consider the cost of signage versus the cost of the project (for example, a signage budget should not exceed 2 per cent of the project cost)
 - Consider factors such as traffic levels or the prominence of the location when deciding on the size and location of a sign
 - Use of other means of communication, where it is particularly difficult to display a sign without incurring large costs

If you are unsure about the appropriate size, location or need for the use of signage, you may wish to consult your communications advisor.

d. Clarity and consistency

All signage for projects funded by the FII program must comply with the guidelines and design parameters set out in the [Federal Identity Program](#) to ensure a consistent approach and message.

It is especially important to ensure that signage is:

- Clear, factual and objective
- Written in plain language (avoid technical terms and jargon and use a maximum five-word description of the project)
- Projected equally in both official languages
- Responsive to the diverse information needs of the public

-
- Visible and that the Government of Canada's identity is recognizable to the public (the Government of Canada's identity has primacy over that of individual departments, and all signage must bear the Government of Canada wordmark)
 - Non-partisan (that is, free from political party slogans, images and identifiers and devoid of any name/image of a minister, member of Parliament or senator)

For advice on the Federal Identity Program, contact your [departmental coordinator](#).

e. *National Master Standing Offer*

A National Master Standing Offer for Government Signage Goods and Related Services is in place with the service provider, Jim Pattison Industries Ltd., operating as Enseignes Pattison Sign Group.

The standing offer is managed by PSPC. All client departments are strongly encouraged to make use of this service to ensure the quality, consistency and durability of government signage, as well as its compliance with federal government policy.

- The standing offer can be used in all regions of the country.
- The service provider is aware of standard signage colours and sizes and will be using the same template graphic as recommended by PSPC.
- The service provider produces the signage and ships and installs it on site, if installation is requested as part of the call-up.
- The project manager, the property and facility manager or the concerned federal government organization is responsible for ordering the signage, executing the standing offer and coordinating the installation.

PSPC provides support in using this standing offer. Enquiries may be directed to signage@pwgsc.gc.ca.

f. *Beyond signage*

A variety of communications tools are available to achieve adequate communications surrounding FII projects. For example, ministerial announcements, media, social media and the web can either replace or support the use of signage for FII projects.

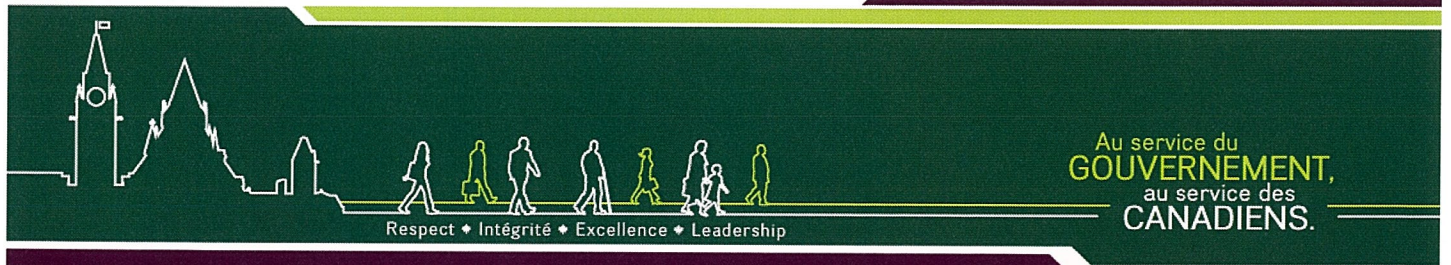
Please contact your communications advisor should you wish to receive further guidance on signage or assistance related to communications surrounding the FII program.



Gouvernement
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Canada



Programme d'investissements dans l'infrastructure fédérale

Lignes directrices relatives aux panneaux

Lignes directrices relatives aux panneaux pour les projets d'investissements dans l'infrastructure fédérale menés ou appuyés par Services publics et Approvisionnement Canada



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1. But

Les présentes lignes directrices relatives aux panneaux de projet ont pour but d'indiquer comment cibler les projets fédéraux financés par le Programme d'investissements dans l'infrastructure fédérale (PIIF) afin que la population canadienne soit au fait des mesures prises par le gouvernement fédéral concernant la revitalisation de l'infrastructure publique, qui est réalisée au profit de toute la population, et dans le but d'assurer la sécurité de cette dernière à proximité des chantiers de construction.

Ces lignes directrices s'harmonisent avec la nouvelle [Politique sur les communications et l'image de marque](#), qui est entrée en vigueur le 11 mai 2016.

2. Rôles et responsabilités

Services publics et Approvisionnement Canada (SPAC) fournit du soutien et des conseils à ses 15 ministères clients¹, mais n'est pas responsable des pratiques qu'ils utilisent pour leurs panneaux et image de marque.

Les ministères clients sont chargés de cibler les projets nécessitant l'installation de panneaux, et de veiller à l'adoption d'une approche rentable pour la conception des panneaux de projet. Ils sont aussi responsables d'acheter les panneaux nécessaires dans le cadre de leurs propres projets.

3. Principes directeurs

Conformément à la [Politique sur les communications et l'image de marque](#), on s'attend à ce que les produits et les activités de communication du gouvernement soient opportuns, exacts, clairs, objectifs, non partisans et rentables, à ce qu'ils soient fournis dans les deux langues officielles et à ce qu'ils répondent aux divers besoins du public en matière d'information.

Afin qu'elles s'harmonisent aux lignes directrices établies par le Secrétariat du Conseil du Trésor du Canada dans le cadre du Programme fédéral de l'image de marque, les exigences relatives aux panneaux pour les investissements dans les projets d'infrastructure fédérale sont simplifiées pour ne concerner que les panneaux de projet de base.

Les principes directeurs correspondants suivants s'appliquent à tous les projets financés par le PIIF :

a. Un bien, un panneau

¹ Les ministères clients sont Agriculture et Agroalimentaire Canada, l'Agence des services frontaliers du Canada, l'Agence canadienne d'inspection des aliments, l'Agence spatiale canadienne, le Service correctionnel du Canada, Environnement et Changement climatique Canada, Pêches et Océans Canada, Santé Canada, la Défense nationale, le Conseil national de recherches du Canada, Ressources naturelles Canada, Parcs Canada, Sécurité publique Canada, la Gendarmerie royale du Canada et Transports Canada.

Bien que certains immeubles, biens ou terrains puissent faire l'objet de différents projets au cours du programme, un seul panneau est requis par immeuble, bien ou terrain.

b. Installation des panneaux

On recommande que les panneaux soient installés à la date de début de tout projet.

c. Panneau économique

Les recommandations suivantes en matière de rentabilité sont fournies afin d'aider les ministères clients à cibler les projets qui nécessiteront des panneaux, tout en tenant compte des principes de saine intendance et de prudence financière.

On recommande que des panneaux normalisés soient utilisés sur les chantiers, conformément aux lignes directrices suivantes :

- Appliquer ce seuil financier pour justifier le recours aux panneaux :
 - Projets dans la région de la capitale nationale : valeur estimée à plus de 500 000 \$
 - Projets à l'extérieur de la région de la capitale nationale : valeur estimée à plus de 100 000 \$

Si la valeur du projet est inférieure au seuil susmentionné, le ministère peut s'appuyer sur les facteurs suivants pour justifier le recours aux panneaux :

- Le projet est très attendu par la collectivité locale et a des avantages économiques importants pour la région;
 - Le projet présente une grande valeur stratégique pour le milieu des affaires canadien (notamment en ce qui a trait aux routes commerciales, aux ponts et aux autres infrastructures commerciales).
- Utiliser des panneaux seulement pour les projets qui seront visibles au grand public (p. ex. les travaux relatifs à un système de chauffage, de ventilation et de climatisation ne requièrent pas l'installation d'un panneau).
 - Estimer le coût des panneaux en fonction du coût du projet (p. ex. un budget de signalisation ne devrait pas dépasser 2 % du coût du projet).
 - Au moment de décider de la taille et de l'emplacement d'un panneau, tenir compte des facteurs comme le volume de circulation ou l'importance de l'emplacement.
 - Utiliser d'autres moyens de communication dans les situations où il est particulièrement difficile d'afficher un panneau sans que soient engagés des coûts importants.

Communiquez avec votre conseiller en communications si vous n'êtes pas certain de la taille que doit avoir un panneau, de l'endroit où il doit être installé ou de la pertinence de ce dernier.

d. Clarté et cohérence

Afin d'assurer une approche et un message uniformes, tous les panneaux relatifs aux projets financés par le PIIF doivent respecter les lignes directrices et les paramètres de conception énoncés dans le Programme fédéral de l'image de marque.

Il est particulièrement important de veiller à ce que le panneau soit :

-
- clair, factuel et objectif;
 - rédigé dans un langage clair (éviter le jargon et les termes techniques et décrire le projet en un maximum de cinq mots);
 - visible de façon égale dans les deux langues officielles;
 - sensible aux divers besoins du public en matière d'information;
 - visible et à ce que le public reconnaisse l'image de marque du gouvernement du Canada (cette dernière l'emporte sur celle des ministères, et tous les panneaux doivent porter le mot-symbole du gouvernement du Canada);
 - non partisan (c.-à-d. exempt de slogans de partis politiques, d'images et d'identifiants, ainsi que du nom ou de la photo de tout ministre, membre du Parlement ou sénateur).

Pour obtenir des conseils sur le Programme fédéral de l'image de marque, communiquez avec votre [coordonnateur ministériel](#).

e. Offre à commande principale et nationale

Une offre à commandes principale et nationale pour les services de signalisation et les services connexes du gouvernement est en place avec le fournisseur de services, Jim Pattison Industries Ltd, qui fait affaire sous le nom d'Enseignes Pattison Sign Group.

L'offre à commandes est gérée par SPAC. Tous les ministères clients sont fortement encouragés à utiliser ce service afin de garantir la qualité, l'uniformité et la durabilité des panneaux du gouvernement ainsi que leur conformité avec la politique du gouvernement fédéral.

- L'offre à commandes peut être utilisée dans toutes les régions du pays.
- Le fournisseur de services connaît les couleurs et les tailles normalisées pour la conception des panneaux et utilisera le modèle recommandé par SPAC.
- Le fournisseur de services produit le panneau, l'expédie et l'installe sur le chantier (si l'installation a été demandée dans le cadre de la commande subséquente).
- Il incombe au gestionnaire de projet, au gestionnaire des immeubles et des installations ou à l'organisation du gouvernement fédéral visée de commander le panneau, d'exécuter l'offre à commandes et de coordonner l'installation du panneau.

SPAC fournit du soutien quant à l'utilisation de cette offre à commandes. Les demandes de renseignements doivent être envoyées à l'adresse suivante : signage@pwgsc.gc.ca.

f. Au-delà de la signalisation

Divers outils de communication sont offerts pour produire des communications adéquates relatives aux projets du PIIF. Par exemple, les annonces ministérielles, les médias, les médias sociaux et le Web peuvent remplacer ou appuyer le recours aux panneaux dans le cadre des projets du PIIF.

Pour obtenir de plus amples renseignements au sujet de la signalisation ou pour recevoir de l'aide par rapport aux communications relatives au PIIF, veuillez communiquer avec votre conseiller en communications.

