



# Public Works and Government Services Canada

Requisition No.   EZ899-220410/A  

DRAWINGS & SPECIFICATIONS  
for

**Fraser Port of Entry  
Demolition of Existing Slab and Re-Paving  
Fraser, BC**

Project No.: R.106775.001

## APPROVED BY:

\_\_\_\_\_

Regional Manager, AES

\_\_\_\_\_

Date

\_\_\_\_\_

Construction Safety Coordinator

\_\_\_\_\_

Date

## TENDER:

\_\_\_\_\_

Project Manager

\_\_\_\_\_

Date

**CONSULTANTS – SEAL & SIGNATURE**

**Discipline**

**Seal/Signature/Date**

Architectural  
Chernoff Thompson Architects



Civil  
Stantec Consulting Ltd..

**TABLE OF CONTENTS**

<b>SPECIFICATION DIVISION</b>		<b>SECTION</b>	<b>PAGES</b>
INDEX	00 01 07	Seal and Signature	1
	00 00 10	Table of Contents	2
DIVISION 01 GENERAL REQUIREMENTS	01 11 55	General Instructions	6
	01 14 00	Work Restrictions	2
	01 31 19	Project Meetings	2
	01 32 16.07	Construction Progress Schedule – Bar (GANTT) Chart	3
	01 33 00	Submittal Procedures	4
	01 35 00	Traffic Control	3
	01 35 33	Health and Safety Requirements	9
	01 35 43	Environmental Procedures	2
	01 45 00	Quality Control	2
	01 51 00	Temporary Utilities	1
	01 52 00	Construction Facilities	3
	01 56 00	Temporary Barriers and Enclosures	2
	01 61 00	Common Product Requirements	3
	01 73 00	Execution	2
	01 74 11	Cleaning	2
	01 74 19	Waste Management and Disposal	6
	01 77 00	Closeout Procedures	1
	01 78 00	Closeout Submittals	6
DIVISION 02 SITE CONSTRUCTION	02 41 13	Site Demolition	4
	02 41 99	Demolition for Minor Works	2
	02 83 11	Lead Basepaint (Abatement Intermediate Precautions)	7
DIVISION 07 THERMAL & METAL PROTECTION	07 61 13	Standing Seam Sheet Metal Roofing	7
DIVISION 09 FINISHES	09 91 13	Exterior Painting	9
DIVISION 31 EARTHWORK	31 05 16	Aggregate Materials	4
DIVISION 32 EXTERIOR IMPROVEMENTS	32 10 01	Traffic Marking Paint and Special Markings	8
	32 12 16	Asphalt Paving	7
<b>APPENDICES</b>			
APPENDIX A		Site Photos	9
APPENDIX B		Geotechnical Report	29
APPENDIX C		Area Specific Designated Substances and Hazardous Materials Survey	49
<b>DRAWING LIST</b>			
<u>ARCHITECTURAL</u>			
A-00		COVER SHEET	

**TABLE OF CONTENTS**

- A-01 SITE PLANS (EXISTING AND NEW)
- A-02 TRAFFIC LINE PAINTING PLAN

CIVIL

- C100 EXISTING CONDITION AND REMOVAL PLAN
- C101 SITE GRADING & PAVEMENT MARKING

END OF SECTION 00 00 10



## 1.0 GENERAL

### 1.1 CODES

- .1 Perform work in accordance with National Building Code for Canada 2015, BCBC 2018, WorkSafe BC, and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 Meet or exceed requirements of specified standards, codes and referenced documents.

### 1.2 DESCRIPTION OF WORK

- .1 Works of this Contract for the repaving work at Fraser Port of Entry, BC, which generally includes demolition of an existing concrete slab and associated foundation, regrading and repaving of parking and roadway, painting of inspection canopy, and new traffic line painting.

### 1.3 TIME OF COMPLETION

- .1 Commence work immediately and complete the scope of project within twelve (12) weeks upon official notification of acceptance of offer.

### 1.4 HOURS OF WORK

- .1 All re-paving and line painting work that is in the way of the regular operation of the Port of Entry must be carried out afterhours. Regular operation hours for the Port is from 8am to 12am midnight. Refer to Section 01 14 00 Work Restriction.

### 1.5 WORK SCHEDULE

- .1 Carry out work as follows:
  - .1 Within 10 working days after Contract award, submit Bar (GANTT) chart as per specification sections 01 32 16.07 Construction Progress Schedule Bar (GANTT) chart. Indicate the following:
    - .1 Submission of shop drawings, product data, MSDS sheets and samples.
    - .2 Commencement and completion of work of each section of the specifications or trades for each phase as outlined.
    - .3 Final completion date within the time period required by the Contract documents.
  - .2 Do not change approved Schedule without notifying Departmental Representative.
  - .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.

### 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 1 subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the work rests solely with the Contractor.
- .3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.

### 1.7 DOCUMENTS REQUIRED

- .1 Maintain one copy each of the following at the job site:
  - .1 Contract drawings.

- .2 Contract specifications.
- .3 Addenda to Contract documents.
- .4 Copy of work schedule.
- .5 Reviewed shop drawings.
- .6 Change orders.
- .7 Other modifications to Contract.
- .8 Field test reports.
- .9 Reviewed samples.
- .10 Manufacturer's installation and application instructions.
- .11 One set of record drawings and specifications for "as-built" purposes.
- .12 National Building Code of Canada 2015.
- .13 Current construction code standards of workmanship listed in technical Sections.
- .14 Building Safety Plan.
- .15 Request for Information (RFI)
- .16 Contemplated Change Notices
- .17 WHMIS Documents
- .18 Site Instructions
- .19 Contractor's Health and Safety Plan, including map to nearest hospital.

#### 1.8 REGULATORY REQUIREMENTS

- .1 There is no Building Permit requirement for this work.
- .2 The Contractor shall also obtain and pay for all other trades permits and licenses required for the Work.
- .3 The Contractor shall conform to the codes, ordinances, regulations and orders of all authorities having jurisdiction over the performance of the Work. Should conflicts arise, the Contractor shall forthwith request clarification from the Departmental Representatives.

#### 1.9 CONTRACTOR'S USE OF SITE

- .1 Use of site:
  - .1 for execution and completion of Work.
  - .2 Assume responsibility for assigned area on the premises for performance of this work.
  - .3 Be responsible for coordination of all work activities on site, including the work of other contractors engaged by the Departmental Representative.
  - .4 Provide safety and security of Contractor's work site and all Contractors and Subcontractor's equipment and material. Secure Contractor's work site at the end of each work day.
  - .5 Any area which access is restricted by sign is a secured or restricted area and shall not be entered.
  - .6 Do not obstruct access to property outside of the Contractor's work site. Maintain overhead clearances, keep roadways and walkways clear, and maintain routes for emergency response vehicles.
- .2 Perform work in accordance with Contract documents. Ensure work is carried out in accordance with approved schedules and the agreed work plan established with Departmental Representative prior to commence of work.
- .3 Do not unreasonably encumber site with material or equipment.
- .4 Coordinate with Departmental Representative for material storage on site which belongs to the project but waiting to be installed.

#### 1.10 EXAMINATION

- .1 Examine site and be familiar and conversant with existing conditions likely to affect work.
- .2 The Contractor will appoint and pay for the update of the Geotechnical Report completed by TETRA TECH Geotechnical Evaluation - Fraser, B.C, December 05, 2014; ISSUED FOR USE, FILE: W14103499-01 to include Highway recommendations. Contact: Adam Wallace, adam.wallace@tetrattech.com Chad Cowan, [chad.cowan@tetrattech.com](mailto:chad.cowan@tetrattech.com)

#### 1.11 CUTTING AND PATCHING

- .1 Cut existing surfaces as required to accommodate new work.
- .2 Remove items as shown or specified.
- .3 Do not cut, bore, or sleeve load-bearing members.
- .4 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.
- .5 Fit work airtight to pipes, sleeves, ducts and conduits.
- .6 Conceal pipes, ducts and wiring in raised floors, wall and ceiling construction of finished areas except where indicated otherwise.
- .7 Patch and make good surfaces cut, damaged or disturbed, to Departmental Representative's approval. Match existing material, colour, finish and texture.
- .8 Making good is defined as matching construction and finishing materials and the adjacent surfaces such that there is no visible difference between existing and new surfaces when viewed from 1.5m in ambient light, and includes painting the whole surface to the next change in plane.

#### 1.12 SETTING OUT OF WORK

- .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .2 Provide devices needed to lay out and construct work.
- .3 Supply such devices as templates required to facilitate Departmental Representative's inspection of work.

#### 1.13 QUALITY OF WORK

- .1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.
- .2 The workmanship, erection methods and procedures to meet minimum standards set out in the National Building Code of Canada 2015 and Construction Standards as specified herein.
- .3 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative, whose decision is final.

#### 1.14 WORKS COORDINATION

- .1 Coordinate work of sub-trades:

- .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 above ceilings and within or near to building structural elements.
    - .2 Identify on coordination drawings, building elements, services lines, rough-in points and indicate location services entrance to site.
  - .3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
  - .4 Publish minutes of each meeting.
  - .5 Plan and coordinate work in such a way to minimize quantity of service line offsets.
  - .6 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
- .3 Submit shop drawings and order of prefabricated equipment or 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 spatial interference.
  - .2 Ensure that each trade provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, cutting, patching and removal or replacement of completed work.
  - .3 Ensure disputes between subcontractors are resolved.
  - .4 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate Work.
  - .5 Maintain efficient and continuous supervision.

#### 1.15 APPROVAL OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- .1 In accordance with Section 01 33 00 Submittals, 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 Review of shop drawings.
  - .3 Review of re-submission.
  - .4 Ordering of reviewed material and/or products. Refer to individual technical section of specification.

#### 1.16 TESTING AND INSPECTION

- .1 Particular requirements for inspection and testing to be carried out by testing service or laboratory approved by the Departmental Representative are specified in Sections 01 45 00 Quality Control.
- .2 The Contractor will appoint and pay for all 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.
- .3 Tests specified in the contract documents to be carried out by Contractor which may be under the Departmental Representative's supervision.
- .3 Within 15 working days after Contract award provide a list of proposed testing services or testing laboratories for Departmental Representative's approval.
- .4 The Departmental Representative may require, and pay for, additional inspection and testing services not included in the previous paragraph.
- .5 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.
- .6 Contractor shall furnish labour and facilities to carry out specified testing and notify Departmental Representative in advance of planned testing.
- .7 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .8 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.
- .9 Provide Departmental Representative with a digital copy of test reports as soon as they are available.

#### 1.17 AS-BUILT DOCUMENTS

- .1 The Departmental Representative will only provide electronic format of drawings and specification in PDF format. Contractor to provide as-built drawings by hardcopy or in pdf.
- .2 Keep one set of current white prints of all contract drawings and all addenda, revisions, clarifications, change orders, and reviewed shop drawings in the site office; and have them available at all times for inspection by the Departmental Representative.
- .3 As the 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.
- .4 Provide accurate as-built drawings by a qualified professional surveyor identifying the various elements shown on the drawings in a professional format.
- .5 At completion of the Work, transfer all deviations, including those called up by addenda, revisions, clarifications, shop drawings and change order, to a set of Issued for Construction drawings. Submit the 'red-marked' as-built set to the Departmental Representative in hard copy and pdf with contractor's review stamp and date confirming that the set submitted are a true record of "as-built" information
- .6 Refer to Section 01 78 00 – Close-out Submittals.

#### 1.18 CLEANING

- .1 Refer to Section 01 74 11 - Cleaning.

#### 1.19 DUST CONTROL

- .1 Provide temporary screening and dust suppression using water spray or other means during dust generating activities.
- .2 Maintain and relocate protection until such work is complete.

1.20 ENVIRONMENTAL PROTECTION

- .1 Prevent extraneous materials from contaminating air beyond construction area, by providing temporary enclosures during work.
- .2 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers.
- .3 Ensure proper disposal procedures in accordance with all applicable territorial regulations.

1.21 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 drawings referred to in the Contract Documents.

1.22 SYSTEM OF MEASUREMENT

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

1.23 COST BREAKDOWN

- .1 Before submitting the first progress claim, submit a breakdown of the Contract price in detail as directed by the Departmental Representative and aggregating Contract price. After approval, the cost breakdown will form the basis of progress payments.
- .2 Within 2 weeks after award of contract, provide a monthly cash flow projection for the whole contract period in detail as directed by Departmental Representative. Contractor should provide a monthly update of the cash flow projection according to the actual work schedule.

1.24 BUSINESS LICENSES FOR CONSTRUCTION PROJECTS

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

1.25 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to the sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent paving has been completed.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

1.0 GENERAL

1.1 FACILITY OPERATIONS AND SECURITY PROCEDURES

- .1 All construction staff shall become thoroughly familiar with and abide by all provisions and requirements of Fraser Port of Entry, Safety and Security Procedures and Restrictions.
  - .1 All construction parking must be outside the Port of Entry.
  - .2 Departmental Representative enforces a zero-tolerance policy for the following misbehavior:
    - .1 Appear to be under the influence of alcohol, drugs or narcotics.
    - .2 Behave in an unusual or disorderly manner.
    - .3 In possession of contraband.
- .2 The Port of Entry must be maintained fully operational during the entire contract period. Area including but not limited to all traffic lanes and inspection bays must be maintained fully operational during the operating hours.
- .3 Cooperate with and coordinate construction/demolition activities with port operation personnel for phasing and traffic management during the full construction period.

1.2 ACCESS AND EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant Federal, municipal, provincial and other regulations.
- .2 Construction work including but not limited to demolition and paving, etc, must be carried out in section so as not to obstruct the normal operation of the Port. Unfinished area must be covered up with steel plate after each work shift.
- .3 Provide hoarding plan for Departmental Representative to review 5 business days prior to installation.

1.3 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 the Port and allow pedestrian and vehicular access.
- .3 Where security is reduced by work, provide temporary means to maintain security as per Departmental Representative's direction.
- .4 Closures: protect work temporarily until permanent enclosures are completed.
- .5 Coordinate with Departmental Representative in scheduling operations to minimize conflict and to facilitate use of space.

1.4 EXISTING SERVICES SHUT DOWNS

- .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 6 weeks of notice for necessary interruption of civil, mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum. Carry out interruptions after normal working hours of the Port.
  - .1 Optimize and plan shut-downs so that services are restored in time for normal facility operation hours. Coordinate all shut-downs with utility providers and facility users.
    - .1 Review the foregoing shutdown requirements; submit within the Project Schedule suggested time and duration for any planned outages. The Departmental Representative will review the proposed schedule and may stipulate changes. Any such changes, modifications, or revisions shall not be the basis for any extra claim.
    - .2 After review of draft schedule, contractor to submit firm time and duration for each outage required. Include all input from the Departmental Representative as described above.
  - .2 Contractor shall be held responsible for damages to facility equipment as the result of service shut-downs.
  - .3 Contractor shall be held responsible for any and all unscheduled shut-downs of building utilities and services.
  - .4 Contractor will not be allowed to connect to Departmental Representative's existing data communication services.
- .3 Provide for vehicular traffic all required barricades and walkway delineation for pedestrian walkways.
- .4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.5 BUILDING SMOKING ENVIRONMENT

- .1 No smoking is allowed within the property.

1.6 NOISE CONTROL

- .1 Comply with applicable provincial by-law for noise control.

1.7 CONSTRUCTION PHASING

- .1 Contractor to coordinate with Departmental Representatives on all phases of work and submit detail phasing schedule for Departmental Representative's review.



1.0 GENERAL

1.1 ADMINISTRATIVE

- .1 Schedule and administer site meetings throughout the progress of the work on a regular basis or at the call of Departmental Representative.
- .2 Prepare and distribute agenda at least three (3) days prior to the meetings.
- .3 Distribute written notice of each meeting seven (7) days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within five (5) days after meetings and transmit to meeting participants and affected parties not in attendance, Departmental Representative
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRE-CONSTRUCTION MEETING

- .1 Within 15 days after award of Contract: Departmental Representative will request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Attendance will include, but is not limited to, the Departmental Representative and the client representative.
- .3 Departmental Representative to establish time and location of pre-construction meeting, Contractor to notify parties concerned a minimum of 4 working days before meeting.
- .4 Contractor will chair the meeting, record minutes and issue minutes.
- .5 Agenda to include:
  - .1 Introduction of official representative of participants in the Work.
  - .2 Start date on site.
  - .3 Communication Protocol for submission of shop drawings, samples, colour chips. 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 51 00 - Temporary Utilities.
  - .5 Site safety in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
  - .6 Communication Protocol for proposed changes, change orders, procedures, approvals required.
  - .7 Owner's Work.
  - .8 Record drawings in accordance with Section 01 78 00 - Closeout Submittals.
  - .9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
  - .10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
  - .11 Monthly progress claims, administrative procedures, photographs, hold backs.

- .12 Appointment of inspection and testing agencies or firms.

**1.3 PROGRESS MEETINGS**

- .1 During course of Work and two weeks prior to Project Completion, Contractor to schedule progress meetings bi-weekly.
- .2 Attendance to include but is not limited to Departmental Representative, client representatives, Contractor, and major subcontractors.
- .3 Contractor is responsible to record minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) days after meeting.
- .4 Record next meeting dates in the meeting minutes or notify parties minimum of seven (7) days in advance for other ad-hoc meetings.
- .5 Agenda to include, at a minimum, the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Health and Safety including any incidents, near misses, and WorkSafe BC visits.
  - .3 Review of Work progress since previous meeting.
  - .4 Coordination discussions with Departmental Representatives.
  - .5 Construction schedule review.
  - .6 Review of off-site fabrication delivery schedules.
  - .7 Corrective measures and procedures to regain projected schedule.
  - .8 Request for Information (RFI) log review.
  - .9 Engineering Disciplines Reviews.
  - .10 Change order log review.
  - .11 Review submittal schedule.
  - .12 Review updated as built.
  - .13 Review and resolve site issues.
  - .14 New business.

## 1.0 GENERAL

### 1.1 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

### 1.2 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.
- .5 Clearly show sequence and interdependence of construction activities and indicate:
  - .1 Start and completion of all items of Work, their major components and interim milestones completion dates.
  - .2 Activities for procurement, delivery, installation and completion of each major piece of equipment, materials and other supplies, including:
    - .1 Time for submittals, re-submittal and review.
    - .2 Time for fabrication and delivery of manufactured products for Work.
    - .3 Interdependence of procurement and construction activities.

- .3 Include sufficient detail for project activities to assure adequate planning and execution of work. Activities should generally range in duration from 3 to 15 days each.
- .4 Provide level of detail for project activities such that sequence and interdependency of Contract tasks are demonstrated to allow coordination and control of project activities. Show continuous flow from left to right.
- .5 Ensure activities with no float are calculated and clearly indicated on logical CPM construction network system as being whenever possible, continuous series of activities throughout length of project to form critical path.

### 1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within ten (10) working days after Award of Contract Project schedule in form of Bar (GANTT) Chart for planning, monitoring and reporting of project progress.

### 1.4 REVIEW OF THE SCHEDULE

- .1 Allow 10 working days for Departmental Representative to review proposed schedule. Make necessary changes to proposed schedule within 5 days.
- .2 Submit letter ensuring the schedule has been prepared in coordination with major subcontractors and suppliers.
- .3 Promptly provide additional information to validate practicability of schedule as required by Departmental Representative.
- .4 Submittal of Schedule indicates that it meets Contract Requirements and will be executed generally in sequence.

### 1.5 COMPLIANCE WITH SCHEDULE

- .1 Comply with reviewed schedule.
- .2 Proceed with significant changes and deviations from schedule sequence of activities which cause delay only after review by Departmental Representative.
- .3 Identify activities that are behind schedule and causing delay. Provide measures to regain slippage.
  - .1 Corrective measures may include:
    - .1 An increase of personnel on the site for effective activities or work packages.
    - .2 An increase in materials and equipment.
    - .3 Additional work shifts, longer hours.

### 1.6 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule that shows milestone and activity types and expand from the following items:
  - .1 Award.
  - .2 Shop Drawings, Samples and Approvals.
  - .3 Permits.
  - .4 Mobilization.
  - .5 Mock-ups and Approvals.

- .6 Procurement.
- .7 Site Works.

### 1.7 PROJECT SCHEDULE REPORTING

- .1 On an ongoing basis, schedule on job site must show “progress to date”. Arrange participation on and off site of subcontractor and suppliers, as and when necessary, for purpose of network planning, scheduling, updating and progress monitoring. Inspect Work with Departmental Representative at least once monthly to establish progress on each current activity shown on applicable networks.
- .2 Maintain a daily log of progress of the work:
  - .1 Submit daily force report to Departmental Representative daily prior to noon the following day indicating:
    - .1 Total number of personnel on site.
    - .2 Major subcontractors on site listed by trade.
    - .3 Major equipment on site, i.e. excavators, cranes, drills.
    - .4 Visitors to site.
    - .5 Weather
    - .6 Documents required from Departmental Representative to Contractor to maintain.
- .3 Perform schedule update monthly dated on last working day of the month. Update to reflect activities completed to date, activities in progress, logic and duration changes.
- .4 Do not automatically update actual start and finish dates by using default mechanisms found in project management software.
- .5 Requirements for monthly progress monitoring and reporting are basis for progress payment request.
- .6 Submit monthly schedule updates with the progress payment request.
- .7 Submit monthly written reports based on schedule, showing Work to Date performed, comparing work progress planned and presenting current forecasts. Report must summarize progress, defining problem areas and anticipated delays with respect to Work Schedule, and critical paths. Explain alternatives for possible schedule recovery to mitigate any potential delay. Include in report:
  - .1 Description of progress made.
  - .2 Pending items and status of: Permits, shop drawings, samples, mockups, deliveries, change orders, possible time extension.
  - .3 Status of Contract Completion Date and Milestones.
  - .4 Current and Anticipated problem areas, potential delays and corrective measures.
- .8 Submit 3 weeks look ahead schedule to Departmental Representative on each Friday of the Week indicating the planned tasks of the next three weeks period.

### 1.8 PROJECT MEETINGS

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

END OF SECTION 01 32 16.07

1.0 GENERAL

1.1 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit 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.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 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 co-ordinated 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.
- .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.
- .11 Do not proceed with work until relevant submissions are reviewed by Departmental Representative.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 When specified in the Contract document, submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia of Canada.
- .3 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 co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow 10 days for Departmental Representative's review of each submission, unless noted otherwise.

- .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 Work.
- .6 Make changes in shop drawings as Departmental Representative may require consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 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.
- .8 Submissions 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.
  - .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 characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.
    - .9 Single line and schematic diagrams.
    - .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit electronic copy of shop drawings for each requirement requested in specification sections and as Departmental Representative may reasonably request.
- .11 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.
- .12 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.
- .13 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.
- .14 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.
- .15 Submit copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .21 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of Construction and Contract Documents.
  - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.
- .22 Shop drawings must be submitted in electronic format. Electronic submissions will only be reviewed and returned electronically. No hardcopies will be returned to contractor.

### 1.3 SAMPLES

- .1 Submit for review samples in duplicate as required in respective specification Sections. Label samples with origin and intended use.



- .2 Deliver samples prepaid to Departmental Representative's business address.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 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 proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will be kept on site and will become standard of workmanship and material against which installed Work will be verified.

1.4 MOCK-UPS

- .1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.5 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpg format, standard resolution monthly with progress statement and as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Viewpoints and their locations as reasonably determined by Departmental Representative.
- .4 Provide photographic documentation of adjacent existing conditions prior to commencement of construction for determining and accidental damage as a result of contractor's work.
- .5 Frequency of photographic documentation: monthly as directed by Departmental Representative.
  - .1 Upon completion of: demolition, framing and services before concealment of Work, and as directed by Departmental Representative.

1.6 CERTIFICATES AND TRANSCRIPTS

- .1 Submit electronic copies of test results and inspection reports required as noted in each section of specifications.

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.

1.2 MEASUREMENT FOR PAYMENT

- .1 No separate measurement for payment will be made for Work under this Section, it is considered incidental to the Work and shall be carried under associated cost items in the Schedule of Quantities and Unit Price table.

1.3 REFERENCES

- .1 Transportation Association of Canada
  - .1 Manual of Uniform Traffic Control Devices for Canada (MUTCDC).

1.4 ACTION AND INFORMATION SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Traffic Control Plan.

1.5 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 When working on travelled way:
  - .1 Place equipment in position to minimize interference and hazard to travelling public.
  - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
  - .3 Do not leave equipment on travelled way overnight.
- .3 Close lanes of road only after receipt of written approval from Engineer.
  - .1 Before re-routing traffic erect suitable signs and devices to MUTCDC.
- .4 Keep travelled way graded, free from potholes and of sufficient width for required number of lanes of traffic.
  - .1 Provide 7 m wide minimum temporary roadway for traffic in two-way sections through Work and on detours.
  - .2 Provide 4 m wide minimum temporary roadway for traffic in one-way sections through Work and on detours.
- .5 Provide gravelled detours or temporary roads as directed by Engineer to facilitate passage of traffic around restricted construction area.
- .6 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, as directed by Engineer.
- .7 Provide and maintain temporary parking facilities adjacent to the site where road widths do not allow on street parking.

1.6 INFORMATION AND WARNING DEVICES

- .1 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades, and miscellaneous warning devices to MUTCDC.

- .3 Place signs and other devices in locations recommended in MUTCDC.
- .4 Continually maintain traffic control devices in use:
  - .1 Check signs daily for legibility, damage, suitability, and location. Clean, repair or replace to ensure clarity and reflectance.
  - .2 Remove or cover signs which do not apply to conditions existing from day to day.

**1.7 CONTROL OF PUBLIC TRAFFIC**

- .1 Provide competent traffic control personnel, trained, and equipped in accordance with provincial workers compensation board, for situations as follows:
  - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
  - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
  - .3 When workers or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
  - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
  - .5 For emergency protection when other traffic control devices are not readily available.
  - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
  - .7 Delays to public traffic due to contractor's operations: eight (8) minutes maximum.

**1.8 TRAFFIC CONTROL PLAN**

- .1 Develop and maintain current a project Traffic Control Plan. Include the following:
  - .1 Description of traffic control methods.
  - .2 Date of road closure(s) and/or lane restriction(s) and expected date each will reopen.
  - .3 Access to Government of Yukon Highways and Public Works Building to be maintained
  - .4 Access to White Pass Rail to be maintained
  - .5 Map indicating:
    - .1 Extent of road closure(s).
    - .2 Detour(s).
    - .3 Location of traffic control personnel.
    - .4 Pedestrian access routes.
    - .5 Parking facilities.
  - .6 List of traffic control devices and their location.
- .2 Issue a Notice of Road Closure to Owner and engineer in accordance with Section 01 33 00 – Submittal Procedures.
- .3 Traffic Control Plan to be review by Government of Yukon Highways and Public Works Department. Anticipate a 5 to10 day review and turnaround.
- .4 Provide 48 to 72 hours notice to Yukon Highways and Public Works Department to coordinate with companies that frequently use the Port-of-Entry
- .5 Ongoing coordination during the project with CBSA, Yukon Highway and Public Works and White Pass Rail.

1.9 OPERATIONAL REQUIREMENTS

- .6 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by Engineer to protect and control public traffic.

END OF SECTION 01 35 00

## 1.0 GENERAL

### **PWGSC Update on Asbestos Use**

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

### **COVID 19**

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

## 1.1 REFERENCES

- .1 Government of Canada.
  - .1 Canada Labour Code - Part II (as amended)
  - .2 Canada Occupational Health and Safety Regulations. (as amended)
- .2 National Building Code of Canada (NBC): (as amended)
  - .1 Part 8, Safety Measures at Construction and Demolition Sites.
- .3 The Canadian Electrical Code (as amended)
- .4 Canadian Standards Association (CSA) as amended:
  - .1 CSA Z797-2018 Code of Practice for Access Scaffold.
  - .2 CSA S269.1-2016 Falsework for Construction Purposes.
  - .3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures.
  - .4 CSA Z1006-10 Management of Work in Confined Spaces.
  - .5 CSA Z462-18 Workplace Electrical Safety Standard
- .5 National Fire Code of Canada 2015 (as amended)
  - .1 Part 5 – Hazardous Processes and Operations and Division B as applicable and required.
- .6 American National Standards Institute (ANSI): (as amended)
  - .1 ANSI/ASSP A10.3-2013, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
- .7 Province of British Columbia:
  - .1 Workers Compensation Act Part 3-Occupational Health and Safety. (as amended)
  - .2 Occupational Health and Safety Regulation (as amended)
- .8 Refer Appendix A of the specification for hazmat reports of all the buildings.

## 1.2 RELATED SECTIONS

- .1 Refer to the following current NMS sections as required:
  - .1 Section 01 01 50 General Instructions
  - .2 Section 01 32 16.0 Construction Progress Schedule-Bar (GANTT) Chart
  - .3 Section 01 33 00 Submittal Procedures
  - .4 Section 01 51 00 Temporary Utilities
  - .5 Section 01 52 00 Construction Facilities
  - .6 Section 01 56 00 Temporary Barriers and Enclosures
  - .7 Section 02 41 13 Site Demolition
  - .8 Section 02 41 99 Demolition for Minor Works
  - .9 Section 02 83 11 Lead Basepaint (Abatement Intermediate Precautions)

1.3 WORKERS' COMPENSATION BOARD COVERAGE

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

1.4 COMPLIANCE WITH REGULATIONS

- .1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.
- .2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

1.5 SUBMITTALS

- .1 Submit to Departmental Representative submittals listed for review in accordance with Section 01 33 00.
- .2 Work affected by submittal shall not proceed until review is complete.
- .3 Submit the following:
  - .1 Organizations Health and Safety Plan.
  - .2 Site Specific Safety Plan or Health and Safety Plan (SSSP or HASP)
  - .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 (SDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
  - .5 Emergency Response Procedures.
- .4 The Departmental Representative will review the Contractor's Site Specific Safety Plan or Health and Safety Plan (SSSP/HASP) and emergency response procedures, and provide comments to the Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.
- .5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.
- .6 Submission of the Site Specific Safety Plan or Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:
  - .1 Be construed to imply approval by the Departmental Representative.
  - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.

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

1.6 RESPONSIBILITY

- .1 Assume responsibility as the Prime Contractor for work under this contract.
- .2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.7 HEALTH AND SAFETY COORDINATOR

- .1 Assign a competent and qualified Health and Safety Coordinator who shall:
  - .1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.
  - .2 Be responsible for implementing, daily enforcing, and monitoring the Site Specific Safety Plan (SSSP) or Health and Safety Plan (HASP)
  - .3 Be on site during execution of work.
  - .4 Have minimum two (2) years' site-related working experience
  - .5 Have working knowledge of the applicable occupational safety and health regulations.

1.8 GENERAL CONDITIONS

- .1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
- .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
  - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
  - .2 Secure site at night time or provide security guard as deemed necessary to protect site against entry.

1.9 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
  - .1 Multi-employer work site.
  - .2 Federal employees and general public.
  - .3 Energized electrical services.
  - .4 Working from heights.
  - .5 Persons incarcerated in the federal institutional system.
  - .6 Hazards - PSPC Preliminary Hazard Assessment included as an Appendix to Specifications

1.10 UTILITY CLEARANCES

- .1 The Contractor is solely responsible for all utility detection and clearances prior to starting the work.
- .2 The Contractor will not rely solely upon the Reference Drawings or other information provided for Utility locations.

1.11 REGULATORY REQUIREMENTS

- .1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.
- .2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

1.12 WORK PERMITS

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

1.13 FILING OF NOTICE

- .1 The General Contractor is to file Notice of Project with Provincial authorities prior to commencement of work. (All construction projects require a Notice of Work)
- .2 Provide copies of all notices to the Departmental Representative.

1.14 SITE SPECIFIC HEALTH AND SAFETY PLAN

- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.
- .2 Prepare and comply with the Site-Specific Safety Plan (SSSP) or Health and Safety Plan (HASP) based on the required hazard assessment, including, but not limited to, the following:
  - .1 Primary requirements:
    - .1 Contractor's safety policy.
    - .2 Identification of applicable compliance obligations.
    - .3 Definition of responsibilities for project safety/organization chart for project.
    - .4 General safety rules for project.
    - .5 Job-specific safe work, procedures.
    - .6 Inspection policy and procedures.
    - .7 Incident reporting and investigation policy and procedures.
    - .8 Occupational Health and Safety Committee/Representative procedures.
    - .9 Occupational Health and Safety meetings.
    - .10 Occupational Health and Safety communications and record keeping procedures.
    - .11 COVID 19 Protocols and Procedures
  - .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
  - .3 List hazardous materials to be brought on site as required by work. SDS required for all products.
  - .4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
  - .5 Identify personal protective equipment (PPE) to be used by workers.
  - .6 Identify personnel and alternates responsible for site safety and health.
  - .7 Identify personnel training requirements and training plan, including site orientation for new workers.



- .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.
- .4 Revise and update Site Specific Safety Plan (SSSP) and/or Health and Safety Plan (HASP) as required, and re-submit to the Departmental Representative.
- .5 Departmental Representative's review: the review of Site Specific Safety Plan and/or Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Site Specific Safety Plan and/or Health and Safety Plan of responsibility for meeting all requirements of construction and Contract documents and legislated requirements.

#### 1.15 EMERGENCY PROCEDURES

- .1 List standard operating procedures and measures to be taken in emergency situations. Include an emergency response and emergency evacuation plan and emergency contacts (i.e. names/telephone numbers) of:
  - .1 Designated personnel from own company.
  - .2 Regulatory agencies applicable to work and as per legislated regulations.
  - .3 Local emergency resources.
  - .4 Departmental Representative.
  - .5 A route map with written directions to the nearest hospital or medical clinic.
- .2 Include the following provisions in the emergency procedures:
  - .1 Notify workers and the first-aid attendant, of the nature and location of the emergency.
  - .2 Evacuate all workers safely.
  - .3 Check and confirm the safe evacuation of all workers.
  - .4 Notify the fire department or other emergency responders.
  - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
  - .6 Notify Departmental Representative.
- .3 Provide written rescue/evacuation procedures as required for, but not limited to:
  - .1 Work at high angles.
  - .2 Work in confined spaces or where there is a risk of entrapment.
  - .3 Work with hazardous substances.
  - .4 Underground work.
  - .5 Work on, over, under and adjacent to water.
  - .6 Workplaces where there are persons who require physical assistance to be moved.
- .4 Design and mark emergency exit routes to provide quick and unimpeded exit.
- .5 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.
- .6 Contractors must not rely solely upon 911 for emergency rescue in a confined space, working at heights, etc.

#### 1.16 HAZARDOUS PRODUCTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS 2015) regarding use, handling, storage and disposal of hazardous

materials, and regarding labelling and provision of Safety Data Sheets (SDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.

- .2 Where use of hazardous and toxic products cannot be avoided:
  - .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable SDS and WHMIS 2015 documents as per Section 01 33 00 Submittal Procedures.
  - .2 In conjunction with Departmental Representative schedule to carry out work during "off hours" when tenants have left the building.
  - .3 Provide adequate means of ventilation in accordance with Section 01 51 00.
  - .4 The contractor shall ensure that the product is applied as per manufacturers recommendations.
  - .5 The contractor shall ensure that only pre-approved products are bought onto the work site in an adequate quantity to complete the work.

#### 1.17 ASBESTOS HAZARD

- .1 Carry out any activities involving asbestos in accordance with current applicable Federal and Provincial Regulations.
- .2 Removal and handling of asbestos will be in accordance with current applicable Provincial / Federal Regulations.

#### 1.18 PCB REMOVALS

- .1 Mercury-containing fluorescent tubes and ballasts which contain polychlorinated biphenyls (PCBs) are classified as hazardous waste.
- .2 Remove, handle, transport and dispose of as indicated in Division 2 specifications.

#### 1.19 REMOVAL OF LEAD-CONTAINING PAINT

- .1 All paint containing TCLP lead concentrations above 5 ppm are classified as hazardous.
- .2 Carry out demolition and/or remediation activities involving lead-containing paints in accordance with current applicable Provincial / Territorial Regulations.
- .3 Work with lead-containing paint shall be completed as per Provincial and Federal regulations.
- .4 Dry Scraping/Sanding of any materials containing lead is strictly prohibited.
- .5 The use of Methylene Chloride based paint removal products is strictly prohibited.

#### 1.20 ELECTRICAL SAFETY REQUIREMENTS

**(Reference: Worksafe BC OHS Regulation Part 19 – Electrical Safety)**

- .1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.
  - .1 Before undertaking any work, coordinate arc flash protection, required energizing and de-energizing of new and existing circuits with Departmental Representative.
  - .2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

1.21 ELECTRICAL LOCKOUT

- .1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.
- .2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.
- .3 Keep the documents and lockout tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

1.22 OVERLOADING

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

1.23 FALSEWORK

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

1.24 SCAFFOLDING

- .1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2009 (as amended) and B.C. Occupational Health and Safety Regulations. (as amended)

1.25 CONFINED SPACES

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

1.26 POWDER-ACTUATED DEVICES

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

1.27 FIRE SAFETY AND HOT WORK

- .1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- .2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.
- .3 Hot Work permits are a mandatory requirement for any hot work activities.

1.28 FIRE SAFETY REQUIREMENTS

- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada. (as amended)

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

#### 1.29 FIRE PROTECTION AND ALARM SYSTEM

- .1 Fire protection and alarm systems shall not be:
  - .1 Obstructed.
  - .2 Shut off.
  - .3 Left inactive at the end of a working day or shift.
- .2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.
- .3 Be responsible/liable for costs incurred from the fire department, the building owner and the tenants, resulting from false alarms.

#### 1.30 UNFORESEEN HAZARDS

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

#### 1.31 POSTED DOCUMENTS

- .1 Post legible versions of the following documents on site:
  - .1 Site Specific Safety Plan (SSSP) or Health and Safety Plan (HASP)
  - .2 Sequence of work.
  - .3 Emergency procedures.
  - .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
  - .5 Notice of Project.
  - .6 Floor plans or site plans. Must be posted in a non-inmate access area and locked up when not being used.
  - .7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
  - .8 Workplace Hazardous Materials Information System (WHMIS 2015) documents.
  - .9 Material Safety Data Sheets (SDS).
  - .10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
  - .11 All Hazardous Material and Substance Reports including Lab Analysis
- .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
- .3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

#### 1.32 MEETINGS

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

1.33 CORRECTION OF NON-COMPLIANCE

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

2.0 PRODUCTS

- .1 Not used.

3.0 EXECUTION

- .1 Not used.

END OF SECTION 01 35 33

Part 1 General

1.1 RELATED DOCUMENTS

- .1 Section 01 74 11 Cleaning

1.2 MEASUREMENT FOR PAYMENT

- .1 No separate measurement for payment will be made for Work under this Section, it is considered incidental to the Work and shall be carried under associated cost items in the Schedule of Quantities and Unit Price Table.

1.3 FIRES

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

1.4 DISPOSAL OF WASTE

- .1 Dispose of waste material at the waste facility as per direction from Owner. Pay for all tipping and disposal fees.
- .2 Do not bury waste material on site.
- .3 Do not dispose of water containing volatile materials, such as mineral spirits, oil or paint thinner into waterways or storm and sanitary sewers.

1.5 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep site free from water.
- .2 Do not pump water containing suspended materials into waterways or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
- .4 Submit an updated Erosion, Sediment and Drainage Control Plan to Departmental Representative for review and approval prior to commencing Work. Plan to identify type and location of erosion and sediment controls to be provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal and Provincial laws and regulations. Plan to specifically address the protection of water bodies, water courses, and the following:
  - .5 Details of erosion control works and materials to be used, including the deployment of silt fencing during Work activities.
  - .6 Work Schedule including the sequence and duration of all related Work activities.
  - .7 The treatment of site runoff to prevent siltation of watercourses.
  - .8 Maintenance of filters and sedimentation traps.
  - .9 Comply with the requirements of all AHJ.
- .10 Have on hand sufficient pumping equipment, machinery, and tankage in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment.
- .11 Plan and execute construction methods to control surface drainage from waste disposal areas, staging areas, laydown areas, and other Work areas. Prevent erosion and sedimentation.

**ENVIRONMENTAL PROCEDURES**

- .12 Remove accumulated sediment resulting from Work activities from adjoining surfaces, drainage systems, and water courses, and repair damage caused by soil erosion and sedimentation as directed by Departmental Representative.

1.6 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties, not identified for removal.
- .2 Protect roots of trees not identified for removal during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .3 Minimize stripping of topsoil and vegetation.
- .4 Restrict tree removal to areas designated by Engineer.

1.7 NOTIFICATION

- .1 Engineer will notify Contractor in writing of observed noncompliance with Federal or Provincial environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Engineer of proposed corrective action and take such action for approval by Engineer.
  - .1 Take action only after receipt of written approval by Engineer.
- .3 Engineer 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.

END OF SECTION 01 35 43

## 1.0 GENERAL

### 1.1 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.

### 1.2 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Contractor.
- .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.

### 1.3 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.

### 1.4 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.



1.5 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 that it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative 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.

1.6 REPORTS

- .1 Submit electronic copy of inspection and test reports to Departmental Representative. Testing and Inspection companies engaged by the Contractor will furnish paper copies of reports on site to allow for work to proceed in a timely manner.
- .2 Provide copies to subcontractor of work being inspected or tested, or manufacturer or fabricator of material being inspected or tested.

1.7 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable to Departmental Representative as specified in specific Section. Each required sample mock up as noted in specification is to be constructed and placed against the existing for comparison.
- .3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in orderly sequence, to not cause delays in Work. Contractor to provide mock up in a prompt manner and schedule a mock up review by Departmental Representative who may invite other stakeholders.
- .4 Failure to prepare mock-ups in timely manner is not considered a reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Individual specification section identifies whether mock-up may remain as part of Work or if it is to be removed.

END OF SECTION 01 45 00

1.0 GENERAL

1.1 REFERENCES

- .1 U.S. Environmental Protection Agency (EPA) / Office of Water
- .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 ACTION AND INFORMATION SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

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

1.4 WATER SUPPLY

- .1 There is no water supply available on site for construction use. Contractor is to arrange their own temporary water supply. Disconnect all temporary water supply after project completion.

1.5 TEMPORARY POWER

- .1 There is no permanent power available on site for construction use. Contractor is to arrange their own temporary power. Disconnect all temporary power after project completion.

1.6 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

1.7 TEMPORARY CLEANING STATION

- .1 Provide and maintain temporary cleaning station for hand and tool cleaning for hygiene control.

END OF SECTION 01 51 00

1.0 GENERAL

1.1 RELATED REQUIREMENTS

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB 1. 189-00, Exterior Alkyd Primer for Wood.
  - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
  
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA-0121-M1978 (R2003), Douglas Fir Plywood.
  - .3 CAN/CSA-S269.2 – M1987 (R2001), Access Scaffolding for Construction Purpose.
  - .4 CAN/CSA-Z321-96 (R2001), Signs and Symbols for the Occupational Environment.
  
- .3 U.S. Environmental Protection Agency (EPA) / Office of Water
  - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 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 Identify areas which have to be gravelled to prevent tracking of mud.
  
- .3 Indicate use of supplemental or other staging area.
  
- .4 Provide construction facilities in order to execute work expeditiously.
  
- .5 Remove from site all such work after use.

1.5 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.

1.6 CONSTRUCTION PARKING

- .1 Parking will not be permitted within the Port of Entry.
  
- .2 Provide and maintain adequate access to project site.

1.7 SECURITY

- .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.8 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 and occupants.

1.9 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.

1.10 CONSTRUCTION SIGNAGE

- .1 No other signs or advertisements, other than warning signs, are permitted on site.
- .2 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by Departmental Representative.

1.11 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 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.
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads necessary.
- .8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operations at all times.
- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

- .12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .13 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.12 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.
- .4 Stack stored new or salvaged material not in construction facilities.

END OF SECTION 01 52 00

## 1.0 GENERAL

### 1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
  - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
  - .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-O121-M1978(R2003, Douglas Fir Plywood.

### 1.2 INSTALLATION AND REMOVAL

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

### 1.3 HOARDING

- .1 Erect temporary site enclosure using new minimum 1.83 m high module lock fence with visual barrier.
- .2 Protect from damage by equipment and constriction procedures.

### 1.4 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations.
- .2 Provide as required by governing authorities.

### 1.5 WEATHER ENCLOSURES

- .1 Provide weather tight closures to unfinished work.

### 1.6 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 Provide temporary screening and dust suppression using water spray or other means during dust generating activities.
- .3 Maintain and relocate protection until such work is complete.

### 1.7 ACCESS TO SITE

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

### 1.8 PUBLIC TRAFFIC FLOW

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

### 1.9 FIRE ROUTES

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

- .2 Maintain clearance for all egress routes.

1.10 PROTECTION OFF-SITE AND PUBLIC PROPERTY

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

1.11 PROTECTION OF EXISTING PROPERTY

- .1 Provide protection for finished and partially finished are of work during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

1.12 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

END OF SECTION 01 56 00

## 1.0 GENERAL

### 1.1 PRODUCTS/MATERIAL AND EQUIPMENT

- .1 Use NEW products/material and equipment unless otherwise specified. The term "products" is referred to throughout the specifications.
- .2 Use products of 1 manufacturer for material and equipment of the same type or classification unless otherwise specified.
- .3 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .4 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions. Departmental Representative will designate which document is to be followed.
- .5 Provide metal fastenings and accessories in the same texture, colour and finish as base metal in which they occur.
  - .1 Prevent electrolytic action between dissimilar metals.
  - .2 Use non-corrosive fasteners, anchors and spacers for securing exterior work.
  - .3 Fastenings which cause spalling or cracking are not acceptable.
  - .4 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
  - .5 Use heavy hexagon heads, semi-finished unless otherwise specified.
  - .6 Bolts may not project more than 1 diameter beyond nuts.
  - .7 Types of washers as follows:
    - .1 Plain type washers: use on equipment and sheet metal.
    - .2 Soft gasket lock type washers: use where vibrations occur.
    - .3 Resilient washers: use with stainless steel.
  - .8 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.
  - .9 Prevent damage, adulteration and soiling of products during delivery, handling and storage. Immediately remove rejected products from site.
  - .10 Store products in accordance with suppliers' instructions.
  - .11 Touch up damaged factory finished surfaces to Departmental Representative's satisfaction.
    - .1 Use primer or enamel to match original.
    - .2 Do not paint over nameplates.

### 1.2 QUALITY OF PRODUCTS

- .1 Products, materials and equipment (referred to as products) incorporated into work shall be new, not damaged or defective, and of the best quality (compatible with the specifications) for the purpose intended. If requested, furnish evidence as to type, source and quality of the products provided.
- .2 Defective products will be rejected regardless of previous inspections.
  - .1 Inspection does not relieve responsibility, but is precaution against oversight or error.
  - .2 Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
  - .3 Retain purchase orders, invoices and other documents to prove that all products utilized in this Contract meet the requirements of the specifications. Produce documents when requested by the Departmental Representative.



- .3 Should any dispute arise as to quality or fitness of products, the decision rests strictly with the Departmental Representative based upon the requirements of the Contract documents.
- .4 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item throughout the building.

### 1.3 AVAILABILITY OF PRODUCTS

- .1 Immediately upon signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items.
- .2 If delays in supply of products are foreseeable, notify Departmental Representative of such in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of the work.
- .3 In event of failure to notify Departmental Representative at the start of work and should it subsequently appear that the work may be delayed for such reason, the Departmental Representative reserves the right to substitute more readily available products of similar character, at no increase in either the Contract price or the Contract time.

### 1.4 MANUFACTURER'S INSTRUCTIONS

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

### 1.5 CONTRACTOR'S OPTIONS FOR SELECTION OF PRODUCTS 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 Approved Product. Alternative products may be considered provided full technical data is received in writing by Departmental Representative in accordance with "Special Instructions to Tenderers".
- .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.

1.6 SUBSTITUTION AFTER CONTRACT AWARD

- .1 No substitutions are permitted without prior written approval of the Departmental Representative.
- .2 Proposals for substitution may only be submitted after Contract award. Such request must include statements of respective costs of items originally specified and the proposed substitution.
- .3 Proposals will be considered by the Departmental Representative if:
  - .1 Products selected by tenderer from those specified are not available;
  - .2 Delivery date of products selected from those specified would unduly delay completion of Contract, or
  - .3 Alternative product to that specified, which is brought to the attention of and considered by Departmental Representative as equivalent to the product specified, and will result in a credit to the Contract amount.
  - .4 Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on the project. Pay for design or drawing changes required as result of substitution.
  - .5 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative and the Contract price will be reduced accordingly.

END OF SECTION 01 61 00

1.0 GENERAL

1.1 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 Owner 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 Owner or separate contractor.
  - .7 Written permission of affected separate contractor.
  - .8 Date and time work will be executed.

1.2 MATERIALS

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

1.3 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.
- .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; maintain excavations free of water.

1.4 EXECUTION

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Uncover Work to install ill-timed Work.
- .3 Remove and replace defective and non-conforming Work.
- .4 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

- .5 Restore work with new products in accordance with requirements of Contract Documents.
- .6 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

END OF SECTION 01 73 00

## 1.0 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 as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .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. Refer to Section 01 74 19 - Waste Management and Disposal.
- .6 Dispose of waste materials and debris off site.
- .7 Clean areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not remain on newly finished surfaces.
- .12 Use only approved and/or safe cleaning agents only.

### 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 other than that caused by others, 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 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

**CLEANING**

- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Remove stains, spots, marks and dirt on new or existing surfaces resulting from construction work.
- .8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Sweep and wash clean paved areas resulting from construction work.
- .11 Remove debris and surplus materials from site.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

END OF SECTION 01 74 11

## 1.0 GENERAL

### 1.1 SUMMARY

- .1 This Section includes requirements for management of construction waste and disposal, which forms the Contractor's commitment to reduce and divert waste materials from landfill and includes the following:
  - .1 Preparation of a Draft Construction Waste Management Plan that will be used to track the success of the Construction Waste Management Plan against actual waste diversion from landfill.
  - .2 Preparation of a Construction Waste Management Plan that provides guidance on a logical progression of tasks and procedures to be followed in a pollution prevention program to reduce or eliminate the generation of waste, the loss of natural resources, and process emissions through source reduction, reuse, recycling, and reclamation.
  - .3 Preparation of monthly progress reports indicating cumulative totals representing progress towards achieving diversion and reduction goals of waste materials away from landfill and identifying any special programs, landfill options or alternatives to landfill used during construction.
  - .4 Preparation of a Construction Waste Management Report containing detailed information indicating total waste produced by the project, types of waste material and quantity of each material, and total waste diverted and diversion rates indicated as a percentage of the total waste produced.
- .2 Departmental Representative has established that this project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors be employed by the Contractor.

### 1.2 RELATED REQUIREMENTS

- .1 Section 01 51 00– Temporary Utilities
- .2 Section 01 52 00– Construction Facilities

### 1.3 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM):
  - .1 ASTM E1609 01, Standard Guide for Development and Implementation of a Pollution Prevention Program
- .2 Canada Green Building Council (CaGBC)
  - .1 LEED® Reference Guide for Building Design and Construction, Version 4
- .3 Recycling Certification Institute (RCI):
  - .1 RCI Certification Construction and Demolition Materials Recycling

### 1.4 DEFINITIONS

- .1 Clean Waste: Untreated and unpainted; not contaminated with oils, solvents, sealants or similar materials.
- .2 Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, repair and demolition.

- .3 Hazardous: Exhibiting the characteristics of hazardous substances including properties such as ignitability, corrosiveness, toxicity or reactivity.
- .4 Non hazardous: Exhibiting none of the characteristics of hazardous substances, including properties such as ignitability, corrosiveness, toxicity, or reactivity.
- .5 Non toxic: Not poisonous to humans either immediately or after a long period of exposure.
- .6 Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- .7 Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- .8 Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form; recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Return: To give back reusable items or unused products to vendors for credit.
- .10 Reuse: To reuse a construction waste material in some manner on the project site.
- .11 Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- .12 Sediment: Soil and other debris that has been eroded and transported by storm or well production run off water.
- .13 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- .14 Toxic: Poisonous to humans either immediately or after a long period of exposure.
- .15 Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- .16 Volatile Organic Compounds (VOC's): Chemical compounds common in and emitted by many building products over time through outgassing:
  - .1 Solvents in paints and other coatings;
  - .2 Wood preservatives; strippers and household cleaners;
  - .3 Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.
  - .4 When released, VOC's can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.
- .17 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.



- .18 Construction Waste Management Plan: A project related plan for the collection, transportation, and disposal of the waste generated at the construction site; the purpose of the plan is to ultimately reduce the amount of material being landfilled.

#### 1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate waste management requirements with all Divisions of the Work for the project, and ensure that requirements of the Construction Waste Management Plan are followed.
- .2 Preconstruction Meeting: Arrange a pre-construction meeting in accordance with Section 01 31 19 – Project Meetings before starting any Work of the Contract attended by the Departmental Representative, Contractor and Consultants to discuss the Contractor's Construction Waste Management Plan and to develop mutual understanding of the requirements for a consistent policy towards waste reduction and recycling.

#### 1.6 SUBMITTALS

- .1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
- .1 Draft Construction Waste Management Plan (Draft CWM Plan): Submit to Departmental Representative a preliminary analysis of anticipated site generated waste by listing a minimum of five (5) construction or demolition waste streams that have potential to generate the most volume of material indicating methods that will be used to divert construction waste from landfill and source reduction strategies; Departmental Representative will provide commentary before development of Contractor's Construction Waste Management Plan.
  - .2 Construction Waste Management Plan (CWM Plan): Submit a CWM Plan for this project prior to any waste removal from site and that includes the following information:
    - .1 Material Streams: Analysis of the proposed jobsite waste being generated, including material types and quantities forming a part of identified material streams in the Draft CWM Plan; materials removed from site destined for alternative daily cover at landfill sites and land clearing debris cannot be considered as contributing to waste diversion and will be included as a component of the total waste generated for the site.
    - .2 Recycling Haulers and Markets: Investigate local haulers and markets for recyclable materials, and incorporate into CWM Plan.
    - .3 Alternative Waste Disposal: Prepare a listing of each material proposed to be salvaged, reused, recycled or composted during the course of the project, and the proposed local market for each material.
    - .4 Landfill Options: The name of the landfill where trash will be disposed of; landfill materials will form a part of the total waste generated by the project.
    - .5 Materials Handling Procedures: A description of the means by which any recycled waste materials will be protected from contamination, and a description of the means to be employed in recycling the above

materials consistent with requirements for acceptance by designated facilities.

- .6 Transportation: A description of the means of transportation of the recyclable materials, whether materials will be site separated and self hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site, and destination of materials.

### 1.7 PROJECT CLOSEOUT SUBMISSIONS

- .1 Record Documentation: Submit as constructed information in accordance with Section 01 78 00– Closeout Submittals as follows:
  - .1 Construction Waste Management Report (CWM Report): Submit a CWM Report for this project according to the samples provided.
    - .1 Accounting: Submit information indicating total waste produced by the project.
    - .2 Composition: Submit information indicating types of waste material and quantity of each material.
    - .3 Diversion Rate: Submit information indicating total waste diverted from landfill as a percentage of the total waste produced by the project.
    - .4 Diversion Documentation: Submit copies of transportation documents or shipping manifests indicating weights of materials, and other evidence of disposal indicating final location of waste diverted from landfill and waste sent to landfill.
    - .5 Alternative Daily Cover (ADC): Submit quantities of material that were used as ADC at landfill sites, and that form a part of the total waste generated by the project.
    - .6 Multiple Waste Hauling: Compile all information into a single CWM Report where multiple waste hauling and diversion strategies were used for the project.
    - .7 Photographs: Submit photographs of waste diversion facilities documenting location and signage describing usage of waste separation containers.

### 1.8 QUALITY ASSURANCE

- .1 Resources for Development of Construction Waste Management Report (CWM Report): The following sources may be useful in developing the Draft Construction Waste Management Plan:
  - .1 Recycling Haulers and Markets: Investigate local haulers and markets for recyclable materials, and incorporate into CWM Plan.
  - .2 Waste-to-Energy Systems: Investigate local waste-to-energy incentives where systems for diverting materials from landfill for reuse or recycling are not available.

### 1.9 DELIVERY, STORAGE AND HANDLING

- .1 Storage Requirements: Implement a recycling/reuse program that includes separate collection of waste materials as appropriate to the project waste and the available recycling and reuse programs in the project area.
- .2 Handling Requirements: Clean materials that are contaminated before placing in

collection containers and ensure that waste destined for landfill does not get mixed in with recycled materials:

- .1 Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
- .2 Arrange for collection by or delivery to the appropriate recycling or reuse facility.
- .3 Hazardous Waste and Hazardous Materials: Handle in accordance with applicable regulations.

## 2.0 PRODUCTS

## 3.0 EXECUTION

### 3.1 (CWM PLAN) IMPLEMENTATION

- .1 Manager: Contractor is responsible for designating an on-site party or parties responsible for instructing workers and overseeing and documenting results of the CWM Plan for the project.
- .2 Distribution: Distribute copies of the CWM Plan to the job site foreman, each Subcontractor, the Departmental Representative and other site personnel as required to maintain CWM Plan.
- .3 Instruction: Provide on site instruction of appropriate separation, handling, and recycling, salvage, reuse, composting and return methods being used for the project to Subcontractor's at appropriate stages of the project.
- .4 Separation Facilities: Lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, composting and return:
  - .1 Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
  - .2 Hazardous wastes shall be separated, stored, and disposed of in accordance with local regulations.
- .5 Progressive Documentation: Submit a monthly summary of waste generated by the project to ensure that waste diversion goals are on track with project requirements:
  - .1 Submission of waste summary can coincide with application for progress payment, or similar milestone event as agreed upon between the Contractor and Departmental Representative.
  - .2 Monthly waste summary shall contain the following information:
    - .1 The amount in tonnes or m3 and location of material landfilled,
    - .2 The amount in tonnes or m3 and location of materials diverted from landfill, and
    - .3 Indication of progress based on total waste generated by the project with materials diverted from landfill as a percentage.

### 3.2 SUBCONTRACTOR'S RESPONSIBILITY

- .1 Subcontractor's shall cooperate fully with the Contractor to implement the CWM Plan.

- .2 Failure to cooperate may result in the Departmental Representative not achieving their environmental goals, and may result in penalties being assessed by the Contractor to the responsible Subcontractor's.

**3.3 SAMPLE CONSTRUCTION WASTE MANAGEMENT FORMS**

- .1 Sample waste tracking form below can be used by the Contractor to establish their own forms for recording management of construction waste:

**.2 SAMPLE WASTE MANAGEMENT FORM**

Material Stream	Diverted Waste by Report Date	Total	Units				
Sept	Oct	Nov	Dec				
Material Streams Contributing to Credit	Plastic	1.25	2.5	10	5	18.75	m <sup>3</sup>
Paper/Cardboard	5	2.5	2.5	5	15	m <sup>3</sup>	
Clean Wood	0	25	0	1.25	26.25	m <sup>3</sup>	
Metal	1.25	2.5	5.5	7	16.25	m <sup>3</sup>	
Concrete	10.5	2.5	5.5	8.75	27.25	m <sup>3</sup>	
Total Diverted Waste	135	m <sup>3</sup>					
Material Streams not Contributing to Credit	Landfill	10.75	7.5	15	10	43.25	m <sup>3</sup>
Screen Fines (ADC)	5	1.25	0	2.5	8.75	m <sup>3</sup>	
150 mm Minus (ADC)	1.25	1.25	5	5.5	13	m <sup>3</sup>	
Total Landfill/ADC Waste	65			m <sup>3</sup>			
Total Waste	200	m <sup>3</sup>					
Percent Diverted	67.5	%					

END OF SECTION 01 75 19

1.0 GENERAL

1.1 SECTION INCLUDES

- .1 Administrative procedures preceding preliminary and final inspections of Work.

1.2 RELATED SECTIONS

- .1 Section 01 78 00 - Closeout Submittals.

1.3 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an 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 that corrections have been made.
  - .2 Request Departmental Representative's Inspection.
  - .3 Departmental Representative's Review: Departmental Representative and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
  - .4 Completion: submit written certificate that following have been performed:
    - .1 Work has been completed and inspected for compliance with Contract Documents.
    - .2 Defects have been corrected and deficiencies have been completed.
    - .3 Work is complete and ready for Final Inspection.

END OF SECTION 01 77 00

1.0 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.
- .2 Section 01 77 00 – Closeout Procedures.

1.2 SUBMISSION

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .2 Copy will be returned after final inspection, with Departmental Representative's comments.
- .3 Revise content of documents as required prior to final submittal.
- .4 Two weeks prior to Interim Completion of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English.
- .5 An electronic copy of Interactive Operating and Maintenance Manual System is required as specified under clause 1.3.
- .6 Hard copies of the Operating and Maintenance Manual System is required as specified under clause 1.4. Provide 4 sets of the Hard Copy Interactive Operating and Maintenance Manual System to the Departmental Representative.
- .7 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .8 If requested, furnish evidence as to type, source and quality of products provided.
- .9 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .10 Pay costs of transportation.

1.3 INTERACTIVE OPERATING AND MAINTENANCE MANUAL SYSTEM

- .1 In addition to the printed copies, submit provide an Interactive Operating and Maintenance Manual System as specified herein.
- .2 System Description and Requirements
  - .1 All as constructed drawings and operation and maintenance (O&M) manuals listed under the Scope of Work shall be converted, where necessary, into Portable Data File (PDF) format for viewing using the Adobe Acrobat Reader.
  - .2 Documentation storage and retrieval system shall be structured based on a database framework with direct links to the appropriate PDF files. Documents retrieval and viewing shall be executed through a menu driven approach.
- .3 Program shall be capable of storing separately and independently data of multiple buildings and shall be expandable for addition of new buildings and systems.
- .4 Data of each building shall be accessible by the input of either the building name or building number as defined by the Departmental Representative.

- .5 O&M data and as constructed drawings shall be classified by their corresponding disciplines, including:
  - .1 Architectural
  - .2 Civil
  - .3 Under each discipline, data shall be grouped into the following four major categories:
    - .1 Basic Documents
      - .1 'Basic Documents' shall, according to the type of services or disciplines, include the full contents of each hard copy of the O&M manuals with the addition of Miscellaneous Maintenance Reports and Records, or as defined by the user. In general, the following shall be included unless specifically excluded by the Departmental Representative:
        - .1 Introduction
        - .2 Consultant/Contractor/Suppliers List
        - .3 System Description
        - .4 Maintenance and Lubrication Schedules
        - .5 Testing and Commissioning (T&C) Reports
        - .6 Misc. Reports
        - .7 Specifications
        - .8 Equipment and/or point schedules as identified in the hard copy documents
        - .9 Others as stipulated by the Departmental Representative
      - .2 All Basic Documents PDF files shall be enhanced with appropriate bookmarks to facilitate searching of information within the document or linking to other relevant documents for references.
    - .2 'As-Constructed' Drawings
      - .1 'As-Constructed' drawings shall be converted from the original electronic files, such as CAD, into PDF format. If only the hard copies of the 'as constructed' drawings are available, they shall be scanned and saved in PDF format. PDF files of the 'As-Constructed' drawings shall be enhanced with the following bookmarks to zoom into legible views on the computer screen as a minimum:
        - .1 Drawing Number and Title
        - .2 Drawing Notes
        - .3 Major Equipment Locations
        - .4 Cross-links to other related drawings
        - .5 Revisions
      - .3 Equipment Data
        - .1 Equipment data shall be classified into the following categories:
          - .1 Equipment submittals
          - .2 T&C Report
          - .3 Maintenance Data
          - .4 Maintenance Records
          - .5 Photo
        - .2 Provide a summary screen to list all equipment classified under a specific system. On the summary screen, provide direct links to the corresponding equipment data under each category with addition links to the relevant 'As Constructed' drawings.
  - .4 The Contractor shall provide a demonstration of the building system to the Departmental Representative to provide verification that the requirements if the specification are fulfilled.

**1.4 FORMAT HARD COPY MANUALS**

- .1 Organize data in the form of an 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. 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 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.
- .9 Provide 1:1 scaled CAD files in .dwg format on CD.

#### 1.5 CONTENTS - EACH VOLUME

- .1 Table of Contents: provide title of project;
  - .1 date of submission;
  - .2 names, addresses, and telephone and fax numbers of Contractor, Subcontractors, Suppliers with name of responsible parties;
  - .3 schedule of products and systems, indexed to content of volume.
  - .4 copy of hardware schedule and paint schedules, complete with the actual manufacturer, supplier and identification names and numbers.
  - .5 all extended guarantees, warranties, maintenance bonds, certificates, letters of guarantees, registration cards, as called for in the various sections of the specification.
  - .6 complete set of all final reviewed shop drawings.
  - .7 certificates of inspection by authorities having jurisdiction.
  - .8 test reports and certificates as applicable.
  - .9 complete set of as constructed drawings.
- .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 clearly 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. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

#### 1.6 'AS CONSTRUCTED' DRAWINGS AND SAMPLES

- .1 In addition to requirements in General Conditions, maintain at the site one record copy of:



- .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to the Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- 
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
  - .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
  - .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
  - .5 Keep record documents and samples available for inspection by Departmental Representative.
  - .6 Provide an electronic copy of as constructed drawings.

1.7 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque drawings, provided by Departmental Representative.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by change orders.
  - .6 Details not on original Contract Drawings.
  - .7 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.8 MATERIALS AND FINISHES

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured 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.

1.9 SPARE PARTS

- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to location as directed; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.10 MAINTENANCE MATERIALS

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to location as directed; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Departmental Representative. Include approved listings in the Operating and Maintenance Manuals.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.11 STORAGE, HANDLING AND PROTECTION

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.12 WARRANTIES AND BONDS

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

- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers within ten days after completion of the applicable item of work.
- .4 Except for items put into use with Owner'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.

END OF SECTION 01 78 00

Part 1 General

1.1 SUMMARY

- .1 Work Included: All existing infrastructure to be removed and disposed within the designated removal limits.

1.2 REFERENCES

- .1 ASTM - American Society for Testing and Materials.
- .2 DIS - Division of Industrial Safety.

1.3 QUALITY ASSURANCE

- .1 Regulatory Requirements: Demolish existing site improvements as indicated on the drawings (all existing infrastructure in the noted removal area unless specified otherwise), in an orderly and careful manner. Comply with all local codes and ordinances.
- .2 Equipment: Use equipment specifically designed for the demolition of each type of material.
- .3 Labor: Employ workmen skilled in the use of the equipment being utilized for demolition.

1.4 DELIVERY, STORAGE AND DISPOSAL

- .1 Delivery and Storage:
  - .1 Do not deliver to the job site nor store thereon demolition equipment and materials prior to receiving written notice to proceed. Confine storage to approved areas.
  - .2 The Contractor shall confine all apparatus, the storage of materials and the operations of workers to limits indicated by law, ordinances, permits or directions of the Consultant and shall not unreasonably encumber the premises with materials.
  - .3 The Contractor shall enforce regulations regarding signs, advertisements, fires, smoking, and storage of inflammable materials.
- .2 Disposal: Legally dispose of off-site products of demolition during or at end of each week's work. Contractor shall pay all disposal costs associated with the project.

1.5 PROJECT/SITE CONDITIONS

- .1 Existing Conditions: Inspect site prior to commencing work. Determine scope of applicable site conditions.
- .2 Access and Testing: Make test excavations and borings required to determine existing conditions, subject to Owner's convenience. Refer to Geo-Technical report within the Appendix.
- .3 Acceptance: Commencing work constitutes Contractor's acceptance of site conditions, both surface and subsurface. No extra payment shall accrue to Contractor by virtue of unknown conditions or difficulties of performing this demolition work.

1.6 PROTECTION

- .1 Protection of Existing Site Improvements
  - .1 References: Verify and maintain benchmarks, monuments, and other reference points. Replace if disturbed or destroyed.

- .2 Protection: Protect existing improvements noted to remain within designated limit(s) of work. Supply shoring, bracing, reinforcing and barricades as required. Refer to drawings for limit of work.
- .3 Utilities: Keep in operation existing utility circuits and piping to remain except at the direction of the Owner's Representative. Provide 48-hour notice of interruption of service. Notify Owner's Representative should utilities not shown on Drawings be found during demolition.
- .4 Repair: If damage to site improvements to remain occurs during the work, restore to the satisfaction of the Owner at no additional cost.

Part 2 Execution

2.1 PREPARATION

- .1 Verification: Verify with Owner items to be removed prior to commencement of work.
- .2 Compliance: Proceed with demolition in an orderly and careful manner, in compliance with local codes and ordinances.
- .3 Disposal: Legally dispose of demolished materials off site unless otherwise directed by Owner.

2.2 DEMOLITION

- .1 Cap and Abandon of existing sub surface utilities:
  - .1 Capping: Disconnecting and capping of utilities must be in accordance with the regulations of the utility company affected.
    - .1 Abandoned storm sewer pipe shall entail completely filling the entire interior void space in the designated section with a flowable fill product that will cure and harden in the physical environment and prevent future collapse of the pipe wall. Other abandonment methods will be permitted only when approved by the Engineer.
    - .2 Mix Design  
Submit mix design for each type of material for review by Engineer including proposed aggregate size, water cement ratio and any admixtures to be used to increase flowability and workability.
    - .3 Grout  
Submit mix design for each type of material for review by Engineer including proposed aggregate size, water cement ratio and any admixtures to be used to increase flowability and workability.
      - .1 Non-shrink cementitious grout shall be a pre-proportioned, pre-packaged, precision cement-based grout requiring only the addition of potable water. Grout material shall meet all the following typical performance criteria when cured at 23°C:
        - .2 Grout shall not contain metallic aggregate, expansive cement, or gas generating additives, such as aluminum powder.
        - .3 Grout shall contain an air release aggregate to generate positive expansion.

**SITE DEMOLITION**

- .4 Early Height Change, ASTM C827 0.0 to 4.0%;
- .5 Hardened Height Change, ASTM C1090 0.0 to 0.3%;
- .6 Effective Bearing Area, 95%;
- .7 Compressive Strength, ASTM C942 at 28 days;
- .8 ASTM C940 – Standard Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced Aggregate Concrete in the Laboratory;
- .9 ASTM C1107 – Standard for Packaged Dry, Hydraulic Cement Grout (non-shrink);
- .10 Flowable fill shall be low strength, self levelling and self-compacting cementitious material which consists of fluid mixture of cement, aggregate, water, fly ash, and admixture enough to provide the needed quality. Components of the flowable fill shall be as follows:
  - Strength at 28 days  $1.0 \pm 0.25$  MPa (measured in accordance with CSA
    - .1 A23.1/A23.2 latest edition)
    - .2 Slump  $200 \pm 25$  mm (measured in accordance with CSA)
    - .3 A23.1/A23.2 latest edition)
    - .4 Execution- Abandonment of pipes larger than 300mm diameter:
      - .5 Flowable fill or low shrink shall be used for abandonment of pipes larger than 300mm;
      - .6 Flowable fill or low shrink shall be pumped into the pipe unless otherwise specified or as directed by the Engineer;
      - .7 Monitor the pressure being exerted on the interior of the pipe during the grouting;
      - .8 Do not allow the monitored pressure exerted on the interior of the pipe to exceed 700 kPa;
      - .9 Monitor the vents and standpipes provided to ensure filling of the pipe to a point where grout fills the vent pipes to a level at least 600 mm above the top of the storm main.
    - .10 Pipe Dewatering
      - Carry out any dewatering of the pipe necessary to allow the grouting of filling operation to proceed as intended and without dilution of the grout being installed;
    - .11 Do not allow trench water to enter the pipe.
- .4 Catch Basins and Manholes to be abandoned shall have their cones removed, backfilled with concrete slurry, or native material compacted to 95% relative compaction. Frames and covers not to be reused shall be delivered to the City as directed by the Engineer
- .2 Paving and Walls:
  - .1 Finishing: Rough grade excavated areas as necessary to achieve the final line and grade as called for in other Sections of this work. Compact to the density of the surrounding area. The final surface shall be smooth, even, and tight, free from loose or soft areas.
- .3 Subgrade: Fill depressions made by demolition and restore excavated areas to a smooth and even grade. The compact and density of the surrounding soil per the Geo-Tech. recommendation.

2.3

DE-WATERING

- .1 General: Provide and operate equipment and do ditching and pumping necessary to keep the project area free from water.
- .2 Protection: Take measures required to dispose of surface and subsurface water in compliance with municipal requirements.
- .3 Debris: Prevent transport of soil, aggregate, or debris off site where practical.

END OF SECTION 02 41 13

1.0 GENERAL

1.1 RELATED REQUIREMENTS

- .1 02 83 11 Lead Basepaint (Abatement Intermediate Precautions)

1.2 REFERENCES

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

1.3 ACTION & INFORMATIONS SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures and 01 74 19 - Waste Management Disposal.
- .2 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
    - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.

1.4 SITE CONDITIONS

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

1.5 HEALTH AND SAFETY

- .1 Do Construction Occupational Health and Safety in accordance with Section 01 35 33- Health and Safety Requirements and the Workers' Compensation Board of BC latest regulations.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste management materials and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

1.7 HAZARDOUS MATERIAL

- .1 Refer to Appendix C for hazmat report and hazmat abatement requirements.

2.0 PRODUCTS

- .1 Not used.

3.0 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 traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.



- .4 Disconnect, cap, plug or divert, as required, existing utilities within the building where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.
  - .1 Immediately notify Departmental Representative and the Owner concerned in case of damage to any utility or service designated to remain in place.
  - .2 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

### 3.2 PREPARATION

- .1 Protection of In-Place Conditions:
  - .1 Prevent movement, settlement, or damage to adjacent structures, and utilities.
  - .2 Keep noise, dust, and inconvenience to occupants to minimum.
  - .3 Protect building systems, services and equipment.
  - .4 Provide temporary dust screens, covers, railings, supports and other protection as required.
  - .5 Do Work in accordance with Section 01 35 33 - Health and Safety Requirements.

### 3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.



- .5 Airlock: ingress or egress system, without permitting air movement between contaminated area and uncontaminated area. Consisting of two curtained doorways at least 2 m apart.
- .6 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another. Typically constructed as follows:
  - .1 Place two overlapping polyethylene sheets over existing or temporarily framed doorway, securing each along top of doorway, securing vertical edge of one sheet along one vertical side of doorway, and secure other sheet along opposite vertical side of doorway.
  - .2 Reinforce free edges of polyethylene with duct tape and add weight to bottom edge to ensure proper closing.
  - .3 Overlap each polyethylene sheet at openings 1.5 m on each side.
- .7 Action level: employee exposure, without regard to usage of respirators, to an airborne concentration of lead of 50 micrograms per cubic meter of air calculated as 8 hour time-weighted average (TWA). Intermediate precautions for lead abatement are based on airborne lead concentrations greater than 0.05 milligrams per cubic meter of air within Work Area.
- .8 Competent person: Professionals capable of identifying existing lead hazards in workplace and taking corrective measures to eliminate them.
- .9 Lead in Dust: wipe sampling on vertical 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.

#### 1.5 ACTION & INFORMAL 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: Provincial Territorial and local requirements for Notice of Project Form.
- .4 Provide proof of Contractor's General and Environmental Liability Insurance.
- .5 Quality Control:
  - .1 Provide Departmental Representative necessary permits for transportation and disposal of lead based paint waste and proof that it 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, entry and exit from Work Area, and aspects of work procedures and protective measures.
  - .3 Provide proof that supervisory personnel have attended lead abatement course, of not less than two days duration, approved by Departmental Representative. Minimum of one supervisor for every ten workers.
- .6 Product data:
  - .1 Provide documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including:
    - .1 Encapsulants.
    - .2 Amended water.
    - .3 Slow drying sealer.
- .7 Submit Exposure Control Plan as per requirement in Worksafe BC Part 6.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead paint, 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.
  - .2 Safety Requirements: worker and visitor protection.
    - .1 Protective equipment and clothing to be worn by workers and visitors in Work Area includes:
      - .1 Respirator NIOSH approved and equipped with filter cartridges with assigned protection factor of 50, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Provide sufficient filters so workers can install new filters following disposal of used filters and before re-entering contaminated areas.
      - .2 Disposable type protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
    - .2 Requirements for workers:
      - .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters, clean coveralls and head covers before entering Equipment and Access Rooms or Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.
      - .2 Remove gross contamination from clothing before leaving work area. Place contaminated work suits in receptacles for disposal with other lead - contaminated materials. Leave reusable items except respirator in Equipment and Access Room. When not in use in Work Area, store work footwear in Equipment and Access Room. Upon completion of lead abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from Work Area or from Equipment and Access Room.
      - .3 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers not to use this system as means to leave or enter work area.
    - .3 Eating, drinking, chewing, and smoking are not permitted in Work Area.
    - .4 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual lead abatement.
    - .5 Ensure workers wash hands and face when leaving Work Area. Facilities for washing are located as indicated on drawings.
    - .6 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section, in both official languages.
    - .7 Ensure no person required to enter Work Area has facial hair that affects seal between respirator and face.
    - .8 Visitor Protection:
      - .1 Provide protective clothing and approved respirators to Authorized Visitors to Work Areas.
      - .2 Instruct Authorized Visitors in use of protective clothing, respirators and procedures.
      - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Work Area.

1.7 WASTE MANAGEMENT & DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
- .2 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
- .3 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.
- .4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.8 EXISTING CONDITIONS

- .1 Reports and information pertaining to lead based paint to be handled, removed, or otherwise disturbed and disposed of during this Project is appended in Appendix C of this specifications.
- .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.

1.9 SCHEDULING

- .1 Not later than two days before beginning Work on this Project notify the following in writing, where appropriate:
  - .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.
- .4 Hours of Work: perform work in accordance with Section 01 11 55 General Instructions. Include in Contract Sum additional costs due to this requirement.

2.0 PRODUCTS

2.1 MATERIALS

- .1 Polyethylene: 0.15 mm unless otherwise specified; in sheet size to minimize joints.
- .2 FR polyethylene: 0.15 mm reinforced fabric bonded both sides with polyethylene.
- .3 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.
- .4 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for trapping residual lead paint residue.
- .5 Lead waste containers: metal fibre type acceptable to dump operator with tightly fitting covers and 0.15 mm sealable polyethylene liners.

- .1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

### 3.0 EXECUTION

#### 3.1 SUPERVISION

- .1 Approved Supervisor must remain within Lead Work Area during disturbance, removal, or other handling of lead based paints.

#### 3.2 PREPARATION

- .1 Remove and wrap items to be salvaged or reused, and transport and store in area specified by Departmental Representative.
- .2 Work Area:
  - .1 At point of access to work areas install warning signs in both official languages in upper case "Helvetica Medium" letters reading as follows where number in parentheses indicates font size to be used:
    - .1 CAUTION LEAD HAZARD AREA (25 mm).
    - .2 NO UNAUTHORIZED ENTRY (19 mm).
    - .3 WEAR ASSIGNED PROTECTIVE EQUIPMENT AND RESPIRATOR (19 mm).
    - .4 BREATHING LEAD CONTAMINATED DUST CAUSES SERIOUS BODILY HARM (7 mm).
  - .2 Where water application is required for wetting lead containing materials, provide temporary water supply by use of appropriately sized hoses for application of water as required.
  - .3 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 lines and equipment.
- .3 Worker Decontamination Enclosure System:
  - .1 Worker Decontamination Enclosure System includes Equipment and Access Room and Clean Room, as follows:
    - .1 Equipment and Access Room: construct between exit and work areas, with two curtained doorways, one to the rest of suite, and one to work area. Install waste receptor and storage facilities for workers' shoes and protective clothing to be re-worn in work areas. Build large enough to accommodate specified facilities, equipment needed, and at least one worker allowing sufficient space to change comfortably.
    - .2 Clean Room: construct with curtained doorway to outside of enclosures. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.
- .4 Construction of Decontamination Enclosures:
  - .1 Construct framing for enclosures or use existing rooms. Line enclosure with polyethylene sheeting and seal with tape, apply two layers of FR polyethylene on floor.
  - .2 Construct curtain doorways between enclosures so when people move through or waste containers and equipment are moved through doorway, one of two closures comprising doorway always remains closed.

- .5 Separation of Work Areas from Occupied Areas
  - .1 Barriers between Work Area and occupied area to be constructed as follows:
    - .1 Construct floor to ceiling lumber metal stud framing, cover with polyethylene sheeting and seal with duct tape. Apply 9 plywood over polyethylene sheeting. Seal plywood joints and between adjacent materials with surface film forming sealer, to create airtight barrier.
    - .2 Cover plywood with polyethylene sheeting and sealed with duct tape.
- .6 Maintenance of Enclosures:
  - .1 Maintain enclosures in clean condition.
  - .2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately.
  - .3 Visually inspect enclosures at beginning of each work day.
  - .4 Use smoke test method to test effectiveness of barriers as directed by Departmental Representative.

### 3.3 LEAD-BASE PAINT ABATEMENT

- .1 Removal of lead based paint to be performed by scraping or sanding using non-powered hand tools, or manual demolition of lead-painted plaster walls or building components by striking a wall with sledgehammer or similar tool.
- .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 before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.
- .4 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .5 After wire brushing and wet sponging to remove visible lead based paint, and after encapsulating lead containing material impossible to remove, wet clean work area including equipment and access room, and equipment used in process. After inspection by Departmental Representative, apply continuous coat of slow drying sealer to surfaces. Do not disturb work for 8 hours with no entry, activity, ventilation or disturbance during this period.
- .6 After enclosing lead painted surfaces, wet clean work area and equipment and access room. During settling period no entry, activity, or ventilation will be permitted.

### 3.4 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 When lead dust leakage from Work Area occurs Departmental Representative may order Work shutdown.
  - .1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

### 3.5 LEAD SURFACE SAMPLING-WORK AREAS

- .1 Final lead surface sampling to be conducted as follows:
  - .1 After Work Area has passed a visual inspection for cleanliness approved by Departmental Representative and acceptable coat of lock-down agent has been applied to surfaces within enclosure, and appropriate setting period of 8 hours has passed. Departmental Representative will perform lead wipe sampling in Work Area.
    - .1 Final lead wipe sampling results from horizontal and vertical surfaces where lead based paints have been removed must show lead levels of less than 40 micrograms of lead in dust per square foot. Samples must be collected and analyzed in accordance with EPA 747-R-95-007.
    - .2 If wipe sampling results show levels of lead in excess of 40 micrograms per square foot, re-clean work area at contractor's expense and apply another acceptable coat of lock-down agent to surfaces.
    - .3 Repeat as necessary until fibre levels are less than 40 micrograms per square foot.

### 3.6 FINAL CLEAN-UP

- .1 Following specified cleaning procedures, and when lead wipe sampling is 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 equipment.
- .3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in plastic bags and sealed labeled waste containers for transport.
- .4 Clean-up Work Areas, Equipment and Access Room, and other contaminated enclosures.
- .5 Clean-up sealed waste containers and equipment used in Work and remove from work areas, via Container and Equipment Decontamination Enclosure System, at appropriate time in cleaning sequence.
- .6 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

### 3.7 RE-ESTABLISHMENT OF OBJECTS & SYSTEMS

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



## 1.0 GENERAL

### 1.1 RELATED REQUIREMENTS

### 1.2 REFERENCES

- .1 Aluminum Association (AA).
  - .1 AA DAF-45-R03, Designation System for Aluminum Finishes - 9th Edition.
  - .2 AA ASM-35-October 2000, Specifications for Aluminum Sheet Metal Work in Building Construction, Section 5.
- .2 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM A 167-99, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .2 ASTM A 240/A 240M-02a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - .3 ASTM A 653/A 653M-02a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .4 ASTM A 792/A 792M-02, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
  - .5 ASTM B 32-00e1, Standard Specification for Solder Metal.
  - .6 ASTM B 370-98, Standard Specification for Copper Sheet and Strip for Building Construction.
  - .7 ASTM D 523-89(1999), Standard Test Method for Specular Gloss.
  - .8 ASTM D 822-01, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
  - .2 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound.
  - .3 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
  - .4 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.
- .4 Canadian Standards Association (CSA International).
  - .1 CAN/CSA A123.3-98, Asphalt Saturated Organic Roofing Felt.
- .5 Department of Justice Canada (Jus).
  - .1 Canadian Environmental Protection Act (CEPA), 1999.
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .7 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC).
  - .1 CCMC-2002, Registry of Product Evaluations.
- .8 Transport Canada (TC).
  - .1 Transportation of Dangerous Goods Act (TDGA), 1992.

### 1.3 SUBMITTALS

- .1 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, and cleaning procedures.

- .2 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 33 – Health and Safety Requirements.
- .4 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures. Shop drawings to be signed and sealed by Professional Engineer registered in Province of British Columbia. The said engineer to provide NBCC 2010 Schedule B1, B2 and C-B.
- .5 Indicate arrangements of sheets and joints, types and locations of fasteners and special shapes and relationship of panels to structural frame.
- .6 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .7 Submit duplicate 300 x 300mm samples of each sheet metal material.

#### 1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Separate for recycling and place in designated containers Steel Metal Plastic waste in accordance with Waste Management Plan.
- .5 Place materials defined as hazardous or toxic in designated containers.
- .6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .7 Ensure emptied containers are sealed and stored safely.
- .8 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .9 Unused paint, caulking, and sealing compound materials must be disposed of at an official hazardous material collections site as approved by Departmental Representative.
- .10 Unused paint, caulking, and sealing compound materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .11 Fold up metal banding, flatten and place in designated area for recycling.

#### 1.5 GUARANTEE

- .1 Provide the RCABC ten (10) year guarantee for new roofing systems and flashings specified in this Section and twenty (20) year Manufacturer Warranty. Guarantee shall cover all materials, installation and workmanship from the date of Substantial Performance of the Project.

## 2.0 PRODUCTS

### 2.1 SHEET METAL MATERIALS

- .1 minimum base metal thickness- 0.701mm(24 gauge).  
Acceptable Product: 305mm wide flat panel completed with 25mm high snap lock, Galvalume Plus AZ180

### 2.2 ACCESSORIES

- .1 Assembly and Installation Accessories: Provide manufacturer's standard fasteners, brackets, clips, anchoring devices, furring strips, spacers, flashings, closures, adhesives, joint sealers, expansion joints and other components needed for a complete permanently weather proof installation. Use materials which are non-corrosive, non-deteriorating, and compatible with the panel faces. All exposed fasteners shall be painted to match siding panels.
- .2 Trims and Custom Break Shapes: Provide trim components as part of the preformed metal cladding work, including all flashing and collars, capping, seam covers, end stop and filler pieces, etc. Match the material and finish of the exterior panels, thickness minimum 0.61mm (24ga).
- .3 Flashings: shall be of the same material and finish as metal cladding, thickness minimum 0.61mm(24ga)
- .4 Closure Strips: shall be of same material and finish as metal cladding, thickness minimum 0.61mm(24ga)
- .5 Sealant: for metal cladding system shall be gummable non-skinning butyl, with the colour to match adjoining surfaces, field applied around all openings, and to side of all cladding.
- .6 Z-Girt: Thermally broken, adjustable with PVC spacers, composed of inner short sections of angle and a continuous angle to the outside, tie together with a screw fastener.

### 2.3 FABRICATION

- .1 Fabricate aluminum sheet metal in accordance with AA ASM-35.
- .2 Determine the section properties of the metal cladding panel systems in strict accordance with the requirements of the National Building Code; Canadian Structural Design Manual including CSA S136, Design of Light Gauge Steel Structured Members.
- .3 Metal cladding panel systems shall withstand all live loads resulting from wind or a combination of wind and temperature as defined in the BC Building Code without exceeding the maximum working stress of 20,000 psi for steel members or the maximum deflection of 1/180th of the span.
- .4 Form individual pieces in 2400 mm maximum lengths. Make allowances for expansion at joints.
- .5 Hem exposed edges on underside 12 mm, mitre and seal.
- .6 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .7 Apply minimum 0.2 mm dry film thickness coat of plastic cement to both faces of dissimilar metals in contact.

- .8 Protect dissimilar metals against oxidization by backpainting with isolation coating where indicated.

#### 2.4 AIR/WATER/VAPOUR BARRIER MEMBRANE (ROOF UNDERLAYMENT)

- .1 SBS modified self-adhesive membrane composed of SBS modified bitumen and a tri-laminated woven polyethylene facer. The underface is covered with a silicone release film.
- .2 Primer
- .1 All substrates must be primed according to manufacturer's recommendations. Substrate to be sound & clean, free of loose materials or contaminants.
- .3 Properties:
- |                                   |   |  |
|-----------------------------------|---|--|
| .1 Thickness:                     | 0.8 mm (31 mil)   |  |
| .2 Dimensions:                    | 40.8 x 1.14 m (134 x 3.7 ft.)                           |  |
| .3 Gross / Net coverage per roll: | 46.5 / 43.5 m <sup>2</sup> (500 / 468 ft <sup>2</sup> ) |  |
| .4 Weight:                        | 0.77 kg/m <sup>2</sup> (0.16 lb/ft <sup>2</sup> )       |  |
| .5 Selvedge width:                | 75 mm (3 in)  |  |
| .6 Top face:                      | Tri-laminate woven polyethylene                         |  |
| .7 Underface:                     | Silicone release film                                   |  |
| .8 Rolls per skid:                | 25  |  |
| .9 Tensile strength, MD/XD:       | ASTM D5147  | 9.5 / 13 KN/m (54 / 74 lbf/in)         |
| .10 Ultimate elongation, MD/XD:   | ASTM D5147  | 33 / 25%                               |
| .11 Cold bending:                 | ASTM D5147  | -50 °C (-58 °F)                        |
| .12 Static puncture:              | ASTM D5602  | 400 N (90 lbf)                         |
| .13 Tear resistance, MD/XD:       | ASTM D1970  | 423 / 458 N (95 / 103 lbf)             |
| .14 Lap adhesion:                 | ASTM D1876  | 1000 N/m (68 lbf/ft)                   |
| .15 Water absorption:             | ASTM D5147  | 0.1 % max.                             |
| .16 Peel resistance on steel:     | ASTM D903   | 950 N/m (5.4 lbf/in)                   |
| .17 Water vapour permeance:       | ASTM E96 (Procedure B)                                  | 1.7 ng/Pa.s.m <sup>2</sup> (0.03 perm) |
| .18 Air permeability:             | ASTM E2853 (75 Pa)                                      | < 0.0002 L/sec • m <sup>2</sup>        |
- .4 Ice and Water Shield
- .1 Provide ice dam protection membrane of self-adhesive SBS modified bitumen membrane extend upslope for a minimum of 915mm.

#### 2.5 SLIP SHEET

- .1 Provide slip sheet on top of insulation as per manufacturer's recommendation.

#### 3.0 EXECUTION

##### 3.1 EXAMINATION

- .1 Examine and obtain all necessary measurements of previously executed work which may affect the work of this Section.
- .2 Report any discovered discrepancies to the Contractor so that instructions may be give for the necessary remedial work.

### 3.2 PREPARATION

- .1 Wherever possible, take field measurements prior to completion of shop fabrication and finishing of preformed metal cladding. Do not delay job progress; allow for trimming where final dimensions cannot be established before fabrication.

### 3.3 STORAGE AND HANDLING

- .1 Exercise care in storing, handling and placing the roof panels to prevent damage likely to impair the adequacy or appearance of the material in the finished structure.
- .2 Damaged material shall be replaced or corrected to the satisfaction of the Consultant and any costs incurred shall be borne by the parties responsible for the damage.

### 3.4 AIR/WATER/VAPOUR BARRIER

- .1 Install air/water/vapour barrier according to RCABC specifications or to manufacturer's recommendations for cold adhesive application as applicable.

### 3.5 PRIMER

- .1 Prime gypsum wall board and metal surfaces to be directly adhered with bituminous membrane and allow to dry.

### 3.6 MEMBRANE APPLICATION

- .1 Align membrane and remove 600mm (24") of release paper. Apply to surface keeping the roll in line. Adhere the remainder of the membrane roll by removing the silicone paper as the membrane is unrolled, pass a broom over the surface to remove any air trapped under the membrane.
- .2 Install subsequent rolls in similar fashion and align with preceding rolls with a side lap of minimum 75 mm (3"). End laps must overlap a minimum of 150mm (6").
- .3 Field membrane shall extend up curb section a minimum of 76mm (3"). Curb membrane shall extend down the wall and back onto the field membrane and minimum of 150mm (6"). This application shall produce a 'shingle lap" over the field membrane resulting in an inside corner which consists of two (2) plies of waterproofing membrane.
- .4 Roll a linoleum roller over the deck membrane application to improve initial adhesion to the substrate.
- .5 Apply a trowelled bead of SBS bitumen mastic to top terminations of curb membrane at the end of each days work.

### 3.7 METAL STANDING SEAM ROOFING

- .1 Erect Standing Seam Roofing to manufacturer's instructions and in accordance with the drawings and details over roofing membrane and Plywood Sheathing.
- .2 All erection work shall be the responsibility of the manufacturer and such erection work shall be carried out by the manufacturer's trained erection crews or manufacturer's approved erector in strict accordance with manufacturer's directions and reviewed shop drawings.
- .3 Metal roofing shall be installed to the slope as indicated on the drawings.

- .4 Anchor component parts of the preformed metal cladding securely in place, providing for necessary thermal and structural movement as recommended by manufacturer. Make corners square, surfaces true and straight in all planes and lines accurate to profiles.
- .5 Tolerances: Erect the work plumb, level and true to line with tolerances not exceeding 6 mm in runs of 6 m.
- .6 Install exterior corners, fillers and closure strips with individually formed and profiled work using concealed fasteners.

### 3.8 FLASHING INSTALLATION

- .1 Use concealed fasteners where appropriate. Exposed fasteners to be of same color as sheet.
- .2 Lock end joints and caulk to provide weather-tight seal. Use standing seam joints in flashings to RCABC Standards. Seal all joints in flashings.
- .3 Provide all flashings to make metal roofing watertight.
- .4 Install matching cap flashing at ridges, eaves and other locations as indicated.
- .5 Flashing color to match metal cladding colors where exposed to view.
- .6 Flashing details shown on the drawings indicate the general type and appearance required. Carry out all work in a proper workmanlike manner to RCABC Standards and details. Form proper returns to stop ends and work to and around all features as necessary.
- .7 Make all roof areas watertight as required. Flash openings and items projecting through roofing. Bend up flashing as required; fold and clip neatly and secure in straight lines free from wrinkles and undulations. Fastening to be concealed and watertight. Carefully place, form and trim breaks. Bond and neutralize soldering.
- .8 Turn back edges of all exposed flashing to form ¼" (6mm) stiffeners.
- .9 Form all flashings on a bending brake. Execute all hand trimming, shaping and soldering with appropriate tools. Install with hold down clips.
- .10 Allow for expansion and contraction to finished work without deformation.
- .11 Install starter strips, backer plates, drip caps, outside custom corners and other trims and flashings, as indicated on the drawings and as required to provide a complete and finished product. Cladding manufacture to supply cap flashings for forming and installation by roofing contractor.
- .12 All Flashing in contact with steel preformed metal cladding as herein described shall be steel and by this trade.

**3.9 SEALANT**

- .1 Provide sealant and joint packing to perimeter joints at metal roofing and at all penetrations through roofing and as required for performance. Comply with sealant manufacturer's instructions for installation and curing.

**3.10 CLEANUP**

- .1 Before removing scaffolding, clean off any marks on metal roofing. Repair any defects to any other work caused by this work; leave panels free of oil, grease and dirt.
- .2 This subcontractor shall leave all metal roofing panels clean and free of all grime and dirt.
- .3 At the completion of the work of this Section, remove any excess materials, debris and equipment, pertaining to the work of this Section from the site.

END OF SECTION 07 61 13

1.0 GENERAL

- .1 Section Includes: All labor, materials, tools and other equipment, services and supervision required to complete all exterior repainting work as indicated on the drawings and specifications.
- .2 Work under this Contract shall also include, but not necessarily be limited to:
  - .1 High pressure washing and abrasive blasting.
  - .2 Surface preparation of substrates as required for acceptance of paint, including cleaning, patching, caulking, and making good surfaces and areas to the limits defined under MPI Repainting Manual Preparation requirements.
  - .3 Specific pre-treatments noted herein or specified in the MPI Repainting Manual.
  - .4 Sealing / priming surfaces for repainting in accordance with MPI Repainting Manual requirements.
- .3 Refer to drawings for type, location and extent of exterior repainting required, and include all touch-ups necessary to complete work shown.

1.1 RELATED REQUIREMENTS

- .1 02 83 11 Lead Basepaint (Abatement Intermediate Precautions)

1.2 REFERENCES

- .1 Environmental Protection Agency (EPA)
  - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .3 The Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual.
  - .2 Standard GPS-1- 12, 2-12, MPI Green Performance Standard for Painting and Coatings.
- .4 National Fire Code of Canada 2015.
- .5 Society for Protective Coatings (SSPC)
  - .1 Systems and Specifications, SSPC Painting Manual latest edition.

1.3 QUALITY ASSURANCE

- .1 This Contractor shall have a minimum of five (5) years proven satisfactory experience and shall show proof before commencement of work that he will maintain a qualified crew of painters throughout the duration of the work. When requested, Contractor shall provide a list of the last three comparable exterior repainting jobs including, name, location, specifying authority / project manager, start / completion dates and value of the work.
- .2 Only qualified journeypersons, as defined by local jurisdiction, shall be engaged in exterior repainting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyperson in accordance with trade regulations.
- .3 All materials, preparation and workmanship shall conform to the standards contained in the latest edition of the Master Painters Institute (MPI) Maintenance and Repainting Manual (herein referred to as the MPI Repainting Manual).



- .4 All exterior repainting work shall be inspected by a Paint Inspection Agency (inspector) acceptable to the specifying authority. The painting contractor shall notify the Paint Inspection Agency a minimum of one week prior to commencement of work and provide a copy of the project painting specification, and plans.
- .5 All surfaces requiring repainting shall be inspected by the Painting Subcontractor who shall notify the Consultant, Paint Inspection Agency, and General Contractor in writing of any defects or problems, prior to commencing repainting or after preparation work.

#### 1.4 REGULATORY REQUIREMENTS

- .1 Conform to work place safety regulations for storage, mixing, application and disposal of all paint related materials to requirements of those authorities having jurisdiction.
- .2 Conform to safety precautions in accordance with the latest requirements to Industrial Health and Safety Regulations, latest edition, of authorities having jurisdiction.
- .3 Notify the Paint Inspection Agency on award of contract and make application for assignment of an Inspector using appropriate forms supplied by the Agency as well as provide a copy of the project repainting specification, drawings, color schedule and list of proposed materials for review purposes prior to commencement of work.
- .4 Fully cooperate at all times with the requirements of the Paint Inspection Agency in the performance of their duties, including providing access and assistance as required to complete inspection work.
- .5 To reduce the amount of contaminants entering waterways, sanitary / storm drain systems or into the ground the following procedures shall be strictly adhered to:
  - .a Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.
  - .b Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
  - .c Return solvent and oil-soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
  - .d Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
  - .e Empty paint cans are to be dry prior to disposal or recycling (where available).
  - .f Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.
- .6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

#### 1.5 MOCK-UPS

- .1 When requested by the Consultant or Paint Inspection Agency, prepare and repaint a designated exterior surface area or item to requirements specified herein, with specified paint or coating showing selected colors, gloss / sheen, texture and workmanship to MPI Repainting Manual standards for review and approval. When approved, exterior surface area and/or item shall become acceptable standard of finish quality and workmanship for similar on-site repainting work.

1.6 SUBMITTALS

- .1 All submittals shall be in accordance with the requirements of Section 01 33 00 – Submittal Procedures.
- .2 Submit list of all painting materials to the Consultant and the Paint Inspection Agency for review prior to ordering materials.
- .3 Submit Material Safety Data Sheets (MSDS) prior to commencement of work for review and for posting at job site as required.
- .4 Submit certification reports for ecologo paint products used.
- .5 Submit invoice list of all paint materials ordered for project work to Paint Inspection Agency indicating manufacturer, types and quantities for verification and compliance with specification and design requirements if requested.
- .6 Submit work schedule for various stages of work for the Consultant's review and Owner's approval if requested.
- .7 At project completion provide an itemized list complete with manufacturer, paint type and color coding for all colors used for Owner's later use in maintenance.
- .8 At project completion provide properly packaged maintenance materials as noted herein and obtain a signed receipt.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver all painting materials in sealed, original labeled containers bearing manufacturer's name, brand name, type of paint or coating and color designation, standard compliance, materials content as well as mixing and/or reducing and application requirements.
- .2 Store all paint materials in original labeled containers in a secure (lockable), dry, heated and well ventilated single designated area meeting the minimum requirements of both paint manufacturer and authorities having jurisdiction and at a minimum ambient temperature of 45 degree F (7 degree C). Only material used on this project is to be stored on site.
- .3 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.
- .4 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.
- .5 Comply with requirements of authorities having jurisdiction, in regard to the use, handling, storage and disposal of hazardous materials.

1.8 PROJECT / SITE REQUIREMENTS

- .1 UNLESS specifically pre-approved by the specifying body, Paint Inspection Agency and the applied product manufacturer, perform no exterior repainting work when the ambient air and substrate temperatures are below 50 degree F (10 degree C).

- .2 Perform no exterior repainting work unless environmental conditions are within MPI and paint manufacturer's requirements or until adequate weather protection is provided. Where required, suitable weatherproof covering and sufficient heating facilities shall be in place to maintain minimum ambient air and substrate temperatures for 24 hours before, during and after paint application.
- .3 Perform no exterior repainting work when the relative humidity is above 85% or when the dew point is less than 5 degree F (3 degree C) variance between the air / surface temperature.
- .4 Conduct all moisture tests using a properly calibrated electronic Moisture Meter.
- .5 Test concrete and masonry surfaces for alkalinity as required.
- .6 Apply paint only to dry, clean, and adequately prepared surfaces in areas where dust is no longer generated by construction activities such that airborne particles will not affect the quality of finished surfaces.

#### 1.9 SCHEDULING

- .1 Submit work schedule for various stages of painting to Departmental Representative for approval. Submit schedule minimum of 48 hours in advance of proposed operations.
- .2 Obtain written authorization from Departmental Representative for changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants in and about building.

#### 1.10 GUARANTEE

- .1 Furnish a two (2) year Painting Association Guarantee or a 100% 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. 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.
- .3 Painting Subcontractors choosing the Maintenance Bond option shall provide written proof of their ability to supply same at time of bidding.

#### 1.11 MAINTENANCE MATERIALS

- .1 At project completion provide a minimum of 4 liters (1 gallon) of each type and color of paint from same production run (batch mix) used in unopened cans, properly labeled and identified for Owner's later use in maintenance. Store where directed.

#### 2.0 PRODUCTS

##### 2.1 MATERIALS

- .1 All materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be products listed in the latest edition of the MPI Approved Product List 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 Approved Product List and shall be compatible with other coating materials as required.
- .3 All materials and paints shall be lead and mercury free.
- .4 Where required, paint products shall meet MPI Environmentally Friendly" E2 ratings based on VOC (EPA Method 24) content levels.
- .5 All paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes, sags, air entrapment, etc. Refer to 3.5, Field Quality Control / Standard of Acceptance requirements.

## 2.2 EQUIPMENT

- .1 Painting Equipment: to best trade standards for type of product and application.
- .2 Spray-Painting Equipment: of ample capacity, suited to the type and consistency of paint or coating being applied and kept clean and in good working order at all times.

## 2.3 MIXING AND TINTING

- .1 Unless otherwise specified or pre-approved, all paints shall be ready-mixed and pre-tinted. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations.
- .4 If required, thin paint for spraying in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.

## 2.4 FINISH AND COLORS

- .1 Unless otherwise specified herein, all exterior repainting work shall be done in accordance with MPI Premium Grade requirements.
- .2 Colors shall be as selected by the Consultant from a manufacturer's full range of colors.
- .3 Color selection will be based on two (2) base colors with a maximum of one (1) deep or bright color. No more than two (2) colors will be selected for exterior painting work on this project.

## 2.5 GLOSS / SHEEN

- .1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI gloss / sheen standard values:

<b>Gloss Level</b>	<b>Description</b>	<b>Units @ 60 degrees</b>	<b>Units @ 85 degrees</b>
<b>G1</b>	Matte or Flat finish	0 to 5	10 maximum

**EXTERIOR PAINTING**

<b>G2</b>	Velvet finish	10 maximum	10 to 35
<b>G3</b>	Eggshell finish	10 to 25	10 to 35
<b>G4</b>	Satin finish	20 to 35	35 minimum
<b>G5</b>	Semi-Gloss finish	35 to 70	
<b>G6</b>	Gloss finish	70 to 85	
<b>G7</b>	High-Gloss finish	> 85	

- .2 Gloss level ratings of all painted surfaces shall be as specified herein.

**3.0 EXECUTION**

**3.1 CONDITION OF SURFACES**

- .1 Prior to commencement of repainting work, thoroughly examine (and test as required) all exterior conditions and surfaces scheduled to be repainted and report in writing to the Department Representative any conditions or surfaces that will adversely affect work of this section.
- .2 The degree of surface deterioration (DSD) shall be assessed using the assessment criteria indicated in the MPI Maintenance Repainting Manual. In general, the MPI DSD ratings and descriptions are as follows:

<b>Condition</b>	<b>Description</b>
<b>DSD-0</b>	Sound Surface (may include visual (aesthetic) defects that do not affect film's protective properties).
<b>DSD-1</b>	Slightly Deteriorated Surface (may show fading; gloss reduction, slight surface contamination, minor pin holes scratches, etc.) / Minor cosmetic defects (runs, sags, etc.).
<b>DSD-2</b>	Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, staining, etc.).
<b>DSD-3</b>	Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges).
<b>DSD-4</b>	Substrate Damage (repair or replacement of surface required by

- .3 Other than the repair of DSD-1 to DSD-3 defects included under this scope of work, structural and DSD-4 substrate defects discovered prior to and after surface preparation or after first coat of paint shall be made good and sanded by others ready for painting, unless otherwise agreed to by the Department Representative and painter to be included in this Work.
- .4 No repainting work shall commence until all such DSD-4 adverse conditions and defects have been corrected and surfaces and conditions are acceptable to the Painting Subcontractor. The Painting Subcontractor shall not be responsible for the condition of the substrate or for correcting defects and deficiencies in the substrate, which may adversely affect the painting work except for minimal work normally performed by the Painting Subcontractor and as, indicated herein. It shall always, however, be the responsibility of the Painting Subcontractor to see that surfaces are properly prepared before any paint or coating is applied. It shall also be the Painting Subcontractor's responsibility to paint the surface as specified providing that the Department Representative accepts responsibility for uncorrected DSD-4 substrate conditions.

### 3.2 PREPARATION OF SURFACES

- .1 Prepare all exterior surfaces for repainting in accordance with MPI Repainting Manual requirements. Refer to the MPI Repainting Manual in regard to specific requirements for the following:
  - .a environmental conditions.
  - .b structural steel and miscellaneous metals.
  - .c galvanized and zinc coated metal.
- .2 Where required, pressure wash and /or sandblast exterior surfaces prior to repainting in accordance with MPI standards for type of surfaces and recommended pressures to ensure complete removal of all loose paint, stains, dirt, and other foreign matter. This work shall be carried out only by qualified tradesman experienced in pressure water cleaning. The use of water hose cleaning will not be considered satisfactory, unless specifically specified. Allow sufficient drying time and test all surfaces using an electronic moisture meter before commencing work.
- .3 Sand, clean, dry, etch, neutralize and/or test all surfaces under adequate illumination, ventilation and temperature requirements.
- .4 Remove and securely store all miscellaneous hardware and surface fittings / fastenings (e.g. electrical lights, mechanical louvers, and removable hazard / instruction labels. from soffit surfaces, 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 (e.g. lacquer finishes).
- .5 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.

### 3.3 APPLICATION

- .1 Do not commence repainting unless substrates and all environmental conditions are acceptable for the application of products.
- .2 Apply primer, paint or stain in accordance with MPI Painting Manual Premium Grade finish requirements.
- .3 Apply primer, paint or stain in a workmanlike manner using skilled and trade qualified applicators as noted under Quality Assurance.
- .4 Apply primer, paint or stain within an appropriate time frame after cleaning and preparation to prevent weathering or water staining of substrate or before environmental conditions encourage flash-rusting, rusting, contamination or when the manufacturer's paint specifications require earlier applications.
- .5 Primer, paint or stain coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations.
- .6 Tint each coat of paint progressively lighter to enable confirmation of number of coats.

- .7 Unless otherwise approved by the painting inspection agency, apply a minimum of four coats of paint where deep or bright colors are used to achieve satisfactory results.
- .8 Sand and dust between each coat to provide an anchor for next coat and to remove defects (runs, sags, etc.) visible from a distance up to 1000 mm (39").
- .9 Do not apply finishes on exterior 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.
- .10 To avoid air entrapment in applied coats, apply materials in strict accordance with manufacturer's spread rates and application requirements.

### 3.4 EXTERIOR FINISH / COATING SYSTEMS

Repaint exterior surfaces in accordance with the following MPI Repainting Manual requirements:

#### .1 **Structural Steel and Metal Fabrications:**

REX 5.1F High build epoxy finish.

#### .2 **Galvanized Metal:** (not chromate passivated)

REX 5.3C Epoxy finish.

### 3.5 FIELD QUALITY CONTROL / STANDARD OF ACCEPTANCE

- .1 All surfaces, preparation and paint applications shall be inspected.
- .2 Repainted exterior surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the Painting Inspection Agency inspector:
  - .a brush / roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
  - .b evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
  - .c damage due to touching before paint is sufficiently dry or any other contributory cause.
  - .d damage due to application on moist surfaces or caused by inadequate protection from the weather.
  - .e damage and/or contamination of paint due to wind blown contaminants (dust, sand blast materials, salt spray, etc.).
- .3 Repainted exterior surfaces shall be considered unacceptable if any of the following are evident under natural lighting conditions:
  - .a visible defects are evident on vertical surfaces when viewed at 90 degrees to the surface from a distance of 1000 mm (39").
  - .b visible defects are evident on horizontal surfaces when viewed at 45 degrees to the surface from a distance of 1000 mm (39").
  - .c visible defects are evident on soffit and other overhead surfaces when viewed at 45 degrees to the surface
  - .d when the final coat on any surface exhibits a lack of uniformity of sheen across full surface area.

- .4 Repainted surfaces rejected by the inspector shall be made good at the expense of the Contractor. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

**3.6 PROTECTION**

- .1 Protect all newly repainted exterior surfaces from rain and snow, condensation, contamination, dust, salt spray and freezing temperatures until paint coatings are completely dry. Curing periods shall exceed the manufacturer's recommended minimum time requirements.
- .2 Erect barriers or screens and post signs to warn, limit or direct traffic away or around work area as required.

**3.7 CLEAN-UP**

- .1 Remove 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 materials 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 (e.g. rags, drop cloths, masking papers, etc.), paints, thinners, paint removers/strippers in accordance with the safety requirements of authorities having jurisdiction.

END OF SECTION 09 91 13



Part 1 General

1.1 SCOPE

- .1 This section covers the general requirements for the production, gradation and stockpiling operations for the crushed aggregate materials required for the project.

1.2 GENERAL

- .1 Aggregate produced shall comply fully with the specifications and the Contractor shall recognize and satisfy himself as to the type and amount of work that may be necessary to produce the required material.
- .2 The aggregate shall meet the requirements for the materials specified in Geotechnical Report completed by *TETRA TECH Geotechnical Evaluation - Fraser, B.C, December 05, 2014; ISSUED FOR USE, FILE: W14103499-01*
- .3 The Contractor shall adjust and modify aggregates as required in order to meet the specification requirements.
- .4 The crushed aggregate shall be composed of sound, hard and durable particles of sand, gravel and rock and shall be free from elongated particles, injurious quantities of flaky particles, soft shales, organic matter, clay lumps and other foreign matter.
- .5 A tolerance of three (3.0) percent in the amount passing the maximum sieve size will be permitted, providing all oversize material passes the next larger standard sieve size.
- .6 The Contractor shall be entirely responsible for the quantity and quality of crushed aggregate produced.

1.3 MEASUREMENT FOR PAYMENT

- .1 Production of aggregate and crush gravel will not be measured separately for payment.
- .2 All granular material imported to site is to be substantiated with haul tickets. Refer to Section 01 33 00 - Submittal Procedures or information requirements and timeline summaries.

1.4 QUALITY CONTROL AND QUALITY CONTROL TESTING

- .1 General
  - .1 In all sources, quality control and quality control testing are the responsibility of the Contractor throughout every stage of the Work.
  - .2 Tests performed by the Departmental Representative will not be considered quality control tests.
  - .3 The Contractor shall provide, pay for and maintain equipment and qualified personnel to carry out all field testing necessary to determine and monitor the characteristics of the materials produced and the final product to be delivered.
  - .4 The Contractor shall provide safe and convenient means for accurately and representatively sampling each aggregate stream being produced during all screening, splitting and crushing processes.
  - .5 Prior to commencement of the Work, the Contractor shall provide the Departmental Representative with his program and schedule of testing for quality control and shall

demonstrate to the satisfaction of the Departmental Representative that the program and schedule are adequate to provide reliable quality control within the limits specified.

- .6 The Contractor shall retain and utilize Professional Engineering Services provided by a registered Engineering Consulting Firm to carry out all quality control and quality control testing and to assess and where necessary, modify the aggregate materials being produced to ensure their end use meets all specification requirements. The firm shall be licensed to operate in the Yukon and BC.
  - .7 All quality control test and test results shall be calculated, recorded and submitted to the Departmental Representative on industry standard worksheets. The tests and test results shall be certified for correctness by the Engineering Consulting Firm employed by the Contractor to perform the tests and shall be signed by the Contractor's representative. All worksheets shall be reviewed and certified for correctness by a Professional Engineer from the Engineering Consulting Firm employed by the Contractor to perform the tests, on a weekly basis at a minimum.
- .2 Test Methods
- .1 Unless otherwise specified, the latest edition of the following test methods shall be used to determine material characteristics.  
Test Description Standard
    - .1 Sampling Aggregates ASTM D75
    - .2 Sieve Analysis of Fines & CSA A23.2 Aggregates
    - .3 Sieve Analysis of Materials ASTM C117 Finer than 75 Micron Sieve by Washing
    - .4 Mineral Filler ASTM D546
- .3 Quality Control Testing Requirements
- .1 The Contractor's quality control and quality control testing program shall include the carrying out of quality control testing using the latest edition of the specified test methods at the minimum specified frequencies.
  - .2 Sampling ASTM D 75 One per 1,000 Aggregates tonnes. (This frequency applied to - each fraction being produced.)
  - .3 Crushed One per 1,000 Aggregates tonnes.
    - .1 Fine and Course ASTM A23.2-2A Fraction
    - .2 Materials finer ASTM C117 than 75micron sieve by washing. (This frequency applied to each fraction being produced.)
  - .4 Blend Sand ASTM D546 One per 300 tonnes
    - .1 Manufactured ASTM D546 Blend Sand (Mineral Filler) One per four (4) hours of plant production
    - .2 One per four (4) hours of plant production
  - .5 Reporting of Sieve Analysis Test Results and Production Quantities
    - .1 The Contractor shall record all sieve analysis test results on industry standard grain size curve sheets and worksheets which provide all test data, calculations, error checks, test results and any additional information requested by the Departmental Representative. The Contractor shall also determine and record on each sieve analysis worksheet, the time and date of sampling, the total quantity of granular material produced at the time of sampling and, where applicable, the test lot that the sample refers to.

**AGGREGATE MATERIALS**

- .6 Quality Acceptance
  - .1 Acceptance of processed aggregates will take place when they are in their final position and have met all the requirements of the Contract. The Departmental Representative may test at any time at the work site and reject material that does not meet the specifications. The Contractor shall promptly remove rejected material from the site.
  - .2 The Departmental Representative and their representatives reserve the right to sample, test, inspect and monitor the quality of material being produced and incorporated into the work by the Contractor at any time and as often as he deems necessary. The Contractor shall cooperate with the Departmental Representative and their representatives for such sampling, testing, inspecting and monitoring. The Departmental Representative is under no obligation to provide the Contractor with test results and this testing shall in no way relieve the Contractor of his responsibility to produce aggregates that meet the specifications in all respects.

Part 2 Products

2.1 MATERIALS

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated, or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for the intended use.
- .2 Fine aggregates satisfying requirements of applicable section to be one of or a blend of the following:
  - .3 Natural sand;
  - .4 Manufactured sand;
  - .5 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .6 Coarse aggregates satisfying requirements of applicable section to be one of or a blend of following:
  - .7 Crushed rock;
  - .8 Gravel and crushed gravel composed of naturally formed particles of stone.

2.2 CRUSHED GRANULAR MATERIALS

- .1 Crushed Granular Materials shall conform to the following gradations:

- .2 20 mm Base Course

Sieve Size (mm)	% Pass by Weight
25	100
12.5	64-100
5	36-75
1.25	12-42
0.315	4-22
0.080	3-6

- .3 80mm Minus Road Gravel and Trench Backfill

Sieve Size (mm)	% Pass by Weight
80	100

**AGGREGATE MATERIALS**

25.0	55-100
12.5	42-84
5.00	26-65
1.25	11-47
0.315	3-30
0.080	0-8

Part 3 Execution

3.1 PREPARATION

- .1 Aggregate Source Preparation
  - .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as approved by authority having jurisdiction.
  - .2 Clear, grub and strip area ahead of quarrying or excavating operation enough to prevent contamination of aggregate by deleterious materials.

3.2 PROCESSING

- .1 Process aggregates uniformly using methods that prevent contamination, segregation, and degradation.
- .2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Departmental Representative.

3.3 HANDLING

- .1 Handle and transport aggregates to avoid segregation, contamination, and degradation.

3.4 STOCKPILING

- .1 Stockpile aggregates in enough quantities to meet project schedules.
- .2 Stockpiling sites shall be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
- .3 Do not incorporate bottom 300mm of stockpile into work.
- .4 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.
- .5 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .6 Coning of piles or spilling of material over edges of pile will not be permitted.
- .7 Do not use conveying stackers.
- .8 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

## Part 1 General

### 1.1 SCOPE

1. This Section applies to the supply and application of Traffic Marking Paint and Special Markings on concrete or asphalt roadway surfaces under the jurisdiction of the Department within the Province of British Columbia. Traffic Marking Paint (Paint) and Special Markings (Special Markings) shall be used with accepted overlay glass reflectorized beads.
2. Not Used

### 1.2 GENERAL REQUIREMENTS

1. The composition and consistency of the Paint will be at the discretion of the manufacturer. Paint shall be supplied in white or yellow colors accepted by the Department without any "pre-mix" beads. Application of Paint shall include an overlay of glass reflectorized beads.
2. Special Markings shall have reflective characteristics to meet Department requirements. Paint and Special Markings products shall meet Environment Canada's Federal Regulations on VOC's limits.
3. Special Markings material and application requirements shall be identified in the Special Provisions.
4. Traffic Marking Paint shall be supplied from traffic paint products listed on the BC Department of Transportation and Infrastructure Recognized Products List, or from either the Alberta Department of Transportation or Washington Department of Transportation product's list as identified in the Special Provisions.
5. Special Marking Materials shall be supplied from the BC Department of Transportation and Infrastructure Recognized Products List or as identified in the Special Provisions.
6. The BC Department of Transportation and Infrastructure Recognized Product List is available on-line at:

.1 [http://www.th.gov.bc.ca/publications/eng\\_publications/geo\\_tech/Recognized\\_Products\\_Book.pdf](http://www.th.gov.bc.ca/publications/eng_publications/geo_tech/Recognized_Products_Book.pdf)

## Part 2 Products

### 2.1 MATERIALS

1. Paint to this specification shall comply with the following:
  - .1 Consistency:
    - .1 85 5 Krebs units in accordance with test method ASTM D 562.
  - .2 Drying Time:
    - .1 Maximum 30 minutes at 21°C at 50-60% relative humidity in accordance with test method ASTM D 711.

- .3 Bleeding:
  - .1 The Paint shall have a degree of resistance to bleeding of seven or greater in accordance with test method ASTM D 868 or ASTM D 969.
- .4 Road Service Life:
  - .1 Paint shall have acceptable properties for general appearance, durability and night visibility. Acceptable properties are defined as being equal to or better than those obtained by Paints currently "Qualified or Accepted" through Department product testing or other jurisdiction testing acceptable by the Departmental Representative.
- .5 Night Time Retro reflectivity:
  - .1 Paint shall meet retro reflectivity as per ASTM D 7585/D 7585M with the exceptions as identified within this Specification and the Department's Pavement Marking Contract. Retro reflectivity shall be measured in accordance to ASTM E 1710.
- .6 Application Characteristics
  - .1 The degree of settling shall be such that the Paint can be readily re-mixed to a uniform consistency and there shall be no skinning. Paint shall not have marked thixotropic properties.
  - .2 Paint shall be capable of being sufficiently atomized to produce a uniformly applied line 100 mm in width with absence of side splatter, overspray, or cobwebbing within the limits imposed by the application equipment used on the Contractor's line stripping machines.
  - .3 Paint shall be capable of being successfully applied to at least 2 km of dash line without the necessity of adjusting any machine settings and without showing any evidence of distortion of the spray pattern or appreciable buildup of Paint in the spray gun tips.
- .7 Colour In accordance to ASTM D 6628:
  - .1 White Paint shall comply with US Federal Specification 595b White 17886.
  - .2 Yellow Paint shall comply with U.S. Federal specification 595b Yellow 33538
  - .3 Yellow Paint shall conform to the a-b colour box for traffic Paint using the L\*a\*b colour coordinate system.
- .8 Retro reflectivity – Retro reflectivity shall be in accordance with ASTM D 4061.
- .9 Glass Beads - Glass reflectorized beads shall be added during the spraying of Paint in accordance with the glass beads manufacturer's recommended application requirements. Glass beads for pavement marking shall:

- .1 Be colorless:
- .2 Be at least 75% by weight as true spherical shape as determined with a Roundness Tester by ASTM D 1155 with exception of the 80um size;
- .3 Have smooth, lustrous, and free of air inclusions, dark specs, milkiness, incipient fractures, surface films or other imperfect finishing characteristics;
- .4 Have spheres exhibit an index of refraction of not less than 150 when tested by the liquid immersion method at 25oC;
- .5 Meet requirements of AASHTO M 247; and
- .6 Have a silica (SiO<sub>2</sub>) content greater than 60%.
- .7 Special Markings shall be laid out and identified in the Special Provisions.

## 2.2 TRAFFIC MARKINGS

1. Paint shall be applied in the manner as required under the Work requirements. Types of Paint lines shall be identified by the Department in accordance to the "Manual of Standard Traffic Signs and Pavement Markings," Fig. 7.1. Department publications are available on-line at:

- .1 [http://www.th.gov.bc.ca/publications/eng\\_publications/eng\\_pubs.htm#signing](http://www.th.gov.bc.ca/publications/eng_publications/eng_pubs.htm#signing)

## 2.3 PERFORMANCE SPECIFICATIONS

1. Longitudinal Pavement Markings –The Contractor shall:

- .1 Layout all, with no additional payment, Longitudinal Pavement Markings as identified on the Drawings or existing pavement markings in accordance with the Department's "Manual of Standard Traffic Signs and Pavement Markings" or as instructed by the Departmental Representative.
- .2 Paint Longitudinal Pavement Markings on New Pavement Projects as follows:
  - .1 Apply an initial application of Longitudinal Pavement Markings at a wet thickness of not less than 10 mils; then after curing
  - .2 Apply a second application, with no additional payment, in accordance with the paint manufacturer's suggested application interval. The wet thickness shall not be less than 15 mils regardless of product used.
  - .3 (The wet thickness of all Longitudinal Pavement Markings will be applied uniformly).
- .3 Ensure all Longitudinal Pavement Markings have well defined edges and are free of tire tracking, with no splatter, excessive overspray or other defects;
- .4 Ensure Longitudinal Pavement Markings are straight, or of uniform curvature, and conform with the alignment;

- 
- .5 Ensure the following dimensional criteria are met:
- .1 Longitudinal Pavement Markings do not exceed a dimensional width of 110 mm for specified 100 mm wide line. No tolerance below 100 mm is allowed for the specified 100 mm line;
  - .2 Longitudinal Pavement Markings do not exceed a dimensional width of 210 mm for specified 200 mm wide line. No tolerance below 200 mm is allowed for the specified 200 mm line;
  - .3 The distance between the lines for Double Solid and Simultaneous Solid and Broken do not exceed a dimensional separation of 110 mm. No tolerance below 100 mm is allowed;
  - .4 Longitudinal Pavement Marking Broken Lines do not exceed a maximum dimensional length deviation of  $\pm 100$  mm for the specified length; and
  - .5 No spaces between Broken Lines exceed a maximum dimensional length deviation of  $\pm 100$  mm from the specified length of space.
- .6 Apply glass beads immediately following the final Paint application. Glass beads are to be applied on all Longitudinal Pavement Markings at a uniform application rate as required by the glass bead Manufacture.
- .7 Ensure:
- .1 Retro reflectivity properties of not less than 200 millicandela-m-2-lux-1 for White Paint under dry conditions are achieved on all Longitudinal Pavement Markings for at least 30 days from the time of application.
  - .2 Retro reflectivity properties of not less than 150 millicandela-m-2-lux-1 for YellowPaint under dry conditions are achieved on all Longitudinal Pavement Markings for at least 30 days from the time of application.
  - .3 Retro reflectivity properties of not less than 150 millicandela-m-2-lux-1 for White Paint under dry conditions are achieved from time of application to October 15th of the calendar year in which the line was painted.
  - .4 Retro reflectivity properties of not less than 100 millicandela-m-2-lux-1 for Yellow Paint under dry conditions are achieved from time of application to October 15th of the calendar year in which the line was painted.
- .5 All durability testing is in accordance with ASTM D 913;
- .6 The condition of Longitudinal Pavement Markings meets the minimum of photographic reference standard No. 8 (Film 97 per cent Intact) Chipping ASTM D 913 from time of application to October 15th of the calendar year in which the line was painted. Longitudinal Pavement Markings that do not meet these criteria must be repainted immediately upon detection or as directed by the Department Representative.
  - .7 The condition of Longitudinal Pavement Markings must meet the minimum of photographic reference standard of No. 4 (Film 77 per cent Intact) Chipping ASTM D 913 on January 15th of the subsequent year to which the line was painted.



2.4 TRANSVERSE, CHEVRON AND CROSSHATCH PAVEMENT MARKINGS

1. The Contractor shall:

- .1 Repaint the Transverse, Chevron and Crosshatch Pavement Markings, with no additional payment, as identified on the Drawings or existing pavement markings to conform to the Department's "Manual of Standard Traffic Signs and Pavement Markings." The Department Representative shall be contacted about any existing Transverse, Chevron and Crosshatch Pavement Markings that do not conform to the Department's "Manual of Standard Traffic Signs and Pavement Markings" prior to proceeding with the repainting;
- .2 Layout and Paint all new Transverse, Chevron, and Crosshatch Pavement Markings in accordance with the Department's "Manual of Standard Traffic Signs and Pavement Markings" or as instructed by the Department Representative;
- .3 Apply Paint to Transverse, Chevron, and Crosshatch Pavement Markings at a wet thickness of not less than 16 mils. This may be done in several coats as long as underlying coats are cured prior to overcoating;
- .4 Ensure all Transverse, Chevron and Crosshatch Pavement Markings are free of tire tracking, with no splatter, excessive overspray, or other defects;
- .5 Ensure the ends of all Chevrons and Crosshatching are within 50 mm of the centre of the intersecting longitudinal line;
- .6 Ensure all Transverse, Chevron and Crosshatch Pavement Markings have well defined edges and are free of horizontal fluctuations;
- .7 Apply glass beads immediately following the final Paint application. Glass beads are to be applied on all Transverse, Chevron, and Crosshatch Pavement Markings at a uniform application rate as required by the glass bead manufacturer; and
- .8 Ensure;
  - .1 Retro reflectivity properties of not less than 200 millicandela·m<sup>-2</sup>·lux<sup>-1</sup> for White Paint under dry conditions are achieved on all Transverse, Chevron, and Crosshatch Pavement Markings for at least 30 days from the time of application;
  - .2 Retro reflectivity properties of not less than 150 millicandela·m<sup>-2</sup>·lux<sup>-1</sup> for Yellow Paint under dry conditions are achieved on all Transverse, Chevron, and Crosshatch Pavement Markings for at least 30 days from the time of application,
  - .3 All durability testing is in accordance with ASTM D 913;
  - .4 The condition of Transverse, Chevron and Crosshatch Pavement Markings meet the minimum of photographic reference standard No. 8 (Film 97 per cent Intact) Chipping ASTM D 913 from time of application to October 15th of the calendar year in which the marking was painted. Transverse, Chevron and Crosshatch Pavement Markings that do not meet these criteria must be repainted immediately upon detection or as directed by the Department Representative; and
  - .5 The condition of Transverse, Chevron and Crosshatch Pavement Markings meet the minimum of photographic reference standard No. 4 (Film 77 per cent Intact)

Chipping ASTM D 913 from time of application to June 15th of the subsequent year in which the marking was painted.

### Part 3 Execution

#### 3.1 QUALITY ASSURANCE

1. This section establishes how the pavement markings will be accepted or not accepted for conformance to the Specifications.
2. Once per Operational Day a minimum of two test sites are to be selected. The selected test sites must be representative of the line type sprayed on the pavement surface of that day (e.g., if 90% of the accomplishment of the day was centerline, then the expectation is that the test sites will be on centerline; if 50% of the accomplishment was on centerline and 50% was on lane line, then the expectation would be that there would be a test site on each line type).

#### 3.2 TESTING

1. The following tests must be performed and recorded per test site for that day:
  - .1 Paint Colour - Testing for conformance shall be made by visual comparison to a standard colour card provided by the Paint manufacturer that certifies colour compliance with this specification.
  - .2 Dimensions - Longitudinal Pavement Markings shall be measured and documented for conformance with the Pavement Marking Specifications.
  - .3 Nighttime Retro reflectivity – Retro reflectivity will be measured as per ASTM D 7585/D 7585M and ASTM E 1710 , notwithstanding the following exceptions contrary to ASTM D 7585/D 7585M:
    - .4 Contrary to Section 6.2.1.4 and 6.2.2.4 of the ASTM D 7585/ D 7585M, checkpoint areas will be as per test sites;
    - .5 Contrary to Section 6.2.1.4 and 6.2.2.4 of the ASTM D 7585/D 7585M, all measurements made within a single checkpoint area may be averaged and recorded as an average. Any average of the readings that do not meet these Pavement Marking Specifications will be determined as unacceptable work; and,
    - .6 Contrary to Section 5.1 of the ASTM D 7585/D 7585M, testing for Retro reflectivity will be carried out only when the newly painted surface is clean, dry, free of all excess beads, and after 24 hours of Paint being applied.
2. Longitudinal Pavement Markings shall have a minimum initial coefficient of retroreflective luminance as indicated in these Pavement Marking Specifications.

#### 3.3 NIGHTTIME RETROREFLECTIVITY MEASUREMENTS

1. All measurements for nighttime retro reflectivity will be made using a MiroLux MX-30, Stripemaster or Stripemaster 2 retro reflectometer or equivalent, as approved in writing by the Departmental Representative. Measurements will be made using the retro reflectometer manufacturer's instructions for operation and procedures and will be made only by competent staff.

2. Sampling will be made using a sample size of 20 test point measurements at 5 m intervals on a single line, tabulated as an average with standard deviation and percent relative standard deviation, and minimum/maximum values.
3. All measurements and related data will be retained by the Contractor in an electronic format approved by the Departmental Representative and will be submitted to the Department on request.

### 3.4 TEST REPORT

1. A test report shall be produced for each checkpoint area and will include the following information:
  - .1 Test date;
  - .2 Average of the readings at each test location, expressed as millicandelas per square metre per lux ( $\text{mcd} \cdot \text{m}^{-2} \cdot \text{lx}^{-1}$ ); the average of the readings will be reported for each traffic direction for centerlines;
  - .3 Geographical location of the test site, referenced by offsets from LKI/RFI landmarks;
  - .4 Identification of the pavement marking material tested: type, colour, date painted, and transverse location on road (line type);
  - .5 Identification of the instrument used;
  - .6 Value and date of standardization of the instrument standard panel used;
  - .7 Remarks concerning the overall condition of the line, such as rubber skid marks, carryover of asphalt, snow plow damage, and other factors that may affect the retro reflectivity measurement;
  - .8 Ambient temperature;
  - .9 Operator's name.

### 3.5 THICKNESS AND CONSISTENCY

1. Longitudinal, Transverse, Chevron, and Crosshatch Pavement Markings shall have a sufficiently thick cross section throughout their entire length and width, and completely cover the intended area being marked. Pavement markings will be tested as per ASTM D 913. Newly applied pavement markings must exceed the photographic reference standard of 97%.

### 3.6 DAYTIME VISIBILITY

1. When viewed dry or wet in the daytime, the pavement markings shall be readily visible for a forward distance of 150 m, or as far forward as possible until obstructed by the road geometry if less than 150 m.
2. Daytime visibility will be assessed visually. Where it is not clear that the specification is met, the distance will be measured.

### 3.7 DURABILITY

1. Longitudinal, Transverse, Chevron, and Crosshatch Pavement Markings shall be visually assessed for conformance with this Specification using ASTM D 913.

**3.8 TEST SITE AND ACCEPTANCE OR REJECTION**

1. A test site is defined as a site where the above six tests have been performed in a single location. If two or more line-types are applied per Operational Day, it may be necessary to perform relevant tests for each line type at more than one location.
2. A failure of any one of the six above components will constitute a failure for that site and will be considered unacceptable work.

**3.9 QUALITY CONTROL**

1. All Quality Control records shall be retained by the Contractor and made available to the Departmental Representative upon request.
2. The Departmental Representative may conduct tests as deemed necessary to identify the Paint supplied is the same as the Paint submitted for qualification.

END OF SECTION 32 10 01

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 31 05 16 – Aggregate Materials

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Site Quality Control Submittals: submit in accordance with Section 01 45 00 – Quality Control.
  - .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article.
  - .2 Submit inspection results report as described in PART 3 – FIELD QUALITY CONTROL.

Part 2 Products

2.1 AGGREGATES

- .1 The contractor shall submit to the Departmental Representative at least ten workdays before start of paving, a mix design using the Marshall Method and performed by an independent testing laboratory acceptable to the Departmental Representative. The contractor shall submit a separate mix design for each change in the supplier or source of materials. No mixing of asphaltic concrete shall proceed until the Departmental Representative approves the job mix formula or any subsequent changes.
- .2 Preliminary approval of the aggregate as represented by the samples shall not constitute general acceptance of all material in the deposits or source of supply; acceptance shall be subject to field tests taken at the discretion of the Departmental Representative. Materials may be considered unsuitable even though particle sizes are within the limits of the gradation sizes required if particle shapes are thin or elongated or any other characteristic precludes satisfactory compaction, or if the material fails to provide a pavement suitable for traffic. The Departmental Representative will determine the acceptability of the final material.
- .3 Aggregate shall consist of hard, durable, uniformly graded, crushed gravel, and shall not contain organic or soft materials that break up when alternately frozen and thawed, or wetted and dried, or other deleterious materials

2.2 GRADATION

- .1 Combined aggregates shall conform to Section 31 05 16.
- .2 When coarse aggregate grading is such that the material will tend to segregate in stockpiling or handling, such aggregate shall be supplied in two or more sizes. Each size of coarse aggregate required to produce the combined gradation specified above shall be placed in individual stockpiles satisfactory to the Departmental Representative. When it is necessary to blend two or more coarse aggregates before placing them in the cold bins, the blending shall be done through separate bins at the cold elevator feeders, and not in the stockpile
- .3 When it is necessary to blend fine aggregates from one or more sources to produce the combined gradation specified, each source or size of fine aggregate shall be placed in individual stockpiles at the plant site and separated by bulkheads or other means satisfactory to the Departmental Representative. The blending shall be done through separate bins at the cold elevator feeders and not in the stockpile.

**ASPHALT PAVING**

- .4 If the Contractor elects to use an approved drier-drum asphalt mixing process, the designated aggregates shall be split on the 5.000 mm sieve, and each material shall be stockpiled separately so that intermixing of each size and type does not occur. The coarse aggregate stockpile shall contain no more than 20% passing the 5.000 mm sieve, and the fine aggregate stockpile shall contain no more than 20% retained on the 5.000 mm sieve. At least 2,000 tonnes of aggregate shall be placed in each stockpile prior to the start of mixing operations.
- .5 The Contractor, during the crushing and splitting process, shall provide a convenient means for accurately and representatively:
  - .1 Sampling the individual coarse and fine aggregate streams, and the combined aggregate stream in its proper proportion.
  - .2 Sampling the individual coarse and fine aggregate streams and weighing the total amounts of both coarse and fine materials being produced.

**2.3 STORAGE**

- .1 No stacking conveyor shall be used to stockpile aggregate for a continuous mix or drum plant. Reference to continuous mix plant in Section 2.4.2 shall also include drum plant
- .2 The aggregate shall be stockpiled at the mixing plant in such a manner that no segregation of the various particle sizes is produced. The asphalt binder shall be stored in suitable tanks at a temperature not exceeding 150°C.

**2.4 DESIGN MIX**

- .1 A qualified testing laboratory shall be employed to prepare a mix design and job mix formula for the aggregate on which the tender is based. The mix design and job mix formula shall be submitted to the Departmental Representative for approval a minimum of ten days prior to paving. No paving shall commence before the Departmental Representative 's approval is given for the mix design or job mix formula. The Departmental Representative may also require a trial batch. The laboratory mix design shall be based on the Marshall Method. Absorption of asphalt into the aggregate shall be considered using the ASTM bulk specific gravity of the aggregate in calculating optimum asphalt content.
- .2 The mix design shall meet the following specifications

	<b>RANGE</b>
Max size of aggregate (mm)	12.5
Number of compactions blow each end of specimen	50
Stability (kN) at 60 degrees Celsius	4.5
Minimum Retained Stability (%)	75
Flow (0.254 mm unit)	8-16
% Voids total mix	4.0 ± 1.0
% Aggregate voids filled with asphalt	73-85
Minimum film thickness <sup>2</sup> (µm)	7.0

**ASPHALT PAVING**

- .3 The job mix formula shall be posted in a conspicuous place within sight of the plant operator. The Departmental Representative must approve any subsequent changes in writing. The job mix formula shall list the following information:
- .1 Batch Plants:
    - .1 the sieve analysis of the combined aggregate in the mix
    - .2 the sieve analysis of the combined aggregate in the mix the weight of the material to be used from each bin for 1 batch of mix
    - .3 the weight of asphalt to be used in each batch
    - .4 the mixing from the temperature
    - .5 Viscosity relationship for the asphalt
  - .2 Continuous Mix Plants:
    - .1 the weight of asphalt per tonne of mix
    - .2 the mixing temperature of the asphalt mix as determined from the temperature-viscosity relationship for the asphalt
    - .3 the setting of the feed systems
- .4 The volumetric settings of the aggregate and asphalt shall be determined by the Contractor and approved by the Departmental Representative. These settings shall be interlocked, so that a change in the volume of aggregate automatically results in a corresponding change in the volume of asphalt.
- .5 The mix produced shall conform to the job mix formula approved by the Departmental Representative and to the following tolerances
- .1 the weight of aggregate from any bin, as well as the total weight of aggregate for each bin, shall not vary from the job mix formula by more than:

SIEVE SIZE (mm)	VARIATION BY MASS (%)
10.000 and larger	+/-7
5.000 to 10.000	+/-5
2.000 to 0.160	+/-4
0.063	+/-2
  - .2 the percent of asphalt in the mix shall not vary by more than 0.3% from the percentage indicated in the approved mix design.
  - .3 the mixing temperature for asphaltic materials shall not vary from those specified in the job mix formula by more than nine degree Celsius. In no case shall the mixing temperature exceed the maximum mix temperature indicated from the asphalt temperature-viscosity curve data
- .6 The Departmental Representative shall have the ability to request that a trial batch be produced and be tested the first time the asphalt mix design is being used for the season or at any time it is found that the actual asphalt mix is deviating from the mix design.
- .7 Asphaltic Binder Data
- .1 Temperature-viscosity data or curves, as obtained from the refineries, for the various grades and types of asphaltic material to be used shall be made available to the Departmental Representative.
- .8 Test Data
- .1 The contractor shall submit all test data performed by the accredited company to the Departmental Representative within 72 hours of receiving results.
- .9 Changes
- .1 The contractor shall notify the Departmental Representative of all proposed changes in the mix proportions. No changes shall be made until a representative of the Departmental Representative is there to witness the change

- .10 Mixing Plant
  - .1 The paving plant shall be of a type capable of consistently meeting or exceeding all of the requirements of these specifications.

## 2.5 TRANSPORTATION

- .1 The mixture shall be transported from the mixing plant to the work in vehicles with tight metal bottoms previously cleaned of all foreign materials. The vehicle shall be suitably insulated, and each load shall be covered with canvas or other suitable material of enough size to protect it from weather conditions
- .2 The inside surface of the box may be lubricated with a light coating of soap or detergent solution; petroleum derivatives shall not be permitted. Any accumulation of asphaltic material, which has collected in the box, shall be thoroughly cleaned before loading with hot mix. Trucks shall be clean of mud or any substance, which could contaminate the working area.

## 2.6 PLACING

- .1 Unless otherwise permitted by the Departmental Representative, a mechanical self-powered paver shall spread the mixture. The paver shall have an automatic levelling device and automatic grade control capable of spreading the mix without segregation or tearing, in thickness varying from 12 mm to 150 mm and in widths greater than 3.0 m and to true line, grade and cross-section as shown on the plans.
- .2 The mixture shall be laid at a temperature not lower than 120 degrees Celsius or higher than 140 degrees Celsius. The atmospheric air temperature shall not be less than 2 degrees Celsius and rising, no frost shall be present, and the road surface shall be dry.
- .3 Where the asphaltic surface course is to be placed in two lifts, the first lift shall be placed, finished and compacted for the full width as shown on the drawings, prior to commencing on the second lift. The maximum lift thickness is 75 mm
- .4 In placing the second lift, the individual mixture spreads shall be aligned in a manner such that the longitudinal joints in each layer will not coincide
- .5 In narrow areas, deep or irregular sections, intersections, turnouts, or driveways, where it is impractical to spread with a paver, the Contractor may use hand methods as directed by the Departmental Representative.

## 2.7 WEATHER LIMITATIONS

- .1 The mixture shall not be placed:
  - .1 during periods of rain or when there is an imminent danger of rain;
  - .2 during excessive winds; or
  - .3 when air temperature is 2 degrees Celsius or cooler or frost is present on the surface

## 2.8 BASE PREPARATION

- .1 Where tack coat or prime coat is applied, it shall be thoroughly cured prior to placing the mixture. The Contractor shall remove all loose and foreign material and water. Where existing pavements are to be overlaid, a levelling course of hot mix asphaltic concrete may be required prior to placing the surface course. Unless otherwise approved by the Departmental Representative, this course shall be laid with a paving spreader and shall meet all the requirements of this section



## 2.9 SURFACE REQUIREMENTS

- .1 Prior to the addition of material to any mat, the surface shall be broken with the tines of a rake to ensure proper bonding. Edges against which additional pavement is to be placed shall be straight and approximately vertical. A lute rake shall be used immediately behind the paver, when required, to obtain a true line and vertical face.

## 2.10 HAND SPREADING

- .1 In small areas where the use of mechanical finishing equipment is not practical, the mix may be spread and finished by hand, if so, directed by the Departmental Representative. The material shall be distributed uniformly to avoid segregation of the coarse and fine aggregates. Broadcasting of material shall not be permitted. During the spreading operation, all material shall be thoroughly loosened and uniformly distributed by a lute rake. Material that has formed into lumps and does not break down readily shall be rejected.

## 2.11 ROLLING

- .1 The rollers used for compaction shall be self-propelled steel-wheeled or rubber-tired rollers, providing at least 35 Newtons per millimeter width of tread. The roller shall be in good condition, without backlash when reversed, and shall be operated by a competent roller-man. The wheels shall be kept properly moistened, but excess water or oil will not be permitted. The rollers must be kept in continuous operation as nearly as practicable, and all parts of the pavement shall receive substantially the same compaction. Rolling shall be done at a maximum speed of 5 km per hour.
- .2 At least one self-propelled steel-wheeled roller shall be used for every 40 tonnes of asphaltic concrete laid per hour. Rolling shall start as soon as the pavement will bear the roller without checking or undue displacement, working from the low part or edge to the high part or edge continuously until no roller marks are left in the finished surface and no further compaction is possible. Where width permits, the pavement shall be rolled diagonally in two directions. At all curbs, manholes and other appurtenances, and at all locations not accessible to the rollers, hand tampers shall be used to produce the same density as provided by the roller. Where the asphaltic concrete is laid in more than one lift, each lift shall be so compacted.

## 2.12 PROTECTION OF APPURTENANCES

- .1 The Contractor shall protect all exposed appurtenances with a suitable cover to prevent the bonding of asphalt to the surface. This includes valve boxes, manholes, and concrete curbs. The Contractor shall consider exposed valve boxes and manhole covers to protect them from roller damage while compacting the first layer of asphalt.

## 2.13 JOINTS

- .1 The mixture shall be laid so that all longitudinal joints are made while the first mat of the two being laid is still hot. A narrow strip along the edge of a mat, which is joined with another asphalt mat, shall be left without rolling until the adjoining mat has been placed against it. The joint, which is formed, shall be rolled immediately after the adjacent mat has been placed to ensure a bonding of the material while the asphalt is still hot.
- .2 Transverse joints shall be carefully constructed and thoroughly compacted to provide a smooth-riding surface. Joints shall be straight edged to assure smoothness and true alignment and shall be offset at least one meter from joints of adjacent mats.
- .3 In order to ensure that the surface shall not become cooled prior to laying an adjacent "run", the spreader shall not advance beyond the limits shown in the table below unless directed by the Departmental Representative, i.e., on collector or arterial roads:

Air Temperature (°C)	Maximum Length of Advancement (m)
Above 27	250
15 - 27	190
7 - 15	125
Below 7	90

- .4 All concrete or metal structures such as gutters, manholes, etc. shall be painted with an approved bituminous material prior to placing the asphalt

**2.14 CLEANUP**

- .1 Locations shall be cleared of all excess material resulting from the paving operation, including if directed by the Departmental Representative, flushing of sanitary and storm mains to remove debris. Flushed debris is to be collected in manholes and removed from the site. Any damage to the Departmental Representative 's or private property caused by the Contractor shall be repaired to the Departmental Representative 's satisfaction within 3 days of the date of completion of the street or lane. Failure to clean up may result in other crews undertaking this work without notice to the Contractor and at the Contractor's expense

**2.15 THICKNESS**

- .1 The pavement shall have the thickness specified on the Departmental Representative 's drawings. Areas suspected to be deficient shall be cored, as directed by the Departmental Representative, on the basis of two cores within the project site. At least one core shall be taken at the designated Marshall location
- .2 Should the asphalt be found to be deficient in thickness the Contractor will be permitted to take two additional asphalt cores in an effort to limit the amount of the asphalt penalty. The location of the two additional cores shall be located within the same asphalt mat as the original deficient core and shall be located no more than halfway between the deficient core and the next adjacent core or contract boundary. Within these two parameters, the exact core locations are to be determined by the Contractor and approved by the Departmental Representative.
- .3 A deficiency penalty shall be assessed according to the following:

Asphalt Thickness	Tolerance Deficiencies	Deficiency Penalty
50 mm	47 to 35 mm	$[C - [A2/B2] * C] * Q$
50 mm	Under 35 mm	Replacement by Contractor
75 mm	71 to 53 mm	$[C - [A2/B2] * C] * Q$
75 mm	Under 53 mm	Replacement by Contractor
100 mm	95 to 70 mm	$[C - [A2/B2] * C] * Q$
100 mm	Under 70 mm	Replacement by Contractor

Where:

A = Average core thickness

B = Specified core thickness C = Contract unit price

Q = Quantity of deficient HMAC

- .4 For any cores of a thickness greater than specified, the specified thickness shall be used for the purpose of all calculations and averages.
- .5 No additional payment will be made to the Contractor for thickness greater than specified. The Contractor shall fill all core holes within a maximum period of 24 hours

**2.16 DENSITIES**

- .1 Densities shall be based on core samples, each of which shall represent one in the parking lot and one on the path surrounding the skate park per constructed lift. Asphalt densities are specified as 98% of the standard laboratory Marshall. A minimum of one Marshall per day shall be performed with one core sample taken at a designated Marshall location.
- .2 If any core fails to meet the density specified, two additional cores shall be taken within one meter of the first core sample, and the average density of the three cores shall represent the area. No additional rolling, to achieve a more favorable density, shall be allowed, WITHOUT the WRITTEN CONSENT OF THE Departmental Representative.
- .3 If the densities are less than specified, a deficiency penalty shall be assessed according to the following:
  - .1  $[-0.041[X-98]^2]U.P.] * Q$
  - .2 Where: U.P. = Unit Price
  - .3 X = Actual Asphalt Density (%)
  - .4 Q = Quantity
- .4 All asphalt below 95% standard Marshall density shall be removed and replaced at the contractor's expense

**2.17 SMOOTHNESS**

- .1 The surface of the compacted pavement shall be true to the required grade and cross-section with a smooth riding quality acceptable to the Departmental Representative.
- .2 In addition to the above, when checked with a 3.0-meter straightedge, held in successive positions parallel or perpendicular to the centerline and in contact with the surface, the pavement surface shall not deviate from the straightedge by more than 3 mm.
- .3 If, in the opinion of the Departmental Representative, an objectionable riding surface exists, the Contractor shall either grind and resurface with asphalt overlay or remove and replace the asphalt surface

**2.18 TEXTURE**

- .1 The completed pavement shall have a tight knit texture and shall be free from segregation and surface cracking.

**2.19 TRAFFIC**

- .1 No traffic shall be allowed on the finished surface until it has cooled to atmospheric temperature

---

**FRASER PORT OF ENTRY DEMOLITION OF EXISTING SLAB  
AND RE-PAVING**

**PROJECT NO. R. 106775.001**

**FRASER, BRITISH COLUMBIA**

---

**APPENDIX A  
SITE PHOTOS**

























---

**FRASER PORT OF ENTRY DEMOLITION OF EXISTING SLAB  
AND RE-PAVING**

**PROJECT NO. R. 106775.001**

**FRASER, BRITISH COLUMBIA**

---

**APPENDIX B  
GEOTECHNICAL REPORT**

December 5, 2014

Stantec Architecture Ltd.  
202 – 107 Main Street  
Whitehorse YT Y1A 2A7

ISSUED FOR USE  
FILE: W14103499-01  
Via Email: lee.fleming@stantec.com

**Attention:** Lee Fleming, P.Eng.

**Subject:** Geotechnical Evaluation  
CBSA Port of Entry – Fraser, British Columbia

## 1.0 INTRODUCTION

Tetra Tech EBA Inc. (Tetra Tech EBA) was retained by Stantec Architecture Ltd. (Stantec) to complete a geotechnical site investigation program and provide recommendations for the geotechnical design of proposed upgrades at the Canada Border Services Agency (CBSA) Port of Entry at Fraser, BC. Authorization to proceed was provided by Mr. Lee Fleming of Stantec by way of a signed subconsultant agreement, received by Tetra Tech EBA on September 25, 2014.

### 1.1 Project Background

We understand that Public Works and Government Services Canada (PWGSC) is contemplating upgrades to the CBSA Port of Entry at Fraser, BC. Based on a preliminary project description and sketches provided by Stantec, the proposed works include construction of a new CBSA building to replace the existing facility, and widening of the existing paved highway to accommodate new southbound highway lanes and a vehicle inspection/ parking area adjacent to the new building. Stantec advised that a small retaining wall will likely be required in order to accommodate the highway widening without encroaching on the existing highway maintenance facility, operated by the Government of Yukon (YG) Department of Highways and Public Works.

At this time, the exact locations of the proposed works have not been finalized; however, approximate locations of the new building and highway widening are shown on Figure 1, attached.

### 1.2 Project Location

The subject site is located at the CBSA Port of Entry between Canada and Alaska at Fraser, BC. The project site can be found on NTS Mapsheet 104-M/11 at approximate UTM coordinates of 6,619,730 N and 497,385 E in Zone 8V.

## 2.0 GEOTECHNICAL DRILLING PROGRAM

Midnight Sun Drilling Inc. (MSDI) was retained by Tetra Tech EBA to complete a geotechnical drilling program at the site. Four boreholes (BH01 and BH04) were drilled in the areas of the proposed highway widening/ retaining wall and the new CBSA building. Holes were drilled using MSDI's MARL M4CT tracked drill rig to advance an ODEX downhole hammer/ casing system, with Large Diameter Penetration Test (LPT) sampling carried out at regular intervals to recover representative, disturbed soil samples and to provide an estimate of the in-situ soil consistency.



Boreholes BH01 and BH02 were drilled near the east edge of the YG highway maintenance yard to assess the subgrade conditions for the proposed highway widening and retaining wall. Boreholes BH03 and BH04 were drilled between the existing north and southbound highway lanes to assess the subgrade conditions in the area of the proposed new CBSA building. Borehole locations are shown on the attached site plan (Figure 1).

Prior to drilling, locations of buried utilities at the site were confirmed by Stantec. Borehole locations were selected to avoid the buried utilities that are present at the site, as shown on as-built drawings provided by PWGSC and Stantec, and based on verbal input from personnel at the YG highway maintenance yard.

During drilling, the soil profile was logged in the field by an experienced geotechnical engineer, and LPT samples were collected and returned to Tetra Tech EBA's Whitehorse laboratory for routine geotechnical index testing.

Upon completion of drilling, the boreholes were backfilled using cuttings and bentonite chips. At boreholes BH03 and BH04, located between the existing north and southbound highway lanes, the paved surface was repaired using cold mix asphalt.

## **3.0 SITE CONDITIONS**

### **3.1 Surface Conditions**

The area surrounding the location of the proposed works is currently occupied by the existing CBSA building and Klondike Highway. The White Pass & Yukon Railway lies immediately adjacent to the highway on the east side of the site. To the west, there is a drainage ditch located along the shoulder of the southbound highway lanes, with the YG highway maintenance yard located west of the ditch.

The maintenance yard includes several buildings, including a large garage/ shop and staff quarters, and exterior areas are surfaced with compacted gravel. Ground elevation at the maintenance yard is about 2 m higher than the grade surrounding the nearby highway and CBSA building. As such, the proposed retaining wall is intended to accommodate the widening of the highway while minimizing any impact to the operational area of the maintenance yard. Also, based on the preliminary site plan provided by Stantec, it is likely that widening of the highway will require filling of the existing ditch to accommodate construction of the new pavement and retaining wall.

### **3.2 Soil Conditions**

Soil profiles encountered at the site are described below and presented in the attached borehole logs, which are included in Appendix B. Please note that the borehole logs contain detailed information that is specific to each borehole, and should be read in preference to the generalized descriptions provided below.

As noted above, in situ soil consistency was estimated based on LPT blow counts recorded during drilling. Because the LPT uses a 75 mm outside diameter split-spoon sampler, which is larger than the standard 50 mm diameter sampler used in typical Standard Penetration Testing (SPT), uncorrected LPT field blow counts will tend to indicate a denser than actual in situ soil consistency. As such, LPT blow counts were corrected to equivalent SPT N-values, which are presented on the borehole logs in Appendix B.

Based on the soils encountered at BH01 and BH02, the soil profile in the YG maintenance yard consists of about 5 m of compact to dense, gravel and sand fill over native ground. The native soil generally consists of compact sand with occasional gravelly and/or silty zones. The interface between fill and native materials was interpreted based on the presence of lumps of organic silt, which would have been present near the original ground surface. Bedrock was encountered at 11.3 m depth at BH01. BH02 was terminated at 5.6 m, before encountering the bedrock surface. However, bedrock at BH02 is understood to be present at about 10 m depth based on the

driller's previous experience at the site, which included a borehole drilled for a separate project within a few metres of BH02.

Soil conditions encountered at BH03 and BH04, which were drilled in the paved area between the existing north and southbound highway lanes, consisted of the pavement structure over granular fill. At BH03, the paved surface consisted of about 50 mm of asphalt pavement, and the bottom of the pavement base/sub-base fill was encountered at about 0.9 m depth. At BH04, the paved surface consisted of about 30 mm of asphalt pavement, or possibly bituminous surface treatment (BST). The interface between the pavement base/ sub-base materials and the underlying granular fill at BH04 was not obvious based on the visual inspection of recovered samples and drill cuttings, nor by observation of drilling action during advancement of the ODEX casing. Both BH03 and BH04 were terminated in the fill at about 2.6 m depth. Based on the relative elevations of the boreholes and the bedrock depth observed at BH01, bedrock at BH03 and BH04 can be estimated at about 9-10 m below existing ground surface. Similarly, the interface between fill and native soil can be estimated at about 3-4 m depth.

### **3.3 Groundwater Conditions**

Groundwater was encountered in BH01 and BH02, which were drilled in the YG highway maintenance yard. The depth to groundwater was estimated based on moisture content observed in recovered samples, as well as water returned during advancement of the ODEX casing and evidence of standing water observed on LPT rods extracted from the boreholes during sampling. Groundwater was encountered at depths of about 5.3 and 4.6 m at BH01 and BH02, respectively, which approximately corresponds to the interpreted depth of the original ground surface below the fill.

No groundwater was observed in either of BH03 or BH04, which were drilled through the existing roadway.

### **3.4 Seasonal Frost Penetration**

Based on average climate data and the soil profile at the site, the maximum seasonal frost depth can be assumed to be about 2.4 m below ground surface.

## **4.0 RECOMMENDATIONS**

Geotechnical recommendations for the design and construction of the proposed new building foundations, retaining wall, new paved highway lanes and vehicle inspection/ parking areas are provided below in the following sections.

### **4.1 Building Foundations**

Based on the soil conditions encountered during the drilling program and discussion with Stantec, a structural slab-on-grade with thickened spread and strip footings is considered to be the preferred foundation system for the proposed new building. As such, geotechnical recommendations for the design and construction of a structural slab-on-grade foundation are provided below.

#### **4.1.1 Site Preparation**

Site preparation for construction of the new building foundations should be completed in accordance with the following recommendations:

- The existing paved surface should be removed and the granular fill subexcavated to a depth of 2 m below the underside of footing elevation from within the building footprint, plus 1.5 m on all sides;



- Prior to backfilling, the exposed subgrade should be inspected by a qualified geotechnical engineer in order to confirm that suitable ground conditions have been encountered and to provide additional recommendations, if necessary;
- Further to the item above, if the subgrade is soft and/ or wet, or if unanticipated ground conditions are encountered, additional measures may be recommended that may include, but not necessarily be limited to, additional excavation and/or placement of geotextile filter fabric to cover the subgrade;
- Prior to backfilling, the approved subgrade should be heavily compacted in order to densify the underlying soils and provide a firm, stable bearing surface. The subexcavation should then be backfilled using either the excavated material, if approved by a qualified geotechnical engineer, or 80 mm pit run gravel, moisture conditioned and compacted to at least 98% Standard Proctor Maximum Dry Density (SPMDD). The recommended gradation of pit run gravel is provided below on Table 1; and
- A 0.15 m thick layer of 20 mm, crushed base course (CBC) gravel should be placed immediately below the slab-on grade and thickened footings to provide a smooth, level bearing surface on which to cast the concrete foundations. The CBC should be moisture conditioned and compacted to at least 98% SPMDD. The recommended gradation of 20 mm CBC is provided below on Table 1.

**Table 1: Recommended Gradation for Granular Fill Materials**

Pit Run Gravel		20 mm Crushed Base Course	
Particle Size (mm)	% Passing (by weight)	Particle Size (mm)	% Passing (by weight)
80	100	-	-
25	55 – 100	20	100
12.5	42 – 84	12.5	64 – 100
5.00	26 – 65	5.00	36 – 72
1.25	11 – 47	1.25	12 – 42
0.315	3 – 30	0.315	4 – 22
0.080	0 – 8	0.080	3 – 6

## 4.1.2 Foundation Design and Construction

### 4.1.2.1 Limit States Design

The 2010 edition of the National Building Code of Canada (NBCC 2010) stipulates that foundation design must be carried out using Limit State Design (LSD) methods. Under LSD, a minimum of two loading cases must be considered by geotechnical and structural designers; the Ultimate Limit State (ULS) and the Serviceability Limit State (SLS). The ULS and SLS bearing resistances are calculated differently. The ULS bearing resistance is the maximum pressure that can be applied to the soil without causing bearing failure. The SLS bearing pressure is the maximum allowable pressure required to limit settlement to a tolerable amount. Both the ULS and SLS bearing resistances are highly dependant on soil properties and footing geometry, including the footing size, shape and burial depth.

Additionally, under LSD, resistance factors are applied to the calculated (unfactored) resistances to determine the maximum allowable factored design load. Geotechnical resistance factors for design of shallow foundations against vertical bearing failure (ULS) and horizontal displacement (sliding under lateral loading) are provided below on Table 2, per Table 6.1 of the *Canadian Highway Bridge Design Code* (CAN/CSA-S6-06). Per

CAN/CSA-S6-06, SLS resistances should consider unfactored loads, and therefore no resistance factor is required.

**Table 2: Geotechnical Resistance Factors – Shallow Foundations**

Item	Resistance Factor
Vertical Bearing Resistance (ULS)	0.5
Horizontal Resistance (Sliding)	0.8

#### 4.1.2.2 Foundation Recommendations

As noted above, a structural slab-on-grade with thickened spread and strip footings is the recommended foundation type for the proposed building. As such, design and construction of the new building foundations should be undertaken in accordance with the following recommendations:

- Spread and strip footings refer to thickened areas within the structural slab-on-grade that are designed to provide the required bearing resistance under building loads. For the purposed of geotechnical design, Tetra Tech EBA has assumed a footing thickness of 0.2 m and a minimum depth of cover of 0.3 m from finished grade to the underside of footing;
- Unfactored bearing resistances are provided based on minimum footing dimensions of 0.4 m for strip footings and 1.0 m for spread (square) footings. If significantly different footing sizes are preferred for this project, or if higher bearing resistance is required to support the design building loads, Tetra Tech EBA should be notified to review and adjust the calculated bearing resistances, as necessary;
- Unfactored ULS bearing resistances of 600 and 350 kPa should be used for spread and strip footings, respectively;
- Unfactored SLS bearing resistances of 1130 and 640 kPa should be used for spread and strip footings, respectively. SLS bearing resistances are calculated based on an allowable elastic settlement of 25 mm, which is generally sufficient to limit total and differential settlement to tolerable levels for typical building projects;
- Based on the compact to dense, granular soil that was encountered during the drilling program, significant long term settlement is not anticipated under building loads, provided that site preparation is completed in accordance with the recommendations provided in Section 4.1;
- The concrete foundation should be cast onto a clean, compacted, granular bearing surface. It is important that no loose and/or disturbed material be allowed to remain on the bearing surface. As discussed above in Section 4.1, foundation bearing surfaces should consist of 20 mm CBC gravel, moisture conditioned and compacted to at least 98% SPMDD;
- The working area should be protected from the inflow of surface water at all times. Concrete foundation elements should not be cast onto saturated or seasonally frozen soil; and
- Because the granular fill materials encountered in our drilling program are considered to be non-frost-susceptible, and because the depth to groundwater appears to be below the depth of seasonal frost penetration, no foundation perimeter insulation is required for the proposed building foundations.

## 4.2 Site Grading and Drainage

The ground elevation at finished grade around the building perimeter should be at least 0.3 m above surrounding grade to maintain positive drainage away from the building foundations. Ponding and/ or infiltration of water adjacent to the building should be prevented, as this could have detrimental effects on the performance of the building foundations. Runoff from the roof should be directed onto splash pads and away from the building. This is particularly important in the late fall, just prior to freeze-up.

## 4.3 Concrete

It is recommended that concrete placed during foundation construction be designed in accordance with CSA A23.1 requirements for F-2 exposure class concrete (30 MPa with 4-7% air entrainment). Any exterior concrete, such as sidewalks or aprons, should be designed in accordance with CSA requirements for C-2 exposure class concrete (32 MPa with 5-8% air entrainment).

## 4.4 Retaining Wall Foundations

We understand that a small retaining wall will likely be required to support the edge of the YG highway maintenance yard adjacent to the widening of the southbound lanes on the Klondike Highway.

Based on the approximately 2 m difference in elevation between the maintenance yard and the road surface elevation, there are several retaining wall configurations that would be feasible for use at the site, including:

- **Lock Block (or similar) Walls:** Concrete lock-blocks, gabion baskets, or other similar, readily available modular block-type materials are commonly stacked for use as low, gravity retaining structures. Due to the limited size of typical lock-blocks, geogrid reinforcement or other tieback systems are typically required for wall heights greater than about 3 m;
- **Bin Walls:** Bin walls consist of prefabricated steel panels that are assembled on site to resemble a typical, large dumpster. The steel bin is then filled with compacted soil, effectively creating a gravity retaining wall. Bin walls are manufactured by a number of Canadian suppliers, and retaining wall design is typically provided by the supplier;
- **Mechanically Stabilized Earth (MSE) Walls:** MSE walls use tightly spaced (less than 1 m) reinforcement, commonly consisting of synthetic geogrids/ fabrics or steel grids/ strips, to stabilize a mass of soil behind the wall face. Facing materials typically consist of geosynthetic fabrics, wire gabion baskets, or concrete panels. Similar to bin walls, MSE walls are readily available from various Canadian suppliers, who also provide retaining wall design services.

If required, Tetra Tech EBA would be pleased to provide Stantec with contact information for wall suppliers operating in the Yukon and northern BC.

Detailed retaining wall design is not included in Tetra Tech EBA's current project scope, however preliminary discussion and geotechnical recommendations for the design and construction of the proposed retaining wall are provided below.

#### 4.4.1 Retaining Wall Design

Design procedures for the retaining wall will vary depending on the preferred type of retaining wall.

For lock-block, gabion basket, or other modular block-type retaining walls that are built using non-specialized, readily available construction materials, site-specific design by a qualified geotechnical engineer is recommended. Tetra Tech EBA would be pleased to provide a proposal to carry out such a design, if required. Such design services would provide, at a minimum:

- Required embedment depth below finished grade at the wall base;
- Tieback/Reinforcement requirements, depending on wall height and loading;
- Subgrade preparation and wall backfill requirements;
- Subgrade bearing capacity;
- Drainage requirements for the wall backfill and facing blocks; and
- Wall batter angle.

As noted above, bin and MSE walls are typically prefabricated by a specialized retaining wall manufacturer, and then assembled on site by the contractor in accordance with the manufacturer's design, which is provided along with the retaining wall materials.

Although the wall manufacturer typically provides design services for bin and/ or MSE walls, it is recommended that the manufacturer's design be reviewed by a qualified geotechnical engineer, particularly with respect to the design bearing capacity below the wall and to global stability of the soil surrounding the wall. Tetra Tech EBA would be pleased to provide these services, if required.

#### 4.4.2 Preliminary Recommendations

At this time, any of the retaining wall options are considered to be acceptable for use at the subject site. However, based on the site layout, the retaining wall will likely be constructed approximately in the area of the existing ditch running along the west shoulder of the highway. As such, the main design challenge facing retaining wall construction will likely be associated with subgrade preparation in the area of the existing ditch. In general, site preparation similar to that described in Section 4.1.1 would be appropriate for the retaining wall. However, additional subexcavation may be required to remove soft and/ or saturated materials from the bottom of the ditch. If a new ditch is contemplated adjacent to the wall face it will be important to locate the base of the wall deeper than the contemplated new ditch invert.

If required, bearing pressures provided above in Section 4.1.2.2 for spread footings can be used for preliminary design purposes.

## 4.5 Pavement

Based on the results of our drilling program and available traffic information, Tetra Tech EBA has completed a pavement design for the proposed highway widening.

### 4.5.1 Design Method and Input Parameters

Pavement design was completed in accordance with 1993 American Association of State Highway and Transportation Officials (AASHTO) *Flexible Pavement Design Procedures*. The following input parameters were used for pavement design:

These parameters are sufficiently conservative; typ. traffic over the past 10 years has been ~250. However, summer traffic has been ~500.

parameters were based on traffic counts of northbound vehicles collected by YG between at Fraser, BC. Traffic input parameters used for pavement design included Average Daily Traffic (ADT) of 250 vehicles per day, including 21% commercial (truck) traffic and an annual growth rate of 2%. Design parameters indicate a total traffic loading of 420,000 Equivalent Single Axle Loads (ESAL) over a 20-year design life.

- **Subgrade Characteristics:** Based on BH03 and BH04, drilled in the area of the existing highway, the subgrade is assumed to consist of non-frost-susceptible, sandy gravel with an assumed resilient modulus of 45 MPa for the compacted subgrade. In general, subgrade preparation should be undertaken similar to that recommended for the CBSA building foundations. It is recommended that the exposed subgrade be inspected by a qualified geotechnical engineer prior to backfilling/ pavement construction. This is particularly important where the highway widening will be construction over the existing ditch.
- **Material Characteristics:** Structural and drainage coefficients used in pavement design are summarized on Table 3 below. As shown on the table, the gradation for 20 mm CBC is provided on Table 1 in Section 4.1.1 above. Similarly, as shown on Table 1, pit run gravel is considered acceptable for use as Select Granular Sub-Base (SGSB) material. A 16 mm, Class 1 Medium Mix asphalt is recommended, per Section 502 of the British Columbia Ministry of Transportation's 2012 *Standard Specifications for Highway Construction*. Based on the cold climate at the site, an asphalt cement with properties to prevent low temperature thermal cracking most likely does not exist. Therefore, a Group A 200/300 binder is recommended (equivalent to PG52-34).

**Table 3: Material Characteristics Used For Pavement Design**

Material Description	Structural Layer Coefficient	Drainage Coefficient
Asphalt Concrete Pavement (AP)	0.4	1.0
20 mm Crushed Basecourse (CBC)	0.14	1.0
Select Granular Sub-Base (SGSB)	0.10	1.0

- **AASHTO Pavement Design Parameters:** Other parameters used to complete pavement design are summarized below on Table 4:

**Table 4: AASHTO Pavement Design Parameters**

Criteria	Value
Reliability	85%
Initial Serviceability Index (P <sub>i</sub> )	4.2
Terminal Serviceability Index (P <sub>t</sub> )	2.5
Serviceability Loss (PSI)	1.7
Overall Standard Deviation (S <sub>o</sub> )	0.45

#### 4.5.2 Recommended Pavement Structure

Three recommended pavement structures are provided below for new pavement constructed at the site, including options using asphalt pavement or BST.

**Table 5: Recommended Pavement Structure - Option 1**

Material Type	Layer Thickness (mm)
AP	75
20 mm CBC	150
80 mm Pit Run (SGSB)	300

**Table 6: Recommended Pavement Structure - Option 2**

Material Type	Layer Thickness (mm)
AP	75
20 mm CBC	350
80 mm Pit Run (SGSB)	-

**Table 7: Recommended Pavement Structure - Option 3**

Material Type	Layer Thickness (mm)
BST Surfacing	-
20 mm CBC	150
80 mm Pit Run (SGSB)	550

#### 4.6 Seismic Site Classification

NBCC 2010 requires that a seismic site classification be established for proposed buildings. As such, we recommend that the site be considered as Site Class D, per Table 4.1.8.4A in NBCC 2010.

## 5.0 CONSTRUCTION TESTING AND MONITORING

All foundation design recommendations presented are site specific and based on the assumption that an adequate level of construction monitoring during foundation excavation and installation will be provided, and that all construction will be carried out by a suitably qualified, experienced contractor. An adequate level of construction monitoring also ensures the recommendations based on geotechnical data obtained at borehole locations are applicable to the entire building site. Appropriate Quality Assurance and Quality Control (QA/QC) testing should be undertaken during construction to confirm that construction is completed in accordance with the recommendations provided in this report.

Furthermore, it is recommended that Tetra Tech EBA be given the opportunity to review the details of the final design related to the geotechnical aspects of the building foundation, prior to construction. Past experience has shown that this action may prevent inconsistencies, poor performance, and/ or increased costs that may lead to disputes.

## 6.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Stantec Architecture Ltd. and their agents. Tetra Tech EBA Inc. (Tetra Tech EBA) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Stantec Architecture Ltd., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in the signed contract and to Tetra Tech EBA's General Conditions, which are provided in Appendix A of this report.

## 7.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,  
Tetra Tech EBA Inc.



Adam Wallace, M.Eng., P.Eng.  
Geotechnical Engineer, Arctic Region  
Direct Line: 867.668.9218  
adam.wallace@tetrattech.com



J. Richard Trimble, M.Sc. (Eng.), P.Eng., FEC  
Principal Consultant, Arctic Region  
Direct Line: 867.668.9216  
richard.trimble@tetrattech.com

/cr

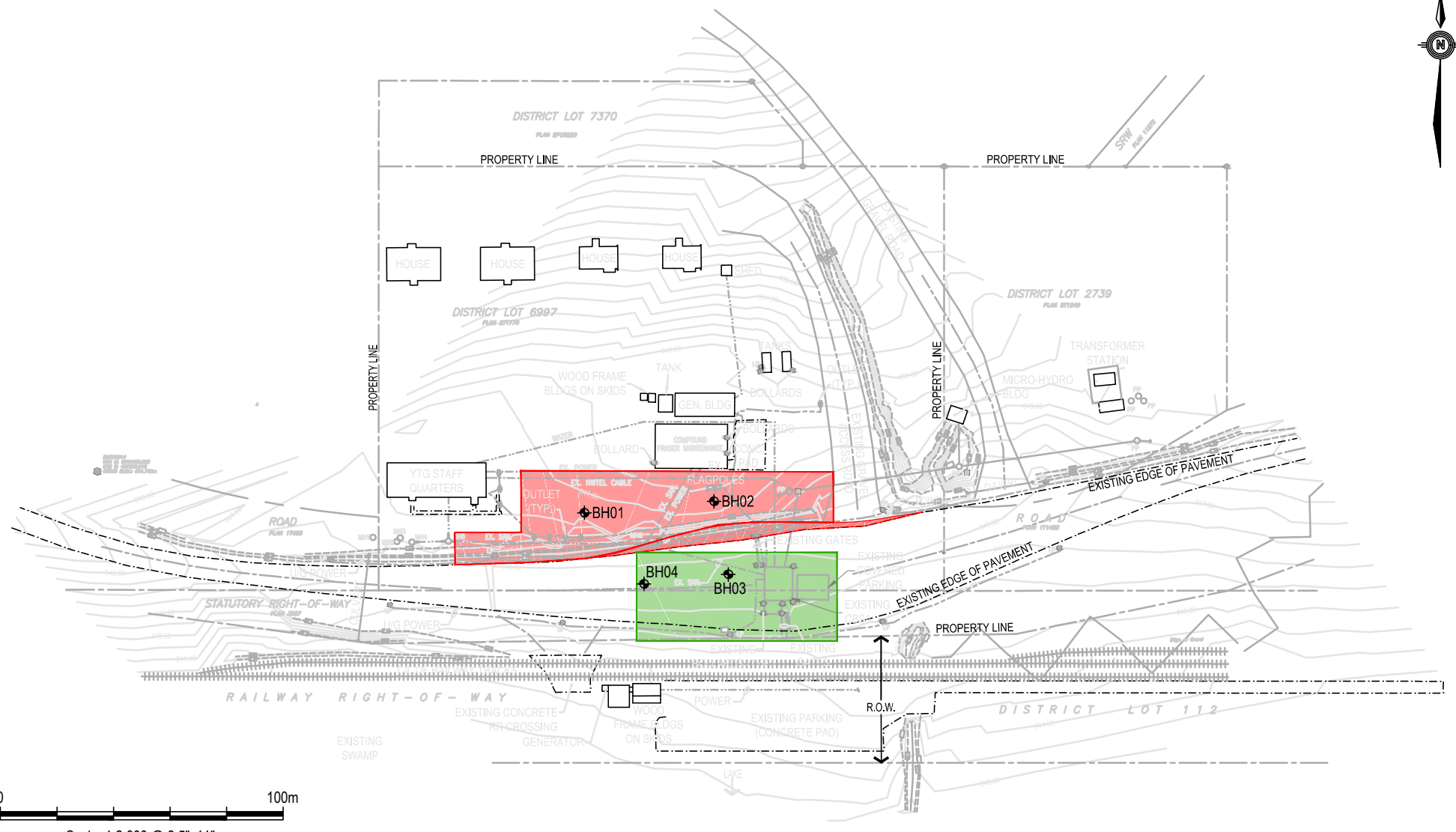
Attachments: Figures (1)  
Appendix A: Tetra Tech EBA's General Conditions – Geotechnical  
Appendix B: Borehole Logs and Geotechnical Laboratory Testing Results



# FIGURES

---

Figure 1      Site Plan Showing Borehole Locations



**LEGEND**

- ◆ - BOREHOLE LOCATION
- AREA SURROUNDING LOCATION OF NEW RETAINING WALL AND EXISTING SHOP / PARKING / ACCESS TO YTG MAINTENANCE BUILDINGS
- AREA SURROUNDING LOCATION OF NEW CBSA BUILDING AND EXISTING CBSA BUILDING

CLIENT



**Stantec**



**TETRA TECH EBA**

**GEOTECHNICAL EVALUATION  
CBSA PORT OF ENTRY - FRASER, BRITISH COLUMBIA**

**SITE PLAN SHOWING BOREHOLE LOCATIONS**

PROJECT NO. W14103499-01	DWN CB	CKD AW	REV 0
OFFICE EBA-WHSE	DATE December 4, 2014		

**Figure 1**

# APPENDIX A

## TETRA TECH EBA'S GENERAL CONDITIONS

---

# GENERAL CONDITIONS

---

## GEOTECHNICAL REPORT

This report incorporates and is subject to these “General Conditions”.

---

### 1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of Tetra Tech EBA's Client. Tetra Tech EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than Tetra Tech EBA's Client unless otherwise authorized in writing by Tetra Tech EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of Tetra Tech EBA. Additional copies of the report, if required, may be obtained upon request.

### 2.0 ALTERNATE REPORT FORMAT

Where Tetra Tech EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed Tetra Tech EBA's instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by Tetra Tech EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of Tetra Tech EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except Tetra Tech EBA. Tetra Tech EBA's instruments of professional service will be used only and exactly as submitted by Tetra Tech EBA.

Electronic files submitted by Tetra Tech EBA have been prepared and submitted using specific software and hardware systems. Tetra Tech EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

### 3.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, Tetra Tech EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

### 4.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. Tetra Tech EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

### 5.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

### 6.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. Tetra Tech EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

## 7.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

## 8.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

## 9.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

## 10.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

## 11.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

## 12.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

## 13.0 SAMPLES

Tetra Tech EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

## 14.0 INFORMATION PROVIDED TO TETRA TECH EBA BY OTHERS

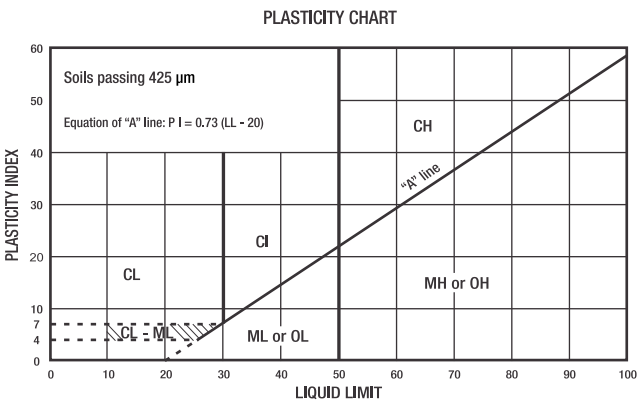
During the performance of the work and the preparation of the report, Tetra Tech EBA may rely on information provided by persons other than the Client. While Tetra Tech EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, Tetra Tech EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

# APPENDIX B

## BOREHOLE LOGS AND GEOTECHNICAL LABORATORY RESULTS

---

# MODIFIED UNIFIED SOIL CLASSIFICATION

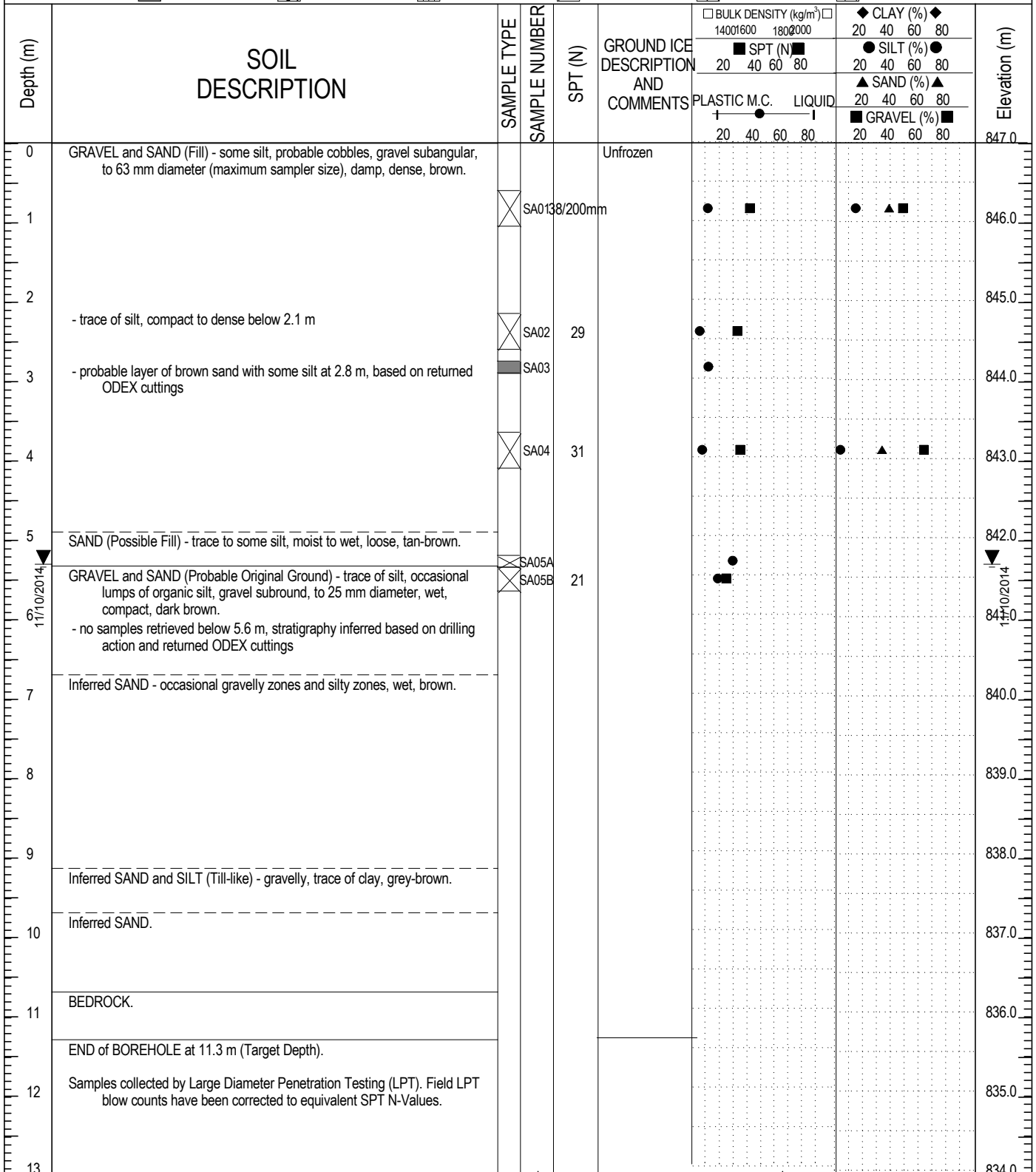
MAJOR DIVISION		GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA		
<b>COARSE-GRAINED SOILS</b> More than 50% retained on 75 µm sieve*	<b>GRAVELS</b> 50% or more of coarse fraction retained on 4.75 mm sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	$C_u = D_{60} / D_{10}$ Greater than 4 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting both criteria for GW	
		GRAVELS WITH FINES	GP	Poorly graded gravels and gravel-sand mixtures, little or no fines		
		<b>SANDS</b> More than 50% of coarse fraction passes 4.75 mm sieve	CLEAN SANDS	GM		Silty gravels, gravel-sand-silt mixtures
			SANDS WITH FINES	GC		Clayey gravels, gravel-sand-clay mixtures
	<b>FINE-GRAINED SOILS (by behavior)</b> 50% or more passes 75 µm sieve*	<b>SILTS</b> Liquid limit	<50	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands of slight plasticity	For classification of fine-grained soils and fine fraction of coarse-grained soils. 
			>50	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts	
		<b>CLAYS</b> Above "A" line on plasticity chart negligible organic content Liquid limit	<30	CL	Inorganic clays of low plasticity, gravelly clays, sandy clays, silty clays, lean clays	
			30-50	CI	Inorganic clays of medium plasticity, silty clays	
			>50	CH	Inorganic clays of high plasticity, fat clays	
		<b>ORGANIC SILTS AND CLAYS</b> Liquid limit	<50	OL	Organic silts and organic silty clays of low plasticity	
>50	OH		Organic clays of medium to high plasticity			
<b>HIGHLY ORGANIC SOILS</b>		PT	Peat and other highly organic soils		*Based on the material passing the 75 mm sieve Reference: ASTM Designation D2487, for identification procedure see D2488. USC as modified by PFRA	

SOIL COMPONENTS					OVERSIZE MATERIAL	
FRACTION	SIEVE SIZE		DEFINING RANGES OF PERCENTAGE BY MASS OF MINOR COMPONENTS		Rounded or subrounded COBBLES 75 mm to 300 mm BOULDERS > 300 mm	
	PASSING	RETAINED	PERCENTAGE	DESCRIPTOR		
GRAVEL coarse fine	75 mm	19 mm	>35 %	"and"	Not rounded ROCK FRAGMENTS >75 mm ROCKS > 0.76 cubic metre in volume	
	19 mm	4.75 mm	21 to 35 %	"y-adjective"		
SAND coarse medium fine	4.75 mm	2.00 mm	10 to 20 %	"some"		
	2.00 mm	425 µm	>0 to 10 %	"trace"		
	425 µm	75 µm				
SILT (non plastic) or CLAY (plastic)	75 µm		as above but by behavior			

TT\_Modified Unified Soil Classification.cdr

Geotechnical Evaluation	CLIENT: Stantec Architecture Ltd.	PROJECT NO. - BOREHOLE NO.
CBSA Port of Entry	DRILL: Midnight Sun Drilling Inc. - MARL M4CT	W14103499 - BH01
Fraser, BC	METHOD: ODEX/LPT	ELEVATION: 847 m

SAMPLE TYPE	<input type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



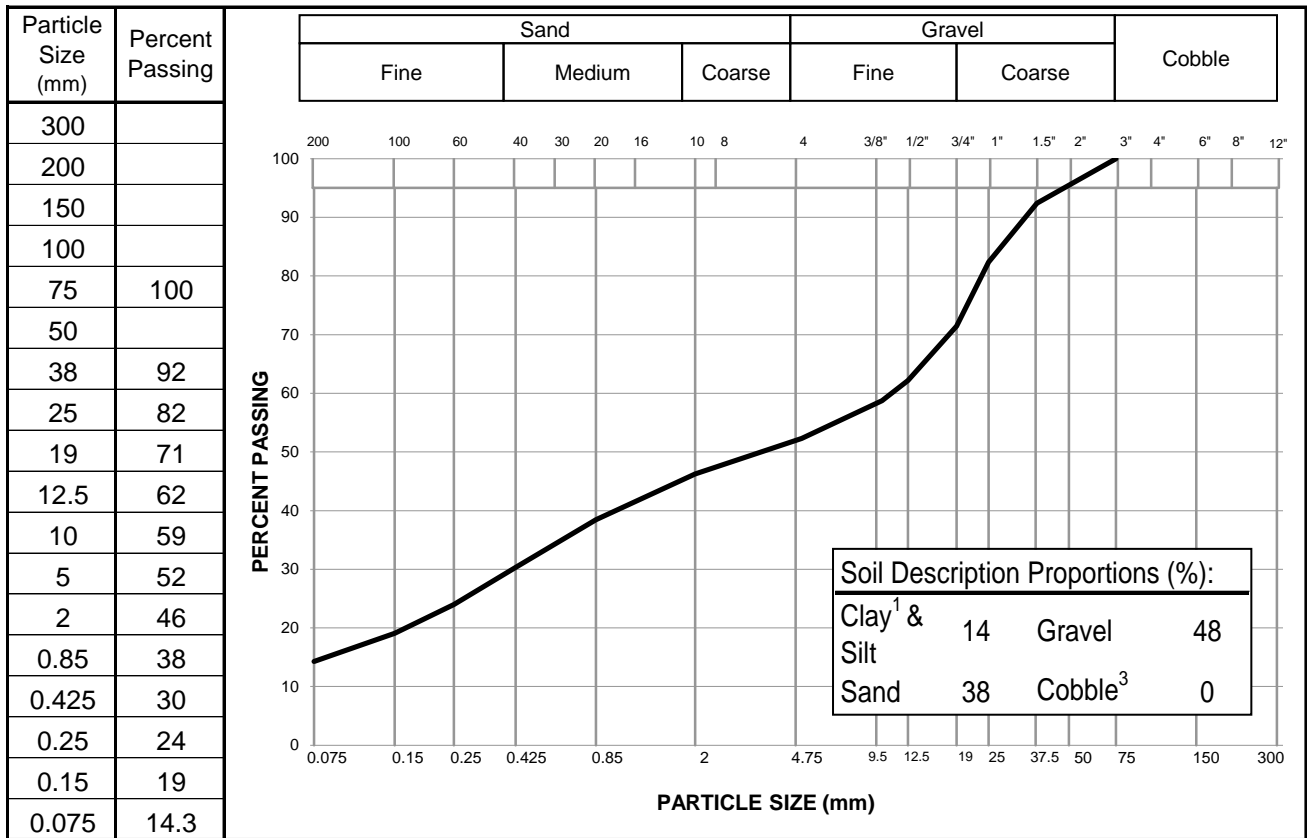
LOGGED BY: AWW	COMPLETION DEPTH: 11.3m
REVIEWED BY: JRT	COMPLETE: 11/10/2014
DRAWING NO: See Figure 1	Page 1 of 1



# PARTICLE SIZE ANALYSIS REPORT

ASTM D422, C136 & C117

Project:	CBSA Port of Entry - Geotech Eval.	Sample No.:	SA01
Project No.:	W14103499-01	Material Type:	
Site:	Fraser, BC	Sample Loc.:	BH01
Client:	Stantec Architecture Ltd.	Sample Depth:	0.60 m
Client Rep.:	Lee Fleming	Sampling Method:	LPT
Date Tested:	December 3, 2014	By:	AMT
		Date sampled:	November 10, 2014
Soil Description <sup>2</sup> :	GRAVEL and SAND - some silt	Sampled By:	AWW
		USC Classification:	GM      Cu: #N/A Cc: #N/A
Moisture Content:	7.7%		



Notes: <sup>1</sup> The upper clay size of 2 um, per the Canadian Foundation Engineering Manual  
<sup>2</sup> The description is visually based & subject to EBA description protocols  
<sup>3</sup> If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: \_\_\_\_\_

Remarks: \_\_\_\_\_  
 \_\_\_\_\_

Reviewed By:  P.Eng.

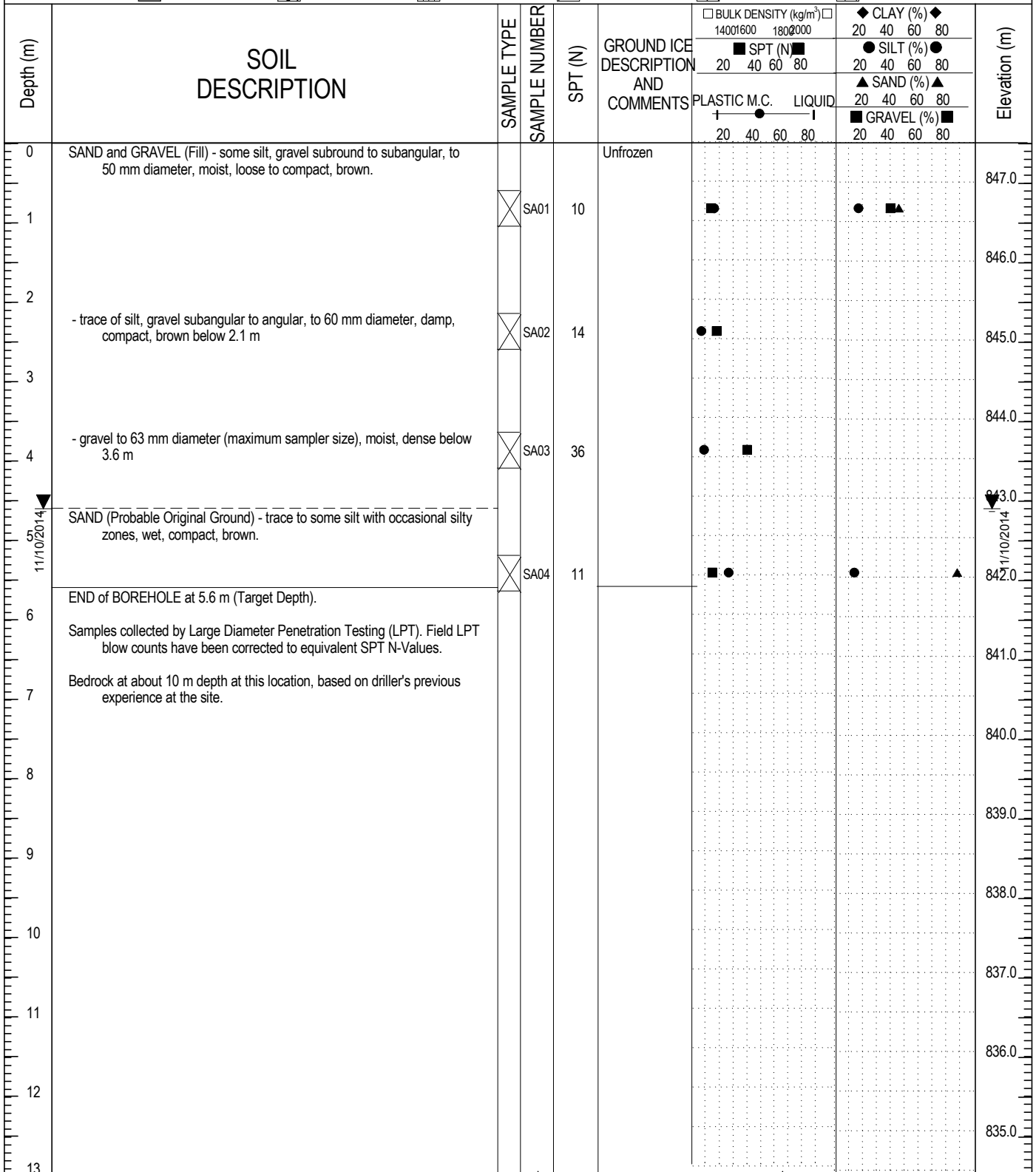
Data presented hereon is for the sole use of the stipulated client. Tetra Tech EBA is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of Tetra Tech EBA. The testing services reported herein have been performed to recognized industry standards, unless noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interpretation be required, Tetra Tech EBA will provide it upon written request.





Geotechnical Evaluation	CLIENT: Stantec Architecture Ltd.	PROJECT NO. - BOREHOLE NO.
CBSA Port of Entry	DRILL: Midnight Sun Drilling Inc. - MARL M4CT	W14103499 - BH02
Fraser, BC	METHOD: ODEX/LPT	ELEVATION: 847.5 m

SAMPLE TYPE	<input type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND

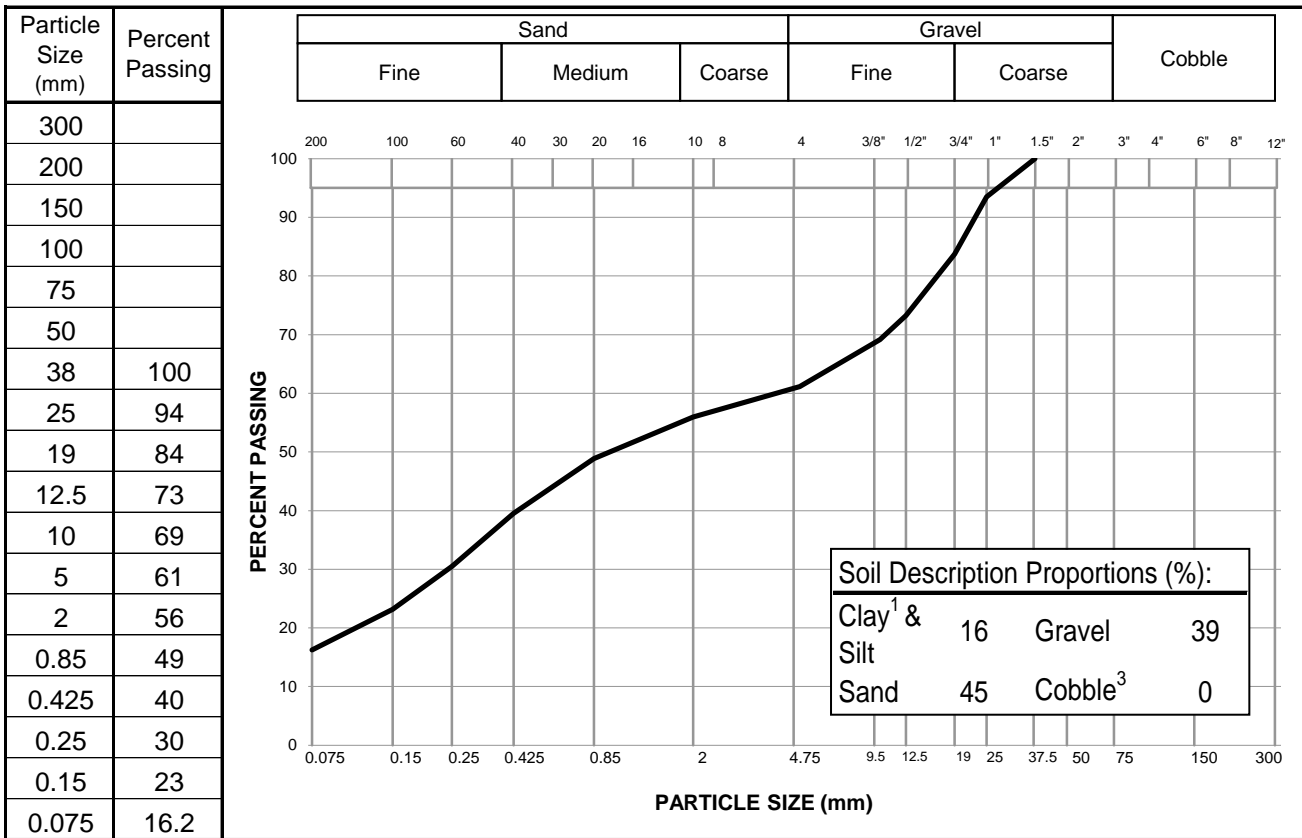


LOGGED BY: AWW	COMPLETION DEPTH: 5.6m
REVIEWED BY: JRT	COMPLETE: 11/10/2014
DRAWING NO: See Figure 1	Page 1 of 1

## PARTICLE SIZE ANALYSIS REPORT

ASTM D422, C136 & C117

Project:	CBSA Port of Entry - Geotech Eval.	Sample No.:	SA01
Project No.:	W14103499-01	Material Type:	
Site:	Fraser, BC	Sample Loc.:	BH02
Client:	Stantec Architecture Ltd.	Sample Depth:	0.60 m
Client Rep.:	Lee Fleming	Sampling Method:	LPT
Date Tested:	December 3, 2014	By:	AMT
		Date sampled:	November 10, 2014
Soil Description <sup>2</sup> :	SAND and GRAVEL - some silt	Sampled By:	AWW
		USC Classification:	SM      Cu: #N/A
Moisture Content:	12.3%		Cc: #N/A



Notes: <sup>1</sup> The upper clay size of 2 um, per the Canadian Foundation Engineering Manual  
<sup>2</sup> The description is visually based & subject to EBA description protocols  
<sup>3</sup> If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: \_\_\_\_\_

Remarks: \_\_\_\_\_  
 \_\_\_\_\_

Reviewed By:  P.Eng.

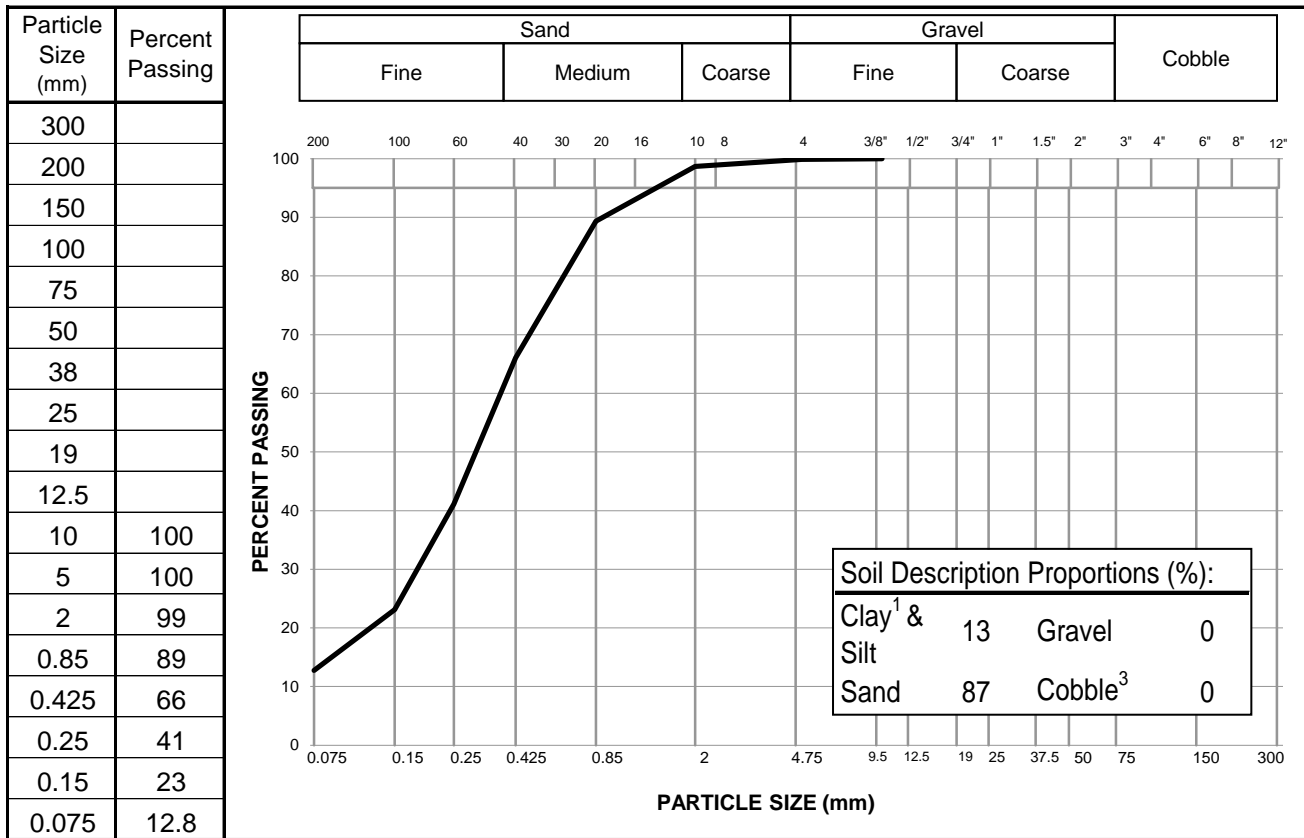
Data presented hereon is for the sole use of the stipulated client. Tetra Tech EBA is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of Tetra Tech EBA. The testing services reported herein have been performed to recognized industry standards, unless noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interpretation be required, Tetra Tech EBA will provide it upon written request.



# PARTICLE SIZE ANALYSIS REPORT

ASTM D422, C136 & C117

Project:	CBSA Port of Entry - Geotech Eval.	Sample No.:	SA04
Project No.:	W14103499-01	Material Type:	
Site:	Fraser, BC	Sample Loc.:	BH02
Client:	Stantec Architecture Ltd.	Sample Depth:	5.18 m
Client Rep.:	Lee Fleming	Sampling Method:	LPT
Date Tested:	December 3, 2014	By:	AMT
		Date sampled:	November 10, 2014
Soil Description <sup>2</sup> :	SAND - some silt	Sampled By:	AWW
		USC Classification:	SM      Cu: #N/A
Moisture Content:	22.7%		Cc: #N/A



Notes: <sup>1</sup> The upper clay size of 2 um, per the Canadian Foundation Engineering Manual  
<sup>2</sup> The description is visually based & subject to EBA description protocols  
<sup>3</sup> If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: \_\_\_\_\_

Remarks: \_\_\_\_\_  
 \_\_\_\_\_

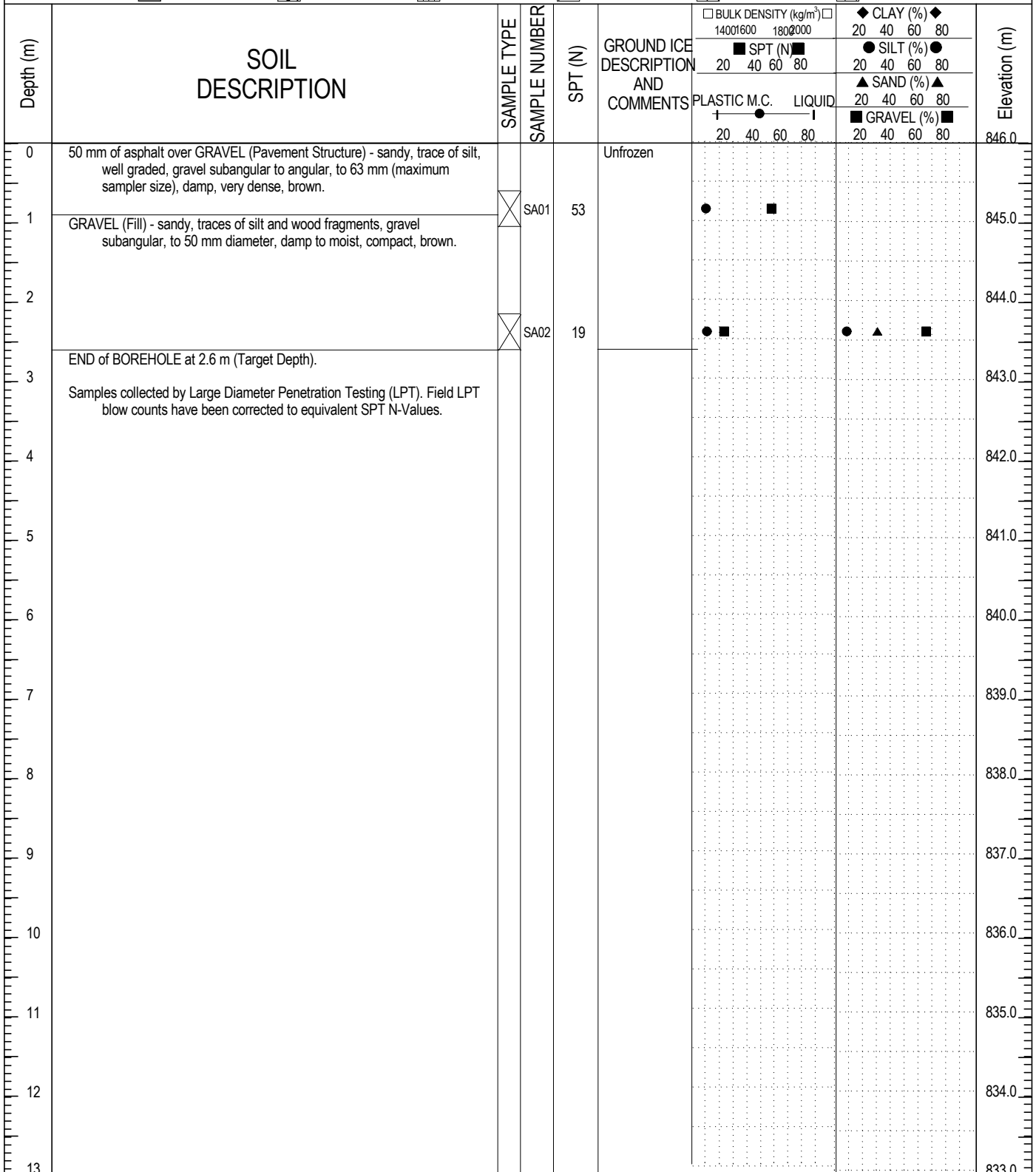
Reviewed By:  P.Eng.

Data presented hereon is for the sole use of the stipulated client. Tetra Tech EBA is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of Tetra Tech EBA. The testing services reported herein have been performed to recognized industry standards, unless noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interpretation be required, Tetra Tech EBA will provide it upon written request.



Geotechnical Evaluation	CLIENT: Stantec Architecture Ltd.	PROJECT NO. - BOREHOLE NO.
CBSA Port of Entry	DRILL: Midnight Sun Drilling Inc. - MARL M4CT	W14103499 - BH03
Fraser, BC	METHOD: ODEX/LPT	ELEVATION: 846 m

SAMPLE TYPE	<input type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



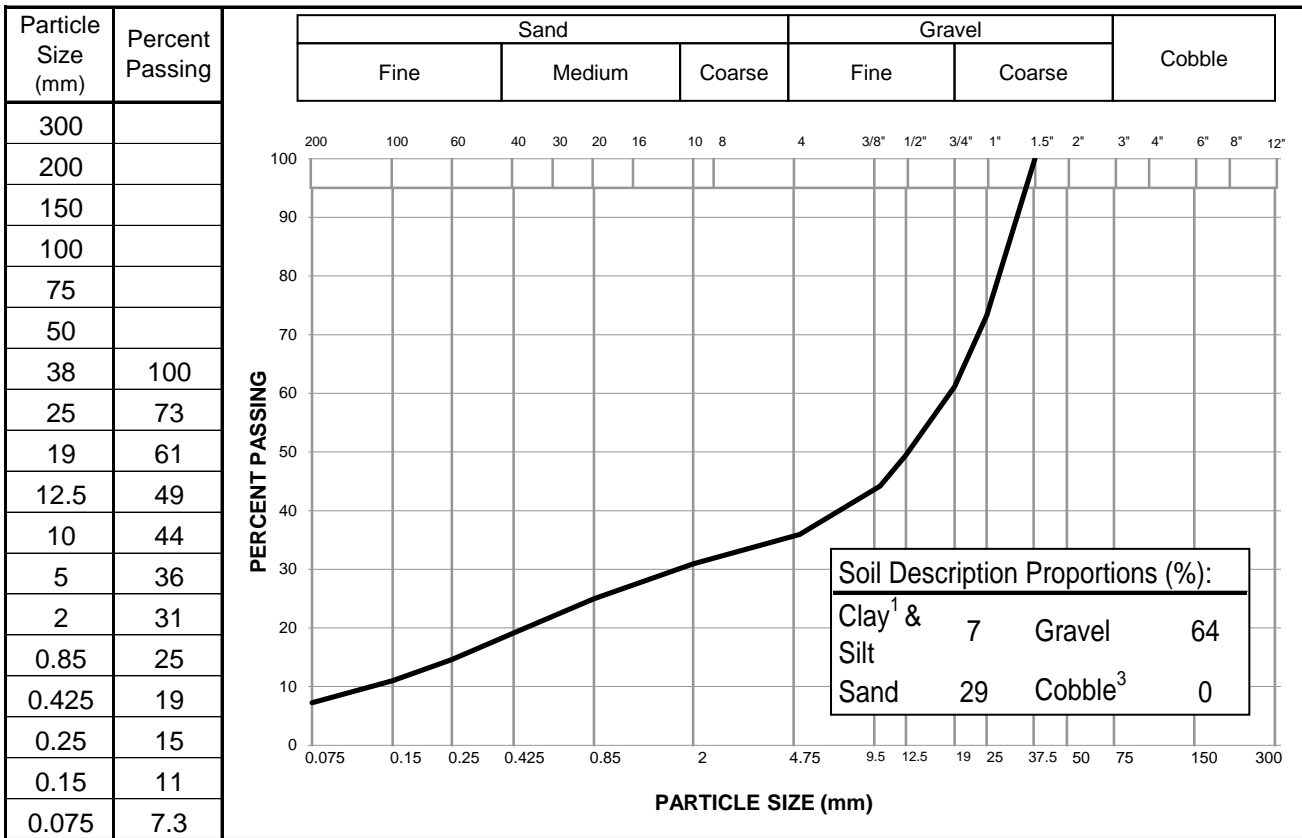
TETRA TECH EBA

LOGGED BY: AWW	COMPLETION DEPTH: 2.6m
REVIEWED BY: JRT	COMPLETE: 11/10/2014
DRAWING NO: See Figure 1	Page 1 of 1

# PARTICLE SIZE ANALYSIS REPORT

ASTM D422, C136 & C117

Project:	CBSA Port of Entry - Geotech Eval.	Sample No.:	SA02
Project No.:	W14103499-01	Material Type:	
Site:	Fraser, BC	Sample Loc.:	BH03
Client:	Stantec Architecture Ltd.	Sample Depth:	2.13 m
Client Rep.:	Lee Fleming	Sampling Method:	LPT
Date Tested:	December 3, 2014	By:	AMT
		Date sampled:	November 10, 2014
Soil Description <sup>2</sup> :	GRAVEL - sandy, trace silt	Sampled By:	AWW
		USC Classification:	GW      Cu:      141.4
Moisture Content:	6.6%		Cc:      1.4



Notes: <sup>1</sup> The upper clay size of 2 um, per the Canadian Foundation Engineering Manual  
<sup>2</sup> The description is visually based & subject to EBA description protocols  
<sup>3</sup> If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: \_\_\_\_\_

Remarks: \_\_\_\_\_  
 \_\_\_\_\_

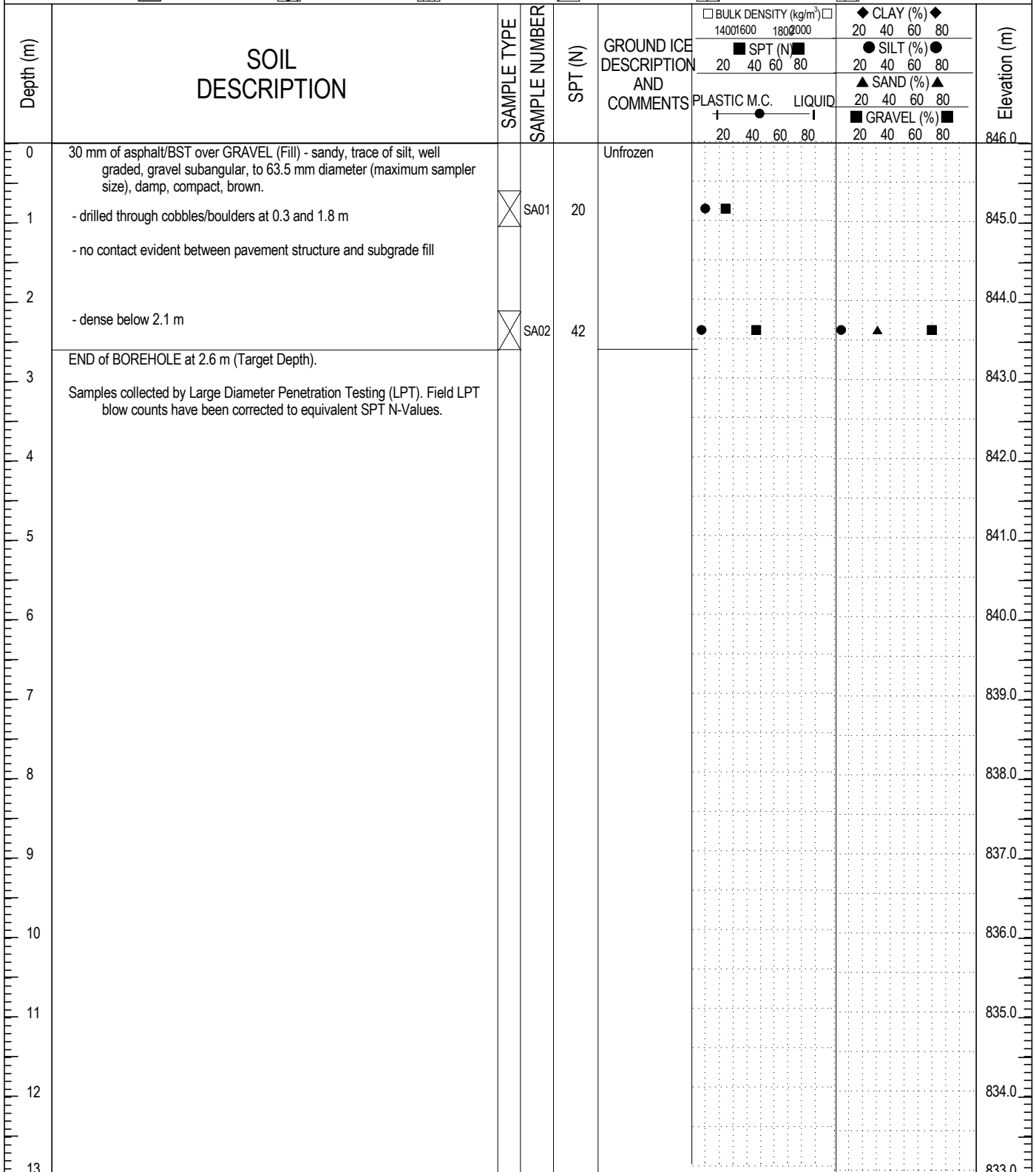
Reviewed By:  P.Eng.

Data presented hereon is for the sole use of the stipulated client. Tetra Tech EBA is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of Tetra Tech EBA. The testing services reported herein have been performed to recognized industry standards, unless noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interpretation be required, Tetra Tech EBA will provide it upon written request.



Geotechnical Evaluation	CLIENT: Stantec Architecture Ltd.	PROJECT NO. - BOREHOLE NO.
CBSA Port of Entry	DRILL: Midnight Sun Drilling Inc. - MARL M4CT	W14103499 - BH04
Fraser, BC	METHOD: ODEX/LPT	ELEVATION: 846 m

SAMPLE TYPE	<input type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



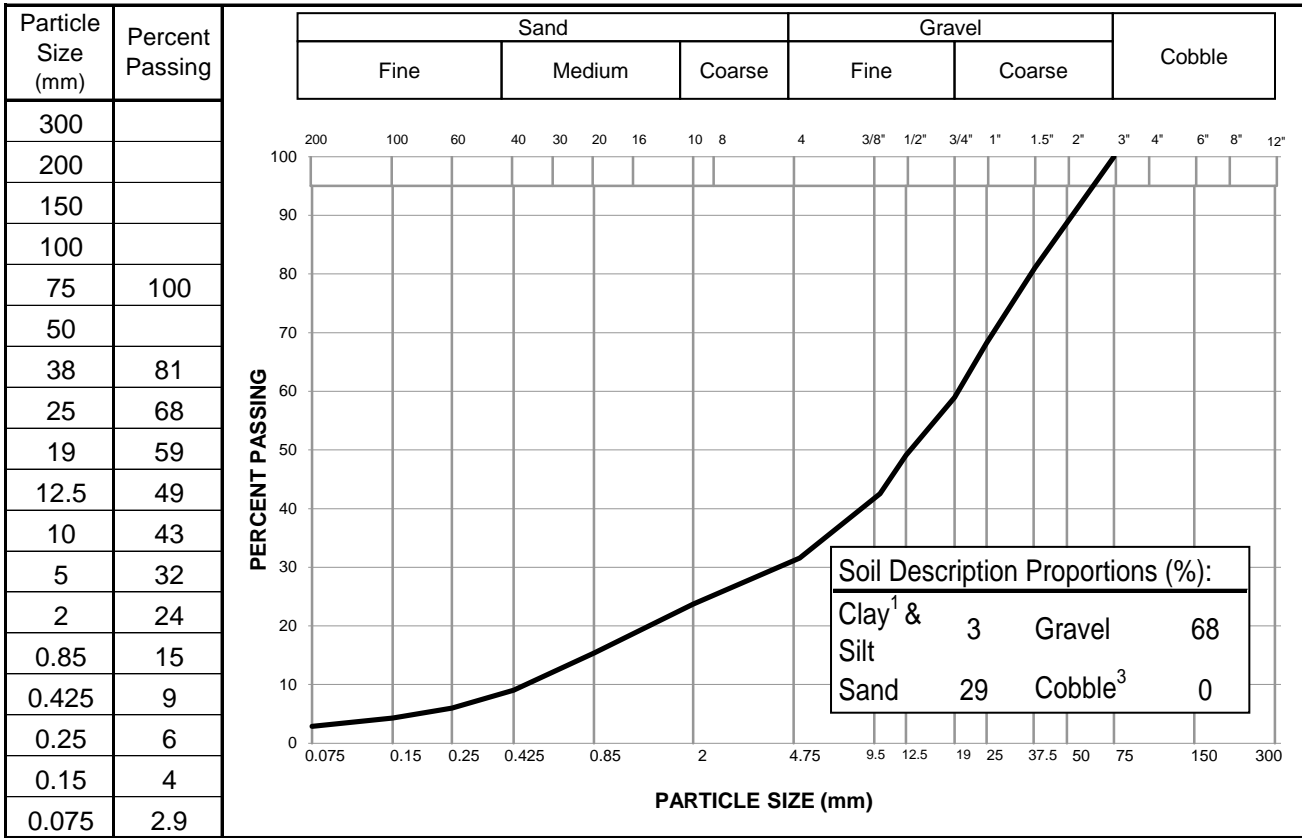
LOGGED BY: AWW	COMPLETION DEPTH: 2.6m
REVIEWED BY: JRT	COMPLETE: 11/10/2014
DRAWING NO: See Figure 1	Page 1 of 1



# PARTICLE SIZE ANALYSIS REPORT

ASTM D422, C136 & C117

Project:	CBSA Port of Entry - Geotech Eval.	Sample No.:	SA02
Project No.:	W14103499-01	Material Type:	
Site:	Fraser, BC	Sample Loc.:	BH04
Client:	Stantec Architecture Ltd.	Sample Depth:	2.13 m
Client Rep.:	Lee Fleming	Sampling Method:	LPT
Date Tested:	December 3, 2014	By:	AMT
Date Tested:	December 3, 2014	Date sampled:	November 10, 2014
Soil Description <sup>2</sup> :	GRAVEL - sandy, trace silt	Sampled By:	AWW
		USC Classification:	GW      Cu:      40.3
Moisture Content:	2.7%		Cc:      2.0



Notes: <sup>1</sup> The upper clay size of 2 um, per the Canadian Foundation Engineering Manual  
<sup>2</sup> The description is visually based & subject to EBA description protocols  
<sup>3</sup> If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: \_\_\_\_\_

Remarks: \_\_\_\_\_  
 \_\_\_\_\_

Reviewed By: P.Eng.

---

**FRASER PORT OF ENTRY DEMOLITION OF EXISTING SLAB  
AND RE-PAVING**

**PROJECT NO. R. 106775.001**

**FRASER, BRITISH COLUMBIA**

---

**APPENDIX C**

**AREA SPECIFIC DESIGNATED SUBSTANCES AND HAZARDOUS  
MATERIALS SURVEY**

CANADA BORDER SERVICES AGENCY

# AREA SPECIFIC DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY FRASER, BRITISH COLUMBIA

MARCH 7, 2018

CONFIDENTIAL



SUITE 300  
2611 QUEENSVIEW DRIVE  
OTTAWA, ON, CANADA K2B 8K2

Tel.: +1 613 829-2800  
Fax: +1 613 829-8299  
WSP.COM



---

# SIGNATURES

## PREPARED BY



---

Briana Laybolt, B.Sc., P.Ag  
Environmental Scientist, Environment

## REVIEWED BY



---

Anthony Dickinson, M.A.Sc., P.Eng.  
Senior Environmental Engineer

This report was prepared by WSP Canada Inc. for the account of CANADA BORDER SERVICES AGENCY, in accordance with the professional services agreement. The disclosure of any information contained in this report is the sole responsibility of the intended recipient. The material in it reflects WSP's best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This limitations statement is considered part of this report.

# EXECUTIVE SUMMARY

WSP Canada Inc. (WSP) was retained by Canada Border Services Agency (CBSA) to carry out an Area Specific Designated Substances and Hazardous Materials Survey (DSS) at the CBSA property in Fraser, British Columbia (hereafter referred to as the Subject Property). The Subject Property consists of a single-storey customs building with an attached canopy on the south side and a separate canopy/covered parking on the north side. It is our understanding the customs building was constructed circa-1978.

The Subject Property investigated during this DSS included the Port-of-Entry customs building and the canopy areas only. It is our understanding that the planned demolition project will take place within this area (see Figure 1 in Appendix A).

The purpose of this survey was to determine the presence/absence of designated substances within the Subject Property in order to provide designated substances information to contractors at the time of tender to ensure complete and correct removal or handling of materials prior to demolition

All of the samples of suspect asbestos-containing materials (ACM) collected during this DSS of the customs building or the one previously completed by Stantec Consultants Ltd. (Stantec) in 2016 were found to be non-detect for asbestos. However, both studies identified paint coatings as lead-containing.

A summary of the materials found to be containing lead in the Customs Building is presented in Table 1:

**Table 1 Designated Substances & Hazardous Materials Survey Findings - Customs Building**

MATERIAL	SURVEY FINDINGS
Lead	<p>Based on the laboratory results, five (5) of the paint samples collected and analyzed during this survey had detectable lead concentrations.</p> <ul style="list-style-type: none"> <li>— Yellow paint applied to external wall paneling.</li> <li>— Cream paint on interior central office trim.</li> <li>— <i>Cream paint applied to external wall paneling.</i></li> <li>— <i>Cream paint on interior walls on southeast side of building.</i></li> <li>— Black/Red Paint on external posts and frames in carport.</li> <li>— <i>Red primer on exterior beams on northeast side of building.</i></li> <li>— White paint applied to the ceiling in the carport.</li> <li>— Weathered Brown Paint on exterior paneling on west side of building.</li> <li>— <i>Light Blue Paint on interior walls of arming room.</i></li> <li>— <i>Cream paint on exterior steel canopy on northeast side of customs building.</i></li> </ul> <p>Notes:</p> <p><i>Italicized paint material was identified within a previous report.</i></p> <ul style="list-style-type: none"> <li>— Lead is also expected to be present in the following building components:</li> <li>— in lead acid batteries in emergency lighting throughout the building;</li> <li>— as a component in ceramic building products such as tiles and bricks;</li> <li>— as a component of the solder on sweated joints between copper pipe and fittings;</li> <li>— as a component of the solder on wire connections of electric components;</li> <li>— as a component of solder used to seal the bell fitting of cast iron rain water leader pipes; and</li> <li>— as a malleable metal sheeting/flashing around roof edges, vent stacks, HVAC fixtures, etc.</li> </ul>

**Table 2 Other Designated Substances & Hazardous Materials Survey Findings**

<b>MATERIAL</b>	<b>SURVEY FINDINGS</b>
Acrylonitrile	None observed.
Arsenic	None observed.
Benzene	None observed.
Coke Oven Emissions	None observed.
Ethylene Oxide	None observed.
Isocyanates	None observed.
Mercury	Although no samples were analyzed for mercury, it is presumed to be present in the following building components: <ul style="list-style-type: none"> <li>– gas in fluorescent light tubes; and,</li> <li>– bactericide or stabilizer in paints and inks manufactured prior to 1992.</li> </ul>
Mould	Significant mould growth was not observed within the study area, with no major water damage apparent.
Ozone Depleting Substances (ODSs)	There was one air conditioning unit observed on the roof of the customs building. There was one fridge in the kitchen which could potentially contain ODS.
Polychlorinated Biphenyls (PCBs)	At least 20 fluorescent light ballasts were observed within the subject building. The light ballasts throughout the building were energized at the time of the survey and therefore could not be safely examined to determine the presence/absence of PCBs. However, based on the date of construction, PCBs may be present in some of the lamp ballasts within the subject buildings.
Silica	Building materials and components known to contain silica such as glass, masonry, stone, concrete, asphalt, cement and mortar were observed throughout the study area.
Radioactive Materials (RAMs)	Smoke/heat detectors were observed in various locations throughout the buildings.
Radon	Although no evidence of radon was observed during the site visit or document review, all sites in Canada have the potential for the presence of radon.

## RECOMMENDATIONS

Hazardous materials must be removed before any demolition or renovation activities are undertaken that may disturb them. A copy of this report should be retained and provided to any contractors who may be undertaking demolition work in the building(s) as required by Section 20.112 of the WorkSafeBC regulations. WorkSafeBC has published guidance documents for asbestos (*Safe Work Practices for Handling Asbestos*, WorkSafeBC 2017) and lead (*Safe Work Practices for Handling Lead*, WorkSafeBC 2017). ACM identified can be removed using removal procedures as specified in the Safety Code for the Construction Industry (CSTC, S-2.1, r.4). Confirmation that the asbestos and lead removal will be conducted in accordance with the WorkSafeBC Safe Work Practices is recommended prior to any work in areas proposed for renovation.

Contractors retained for renovations should have a proven record in managing designated substances and operate under a control program. All designated substances must be handled in accordance with the appropriate guidelines and

regulations. Designated Substance and Hazardous Material information will require updating if corrective measures have been instituted and materials have been removed from the building.

Special precautions should be taken when disturbing any concrete or painted surfaces given the presence of silica, lead and potentially arsenic. All designated substances must be handled in accordance with the appropriate guidelines and regulations. According to the Safety Code for construction work (S-2.1, r. 4), guidelines for handling and controlling lead and silica in construction need to be applied and it is recommended that these guidelines be followed when removing and cutting into concrete. Coring, sawing or breaking up the materials containing silica, lead and potentially arsenic should be completed only with appropriate dust suppression methods, proper respiratory protection and general worker safety precautions as outlined in the British Columbia Occupational Health and Safety Regulation.

Removal and disposal of lead-containing equipment is required prior to construction or demolition activities that may disturb this equipment. The handling, transport, and disposal of lead-containing equipment must follow all provincial and federal regulations and guidelines pertaining to lead, including the requirements of *BC Workers Compensation Act*, *BC Environmental Management Act*, and *R.S.A. 2000, c. E-12 - Environmental Protection and Enhancement Act*. Prior to the disposal of lead coatings on concrete, wood, and skim coated plaster bulk substrate samples must be sent for Toxicity Characteristic Leaching Protocol (TCLP) analysis as required by the BC Environmental Management Act and regulations.

Atomic Energy Control Board (AECB) guidelines state that smoke detectors containing more than 5 µCi of Am-241 or any quantity of Radium -226 must be disposed of through a consultant or AECB licensed waste facility. The current AECB guidelines allow for the disposal of smoke detectors with an Am-241 isotope source of less than 5.0 µCi to a regular landfill site. Smoke detectors must be disposed of in packages containing a maximum of ten smoke detectors per package.

Removal and disposal of mercury-containing equipment is required prior to construction or demolition activities that may disturb this equipment. The handling, transportation and disposal of mercury-containing equipment must comply with all provincial and federal requirements and guidelines for mercury, including the requirements of the Federal Hazardous Materials (MSDS) Regulations, Q-2, r.32, *BC Workers Compensation Act* and *BC Environmental Management Act and Regulations*.

If found during renovation/demolition, mould-contaminated materials should be removed/handled in accordance with the Canadian Construction Association document CCA 82/2004 and WorkSafeBC Guidelines (G4.79 Moulds and indoor air quality). Contractors should be warned of the presence of mould and every precaution should be taken to prevent airborne exposure to workers where mould is present and where workers are likely to inhale or ingest mould.

It is the intention of the federal government to phase out the use of ODSs by the year 2030 in order to protect the upper atmosphere. The Ministry of Environment (MOE) has issued Regulation 356 regarding the use, disposal and recycling of ODSs. Recapturing of ODSs during servicing must be done by licensed personnel.

A single air conditioning unit containing ODS (i.e. R-22) was observed at the time of the site investigation. If HVAC units are discovered and observed to contain ODSs (i.e. R-22) the units should be recycled following Federal (FHR 2003) and General Waste Management Regulations (R.R.O. 1990, Regulation 347), as amended. All equipment containing ODSs must be serviced by an individual holding a valid Ozone Depletion Prevention (ODP) Card, and the refrigerant drained from the unit and collected for recycling or disposal in accordance with all applicable legislation.

When decommissioned, verify the PCB content of each fluorescent light ballast as per the *Environment Canada* publication "Identification of Lamp Ballasts Containing PCBs", 1991. Handle, store and dispose of PCB-containing materials in accordance with *Federal PCB Regulation SOR/92-507* and *R.S.A. 2000, c. E-12 - Environmental Protection and Enhancement Act*.

Work that may disturb silica-containing materials should follow all applicable provincial and federal regulations and guidelines pertaining to silica.

If during renovation or demolition, additional materials suspected of containing asbestos are encountered, they must be handled in accordance with the appropriate guidelines and regulations. It should be noted that asbestos may be present in the enclosed spaces not accessible at the time of the site visit.

Complete commentary on each of the designated substances in the project area will be provided in the report to follow. This executive summary is not intended to substitute for the complete report, nor does it discuss certain specific issues documented within the report.





# TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Background .....	1
1.2	Survey Objectives.....	1
1.3	Scope of Work.....	2
<b>2</b>	<b>METHODOLOGY .....</b>	<b>3</b>
2.1	General Survey Methodology .....	3
2.2	Asbestos Survey Methodology.....	3
2.3	Lead Survey Methodology .....	5
2.4	Acrylonitrile.....	5
2.5	Arsenic.....	5
2.6	Benzene .....	6
2.7	Coke Oven Emissions.....	6
2.8	Ethylene Oxide .....	6
2.9	Isocyanates.....	6
2.10	Mercury.....	6
2.11	Mould.....	6
2.12	Ozone Depleting Substances (ODS) .....	7
2.13	Polychlorinated Biphenyls (PCB).....	7
2.14	Silica.....	7
2.15	Urea Formaldehyde Foam Insulation (UFFI).....	7
2.16	Radioactive Materials (RAMs).....	7
2.17	Radon .....	7
<b>3</b>	<b>SITE OVERVIEW.....</b>	<b>8</b>
3.1	Site Description.....	8
3.1.1	Customs Building .....	8
3.2	Records Review.....	8
3.2.1	Customs Building - Lead Identified in Prior Survey.....	8





3.3	Site Inspection .....	8
<b>4</b>	<b>REGULATORY CONTEXT .....</b>	<b>9</b>
4.1	Asbestos .....	9
4.2	Lead .....	10
<b>5</b>	<b>OBSERVATIONS AND RESULTS .....</b>	<b>11</b>
5.1	Customs Building .....	12
5.1.1	Asbestos .....	12
5.1.2	Lead .....	14
5.2	Other Designated Substances and Hazardous Materials.....	16
<b>6</b>	<b>LIMITATIONS .....</b>	<b>22</b>
<b>7</b>	<b>REFERENCES .....</b>	<b>23</b>

---

## **TABLES**

TABLE 1	DESIGNATED SUBSTANCES & HAZARDOUS MATERIALS SURVEY FINDINGS - CUSTOMS BUILDING .....	II
TABLE 2	OTHER DESIGNATED SUBSTANCES & HAZARDOUS MATERIALS SURVEY FINDINGS .....	III
TABLE 3	MINIMUM NUMBER OF BULK SAMPLES TO BE COLLECTED UNDER WORKSAFEBC GUIDELINES REGARDING DEMOLITION AND ASBESTOS WASTE MATERIALS .....	4
TABLE 4	CUSTOMS BUILDING - SUMMARY OF WSP BULK SAMPLES IDENTIFIED AS "NONE-ASBESTOS" .....	13
TABLE 5	CUSTOMS BUILDING - SUMMARY OF LEAD CONCENTRATIONS IN WSP BULK SURFACE COATING (PAINT) SAMPLES .....	15
TABLE 6	OTHER DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS INCLUDED IN THE SURVEY .....	16

---

## **APPENDICES**

<b>A</b>	FIGURES
<b>B</b>	SITE PHOTOGRAPHS
<b>C</b>	CERTIFICATES OF ANALYSIS - ASBESTOS
<b>D</b>	CERTIFICATES OF ANALYSIS - LEAD
<b>E</b>	PUBLIC SERVICES AND PROCUREMENT CANADA - ASBESTOS MATERIALS SURVEY -EVALUATION OF ASBESTOS-CONTAINING MATERIALS AND RECOMMENDATIONS FOR CONTROL

# 1 INTRODUCTION

---

## 1.1 BACKGROUND

WSP Canada Inc. (WSP) was retained by Canada Border Services Agency (CBSA) to carry out an Area Specific Designated Substances and Hazardous Materials Survey (DSS) at the CBSA port in Fraser, British Columbia (hereafter referred to as the Subject Property). The Subject Property is comprised of a smaller customs facility located approximately 140 km south of Whitehorse, YK on Highway 2. (Figure 1, Appendix A).

The Subject Property consists of a single-storey 115 m<sup>2</sup> (1,235 sq. ft.) customs building with eastward attached 30 m<sup>2</sup> (320 sq. ft.) canopy covered vehicle pass-through and separate north adjacent 110 m<sup>2</sup> (1,180 sq. ft.) at grade canopy covered parking/storage structure. The customs building was constructed circa-1978.

The Subject Property investigated during this DSS included the customs building including vehicle pass-through and the covered parking/storage structure. It is our understanding that the planned demolition project works will take place in area illustrated on Figure 1, Appendix A.

The purpose of this survey is to determine the presence/absence of designated substances within the Subject Property and to provide designated substances information to contractors at the time of tender to ensure complete and correct removal or handling of materials prior to demolition

The initial survey was conducted by Gordon Philippe and Briana Laybolt of WSP on August 26, 2017.

---

## 1.2 SURVEY OBJECTIVES

This survey is required to satisfy the building owner's requirements under Section 20.112 of the *BC Occupational Health and Safety Regulation (OHSR)* which requires that a hazardous building materials survey should be conducted by a qualified person prior to any demolition or renovation activity which might disturb hazardous materials. The *Canadian Occupational Health and Safety Regulations* and *Canada Labour Code, Part II*, which applies to all areas under federal jurisdiction, stipulates the requirements for protection of employees.

This information allows workers to take appropriate steps to prevent accidental exposure to these harmful substances. This report should be provided to all maintenance workers, prospective contractors (and in turn to their sub-trades) who are likely to handle, come into contact with, or disturb building materials. Contractors who may work in close proximity to the identified materials and who may also disturb the materials should also be notified.

The primary objectives of the survey were to:

- Develop an up-to-date inventory, and gain a better understanding of the designated substances and/or hazardous materials that are present in the Subject Property scheduled for demolition including materials considered to be suspect lead-containing materials (LCM) and asbestos-containing materials (ACM) identified during a previous Phase I ESA (Environmental Site Assessment) conducted for the Subject Property in 2017 by WSP;
- Document their locations, applications, concentrations, quantities, and conditions within the Subject Property buildings in order to provide workers, and prospective contractors, with adequate information to prevent accidental exposures; and
- Provide recommendations for the safe removal, handling and disposal of the identified designated substances and hazardous materials as necessary.

---

## 1.3 SCOPE OF WORK

The scope of this work program was to identify suspect or possible designated substances. The objective of this survey was to conduct sampling and analysis of additional materials considered to be LCM and ACM. WSP's scope of work for this project included a thorough and intrusive DSS survey of the Subject Property buildings, which consisted of:

- A review of existing environmental reports (i.e. those pertaining to Designated Substances and Hazardous Materials) and other relevant site specific information;
- A thorough room by room visual inspection of the Subject Property buildings and structures for potential Designated Substances and Hazardous Materials;
- Collection of bulk samples of materials suspected to contain asbestos in general accordance with WorkSafeBC Occupational Health and Safety Regulations Part 20, Construction, Excavation and Demolition, Section 20.112 Hazardous Materials;
- Collection of representative surface coatings via bulk sampling of full thickness paint layerings suspected to contain elevated concentrations of lead;
- Visually-evident sources of mercury being inventoried (e.g. thermostats and florescent light tubes);
- Assessment of the likelihood of exposure to designated substances with recommendations for appropriate corrective action where required;
- Suspected or visually obvious signs of mould being recorded and quantified;
- Visually identify stored materials which may be flammable or explosive;
- Visual identification of other hazardous materials, including equipment containing ODS, fuel, oil and/or waste oil storage, chemical storage, urea-formaldehyde foam insulation (UFFI) and/or radioactive materials being inventoried by recording name plate/label information and quantities, where they were observed.
- Collection of roofing materials, where accessible.

# 2 METHODOLOGY

---

## 2.1 GENERAL SURVEY METHODOLOGY

WSP's survey will identify those substances defined as Designated Substances and Hazardous Materials under Section 20.112 of the *BC Occupational Health and Safety Regulation* including: **asbestos** (friable and non-friable), lead, mercury, silica, benzene, acrylonitrile, arsenic, coke oven emissions, ethylene oxide, isocyanates, and vinyl chloride. In addition, other hazardous materials, such as PCBs, radioactive materials (RAMs), ozone-depleting substances (ODS), UFFI, mould, radon and other stored chemicals and wastes were included in the survey scope.

Our surveyors performed a systematic survey of the study area for the purposes of identifying Designated Substances and Hazardous Materials and documenting observations made about their locations, estimated quantities and respective conditions. These observations form the basis for developing the recommendations provided within this report.

The survey of the study area for designated substances consisted of a walk-through and physical examination of suspected materials in accessible areas of the building. A physical examination was completed to assess the condition of materials and to examine for underlying layers. In situations where ACM or other designated substances extended into a non-accessible area, such as asbestos cement parging on mechanical pipes it was assumed that ACM were also present in these areas and were reported as such.

Survey procedures specific to asbestos and lead are documented in the following sections of this report.

---

## 2.2 ASBESTOS SURVEY METHODOLOGY

The surveyors inspected the study area for the presence of friable and non-friable ACM. Examples of ACM commonly found in buildings may include:

- Sprayed insulation;
- Rock insulation in the cavities of concrete block walls;
- Acoustic/texture finish;
- Drywall joint compound;
- Mechanical insulation/joint tape compound;
- Asbestos cement;
- Piping;
- Acoustic ceiling tiles;
- Vinyl floor tiles and vinyl sheet flooring;
- Plaster;
- Roofing material;
- Caulking/mastic.

The collection of bulk asbestos samples was performed in accordance with WorkSafeBC Occupational Health and Safety Regulations Part 20, Construction, Excavation and Demolition, Section 20.112 Hazardous Materials. Bulk samples were collected from suspect materials (i.e. materials known as having the potential to be asbestos-containing) and analyzed to identify or confirm the presence/absence of asbestos. Asbestos samples were collected by taking a small amount of representative material (approximately two square centimeters in size) from either intact material or preferably from a damaged section. Subsequent to sampling, material areas were cleaned and sealed to limit potential exposure risk. The

collected samples were placed in zipper storage plastic bags, sealed, uniquely labelled, and forwarded to an analytical laboratory.

The bulk samples collected were then submitted with an accompanying a chain of custody form to an to an accredited, independent laboratory (EMSL Analytical of Calgary, Alberta) for analysis of asbestos content via US EPA Method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials in accordance with the *Safe Work Practices for Handling Asbestos* manual (WorkSafeBC, 2017). The laboratory was instructed to use “stop-positive” analysis when asbestos was identified via Polarized Light Microscopy (PLM) analysis.

The aforementioned building materials review and bulk material sample collection for analysis of potential asbestos was consistent with recognized industry standards and principles of good occupational hygiene practice for a DSS in North America.

The number of bulk samples required in order to establish whether a material is asbestos-containing according to *O. Reg. 278/05 and Safe Work Practices for Handling Asbestos Manual*, is summarized in Table 3.

**Table 3 Minimum Number of Bulk Samples to be collected under WorkSafeBC Guidelines Regarding Demolition and Asbestos Waste Materials**

**WORKSAFEBC GUIDELINES - BULK MATERIAL SAMPLES TABLE**

<b>Item</b>	<b>Type of material</b>	<b>Size of area of homogeneous material</b>	<b>Minimum number of bulk material samples to be collected</b>
1.	Surfacing materials, including textured coatings, drywall mud, plasters, and stucco	Less than 90 square metres	3 of each type of surfacing material
		90 or more square metres, but less than 450 square metres	5 of each type of surfacing material
		450 or more square metres	7 of each type of surfacing material
2.	Sprayed insulation and blown-in insulation, including sprayed fireproofing and vermiculite insulation (including vermiculite insulation within concrete masonry units - CMUs).	Less than 90 square metres	3
		90 or more square metres, but less than 450 square metres	5
		450 or more square metres	7
3.	Flooring, including vinyl sheet flooring (and backing) and floor tiles	Any size	1 sample per flooring type in each room (and 1 from each layer of flooring)
4.	Mechanical insulation, including duct taping, pipe insulation, elbows, and boiler/tank insulation	Any size	3 samples per house or mechanical or boiler room
5.	Roofing materials, including felting and shingles	Less than 90 square metres	1 from each layer of roofing material
		90 or more square metres, but less than 450 square metres	2 from each layer of roofing material
		450 or more square metres	3 from each layer of roofing material
6.	Asbestos cement (transite) board and pipe	Any size	1 sample
7.	Other materials	Any size	1 sample per type of material

Samples were collected from discrete locations with every attempt to minimize damage. The following procedures for collection of samples were followed:

The surface of the material was wetted with water using a spray bottle. In situations where the material could not be wetted, a plastic bag or other containment device was placed around the sampling device.

A sample was obtained by one of two methods:

- A coring device or sampling device was slowly pushed into the material with a twisting motion until the entire thickness was penetrated, followed by extraction of the sampling device, or;
- A knife or chisel was cleaned and then used to excise a piece of the material.

Each sample was placed in a clear bag with a tight closure, labelled appropriately and placed in a second, similar bag. Debris was cleaned with wet paper towels and discarded into a dedicated plastic bag.

Damage to the material sampled was repaired with tape and/or filler material as required.

---

## 2.3 LEAD SURVEY METHODOLOGY

Bulk surface coatings with suspect elevated lead content were collected from each distinct colour of paint observed at the Subject Property. Utility paint scrapers and blades were cleaned prior to each sampling. The surveyors selected sample locations where it appeared that the paint application and layering was most representative of areas on which it was applied. Surface coating suspect lead based paint samples were collected by scraping the full depth of all layers down to the base substrate taking a small volume of material.

Collected samples were placed in appropriate bags, sealed, uniquely labelled, and forwarded along with Chain-of-Custody forms to an accredited, independent laboratory for analysis of lead content. Lead analysis was performed following ASTM Method, ASTM D3335-85A “*Standard Method to Test for Low Concentrations of Lead in Paint by Atomic Absorption Spectrophotometry*”.

The aforementioned building materials review and bulk material sample collection for analysis of potential lead based surface coatings was consistent with recognized industry standards and principles of good occupational hygiene practice for a DSS on buildings in North America.

---

## 2.4 ACRYLONITRILE

The surveyor inspected the subject buildings for the presence of materials known to contain acrylonitrile. Acrylonitrile is mostly used as a feedstock or chemical aid in the production of nitrile-butadiene rubber and in acrylonitrile-butadiene-styrene and styrene-acrylonitrile polymers. Acrylonitrile is also used to make other chemicals such as plastics, synthetic rubber, and acrylic fibre (e.g. clothing, blankets, and carpeting) and nitrile rubber for oil-resistant hoses. No samples were collected or analyzed.

---

## 2.5 ARSENIC

The surveyor inspected the subject buildings for the presence of materials known to contain arsenic. Arsenic is used with other metals (chiefly copper, lead and zinc) to make alloys. Arsenic compounds are also used in pigments, animal poisons, insecticides, paints, wallpaper, ceramics, and poison gases for chemical warfare, glass making, in calico and indigo printing, pyrotechnics, integrated circuits and transistors. Arsenic is also a major waste material from the gold mining industry. No samples were collected or analyzed.

---

## 2.6 BENZENE

The surveyor inspected the subject buildings for the presence of materials known to contain benzene. Benzene is widely used in the chemical industry as a starting material and solvent. Benzene occurs naturally in crude oil and is present in all gasoline products. Benzene is highly volatile, and will release into the atmosphere over a short time. No samples were collected or analyzed.

---

## 2.7 COKE OVEN EMISSIONS

The surveyor inspected the subject buildings for equipment which is likely to contain coke oven emissions. Coke oven emissions are complex mixtures of coal and coke particles, various vapours, gases and tars emitted during carbonization of coal to produce coke. The primary use of coke (pure carbon) is in the manufacture of iron and steel. Coke is also used to synthesize calcium carbide and to manufacture graphite and electrodes. No samples were collected or analyzed.

---

## 2.8 ETHYLENE OXIDE

The surveyor inspected the subject buildings for the presence of materials known to contain ethylene oxide. Ethylene Oxide is an extremely flammable gas used in the manufacture of several industrial chemicals including textiles, detergents, polyurethane foam, antifreeze (especially ethylene glycol), solvents, medicinal products, adhesives, and other related products. It is also used as a fumigant and as a sterilizing agent for food (spices), cosmetics, and surgical tool and plastic devices in hospitals as an alternative to steam. No samples were collected or analyzed.

---

## 2.9 ISOCYANATES

The surveyor inspected the subject buildings for the presence of materials known to contain isocyanates. Isocyanates are the raw materials from which all polyurethane products are made. Isocyanates are widely used in the manufacture of flexible and rigid foams, fibres, coatings such as paints and varnishes, elastomers, and also in materials used in auto body repair and building insulation. No samples were collected or analyzed.

---

## 2.10 MERCURY

The surveyor inspected the subject buildings for equipment which is likely to contain mercury. Mercury is used in thermostat electrical switches, thermometers, and batteries. Mercury vapour is present as a vapour in fluorescent lights, metal halide lights and mercury vapour lights. Pertinent information of the suspected equipment including manufacturer, dates, model and serial numbers, and quantities was recorded when available. No samples were collected or analyzed.

---

## 2.11 MOULD

The surveyor inspected the subject buildings for the presence of mould. This included a non-intrusive visual assessment of exterior and interior building material surfaces and components for evidence of obvious visible mould, and/or areas conducive to mould growth (i.e. demonstrating significant moisture saturation and water damage). No samples were collected or analyzed.



---

## 2.12 OZONE DEPLETING SUBSTANCES (ODS)

The surveyor inspected the subject buildings for equipment which may contain ODS. Information on the type of equipment, manufacturer, and type and quantity of refrigerants used was recorded, where available. Pertinent information of the suspected equipment, including manufacturer, dates, model and serial numbers, and quantities, was recorded when available.

---

## 2.13 POLYCHLORINATED BIPHENYLS (PCB)

The surveyor inspected the subject buildings for equipment which may contain PCBs. Equipment that is generally suspected of containing PCBs includes lamp ballasts, transformers, hydraulic fluid, compressors, switchgears, capacitors and other electric equipment. Pertinent information of the suspected equipment including manufacturer, dates, model and serial numbers, and quantities was recorded when available. No samples were collected or analyzed.

---

## 2.14 SILICA

The surveyor inspected the subject buildings for the presence of materials known to contain silica. Silica is present in materials such as glass, concrete, masonry, stone and mortar which are prevalent materials in building construction. No samples were collected or analyzed.

---

## 2.15 UREA FORMALDEHYDE FOAM INSULATION (UFFI)

The surveyor inspected the subject buildings for the presence of UFFI. UFFI was historically used as a retrofitted insulating material in walls and ceiling spaces. No samples were collected or analyzed.

---

## 2.16 RADIOACTIVE MATERIALS (RAMs)

The surveyor visually inspected the subject areas for the presence of materials known to contain RAMs; low concentration sources are used for ionization chamber type smoke detectors and unpowered emergency exit signs.

---

## 2.17 RADON

The surveyor reviewed the location of the Subject Property relative to the findings of The Ministry of Health completed regional study of radon in homes in British Columbia. The results of the study were published in a document entitled Cross-Canada Survey of Radon Concentrations in Homes - Final Report. (<https://www.canada.ca/en/health-canada/services/environmental-workplace-health/radiation/radon/cross-canada-survey-radon-concentrations-homes-final-report.html>). The location of the Subject Property was also reviewed for Relative Radon Hazard Zoning Hazard as denoted on the Radon Potential Map Canada (REM Corp., 2011). No radon testing was completed.

# 3 SITE OVERVIEW

---

## 3.1 SITE DESCRIPTION

The Subject Property is described as the CBSA port in Fraser British Columbia. The Subject Property area investigated during this DSS included the single-storey 115 m<sup>2</sup> (1,235 sq. ft.) customs building with eastward attached 30 m<sup>2</sup> (320 sq. ft.) canopy covered vehicle pass-through and separate north adjacent 110 m<sup>2</sup> (1,180 sq. ft.) at grade canopy covered parking/storage structure. It is our understanding the customs building was constructed circa-1978.

---

### 3.1.1 CUSTOMS BUILDING

The customs building, vehicle pass-through, and adjacent parking/storage structures are of structural steel (painted) construction with metal roofing. The customs building is set on a concrete floor slab, has an aluminum exterior (painted) and is insulated (walls and attic). Common interior finishes included vinyl sheet flooring, laminate covered wooden counters/cabinetry, painted drywall, prefabricated vinyl covered drywall panels, and texture coated drywall ceilings. The customs building was constructed circa-1978.

---

## 3.2 RECORDS REVIEW

The following report was referenced for this assignment:

- "Pre-Demolition Hazardous Building Materials Assessment" Project # 1232-20503, prepared by Stantec Consulting Ltd. (Stantec), dated February 26, 2016.

Review of the above-noted prior 2016 Stantec report findings found no reference to determination of asbestos-containing materials. However, lead based materials were identified as discussed in section 3.1.1.

---

### 3.2.1 CUSTOMS BUILDING - LEAD IDENTIFIED IN PRIOR SURVEY

The following paints were identified in the Stantec Pre-Demolition Hazardous Building Materials Assessment (Feb. 26, 2016) as lead-containing:

- Red primer on structural steel components through the main building and the exterior carport;
  - Cream paint on steel canopy on the north building exterior;
  - Yellow paint on the corrugated exterior siding.
- 

## 3.3 SITE INSPECTION

The DSS site inspection was conducted by Gordon Phillippe and Briana Laybolt on August 26, 2017.

# 4 REGULATORY CONTEXT

---

## 4.1 ASBESTOS

Asbestos possesses refractory properties appropriate to multiple applications, notably in construction. Asbestos may be found in various friable materials found in a building (flocking, architectural coatings, insulating panels, seals, thermal insulation, acoustic panels, etc.) and non-friable materials (floor tiles, asbestos cement panels, etc.). Asbestos is a component of a variety of building materials manufactured before 1984 including mechanical insulation, floor tiles, ceiling tiles, caulking, plaster, wiring etc. Workers and building occupants may be exposed during demolition/renovation activities. Exposure to asbestos can cause cancer and lung disease. The route of exposure is primarily by inhalation.

CBSA, on behalf of its client, the Federal Government, must conform to all Federal, Provincial, Territorial and Municipal regulations, laws and stipulations regarding asbestos-containing materials located in buildings and installations belonging to or leased by its client. In this light, Public Services and Procurement Canada (PSPC) Asbestos Management Standard (AMS) was adopted. This Standard takes into account Federal legislation: The Canadian Labour Code (R.S.C, 1985, c. L-2) and the Canada Occupational Health and Safety Act (SOR/86-304), as well as the applicable Provincial legislation, British Columbia Occupational Health and Safety Regulation (OHSR B.C Reg. 296/97 including amendments up to BC Reg. 142/2017, August 1, 2017)

For the purpose of this report, although employees working on the site are governed by Federal regulations, all local contractors performing work on the site are governed by the BC OHSR, and hence the scope of work will be consistent with the requirements of the BC OHSR, which are more explicit than the federal regulations.

Section 20.112 of the BC OHSR requires that a hazardous building materials survey should be conducted by a qualified person prior to any demolition or renovation activity which might disturb asbestos materials. The Canadian Occupational Health and Safety Regulations and Canada Labour Code, Part II, which applies to all areas under federal jurisdiction, stipulates the requirements for protection of employees.

In British Columbia as of February 1, 2012, the definition of asbestos-containing material (ACM) for manufactured articles or other material, other than vermiculite insulation, includes materials that contain at least 0.5% asbestos, as determined by methods referenced in BC OHSR section 6.1. Vermiculite insulation containing any asbestos, as determined by the referenced method, is also an ACM.

In the event that renovation or demolition is planned, an intrusive survey of the impacted areas must be performed as per Section 20.112 of the BC OHSR.

The *Safe Work Practices for Handling Asbestos* (WorkSafeBC, April 2017) describes the asbestos assessment requirements, management of asbestos on-site, abatement operations and procedures (i.e., low, moderate and high risk), the use of personal protective equipment (PPE), and air monitoring requirements. The *Safe Work Practices for Handling Asbestos* also provides generic information that employers can use to develop their own site-specific procedures. If a worker is or may be exposed to potentially harmful levels of asbestos, the employer must develop and implement an exposure control plan meeting the requirements of Section 5.54 of the BC OHSR. The employer must also ensure that surveys and risk assessments on asbestos-containing materials are conducted by a qualified person. Specific procedures must be based on the risk assessments.

Prior to a building being demolished or deconstructed, all materials containing asbestos must be removed.

The movement of asbestos is regulated by the Province of British Columbia's *Ministry of the Environment* – Environmental Management Act (SBC 2003, c 53).

---

## 4.2 LEAD

Lead may be present in paint, solder used on copper pipes, caulking on cast iron water pipes, glazing on ceramic tiles, and electrical wires and fixtures. Workers and building occupants may be exposed during demolition/renovation activities. Primary routes of exposure include inhalation, absorption through the skin and ingestion. Overexposure can affect the blood, kidneys, gastro-intestinal system, nervous system and reproductive system.

Lead-based paints are not specifically defined in the current WorkSafeBC regulations. Prior to disposal of waste containing lead, BC Environmental Regulations and WorkSafeBC Guidelines require a Toxicity Characteristic Leaching Procedure (TCLP) be conducted. All material which, when tested, produces a leachate containing more than 5.0 mg/L of lead is considered to be a hazardous material and must be disposed of according to regulations for hazardous materials.

Health Canada and the US Consumer Product Safety Improvement Act both consider a lead-containing surface coating as a paint that contains over 0.009% (90 mg/kg) dry weight of lead. This corresponds to the concentration of lead in paint that may present risk to pregnant women and children. The *Surface Coatings Materials Regulations (SOR/2016-193)* limits the total lead concentration in surface coating materials to 90 mg/kg (same unit of measure as parts per million - ppm) under subsection 2(1). Therefore using this threshold limit, surface coating materials with lead concentrations that exceed 90 mg/kg or ppm (0.009% by weight) are considered to be lead-containing.

To comply with WorkSafeBC regulations, if lead materials are identified at a site (this includes lead in paint), the employer must, before any renovation/demolition, have a qualified professional conduct a risk assessment and develop an exposure control plan, that contains safe work procedures, to protect workers that may be exposed to lead. When evaluating risk, the concentration of lead in paint and the activity must be considered together. In general, if aggressive techniques (i.e. cutting torch, abrasive blasting, and power grinders/sanders) are not used and if the lead concentration in paint is below 600 mg/kg, renovation/demolition workers are unlikely to be exposed to lead concentrations in air exceeding the WorkSafeBC Time Weighted Average for 8 h exposure (TWA) of 0.05 mg/m<sup>3</sup>.

# 5 OBSERVATIONS AND RESULTS

Information in this section of the report should be provided to all prospective contractors, tenants, and/or workers who are likely to handle, come into contact with, or disturb asbestos or other designated substances. Detailed specifications that outline specific abatement procedures are recommended when tendering the renovation/demolition work.

This information may require updating upon the removal of designated substances from various sections of the building upon completion of the demolition. A close-out report stating that the materials are no longer present is also required once the materials are removed.

Contractors and maintenance personnel should be warned of the possibility of undisclosed materials when breaking into enclosed areas. Friable and non-friable building materials discovered in enclosed areas should be treated as asbestos-containing until proven otherwise and other substances, self-evident as designated substances, should be handled in a likewise fashion. In all cases, these materials must be handled and disposed of in accordance with the applicable provisions of the Safety Code for Construction Work.

Samples collected for each building are summarized in two tables. The first is for asbestos-containing materials and the second is for materials that were tested and found to be “non-detect” for asbestos.

For materials containing asbestos, recommended actions for management, repair or removal of these materials, are based on the requirements and procedures specified by PSPC AMS (federal) and the BC Safe Work Practices for Handling Asbestos (provincial) and have been suggested based on the type of disturbance which is anticipated or likely. Alternate handling, repair and removal procedures must comply with the requirements of PSPC AMS and the BC Safe Work Practices for Handling Asbestos.

## SUSPECTED ASBESTOS-CONTAINING MATERIALS

Certain building materials which have historically contained asbestos were not included in the survey since they were inaccessible, are used in a random fashion, or have a low risk of asbestos fibre release.

These materials include:

- Buried services such as underground piping; these pipes were commonly manufactured from a non-friable form of asbestos cement but are inaccessible for sampling without excavation work. Site drawings should be consulted and reviewed to ascertain the presence or absence of such structures.
- Floor levelling compounds; these materials were used in a random fashion, may or may not contain asbestos, and require demolition of floor finishes to access for sample collection. Where seen, floor levelling compounds were collected and tested.
- Packing materials in valves, fittings, etc., may be present but are inaccessible without demolition activities (e.g. within concealed areas behind bulkheads).

In addition, inspection of mechanical equipment such as furnaces, HVAC systems, chimneys or within electrical equipment was not conducted due to safety limitations. These areas are considered not accessible to the surveyor and as such materials suspected to contain asbestos may be present within these inaccessible areas, including:

- electrical wiring insulation,
- underground utilities such as sewers or drain lines,
- electrical conductors,
- high temperature gaskets,
- incandescent light fixture backing,
- ductwork connections,
- chimney interiors.

Prior to demolition or renovation activities, materials suspected of containing asbestos (MSCAs) should be sampled and analyzed to determine the type and quantity of asbestos present in the facility. If asbestos is present in these materials, they should be removed in accordance with the BC Occupational Health and Safety Regulations (BC OHSR) and the Construction Safety Code (S-2.1, r 4).

However, it should be noted that ACMs can be concealed by existing building finishes. If demolition or renovation work reveals materials likely to contain asbestos, all work must be discontinued and the materials must either be considered as containing asbestos or samples of the material must be collected for analysis to determine whether asbestos is present. If laboratory tests determine that the material contains asbestos, it must be handled in accordance with all applicable asbestos regulations and procedures.

## **SUSPECTED LEAD-CONTAINING MATERIALS**

Lead is expected to be present in the following building components:

- as a surface coating, such as paint;
- in lead acid batteries in emergency lighting throughout the building;
- as a component in ceramic building products such as tiles and bricks;
- as a component of the solder on sweated joints between copper pipe and fittings;
- as a component of the solder on wire connections of electric components;
- as a component of solder used to seal the bell fitting of cast iron rain water leader pipes; and
- as a malleable metal sheeting/flashing around roof edges, vent stacks, HVAC fixtures, etc.

Work that will disrupt or disturb lead-containing materials (including drilling, cutting, grinding or abrading) shall comply with the requirements of the BC OHSR and the Safety Code for Construction (S-2.1, r.4), in particular Articles 3.2.12 and 3.2.14, so that working procedures can minimize lead dust emissions.

The measures to be applied for work in the presence of lead are determined according to the type of work carried out and the level of exposure of the workers.

Removal and disposal of lead-containing equipment is required prior to any construction or demolition activity that may cause disruption to this equipment. The handling, transport and disposal of lead-containing equipment must comply with all federal lead regulations and directives, including the requirements of R.S.A. 2000, c. E-12 - Environmental Protection and Improvement Act.

---

## **5.1 CUSTOMS BUILDING**

---

### **5.1.1 ASBESTOS**

#### **ASBESTOS-CONTAINING MATERIALS**

A total of seventeen (17) building material samples were collected by WSP representatives from fourteen (14) homogeneous building materials and submitted for laboratory analysis of asbestos content. There were no materials identified by WSP as ACMs. WSP'S sampling plan is provided in Figure 2, Appendix A.

As per the previously conducted "Pre-Demolition Hazardous Building Materials Assessment" (Stantec February 26, 2016), there were no materials previously identified by Stantec as ACMs.

#### **SUMMARY OF BULK SAMPLES IDENTIFIED AS "NONE ASBESTOS"**

The tables below summarize the analytical results of bulk material samples collected from suspect materials during this WSP DSS and that of the prior 2016 Stantec assessment. Based on the representative sampling, corresponding EMSL

Canada Inc. results of 'None Detect' for asbestos content (None-Asbestos), WorkSafeBC criteria, and site review assessment of visually similar materials, asbestos is not anticipated to be present within the material types sampled.

**Table 4 Customs Building - Summary of WSP Bulk Samples Identified as "None-Asbestos"**

<b>MATERIAL DESCRIPTION / LOCATION</b>	<b>SAMPLE ID<sup>1</sup></b>
Kitchen - Wall Drywall Compound (WDWC)	FR-WDWC-1-01 FR-WDWC-1-02
Washroom - Wall Drywall Compound (WDWC)	FR-WDWC-2-01
Central Office, Central Pillar - Wall Drywall Compound (WDWC)	FR-WDWC-3-01
Central Office, West Wall - Wall Drywall Compound (WDWC)	FR-WDWC-4-01
Southwest Foyer - Wall Drywall Compound (WDWC)	FR-WDWC-5-01
Southeast Entrance - Ceiling Texture Coat (CTC)	FR-CTC-1-01
Central Office - Ceiling Texture Coat (CTC)	FR-CTC-1-02
Kitchen - Ceiling Texture Coat (CTC)	FR-CTC-1-03
Janitorial Storage Closet - Baseboard and Mastic on Wall Drywall Compound (BM/WDWC)	FR-BM/WDWC-1-01
Janitorial Storage Closet - Modern Vinyl Sheet Flooring (VSF)	FR-VSF-1-01
Washroom East Wall - Prefabricated Panel Wall Vinyl Wall Paper (VSP)	FR-VWP-1-01
West Office North Wall - Prefabricated Panel Wall Vinyl Wall Paper (VSP)	FR-VWP-2-01
Kitchen - Black Sink Undercoating (SUD)	FR-SUD-1-01
Attic (via access port near Southeast Entrance) - Blown-In Modern Loose Fill Insulation (MLFI).	FR-MLFI-1-01
Kitchen - Exterior Window Caulking/Sealant (WS)	FR-WS-1-01
Under North Siding - Exterior Building Paper (BP)	FR-BP-1-01
Bond Room - along the north and west side - Brown Floor Tile (FT)	FT-01 Tile
Bond Room - along the north and west side - Mastic Brown Floor Tile (FT)	FT-01 Mastic
Bond Room - Light Grey Sheet Flooring (SF)	SF-01
Arming Room - Grey Sheet Flooring (SF)	SF-02
West Exit Door - Grey Door Frame Caulking (DFC)	DFC-01A, DFC-01B, DFC-01C
Kitchen - Drywall Joint Compound (DJC)	DJC-01A
Bond Room - Drywall Joint Compound (DJC)	DJC-01B
Southeast Entrance - Drywall Joint Compound (DJC)	DJC-01C
Southwest Foyer - Drywall Joint Compound (DJC)	DJC-01D
Locker Room - Drywall Joint Compound (DJC)	DJC-01E

<b>MATERIAL DESCRIPTION / LOCATION</b>	<b>SAMPLE ID<sup>1</sup></b>
South Central Public Waiting Area - Drywall Joint Compound (DJC)	DJC-01F
Arming Room - Drywall Joint Compound (DJC)	DJC-01G
North of East Exit Door - White Window Frame Caulking (WFC)	WFC-01A, WFC-01B
South Central Public Waiting Area - White Window Frame Caulking (WFC)	WFC-01C
Northwest Kitchen Window - Grey Window Frame Caulking (WFC)	WFC-02A, WFC-02B, WFC-02C
Northeast Kitchen Window - White Window Frame Caulking (WFC)	WFC-03A, WFC-03B, WFC-03C
West Exit Door - Grey Window Pane Caulking (WPC)	WPC-01A, WPC-01B, WPC-01C
East Exit - Ceiling Texture Coat (CTC)	CTC-01A
West Foyer (Exit) - Ceiling Texture Coat (CTC)	CTC-01B
Kitchen - Ceiling Texture Coat (CTC)	CTC-01C
Bond Room - Ceiling Texture Coat (CTC)	CTC-01D
Central Office (Main Office) - Ceiling Texture Coat (CTC)	CTC-01E
<p>Laboratory Test Report: Asbestos Analysis in Bulk Material for Occupational Health And Safety, British Columbia, Regulation 188/2011 via EPA 66/R-93/116 Method dated 9/14/2107 as undertaken for WSP confirmed 'None-asbestos' in the above noted representative materials samples submitted for analysis (Appended).</p> <p><i>For items in italics the sample ID and concentration levels refer to report: "Pre-Demolition Hazardous Building Materials Assessment " Project # 1232-20503, prepared by Stantec Consultants Ltd. (Stantec) in 2013.</i></p>	

## 5.1.2 LEAD

### LEAD CONTENT OF SURFACE COATINGS (PAINTS)

A total of eight (8) surface coating (paint) samples were collected by WSP representatives and submitted for laboratory analysis of lead content. Some surface coatings were identified by WSP to have elevated lead content. WSP'S sampling plan is provided in Figure 2, Appendix A.

As per the previously conducted "Pre-Demolition Hazardous Building Materials Assessment" (Stantec February 26, 2016), some surface coatings (paints) were identified by Stantec to have elevated lead content.

### SUMMARY OF BULK SAMPLES IDENTIFIED WITH "ELEVATED LEAD CONTENT"

The tables below summarize the analytical results of bulk material surface coating (paint) samples collected during this WSP DSS and that of the prior Stantec assessment (2016). Based on the representative sampling, corresponding EMSL Canada Inc. results for lead content, federal and provincial criteria, and site review assessment of visually similar materials, the following surface coatings were identified as having elevated lead content.



**Table 5 Customs Building - Summary of Lead Concentrations in WSP Bulk Surface Coating (Paint) Samples**

MATERIAL DESCRIPTION	ASSESSMENT	ACTION <sup>1</sup>
Black on Red Paint. Applied to supporting structural steel of the canopy covered parking/storage structure.	Sample ID: FR-PB-1-01 Concentration: 6,400 ppm Condition: Poor	Prior to any renovation/demolition, a qualified professional should conduct a risk assessment and develop an exposure control plan that contains safe work procedures to protect workers that may be exposed to lead.
Red Primer. Applied to the exterior steel I-beams on the northeast side of the customs building.	Sample ID: P-03 Concentration: 3,000 ppm Condition: Good/poor	
White Paint. Applied to underside of the ceiling structural steel of the canopy covered parking/storage structure.	Sample ID: FR-PB-1-02 Concentration: 1,800 ppm Condition: Poor – Largely Flaking	
Yellow Paint. Applied to north exterior side paneling of the customs building.	Sample ID: FR-PB-1-03 Concentration: 13,000 ppm Condition: Good	
Yellow Paint. Applied to south exterior side paneling of the customs building.	Sample ID: FR-PB-1-04 Concentration: 10,000 ppm Condition: Fair	
Yellow Paint. Applied to the exterior of the customs building (portion undetermined).	Sample ID: P-05 Concentration: 9,100 ppm	
Cream Paint. Applied to the exterior steel canopy on the northeast side of the customs building	Sample ID: P-04 Concentration 1,800 ppm	
Cream Paint. Applied to interior central office trim.	Sample ID: FR-PB-1-08B Concentration: 510 ppm Condition: Fair	
Cream Paint. Applied to the interior walls on southeast side of building.	Sample ID: P-01 Concentration 350 ppm	
Light Blue Paint. Applied to the interior walls of the arming room.	Sample ID: P-02 Concentration 490 ppm	
Weathered Brown Paint. Applied to west exterior side paneling trim of the customs building.	Sample ID: FR-PB-1-09 Available sample weight was insufficient to undertake analysis. Condition: Fair	

MATERIAL DESCRIPTION	ASSESSMENT	ACTION <sup>1</sup>
White Paint. Applied to interior kitchen walls.	Sample ID: FR-PB-1-06 Concentration: <90 ppm Condition: Good to Poor	No Action Required Results are below laboratory detection limits.
White Paint Applied to interior washroom walls.	Sample ID: FR-PB-1-07 Concentration: <90 ppm Condition: Good	
Cream Paint. Applied to interior central office walls.	Sample ID: FR-PB-1-08A Concentration: <90 ppm Condition: Good to Poor	
<p><b>1</b> EMSL Canada Inc. laboratory Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B) dated 09/14/2017 as undertaken for WSP confirmed the Lead Concentrations of the above noted representative material samples submitted for analysis (Appended).</p> <p><b>2</b> For items in italics the sample ID and concentration levels refer to report: "Pre-Demolition Hazardous Building Materials Assessment " Project # 1232-20503, prepared by Stantec Consultants Ltd. (Stantec) in 2013.</p>		

## 5.2 OTHER DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS

The following table summarizes other designated substances and hazardous materials which were also included in the survey. Identification of these materials and substances was based on visual observations only, and where appropriate, recommendations and necessary actions have been provided.

All designated substances must be handled in accordance with the appropriate guidelines and regulations. Designated Substance and Hazardous Material information will require updating as corrective measures are instituted and materials have been removed from various sections of the building.

**Table 6 Other Designated Substances and Hazardous Materials included in the Survey**

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Acrylonitrile	Acrylonitrile is mostly used as a feedstock or chemical aid in the production of nitrile-butadiene rubber and in acrylonitrile-butadiene-styrene and styrene-acrylonitrile polymers. Acrylonitrile is also used to make other chemicals such as plastics, synthetic rubber, and acrylic fibre (e.g. clothing, blankets, carpeting) and nitrile rubber for oil-resistant hoses.	Acrylonitrile is not expected to be present in the study area.	N/A

<b>MATERIAL</b>	<b>DESCRIPTION</b>	<b>FINDINGS</b>	<b>ACTION</b>
Arsenic	Arsenic is used with other metals (chiefly copper, lead and zinc) to make alloys. Arsenic compounds are also used in pigments, animal poisons, insecticides, paints, wallpaper, ceramics, and poison gases for chemical warfare, glass making, in calico and indigo printing, pyrotechnics, integrated circuits and transistors. Arsenic is also a major waste material from the gold mining industry.	Arsenic is not expected to be present in the study area.	N/A
Benzene	Benzene is widely used in the chemical industry as a starting material and solvent. Benzene occurs naturally in crude oil and is present in all gasoline products, automobile emissions and cigarette smoke. Benzene is highly volatile, and will release into the atmosphere over a short time.	Benzene is not expected to be present in the study area.	N/A
Coke Oven Emissions	Coke oven emissions are complex mixtures of coal and coke particles, various vapors, gases and tars emitted during carbonization of coal to produce coke. The primary use of coke (pure carbon) is in the manufacture of iron and steel. Coke is also used to synthesize calcium carbide and to manufacture graphite and electrodes.	Coke oven emissions are not expected to be present in the buildings.	N/A
Ethylene Oxide	Ethylene Oxide is an extremely flammable gas used in the manufacture of several industrial chemicals including textiles, detergents, polyurethane foam, antifreeze (especially ethylene	Ethylene Oxide is not expected to be present in the study area.	N/A

MATERIAL	DESCRIPTION	FINDINGS	ACTION
	glycol), solvents, medicinal products, adhesives, and other related products. It is also used as a fumigant and as a sterilizing agent for food (spices), cosmetics, and surgical tool and plastic devices in hospitals as an alternative to steam.		
Isocyanates	Isocyanates are the raw materials from which all polyurethane products are made. Isocyanates are widely used in the manufacture of flexible and rigid foams, fibres, coatings such as paints and varnishes, elastomers, and also in materials used in auto body repair and building insulation.	Isocyanates are not expected to be present in the study area.	N/A
Mercury	Mercury is used in thermometers, batteries and some electrical switches. It is also used in dental fillings and in latex paint to protect against fungal attack and mildew. Mercury vapour is also present as a vapour in fluorescent lights, metal halide lights and mercury vapour lights.	<p>Although no samples were analyzed for mercury, it is presumed to be present in the following building components:</p> <ul style="list-style-type: none"> <li>— in liquid filled reservoirs in thermostats;</li> <li>— as a gas in fluorescent light tubes; and</li> <li>— as a bactericide or stabilizer in paints and inks.</li> </ul>	<p>The presence of mercury within assembled units (e.g. fluorescent light bulbs, piping thermometers, and thermostat bulbs) should not be considered a hazard provided that the assembled units remain sealed and intact. Avoid direct skin contact with mercury and avoid inhalation of mercury vapour.</p> <p>Removal and disposal of mercury-containing equipment is required prior to construction or demolition activities that may disturb this equipment. The handling, transportation and disposal of mercury-containing equipment must comply with all provincial and federal requirements and guidelines for mercury, including the requirements of the Hazardous</p>

MATERIAL	DESCRIPTION	FINDINGS	ACTION
			Materials (MSDS) Regulations, Q-2, r.32) (provincial).
Mould	<p>Mould is a group of various species of simple, microscopic organisms found in every ecological niche, indoors and outdoors. Moulds are necessary for recycling of organic materials in nature.</p> <p>To grow, mould needs:</p> <ul style="list-style-type: none"> <li>— A mould spore;</li> <li>— An organic food source (i.e. paper, drywall, wood, dirt, paint, etc.);</li> <li>— Moisture;</li> <li>— Time (this will vary depending on the site-specific conditions, including the cleanliness of the water source).</li> </ul>	<p>Significant mould growth was not observed within the study area.</p> <p>Water damage was observed on some acoustic ceiling tiles within the customs building.</p>	<p>If found during renovation/demolition, mould-contaminated materials should be removed/handled in accordance with the Canadian Construction Association document CCA 82/2004. Contractors should be warned of the presence of mould and every precaution should be taken to prevent airborne exposure to workers where mould is present and where workers are likely to inhale or ingest mould.</p>
Ozone Depleting Substances (ODSs)	<p>It is the intention of the federal government to phase out the use of ODSs by the year 2030 in order to protect the upper atmosphere. The MOE has issued Regulation 356 regarding the use, disposal and recycling of ODSs. Recapturing of ODSs during servicing must be done by licensed personnel.</p>	<p>There was one air conditioning unit observed on the roof of the customs building. There was one fridge in the kitchen which could potentially contain ODS. It is unknown whether the units contain ODSs.</p>	<p>Decommissioning, removal and disposal of any equipment suspected, or confirmed, to contain ODS must comply with provincial and federal regulations pertaining to ODS including: Federal (FHR 2003) and General Waste Management Regulations (R.R.O. 1990, Regulation 347).</p>

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Polychlorinated Biphenyls (PCBs)	The federal Regulation SOR/2008-273 (September 5, 2008) states that any solid material containing 50 parts per million (ppm) or more of PCBs must be handled as a PCB-containing material in accordance with all applicable regulations.	Fluorescent light ballasts were observed within the subject buildings. The light ballasts throughout the building were energized at the time of the survey and therefore could not be safely examined to determine the presence/absence of PCBs. However, based on the date of construction, PCBs may be present in some of the lamp ballasts within the subject building.	When decommissioning ballasts which do not have a “No PCBs” indicator on the label, manufacturer’s codes should be compared with Environment Canada’s Identification of Lamp Ballasts Containing PCBs EPS 2/CC/2 (revised). Handle, store and dispose of PCB-containing materials in accordance with <i>Federal PCB Regulation SOR/92-507</i> and the Regulation Respecting Hazardous Materials (RMD; Q-2, r.32) (provincial).
Silica	Silica, or silicon dioxide (SiO <sub>2</sub> ), is the basic component of sand, quartz and granite rock. Crystalline Silica (the designated substance) is encountered in industry in three forms: quartz, tridymite, and cristobalite.	Crystalline Silica should be assumed to be present in glass, masonry, stone, concrete, asphalt, cement and mortar.	Work that may disturb silica-containing materials should follow all applicable provincial and federal regulations and guidelines pertaining to Silica including the requirements of the Safety Code for the Construction Industry (CSTC, S-2.1, r.4).
Radioactive Materials	Smoke/heat detectors may contain a radioactive power source. Atomic Energy Control Board (AECB) guidelines state that smoke detectors containing more than 5 µCi of Am-241 or any amount of Radium -226 must be disposed of through a consultant or AECB licensed waste facility. The current AECB guidelines allow for the disposal of smoke detectors with an Am-241 isotope source of less than 5.0 µCi to a regular landfill site.	Smoke/heat detectors were observed in various locations throughout the buildings.	Smoke detectors must be disposed of in packages containing a maximum of ten smoke detectors per package.

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Radon	Radon is a colourless, odourless, and tasteless radioactive gas formed from the breakdown of uranium, a naturally occurring radioactive material found in soil, rock, and groundwater. Radon concentrations will vary depending on underlying geologic units, uranium geochemistry and radiometric geophysical response. As a gas, radon can move freely from the soil or bedrock into the atmosphere, and may accumulate in enclosed areas, such as mines or buildings.	Although no evidence of radon was observed during the site visit or document review, all sites in Canada have the potential for the presence of radon.	In the absence of any region-specific or user-specific legislation for testing, there are no recommendations for radon testing at the Subject Property at this time.

## 6 LIMITATIONS

The field observations and laboratory analyses presented herein are considered sufficient in detail and scope to form a general inventory of designated substances at the subject building(s) and/or property. The findings and conclusions contained herein have been prepared in accordance with generally accepted industry standards and procedures. It is possible that designated substances or hazardous materials may exist which could not be reasonably identified within the scope of the assessment or which were not apparent during the site visit. WSP Canada Inc. cannot warrant or guarantee that the information presented in this report is absolutely complete or accurate beyond those observations and findings reported herein.

This report is prepared for the sole use of Canada Border Services Agency (CBSA), who are responsible for its distribution to any third parties. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. The conclusions and recommendations contained in this assessment report are based upon professional opinions with regard to the subject matter. These opinions are in accordance with currently accepted industry practices for asbestos surveys and regulatory requirements for sampling and identifying asbestos and are subject to the following inherent limitations:

- The data and findings presented in this report are valid as of the date(s) of the investigation only. The passage of time, manifestation of latent conditions or occurrence of future events may warrant further exploration of the Site, analysis of the data, and re-evaluation of the findings, observations, and conclusions expressed in this report.
- The findings, observations, conclusions, and recommendations expressed by WSP Canada Inc. in this report do not represent an opinion concerning compliance of any past or present owner or operator of the Site with any federal, provincial or local laws or regulations.
- WSP's assessment presents professional opinions and findings of a scientific and technical nature. While attempts were made to relate the data and findings to applicable environmental and occupational health & safety laws and regulations, the report shall not be construed to offer legal opinion or representations as to the requirements of, nor compliance with, environmental and occupational health and safety laws, rules, regulations or policies of federal, provincial, or local governmental agencies. WSP liability extends only to its client and not to other parties who may obtain this assessment report. Issues raised by the report should be reviewed by appropriate legal counsel.
- The DSS did not involve destructive sampling (i.e. inspection within plaster/drywall (false) walls or ceilings, within mechanical equipment such as boilers, furnaces, HVAC systems, or within electrical equipment), except those which may be accessed by moveable (non-fixed) barriers such as above suspended ceiling tiles, access doors, hatches, panels etc. These areas are considered not accessible to the surveyor and as such materials suspected to contain asbestos and other designated substances and hazardous materials may be present within these inaccessible areas. The survey also did not include exterior building materials as per the proposed scope of work with the exception of roofing materials that were collected where accessible.
- This DSS included interior and exterior building construction materials and components only. As it is neither practical nor feasible to sample materials on a foot by foot basis, visually similar materials' analysis results were extrapolated throughout the client designated areas of the structure and / or based on estimated phases of construction, where that information was made available.
- Energised electrical and mechanical equipment or systems were not opened for safety reasons. This survey excluded owner or occupant articles such as furniture or stored items. Concealed or inaccessible materials within the building structure, fire doors, roofing, and below ground materials including tanks and pipes were specifically excluded from our scope of work.
- No upper surface roofing, exterior siding, window trim, nor below-grade water, drainage or plumbing systems, or sub surface investigations of materials were included in the scope of this DSS.



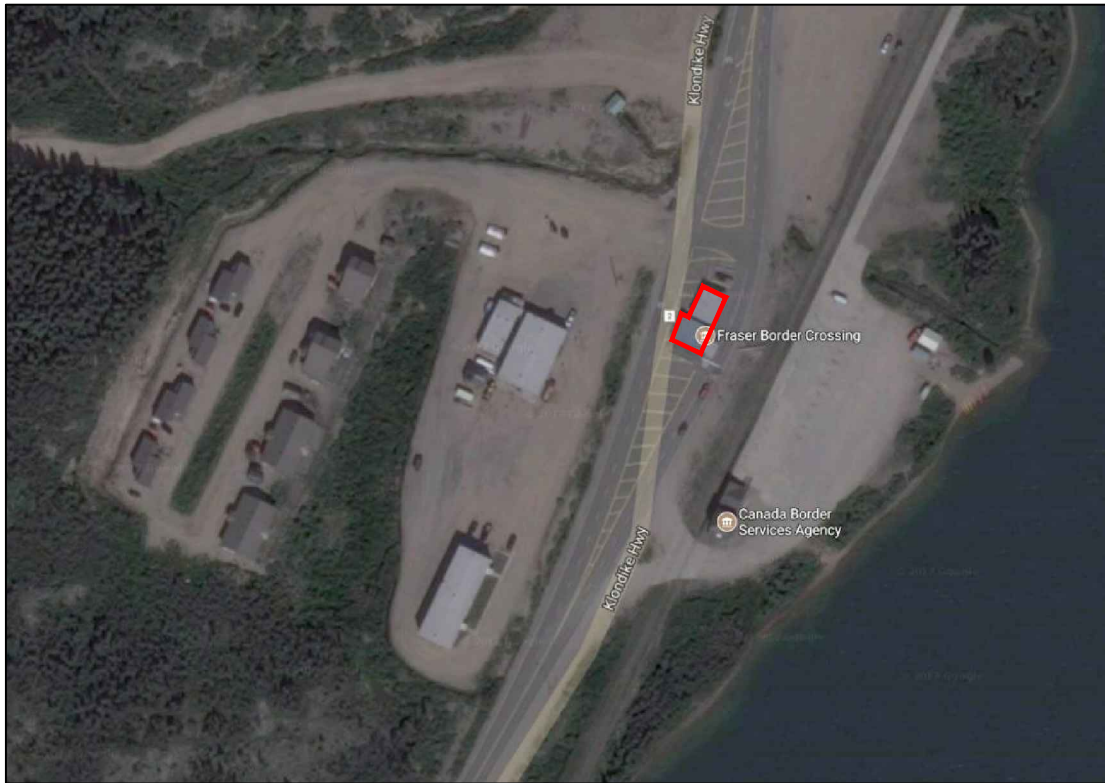
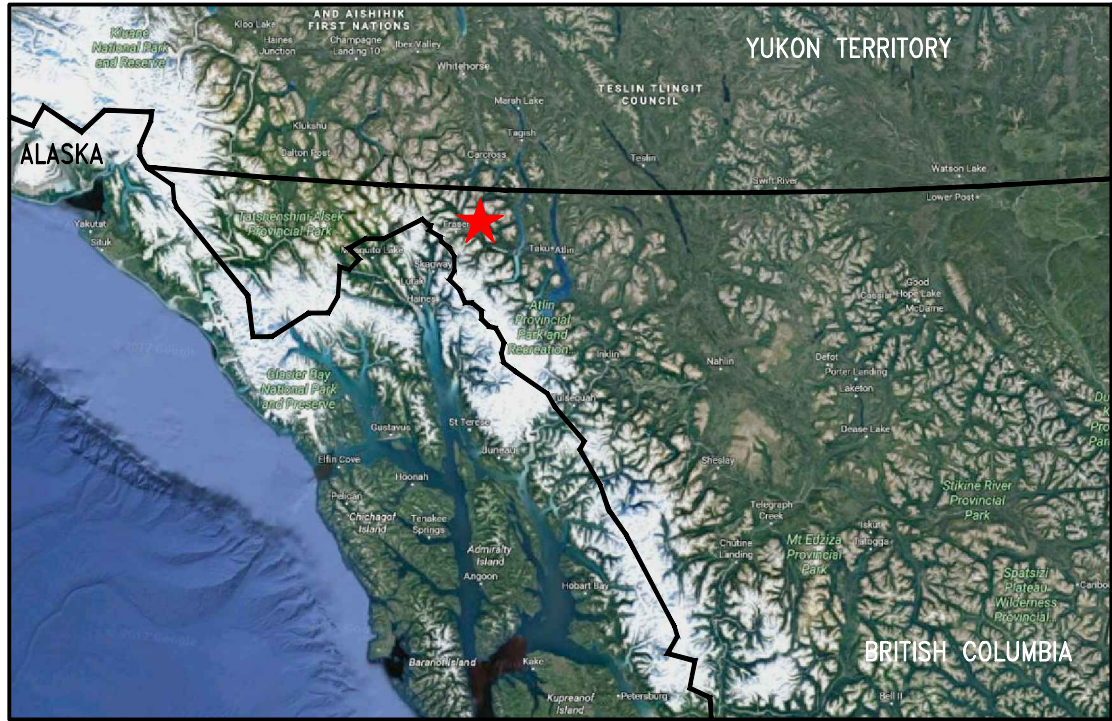
# 7 REFERENCES

- GOVERNMENT OF CANADA. Surface Coating Materials Regulation. SOR/2005-109
- HEALTH CANADA 2005. PCB – You and Your Health. Internet site <http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/pcb-bpc-fra.php>
- CANADIAN CONSTRUCTION ASSOCIATION (2004). *Mould Guidelines for the Canadian Construction Industry*. Document CCA 82.
- ENVIRONMENT CANADA. Identification of Lamp Ballasts Containing PCBs. August 1991. Available online at: [http://www.facilities.ualberta.ca/en/Planning\\_Project\\_Delivery/Hazardous\\_Materials/~/\\_media/facilities/Documents/SafetyDocuments/ID-LampBallastsContainingPCBsReport-EPS2CC2Aug1991.pdf](http://www.facilities.ualberta.ca/en/Planning_Project_Delivery/Hazardous_Materials/~/_media/facilities/Documents/SafetyDocuments/ID-LampBallastsContainingPCBsReport-EPS2CC2Aug1991.pdf)
- PUBLIC SERVICES AND PROCUREMENT CANADA Asbestos Management Standard.
- Stantec Consultants Ltd. (2016). "Pre-Demolition Hazardous Building Materials Assessment" Project # 1232-20503.
- GOVERNMENT OF CANADA (2008). *Canadian Environmental Protection Act*, PCB Regulations, SOR/2008-273. Available online at: <http://laws-lois.justice.gc.ca/eng/regulations/sor-2008-273/index.html>
- GOVERNMENT OF CANADA. Canadian Consumer Product Safety Act, Surface Coatings Materials Regulations (Lead), SOR/2016-193. Available online at: <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2016-193/index.html>
- RADON ENVIRONMENTAL MANAGEMENT CORP. (2011). *Mapping the geological radon potential in Canada*. Available online at: [www.radoncorp.com](http://www.radoncorp.com)
- Occupational Health and Safety Regulation (B.C Reg. 296 / 97, as amended) 2015.
- Construction, Excavation and Demolition, Demolition, Hazardous Materials, WorkSafeBC, 2015.
- Safe Work Practices for Handling Asbestos, WorkSafeBC, 2017 Edition.
- Guidelines Regarding Demolition and Asbestos Waste Materials, WorkSafeBC revised 2012.
- Safe Work Practices for Handling Lead, WorkSafeBC, 2017
- Environmental Management Act, Chapter 53. Queens Printer, Victoria, British Columbia, 2003.

# APPENDIX

## A FIGURES





**LEGEND**

**★** – SUBJECT PROPERTY



WSP CANADA INC.

#200 1985 W BROADWAY, VANCOUVER, BC V6J 4Y3  
PHONE: 604-736-5421 • WWW.WSP.COM

**TITLE:**

Property Location Map

Area Specific Designated -

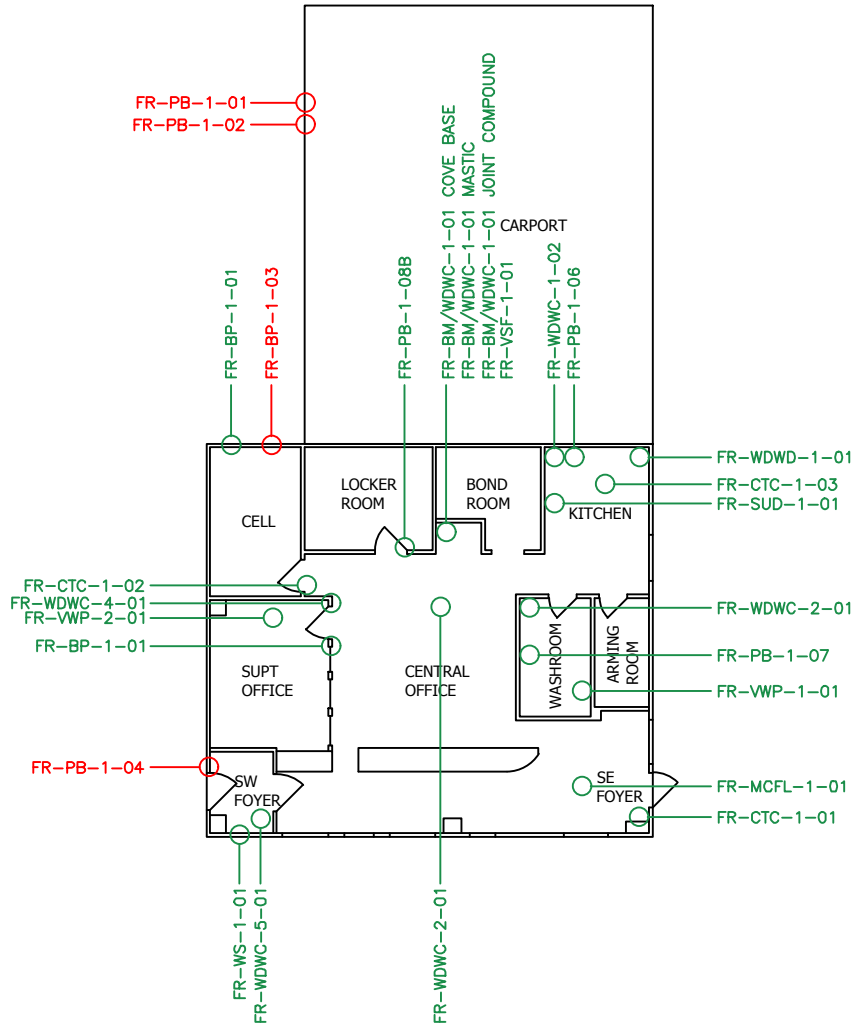
**PROJECT:**

Substances and Hazardous Materials Survey  
CBSA Buildings, Klondike HWY, Fraser, BC

**CLIENT:**

CBSA

DES.	DR.	RCM
CH.	SCALE	NTS
APP.	DATE	OCT 2017
FILE NO.	171-09104-00-602	
DWG. NO.	FIGURE 1	



Main Floor

**LEGEND**

- △ [L28] - Positive Lead Paint Sample      △ [L28] - Negative Lead Paint Sample
- [A51] - Positive Asbestos Bulk Sample      ○ [A51] - None-Detected for Asbestos Bulk Sample



WSP CANADA INC.

#200 1985 W BROADWAY, VANCOUVER, BC V6J 4Y3  
PHONE: 604-736-5421 • WWW.WSP.COM

**TITLE:** Location Plan - Customs Building  
Area Specific Designated -  
Substances and Hazardous Materials Survey  
CBSA Buildings, Klondike HWY, Fraser, BC  
CBSA

**PROJECT:**

**CLIENT:**

DES.	DR.	RCM
CH.	SCALE	NTS
APP.	DATE	OCT 2017
FILE NO.	171-09104-00-602	
DWG. NO.	FIGURE 2	

# APPENDIX

**B**

SITE

PHOTOGRAPHS





**Photograph 1:** Black paint with red primer caulking observed on the posts and frames of the carport on the north side of the Custom's Building with a lead content of 6,400 ppm.



**Photograph 2:** White and cream paint observed on the frames and ceiling of the carport on the north side of the Custom's Building with a lead content of 1,800 ppm.



**Photograph 3:** Yellow paint observed on the metal panels on the north exterior of the Custom's Building with a lead content of 13,000 ppm.



**Photograph 4:** Yellow paint observed on the metal panels on the south exterior of the Custom's Building with a lead content of 10,000 ppm.

# APPENDIX

## C CERTIFICATES OF ANALYSIS - ASBESTOS





# EMSL Canada Inc.

4506 Dawson Street Burnaby, BC V5C 4C1  
 Phone/Fax: 604-757-3158 / (604) 757-4731  
<http://www.EMSL.com> / [vancouverlab@EMSL.com](mailto:vancouverlab@EMSL.com)

EMSL Canada Order 691702111  
 Customer ID: 55WSPV42  
 Customer PO:  
 Project ID:

**Attn:** Gordon Philippe Phone: (250) 475-1000  
 WSP Canada Inc. Fax: (250) 475-2211  
 760 Enterprise Crescent Collected: 8/24/2017  
 Victoria, BC V8Z 6R4 Received: 9/07/2017  
 Analyzed: 9/14/2017

**Proj:** 171-09104-00 SUBPHASE 602 FR

## 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:** FR-WDWC-1-01 **Lab Sample ID:** 691702111-0001

**Sample Description:** POE Building - Main Floor - Kitchen - NE Corner Wall/Drywall Joint Compound (Stop Positive-A)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/14/2017	White	0%	100%	None Detected	

**Client Sample ID:** FR-WDWC-1-02 **Lab Sample ID:** 691702111-0002

**Sample Description:** POE Building - Main Floor - Kitchen - NW Overt Corner Wall/Drywall Joint Compound (Stop Positive-A)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/14/2017	White	0%	100%	None Detected	

**Client Sample ID:** FR-WDWC-2-01 **Lab Sample ID:** 691702111-0003

**Sample Description:** POE Building - Main Floor - Washroom - SW Corner Wall/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/14/2017	White	0%	100%	None Detected	

**Client Sample ID:** FR-WDWC-3-01 **Lab Sample ID:** 691702111-0004

**Sample Description:** POE Building - Main Floor - Central Office - N Central Pillar Wall/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/14/2017	White	0%	100%	None Detected	

**Client Sample ID:** FR-WDWC-4-01 **Lab Sample ID:** 691702111-0005

**Sample Description:** POE Building - Main Floor - Central Office- W Wall/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/14/2017	White	0%	100%	None Detected	

**Client Sample ID:** FR-WDWC-5-01 **Lab Sample ID:** 691702111-0006

**Sample Description:** POE Building - Main Floor - SW Foyer - SE Corner Wall/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/14/2017	White	0%	100%	None Detected	

**Client Sample ID:** FR-CTC-1-01 **Lab Sample ID:** 691702111-0007

**Sample Description:** POE Building - Main Floor - SE Entrance - Ceiling/Ceiling Texture Coat (Stop Positive-B)

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/14/2017	Beige	0%	100%	None Detected	



# EMSL Canada Inc.

4506 Dawson Street Burnaby, BC V5C 4C1  
Phone/Fax: 604-757-3158 / (604) 757-4731  
<http://www.EMSL.com> / [vancouverlab@EMSL.com](mailto:vancouverlab@EMSL.com)

EMSL Canada Order 691702111  
Customer ID: 55WSPV42  
Customer PO:  
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

<b>Client Sample ID:</b>	FR-CTC-1-02				<b>Lab Sample ID:</b>	691702111-0008
<b>Sample Description:</b>	POE Building - Main Floor - Central Office (N Hall W End) - Ceiling/Ceiling Texture Coat (Stop Positive-B)					
<b>TEST</b>	<b>Analyzed Date</b>	<b>Color</b>	<b>Non-Asbestos</b>		<b>Asbestos</b>	<b>Comment</b>
			<b>Fibrous</b>	<b>Non-Fibrous</b>		
PLM	9/14/2017	White	0%	100%	None Detected	

<b>Client Sample ID:</b>	FR-CTC-1-03				<b>Lab Sample ID:</b>	691702111-0009
<b>Sample Description:</b>	POE Building - Main Floor - Kitchen - N Ceiling/Ceiling Texture Coat (Stop Positive-B)					
<b>TEST</b>	<b>Analyzed Date</b>	<b>Color</b>	<b>Non-Asbestos</b>		<b>Asbestos</b>	<b>Comment</b>
			<b>Fibrous</b>	<b>Non-Fibrous</b>		
PLM	9/14/2017	White/Beige	0%	100%	None Detected	

<b>Client Sample ID:</b>	FR-BM/WDWC-1-01-Cove Base				<b>Lab Sample ID:</b>	691702111-0010
<b>Sample Description:</b>	POE Building - Main Floor - Janitorial Storage Closet - NW Corner Wall/Baseboard & Mastic On Drywall Joint Compound					
<b>TEST</b>	<b>Analyzed Date</b>	<b>Color</b>	<b>Non-Asbestos</b>		<b>Asbestos</b>	<b>Comment</b>
			<b>Fibrous</b>	<b>Non-Fibrous</b>		
PLM	9/14/2017	Black	0%	100%	None Detected	

<b>Client Sample ID:</b>	FR-BM/WDWC-1-01-Mastic				<b>Lab Sample ID:</b>	691702111-0010A
<b>Sample Description:</b>	POE Building - Main Floor - Janitorial Storage Closet - NW Corner Wall/Baseboard & Mastic On Drywall Joint Compound					
<b>TEST</b>	<b>Analyzed Date</b>	<b>Color</b>	<b>Non-Asbestos</b>		<b>Asbestos</b>	<b>Comment</b>
			<b>Fibrous</b>	<b>Non-Fibrous</b>		
PLM	9/14/2017	Gray	0%	100%	None Detected	

<b>Client Sample ID:</b>	FR-BM/WDWC-1-01-Joint Compound				<b>Lab Sample ID:</b>	691702111-0010B
<b>Sample Description:</b>	POE Building - Main Floor - Janitorial Storage Closet - NW Corner Wall/Baseboard & Mastic On Drywall Joint Compound					
<b>TEST</b>	<b>Analyzed Date</b>	<b>Color</b>	<b>Non-Asbestos</b>		<b>Asbestos</b>	<b>Comment</b>
			<b>Fibrous</b>	<b>Non-Fibrous</b>		
PLM	9/14/2017	White	0%	100%	None Detected	

<b>Client Sample ID:</b>	FR-VSF-1-01				<b>Lab Sample ID:</b>	691702111-0011
<b>Sample Description:</b>	POE Building - Main Floor - Janitorial Storage Closet - NW Corner Floor/Modem Vinyl Sheet Flooring & Mastic On Leveling Compound					
<b>TEST</b>	<b>Analyzed Date</b>	<b>Color</b>	<b>Non-Asbestos</b>		<b>Asbestos</b>	<b>Comment</b>
			<b>Fibrous</b>	<b>Non-Fibrous</b>		
PLM	9/14/2017	Gray	0%	100%	None Detected	

<b>Client Sample ID:</b>	FR-VWP-1-01				<b>Lab Sample ID:</b>	691702111-0012
<b>Sample Description:</b>	POE Building - Main Floor - Washroom - E Wall/Vinyl Wall Paper On Fabricated Drywall Panel					
<b>TEST</b>	<b>Analyzed Date</b>	<b>Color</b>	<b>Non-Asbestos</b>		<b>Asbestos</b>	<b>Comment</b>
			<b>Fibrous</b>	<b>Non-Fibrous</b>		
PLM	9/14/2017	Brown/White	50%	50%	None Detected	

<b>Client Sample ID:</b>	FR-VWP-2-01				<b>Lab Sample ID:</b>	691702111-0013
<b>Sample Description:</b>	POE Building - Main Floor - W Office - N Wall/Vinyl Wall Paper On Fabricated Drywall Panel					
<b>TEST</b>	<b>Analyzed Date</b>	<b>Color</b>	<b>Non-Asbestos</b>		<b>Asbestos</b>	<b>Comment</b>
			<b>Fibrous</b>	<b>Non-Fibrous</b>		
PLM	9/14/2017	Brown/White	50%	50%	None Detected	



# EMSL Canada Inc.

4506 Dawson Street Burnaby, BC V5C 4C1  
Phone/Fax: 604-757-3158 / (604) 757-4731  
<http://www.EMSL.com> / [vancouverlab@EMSL.com](mailto:vancouverlab@EMSL.com)

EMSL Canada Order 691702111  
Customer ID: 55WSPV42  
Customer PO:  
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:** FR-SUD-1-01 **Lab Sample ID:** 691702111-0014  
**Sample Description:** POE Building - Main Floor - Kitchen - Sink/Sink Black Undercoating

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/14/2017	Black	20%	80%	None Detected	

**Client Sample ID:** FR-MLFI-1-01 **Lab Sample ID:** 691702111-0015  
**Sample Description:** POE Building - Attic Above Main Floor - SE Access Port/Modern Blown In White Loose Fill Insulation

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/14/2017	White	99%	1%	None Detected	


**Client Sample ID:** FR-WS-1-01 **Lab Sample ID:** 691702111-0016  
**Sample Description:** POE Building - Exterior - Kitchen Window/Window Caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/14/2017	Brown	0%	100%	None Detected	

**Client Sample ID:** FR-BP-1-01 **Lab Sample ID:** 691702111-0017  
**Sample Description:** POE Building - Exterior - Under N Siding/Building Paper

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/14/2017	Black	80%	20%	None Detected	

**Analyst(s):**  
Kathleen Cruz PLM (19)

**Reviewed and approved by:**  
  
Nicole Yeo, Laboratory Manager  
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. This report must not be used to claim product endorsement by NVLAP of any agency of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Burnaby, BC

Initial report from: 09/14/2017 10:59:15

# APPENDIX

## **D** CERTIFICATES OF ANALYSIS - LEAD

**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](mailto:torontolab@emsl.com)

EMSL Canada Or	551709973
CustomerID:	55WSPV42
CustomerPO:	171-09104-00
ProjectID:	

Attn: **Gordon Philippe**  
**WSP Canada Inc.**  
**760 Enterprise Crescent**  
**Victoria, BC V8Z 6R4**

Phone: (250) 475-1000  
 Fax: (250) 475-2211  
 Received: 09/07/17 9:56 AM  
 Collected:

Project: 171-09104-00 SUB PHASE 602 FR FRASER, BC

**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>
FR-PB-1-01	551709973-0001	9/8/2017		0.64 % wt
Site: BLACK/RED PAINT. CARPORT, STRUCTURAL				
FR-PB-1-02	551709973-0002	9/8/2017		0.18 % wt
Site: WHITE PAINT. CARPORT, CEILING				
FR-PB-1-03	551709973-0003	9/8/2017		1.3 % wt
Site: YELLOW PAINT. POE, N EXT PANELING				
FR-PB-1-04	551709973-0004	9/8/2017		1.0 % wt
Site: YELLOW PAINT. POE, S EXT PANELING				
FR-PB-1-06	551709973-0005	9/8/2017		<0.0090 % wt
Site: WHITE PAINT. POE, KITCHEN INTERIOR WALL				
FR-PB-1-07	551709973-0006	9/8/2017		<0.0090 % wt
Site: WHITE PAINT. POE, WASHROOM INTERIOR WALL				
FR-PB-1-08A	551709973-0007	9/8/2017		<0.0090 % wt
Site: CREAM PAINT. POE, CENTRAL OFFICE INT WALL				
FR-PB-1-08B	551709973-0008	9/8/2017		0.051 % wt
Site: CREAM PAINT. POE, CENTRAL OFFICE INT TRIM				

Rowena Fanto, Lead Supervisor  
 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 unless specifically indicated otherwise. Definitions of modifications are available upon request.

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

Initial report from 09/14/2017 08:33:29

# APPENDIX

**E**

PUBLIC SERVICES AND  
PROCUREMENT CANADA –  
ASBESTOS MATERIALS SURVEY  
–EVALUATION OF ASBESTOS-  
CONTAINING MATERIALS AND  
RECOMMENDATIONS FOR  
CONTROL



## ASBESTOS-CONTAINING MATERIAL EVALUATION CRITERIA

A description of the criteria used in evaluating the condition, accessibility and exposure risk of asbestos-containing materials (ACM) is provided below.

### ASSESSMENT OF CONDITION

#### SPRAY-APPLIED FIREPROOFING, INSULATION AND TEXTURE FINISHES

In evaluating the condition of ACM spray applied as fireproofing, thermal insulation or texture, decorative or acoustic finishes, the following criteria apply:

##### **Good**

Surface of material shows no significant signs of damage, deterioration or delamination. Up to one percent visible damage to surface is allowed within range of **GOOD**. Evaluation of sprayed fireproofing requires the Assessor to be familiar with the irregular surface texture typical of sprayed asbestos products. **GOOD** condition includes un-encapsulated or unpainted fireproofing or texture finishes, where no delamination or damage is observed, and encapsulated fireproofing or texture finishes where the encapsulation has been applied after the damage or fallout occurred.

##### **Poor**

Sprayed materials show signs of damage, delamination or deterioration. More than one percent damage to surface of ACM spray. In observation areas, where damage exists in isolated locations, both **GOOD** and **POOR** condition may be reported. The extent or percentage of each condition will be recorded on the Assessor reassessment form.

**Fair** condition is not utilized or considered as a valid criterion in the evaluation of sprayed fireproofing, sprayed insulation, or texture coat finishes.

The evaluation of ACM spray applied as fireproofing, non-mechanical thermal insulation, or texture, decorative or acoustic finishes which are present above ceilings, may be limited by the number of observations made, and by building components such as ducts or full height walls that obstruct the above ceiling observations. Persons entering the ceiling area are advised to be watchful for ACM DEBRIS prior to accessing or working above ceilings in areas of building with ACM, regardless of the reported condition.

#### MECHANICAL INSULATION

In evaluating the condition of mechanical insulation (on boilers, breaching, ductwork, piping, tanks, equipment etc.) the following criteria are used:

##### **Good**

Insulation is completely covered in jacketing and exhibits no evidence of damage or deterioration. No insulation is exposed. Includes conditions where the jacketing has minor surface damage (i.e., scuffs or stains), but the jacketing is not penetrated.

##### **Fair**

Minor penetration damage to jacketed insulation (cuts, tears, nicks, deterioration or delamination) or undamaged insulation that has never been jacketed. Insulation is exposed but not showing surface disintegration. The extent of missing insulation ranges should be minor to none.

##### **Poor**

Original insulation jacket is missing, damaged, deteriorated or delaminated. Insulation is exposed and significant areas have been dislodged. Damage cannot be readily repaired.

The evaluation of mechanical insulation may be limited by the number of observations made and building components such as ducts or full height walls that obstruct observations. In these circumstances, it is not possible to observe each foot of mechanical insulation from all angles.



## NON-FRIABLE AND POTENTIALLY FRIABLE MATERIALS

Non-friable materials generally have little potential to release airborne fibres, even when damaged by mechanical breakage. However, some non-friable materials, i.e., exterior asbestos cement products, may have deteriorated so that the binder no longer effectively contains the asbestos fibres. In such cases of significantly deteriorated non-friable material, the material will be treated as a friable product.

## DEBRIS FROM FRIABLE ACM

The presence of fallen friable asbestos-containing material is noted separately from the presumed friable asbestos-containing material source (sprayed fireproofing, thermal insulation, texture, decorative or acoustic finishes or mechanical insulation) and is referred to as debris.

The presence of fallen asbestos-containing material from damaged non-friable asbestos-containing material is reported separately from the non-friable asbestos-containing material source. Fallen non-friable asbestos-containing material that has become friable is reported as debris. Workers are advised to be watchful for the presence of debris prior to accessing, or working in proximity to, mechanical insulation or above ceiling areas of buildings with asbestos-containing material, regardless of the reported presence or absence of debris.

## DETECTION LIMIT OF BULK ANALYSIS

ACM is defined as any material found to contain asbestos at or above the limit defined by provincial/territorial standards for an ACM, as determined by the allowable analytical method for the analysis of bulk samples (refer to Asbestos Management Standard, Section 6.1.2.2. Laboratory material analysis). Except in the case of vermiculite, the provincially/territorially-regulated limits or generally-accepted guidelines to consider a material as an ACM, subject to asbestos in buildings regulation, are provided as follows:

Minimum concentration to consider as an asbestos-containing material (by province)

Quebec (includes part of National Capital Area): 0.1%

Alberta, Manitoba, Saskatchewan (for friable material): 0.1%

Ontario (includes part of National Capital Area) British Columbia: 0.5%

Nova Scotia: 0.5%

all other provinces and territories (non-friable material in Manitoba, Saskatchewan): 1.0%

Note that these concentrations may change with regulatory amendments, therefore applicable legislation should be consulted to confirm that they are still valid.

Vermiculite is considered an asbestos-containing material in the presence of any concentration of asbestos measured in a composite sample taken in accordance with provincial/territorial sampling standards.





## EVALUATION OF ACCESSIBILITY

The accessibility of building materials known or suspected of being ACM is rated according to the following criteria:

### Access (A)

Areas of the building within reach of all building users. Includes areas such as gymnasiums, workshops, and storage areas where activities of the building users may result in disturbance of ACM not normally within reach from floor level.

### Access (B)

Frequently entered maintenance areas within reach of maintenance staff, without the need for a ladder. Includes: frequently entered pipe chases, tunnels and service areas or areas within reach from a fixed ladder or catwalk, i.e., tops of equipment, mezzanines.

### Access (C) Exposed

Areas of the building above 8'0" where use of a ladder is required to reach the ACM. Only refers to ACM materials that are exposed to view, from the floor or ladder, without removing or opening other building components such as ceiling tiles, or service access doors or hatches. Does not include infrequently accessed service areas of the building.

### Access (C) Concealed

Areas of the building which require the removal of a building component, including lay-in ceilings and access panels into solid ceiling systems. Includes rarely entered crawl spaces, attic spaces, etc. Observations are limited to the extent visible from the access points.

### Access (D)

Areas of the building behind inaccessible solid ceiling systems, walls, or mechanical equipment, etc. where demolition of the ceiling, wall or equipment, etc., is required to reach the ACM. Evaluation of the condition and extent of ACM is limited or impossible, depending on the Assessor's ability to visually examine the materials in Access D.

## DEFINITION OF ACTION LEVELS

Based on the results of the inspection and bulk sample analysis of samples collected and submitted for testing, recommendations were provided for compliance with regulation. These include assigned "Action Levels" to assist in the prioritization of corrective measures. The Action Matrix provided below establishes the recommended asbestos control action. The measures that are to be taken for each "Action Level" are described in full following the matrix.

ACM ACTION MATRIX				
Access	Condition			Debris
	Good	Fair	Poor	
(A)	ACTION 5/7 <sup>1</sup>	ACTION 5/6 <sup>2</sup>	ACTION 3	ACTION 1
(B)	ACTION 7	ACTION 6/5 <sup>3</sup>	ACTION 3	ACTION 1
(C) exposed	ACTION 7	ACTION 6	ACTION 4	ACTION 2
1.	If material in ACCESS (A)/GOOD condition is not removed ACTION 7 is required.			
2.	If material in ACCESS (A)/FAIR condition is not removed ACTION 6 is required.			
3.	Remove ACM in ACCESS (B)/FAIR condition if ACM is likely to be disturbed.			
4.	Suspect ACM are to comply with ACTION 8 requirements.			



ACTION LEVEL	REQUIRED ACTION
“ACTION 1”	<p><b><i>Immediate Clean-Up of Debris that is Likely to Be Disturbed</i></b></p> <p>Restrict access that is likely to cause a disturbance of the ACM DEBRIS and clean up ACM DEBRIS immediately. Utilize correct asbestos procedures. This action is required for compliance with regulatory requirements. The surveyor will immediately notify the owner of this condition.</p>
“ACTION 2”	<p><b><i>Entry into Areas with ACM DEBRIS requires Intermediate Risk Precautions</i></b></p> <p>At locations where ACM DEBRIS can be isolated in lieu of removal or cleaned up, use appropriate means to limit entry to the area. Restrict access to the area is restricted to persons using intermediate risk asbestos work precautions. The precautions will be required until the ACM DEBRIS has been cleaned up, and the source of the DEBRIS has been stabilized or removed following intermediate risk (if minor) or high risk precautions.</p>
“ACTION 3”	<p><b><i>ACM Removal Required for Compliance</i></b></p> <p>Remove ACM for compliance with regulatory requirements. Utilize asbestos procedures appropriate to the scope of the removal work.</p>
“ACTION 4”	<p><b><i>Access into Areas Where ACM is Present &amp; Likely to be Disturbed by Access Requires Intermediate Risk Precautions</i></b></p> <p>Intermediate risk asbestos precautions are to be used when entry or access into an area is likely to disturb the ACM. ACTION 4 must be used until the ACM is removed (Use ACTION 1 or 2 if DEBRIS is present). Intermediate risk or high risk precautions should be used for removal (depending on extent of removal).</p>
“ACTION 5”	<p><b><i>Proactive ACM Removal</i></b></p> <p>Remove ACM in lieu of repair may be considered, even if it is in <b>Good</b> condition at locations, where ACM is easily accessible, limited in quantity, and removal would be cost-effective.</p>
“ACTION 6”	<p><b><i>ACM Repair</i></b></p> <p>ACM may be repaired if found in <b>FAIR</b> condition and not likely to be damaged again or disturbed by normal use of the area or room. Upon completion of the repair work, ACM is to be treated as being in <b>GOOD</b> condition and <b>ACTION 7</b> is to be implemented. If ACM is likely to be damaged or disturbed, during normal use of the area or room, <b>ACTION 5</b> is to be implemented.</p>
“ACTION 7”	<p><b><i>Routine Surveillance</i></b></p> <p>Routine surveillance of the ACM is to be instituted. Trained workers or service providers must use appropriate asbestos precautions (low, intermediate or high) during disturbance of the remaining ACM.</p>