Public Works and Government Services Canada

Requisition No.: EZ897-191718

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Specifications for

PEC Contaminated Site Soil Excavation

PEC Site, West Vancouver, BC

Project No. R.044582.014 2018Aug

APPROVED BY:

Regional Manager ES — Date: 2018/08/27

Construction Safety Coordinator — Date: 2018-08-31

TENDER:

Project Manager — Date: 2018 Aug 25

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

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2018 Nov 26
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
S. S. TOMLINSON

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1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. After hours work: at least 5 Working Days prior to commencing after hours work Submit a schedule showing requested dates, times, and reasons for after hours work. Approval will only be granted for reasons valid in the opinion of the Departmental Representative and if request can be reasonably accommodated by other contracts.

1.4. Work Covered by Contract

1.4.1. Work to be performed under the Contract includes, but is not limited to, the following items, including all ancillary Work, covered further in the Contract:

1.4.1.1. Prime Contractor for health and safety and environmental protection at Site.
1.4.1.2. All required design activities to complete Work.
1.4.1.3. Pre-mobilization Submittals.
1.4.1.4. Progress Submittals, including cash flow and forecasting.
1.4.1.5. Prepare Site for Work, including clearing site as required and provision of onsite temporary office facilities for Departmental Representative and consultants.
1.4.1.6. Site Maintenance to be conducted before the excavation and soil disposal program begin. This includes repairs to the boundary fence, cleanout of the wheel wash, repair of the water service for the site trailer, and repairs to the site roadways and one road relocation.
1.4.1.7. Transport Hazardous Waste, Amended Waste, Contaminated Waste and Gravel/Cobbles offsite for disposal at an approved facility.
1.4.1.8. Construct new stockpile cells onsite.
1.4.1.9. Import clean backfill to site to be mixed with existing site backfill, then placed, graded and compacted.
1.4.1.10. Plan excavation, including geotechnical design as required.
1.4.1.11. Design and install temporary shoring support as required to allow excavation to extents as shown on Drawings.
1.4.1.12. Excavate Contaminated Material as instructed by the Departmental Representative.
1.4.1.13. Excavation of Contaminated Material to extents as shown on Drawings
1.4.1.14. Load and transport Waste Materials to an approved facility for final disposal.
1.4.1.15. Restore Site to pre-existing conditions.
1.4.1.16. As-built and closure Submittals.

1.5. Location

1.5.1. The Site location is shown on Drawings.
1.5.2. There is no civic street address or PIN for the Site.

1.6. Project/Site Conditions

1.6.1. Contractor must provide personnel and equipment with appropriate experience for site conditions, including experience in remediating site-specific Contaminated Soils. Contractor to provide specialized material handling, health and safety, and environmental protection procedures, and must have knowledge of appropriate regulations.
1.6.2. Work at Site involves Work with Contaminated Soils. Complete list of anticipated contaminants and concentration levels on the Site available separately in Appendices and/or Drawings.
1.6.3. Existing condition on the Site identified according to Drawings.

1.7. Other Contracts

1.7.1. Other contracts are currently in progress at Site.
1.7.2. Other contracts are:
1.7.2.1. Environmental and other consultants.
1.7.2.2. Disposal Contractor for material to be excavated.
1.7.2.3. Site users as identified in Contract Documents.
1.7.3. Further contracts may be awarded while the Contract is in progress.
1.7.4. Cooperate with other contractors in carrying out their respective works and carry out directions from Departmental Representative.
1.7.5. Coordinate Work with that of other contractors. If any part of Work under the Contract depends for its proper execution or result upon Work of another contractor, report promptly to Departmental Representative, in writing, any defects which can interfere with proper execution of this Work.

1.8. Contractor's Use of Site

1.8.1. Use of Site:
1.8.1.1. For the sole benefit of Canada.
1.8.1.2. Exclusive and only for completion of the execution of Work.
1.8.1.3. Assume responsibility for assigned premises for performance of this Work.
1.8.1.4. Be responsible for coordination of all Work activities onsite, including the Work of other contractors engaged by the Departmental Representative.
1.8.2. There are no pre-existing arrangements for access or encroachment on the neighbouring properties. Offsite access or encroachment is the responsibility of the Contractor.
1.8.3. Perform Work in accordance with Contract. Ensure Work is carried out in accordance with schedule accepted by Departmental Representative.

1.8.4. Do not unreasonably encumber Site with material or equipment.
1.8.5. Accommodate common areas with other Site users, including roadways.
1.8.6. Segregate Contractor's work area from common areas to prevent unintentional multiple employer worksite, as required.

1.9. Existing Permits
1.9.1. Existing permits are:
1.9.1.1. None

1.10. Schedule Requirements
1.10.1. Work to be initiated: within 5 Working Days of Contract Award.
1.10.2. Pre-Mobilization Submittals: within 10 Working Days of Contract Award.
1.10.3. Site Works: Final Completion no later than January 15, 2019.
1.10.4. Treatment Works: Final Completion no later than January 15, 2019.
1.10.5. Completion of the Work: no later than January 30, 2019. Includes all final Submittals including as-built documents, the Certificate of Completion, and the Statutory Declaration at Final Completion.

1.11. Hours of Work
1.11.1. Restrictive as follows:
1.11.1.1. Working Day Work Hours are 07:00 to 19:00.
1.11.2. Work outside of Working Day, holiday and Working Hours subject to approval of Departmental Representative.
1.11.2.1. Proceed only as instructed by the Departmental Representative.

1.12. Security Clearances
1.12.1. Not Used.

2. PART 2 - PRODUCTS

2.1. Not Used
2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used
3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. Certificate of Completion: see General Conditions.

1.2.2. Change Order: PWGSC form issued by the Departmental Representative to the Contractor as per the relevant Contemplated Change Notice.

1.2.3. Classification: material (including soil and water) categorized into different quality classes by the Departmental Representative based on presence and concentration of different substances. Includes Contaminated Soil, Non-Contaminated Soil, Contaminated Water, and Non-Contaminated Water. Re-Classification must have approval of Departmental Representative.

1.2.4. Confirmation Samples: soil and sediment samples collected from the base and walls of the excavation by the Departmental Representative to confirm that the remedial objectives for the Work have been met.

1.2.5. Contaminated Soil: unconsolidated mineral or organic material, rock, fill, and sediment deposited on land, and other solid material where substances occur at concentrations that: (i) are above background levels and pose, or are likely to pose, an immediate or long-term hazard to human health or the environment, or (ii) exceed the levels specified in policies and regulations. Includes Hazardous Waste and Waste Quality. Does not include Non-Contaminated Soil. Relevant regulations, unless otherwise in accordance with the Contract or as directed by the Departmental Representative, include:

1.2.5.1. For all sites: Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines and CCME Canada-Wide Standards.

1.2.5.2. For sites in BC, may include risk-based site-specific target levels for remediation objectives (ie CCME Tier 3): BC Hazardous Waste Regulation, BC Approved Water Quality Guidelines, BC Contaminated Sites Regulation.

1.2.6. Contaminated Soil Extents: lateral and vertical extents of Contaminated Soil to be remediated to meet remediation objectives. Extents on Drawings are approximate and may vary based on field observations or Confirmation Samples. Does not include Topsoil, Overburden, or other Non-Contaminated Soil excavated incidentally.

1.2.7. Contaminated Water: liquids where substances occur at concentrations that: (i) are above background levels and pose, or are likely to pose, an immediate or long-term hazard to human health or the environment, or (ii) meet or exceed the levels specified in policies and regulations. Includes Hazardous Waste and water that is not suitable for aquatic life, irrigation, livestock or drinking water or any other water use specified in the BC Contaminated Sites Regulation or Yukon Contaminated Sites Regulation, as applicable. Includes NonAqueous

Phase Liquids (NAPL). Does not include Non-Contaminated Water or Sewage Wastewater. Relevant regulations, unless otherwise in accordance with the Contract or as directed by the Departmental Representative, include:

1.2.7.1. For all sites: Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines and CCME Canada-Wide Standards.

1.2.7.2. For sites in BC, may include risk-based site-specific target levels for remediation objectives (ie CCME Tier 3): BC Hazardous Waste Regulation, BC Contaminated Sites Regulation.

1.2.8. Contaminated Water Treatment Plant: a temporary onsite or existing offsite facility located in Canada that is designed, constructed and operated for the handling or processing of Contaminated Water in such a manner as to change the physical, chemical or biological character or composition of the water to lower than the site-specific remedial objective, Discharge Approval, and in compliance with all regulations.

1.2.9. Contemplated Change Notice: PWGSC form issued by the Departmental Representative to the Contractor requesting Contractor to provide a quote, which may result in a Change Order.

1.2.10. Contract: see General Conditions.

1.2.11. Contract Amount: see General Conditions.

1.2.12. Contractor: see General Conditions.

1.2.13. Departmental Representative: see General Conditions.

1.2.14. Discharge Approval: permit, certificate, approval, license, or other required form of authorization issued by appropriate federal agency, province, territory, or municipality having jurisdiction and authorizing discharge.

1.2.15. Disposal Facility: an offsite facility specifically used to introduce Contaminated Soil into the environment for the purpose of final burial.

1.2.16. Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.

1.2.17. Environmental Protection: prevention, control, mitigation, and restoration of pollution and habitat or environmental disruption during construction. Control of Environmental Pollution and Damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; vibrations; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.18. Environmental Protection Plan: plan developed by the Contractor to ensure Environmental Protection and prevent Environmental Pollution and Damage identifying all environmental risks and mitigation measures, including: personnel requirements, emergency contacts, Environmental Protection methods, procedures, and equipment, and emergency response including a Spill Control Plan.

1.2.19. Extension of Time: see General Conditions.
1.2.20. Extension of Time on Contracts: PWGSC form requesting an Extension of Time.
1.2.21. Facility Authority:
1.2.21.1. For facilities within provincial or territorial jurisdiction: the relevant provincial or territorial ministry.
1.2.21.2. For facilities on First Nation reserve land in Canada not subject to the First Nation Land Management regime: Indigenous and Northern Affairs Canada.
1.2.21.3. For facilities on First Nations reserve land in Canada subject to the First Nation Land Management regime: the relevant First Nation Council. In addition, a Qualified Professional must certify that the facility is appropriate for the relevant Contaminated Soil.
1.2.21.4. For facilities in the United States of America: either or both of the Environmental Protection Agency and the relevant State, as appropriate.
1.2.22. Field Survey: Survey conducted by Departmental Representative or their Consultant. Not a Legal Survey conducted by a Qualified Professional.
1.2.23. Land Surveyor: a person working for the Contractor who is a qualified, registered land surveyor licensed to practice in relevant jurisdiction.
1.2.24. Final Completion: see General Conditions.
1.2.25. Hazardous Waste: Contaminated Soil (soil and water) which meets the regulatory definition of Hazardous Waste.
1.2.26. Land Treatment Facility: equivalent of Soil Treatment Facility.
1.2.27. Landfill Facility: an offsite facility specifically used to introduce Non-Contaminated Soil into the environment for the purpose of final burial.
1.2.28. Materials Source Separation Program: consists of a series of ongoing activities to separate reusable and recyclable waste into categories from other types of waste at point of generation.
1.2.29. Non-Contaminated Soil: unconsolidated mineral or organic material, rock, fill, and sediment deposited on land, and other solid material excavated incidentally. Includes cleared and grubbed vegetation, litter, rubbish, debris, cobbles, boulders, excess construction material, lumber, steel, plastic, concrete, and asphalt. Includes Topsoil and Overburden that is not re-used. Does not exceed applicable standards in BC Contaminated Sites Regulation or Yukon Contaminated Sites Regulation, as appropriate.
1.2.30. Non-Contaminated Water: liquids which are suitable for direct discharge to the environment, and which is not Contaminated Water or Sewage Wastewater. Includes surface runoff, stormwater, and groundwater which has not come into contact with Contaminated Soil.
1.2.31. On Site Instruction: notices, instructions, or directions issued by the Departmental Representative to the Contractor.
1.2.32. On Site Notice: notice or other communication issued by the Contractor to the Departmental Representative.

1.2.33. Onsite Soil Treatment Facility (Onsite STF): a facility constructed and operated on property under the control of PWGSC specifically used to bioremediate Contaminated Soil originating only from federal Sites.
1.2.34. Overburden: Non-Contaminated Soil excavated incidentally above Contaminated Soil Extents that is suitable as Backfill. Does not include Topsoil, Overburden, or other Non-Contaminated Soil excavated incidentally.
1.2.35. Progress Payment: see General Conditions.
1.2.36. PWGSC: Public Works and Government Services Canada. Representative of Canada with control of the Site.
1.2.37. Qualified Professional: a person who is registered in relevant jurisdiction with his or her appropriate professional association, acts under that professional association's code of ethics, and is subject to disciplinary action by that professional association, and through suitable education, experience, accreditation and knowledge can be reasonably relied on to provide advice within his or her area of expertise. Includes:
1.2.37.1. Association of British Columbia Land Surveyors or the Association of Canada Lands Surveyors.
1.2.37.2. Engineers and Geoscientists British Columbia.
1.2.37.3. College of Applied Biology.
1.2.37.4. British Columbia Institute of Agrologists.
1.2.37.5. Association of the Chemical Profession of British Columbia.
1.2.38. Quote: Contractor’s cost estimate issued to the Departmental Representative as per the relevant Contemplated Change Notice via an On Site Notice.
1.2.39. Remediation by Excavation: complete excavation of Contaminated Soil and incidental Non-Contaminated Soil to the boundaries shown on the drawings. Includes full treatment and disposal. Does not include risk assessment or risk management of material onsite. Does not include encapsulation or solidification in place.
1.2.40. Sewage Wastewater: liquid waste which is not suitable for direct discharge to the environment, and which must be either treated offsite or discharged to a sanitary sewer. Includes water from hand basin, shower, personal hygiene facilities, or other liquid waste from sanitary facilities.
1.2.41. Site: work area available to Contractor according to Drawings. Does not include shared or public areas, including common roads.
1.2.42. Amended Hazardous Waste Soil: Soils that have been amended with Portland cement under a separate site program.
1.2.43. Soil Treatment
1.2.44. Subcontractor: see General Conditions.
1.2.45. Submit/Submittals: documents from the Contractor to the Departmental Representative as: required by Contract; stipulated in permit, certificate, approval, license, or any other form of authorization; by convention or industry practice. Submittals are final only after review and accepted in writing by Departmental Representative.
1.2.46. Substantial Performance: see General Conditions.

1.2.47. Superintendent: see General Conditions
1.2.48. Supplier: see General Conditions.
1.2.49. Topsoil: Non-Contaminated Soil excavated incidentally above Contaminated Soil Extents that is a surface organic layer to facilitate vegetation growth. Does not include Overburden or other Non-Contaminated Soil excavated incidentally.
1.2.50. Transfer/Interim Storage Facility: an offsite facility specifically used to transfer or short term storage Contaminated Soil during offsite transport.
1.2.51. Treatment Facility: an offsite facility specifically used to treat Contaminated Soil or Contaminated Water. Treatment Facility may treat soil, sediment, or water. All material Treated at a Treatment Facility is still considered Contaminated Soil in the Contract. All material Treated at a Treatment Facility must be Disposed at a Disposal Facility.
1.2.52. Waste: Non-Contaminated Material that is not soil. Includes cleared and grubbed vegetation, litter, rubbish, debris, cobbles, boulders, excess construction material, lumber, steel, plastic, concrete, and asphalt.
1.2.53. Waste Oversize Debris: Waste that is required to be excavated and is: larger than 1 cubic metre or larger than 2 metres in one dimension, cannot be removed with a typical excavator with bucket, and requires the use of special equipment (e.g., saws, hydraulic cutters, excavator hammers, vibratory pile extractors). Includes bedrock, boulders, pilings, pipes, building structures, and concrete foundations.
1.2.54. Waste Quality: soil or other material that is not suitable for industrial, commercial, urban park, residential, agricultural, wildlands or any other land use specified in the BC Contaminated Sites Regulation, as applicable.
1.2.55. Waste Reduction Plan: a written report which addresses opportunities for reduction, reuse or recycling of materials.
1.2.56. Wastewater: Non-Contaminated Water that is not Sewage.
1.2.57. Work: see General Conditions.
1.2.58. Working Day: see General Conditions.

1.3. Action and Informational Submittals

1.3.1. Utility Locations: at least 5 Working Days prior to commencing any subsurface disturbance, Submit drawings identifying all utilities on the Site. Update drawings as instructed by the Departmental Representative.
1.3.2. Breakdown of Lump Sum Prices: at least 5 Working Days prior to submitting the first Progress Payment, Submit a breakdown of the Contract lump sum prices including labour, material and time, in detail as instructed by the Departmental Representative and aggregating Contract Amount.
1.3.3. Daily Work Records: at the end of each shift Submit daily Work records, during onsite Work. Include:
1.3.3.1. Quantities for each Description of Work identified in the Unit Price Table and Change Orders.
1.3.3.2. Description of Work performed.
1.3.3.3. Current Site conditions.

1.3.3.4. General information including: date, time shift started and ended, Subcontractor(s) onsite, Health and Safety items, and Environmental Protection items.
1.3.3.5. Signature of Superintendent.
1.3.4. Cash Flow: with each Progress Payment, Submit a cash flow forecast. Include:
1.3.4.1. Calculation of planned cost versus actual cost and schedule forecasting and cash flow projections on a monthly basis, indicating anticipated value of future Progress Payments, for each Description of Work identified in the Unit Price Table.
1.3.4.2. Progress Payments will not be processed until cash flow has been accepted by the Departmental Representative.
1.3.5. Coordination Meeting Minutes and Drawings: at least 5 Working Days prior to relevant Work commencing, Submit final meeting minutes and drawings from coordination with Subcontractors.
1.3.6. Quality Management Plan: within 10 Working Days after Contract award, Submit a quality management plan. Include:
1.3.6.1. Details on planned review, inspection and testing to provide Quality Assurance and Quality Control for the Work.
1.3.6.2. Subcontractors responsible for review, inspection and testing.
1.3.6.3. Schedule of submittals of review, inspection and testing results.
1.3.7. Review, Inspection, and Testing Results: within 5 Working Days of receipt, Submit all results of reviews, inspection, and testing performed as part of the Work, including laboratory reports and sampling chains of custody.

1.4. Documents Required

1.4.1. Maintain 1 copy each of the following posted at the job Site:
1.4.1.1. General Conditions.
1.4.1.2. Drawings.
1.4.1.3. Specifications.
1.4.1.4. Addenda or other modifications to Contract.
1.4.1.5. Change orders.
1.4.1.6. Copy of current Work schedule.
1.4.1.7. Reviewed and final Shop Drawings Submittals.
1.4.1.8. One set of record Shop Drawings and Specifications for "as-built" purposes.
1.4.1.9. Field and laboratory test reports.
1.4.1.10. Reviewed and accepted Submittals.
1.4.1.11. Manufacturers' installation and application instructions (as appropriate).
1.4.1.12. *National Building Code of Canada* (as appropriate).
1.4.1.13. Current construction standards of workmanship listed in technical Sections (as appropriate).
1.4.1.14. Health and Safety documents, including all daily toolbox meetings, Notice of Project, and utility clearances.

1.4.1.15. Environmental Protection Plan.
1.4.1.16. Quality Management Plan.
1.4.1.17. Final Meeting Minutes, Agendas and associated attachments.
1.4.1.18. Permits and other approvals.

1.5. Green Requirements

1.5.1. Use only environmentally responsible green materials/products with no Volatile Organic Compounds (VOC) emissions or minimum VOC emissions of indoor off-gassing contaminants for improved indoor air quality – subject of acceptance of Submittal of Materials Safety Data Sheet (MSDS) Product Data.
1.5.2. Use materials/products containing highest percentage of recycled and recovered materials practicable – consistent with maintaining cost effective satisfactory levels of competition.
1.5.3. Adhere to waste reduction requirement for reuse or recycling of waste materials, not including soil or water, thus diverting materials from Landfill Facility.

1.6. Setting out of Work

1.6.1. Assume full responsibility for and execute complete layout of Work to locations, lines and elevations according to Drawings.
1.6.2. Provide devices needed to layout and construct Work.
1.6.3. Supply such services and devices in accordance with the Contract to facilitate Departmental Representative's inspection of Work.

1.7. Acceptance of Substrates

1.7.1. Each trade must examine surfaces prepared by others and job conditions which can affect his work, and must report defects to the Departmental Representative. Commencement of Work will imply acceptance of prepared Work or substrate surfaces.

1.8. Works Coordination

1.8.1. Coordinate Work of Subcontractors.
1.8.1.1. Designate one person to be responsible for review of Contract and Shop Drawings and managing coordination of Work.
1.8.2. Convene meetings between Subcontractors whose Work interfaces and ensure awareness of areas and extent of interface required.
1.8.2.1. Provide each Subcontractor with complete Drawings and Specifications for Contract, to assist them in planning and carrying out their respective work.
1.8.2.2. Develop coordination drawings when required, illustrating potential interference between Work of various trades and distribute to affected parties.
1.8.2.3. Facilitate meeting and review coordination drawings. Ensure Subcontractors agree and sign off on coordination drawings.
1.8.2.4. Publish minutes of each meeting.

1.8.2.5. Submit a copy of coordination drawings and meeting minutes as directed by the Departmental Representative.
1.8.3. Submit Shop Drawings and order of prefabricated equipment or rebuilt components only after coordination meeting for such items has taken place.
1.8.4. Work coordination:
1.8.4.1. Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of spatial interference.
1.8.4.2. Ensure that each trade provides all other trades reasonable opportunity for Final Completion of Work and in such a way as to prevent unnecessary delays, cutting, patching and removal or replacement of completed Work.
1.8.4.3. Ensure disputes between Subcontractors are resolved.
1.8.5. Failure to coordinate Work is responsibility of Contractor.

1.9. Approvals of Shop Drawings, Product Data and Samples

1.9.1. The term "shop drawings" means drawings, figures, diagrams, illustrations, schedules, performance charts, brochures and other data which are Submittals by Contractor to illustrate details of a portion of Work.
1.9.2. Submit as instructed by the Departmental Representative the requested shop drawings, product data, MSDS sheets and samples in accordance with the Contract.
1.9.3. Allow sufficient time for the following:
1.9.3.1. Review of product data.
1.9.3.2. Acceptance of shop drawings.
1.9.3.3. Review of re-submission.
1.9.3.4. Ordering of accepted material and/or products.

1.10. Relics and Antiquities

1.10.1. See General Conditions.

1.11. Additional Drawings

1.11.1. 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.
1.11.2. Upon request, Departmental Representative may furnish up to a maximum of 2 sets of Drawings for use by the Contractor at no additional cost. Should more than 2 sets of documents be required the Departmental Representative will provide them at additional cost.

1.12. Record Keeping

1.12.1. On Site Instruction: Contractual correspondence from the Departmental Representative to the Contractor. Does not include Contemplated Change Notices, Change Orders, and Extension of Time on Contracts. Sequentially

numbered On Site Instructions. Include cross references to applicable On Site Notifications. The status of the Contractor, including the function of Prime Contractor, must not change by reason of any On Site Instructions.

1.12.2. On Site Notifications: Contractual correspondence from Contractor to the Departmental Representative. Includes Submittals. Does not include Quotes, and Extension Of Time On Contracts. Must be as a sequentially numbered On Site Notifications. Include cross references to applicable On Site Instructions. The status of the Contractor, including the function of Prime Contractor, must not change by reason of any On Site Notifications.

1.12.3. Maintain adequate records to support information provided to Departmental Representative.

1.12.4. Maintain asbestos waste shipment records or other Hazardous Waste Manifests for minimum of 3 years from date of shipment or longer period required by applicable law or regulation.

1.12.5. Maintain bills of ladings for minimum of 300 Working Days from date of shipment or longer period required by applicable law or regulation.

1.13. Change Documents

1.13.1. Change Documents do not relieve Contractor of any obligation.

1.13.2. Change Documents do not change the Contractor's responsibility for sequencing, methods and means.

1.13.3. Change Documents do not change by any reason the status of the Contractor, including the function of Prime Contractor or as supervisor.

1.13.4. Change Documents include:

1.13.4.1. Change Order: There may be a change to the Contract Amount by reason of any Change Order. No Extension of Time for completion of the Work by reason of any Change Order.

1.13.4.2. Contemplated Change Notice: No increase to the Contract Amount by reason of any Contemplated Change Notice. No Extension of Time for completion of the Work by reason of any Contemplated Change Notice.

1.13.4.3. Extension of Time on Contracts: No increase to the Contract Amount by reason of any Extension of Time on Contracts. There may be an Extension of Time for completion of the Work by reason of an Extension of Time on Contracts.

1.13.4.4. Quote: No increase to the Contract Amount by reason of any Quote. No Extension of Time for completion of the Work by reason of any Quote.

1.14. System of Measurement

1.14.1. The metric system of measurement (SI) will be employed on the Contract.

1.15. Field Surveying

1.15.1. Contractor's Qualified Professional for Surveying is a Land Surveyor ie a member of either the Association of British Columbia Land Surveyors or the Association of Canada Lands Surveyors.

1.15.2. Departmental Representative will measure volumes using equipment such as tape measurements, non-differential GPS, or theodolite. Departmental Representative will not Survey using a Qualified Professional.

1.15.3. Volumes may be measured by a Contractor's Qualified Professional retained by Contractor at their sole cost. All data collected by Contractor's Qualified Professional subject to review by Departmental Representative.

1.16. Inspection

1.16.1. Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Site, allow access to such Work whenever it is in progress. Work at locations other than Site includes offsite Facilities.

1.16.2. Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative directions, or law of Site.

1.16.3. 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.

1.16.4. 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.

2. PART 2 - PRODUCTS

2.1. Asbestos Containing Materials Prohibition

2.1.1. Any material containing any degree of asbestos is banned from use in any and all sites, designs and projects.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Pre-Mobilization Submittals will be paid in accordance with lump sum price established for all Preconstruction Meetings, final design, planning, health and safety, and other Submittals in accordance with the Contract or required and accepted by the Departmental Representative as in accordance with the Contract prior to mobilization to Site.

1.1.2. Mobilization will be paid in accordance with lump sum price established for mobilizing all necessary equipment, materials, supplies, facilities, and personnel associated with the Works to the Site. Includes initial insurance, bonding, and permits. Additional insurance, bonding, and permits due to changes in scope, cost, and schedule as accepted by the Departmental Representative will be included in Contract amendments.

1.1.3. Site Preparation will be paid in accordance with lump sum price established to prepare the Site for planned construction works. Includes clearing and grubbing, demolition, temporary removal of existing infrastructure, utility location, rerouting, and protection, and construction of temporary onsite access roads. Also includes removal of any incidental or generated material. Also includes Preconstruction Precondition Survey and Preconstruction As-Built Documents.

1.1.4. Site Restoration will be paid in accordance with the lump sum price established to restore the Site to make suitable for post-Work use according to Drawings. Includes re-establishment of pre-existing infrastructure, final grading, topsoil reuse, revegetation, and deconstructing and removal from Site all temporary facilities and removal of any incidental or generated material.

1.1.5. Demobilization will be paid in accordance with lump sum price established for demobilizing all equipment and personnel associated with the Works from the Site. Includes decontaminating all equipment prior to removal from Site.

1.1.6. Closeout Submittals will be paid in accordance with lump sum price established for Final Site Inspection (for Certificate of Completion purposes), Closeout Meetings, and final As-Built Documents as directed by the Departmental Representative.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Preconstruction As-Built Documents: at least 5 Working Days prior to commencing any subsurface disturbance, Submit drawings identifying all infrastructure, including utilities, on the Site. Update drawings as directed by the Departmental Representative.

1.3.2. Breakdown of Lump Sum Prices: at least 5 Working Days prior to submitting the first Progress Payment, Submit a breakdown of the Contract lump sum prices

including labour, material and time, in detail as directed by the Departmental Representative and aggregating Contract Amount.

1.3.3. As-Built Documents: within 10 days of completing site Work, provide Drawings showing all Work, including infrastructure, utilities, excavation limits, backfill material limits and compaction, final grades, and any other improvements or reinstatements.

1.4. Mobilization and Demobilization

1.4.1. Move all personnel, equipment, supplies, and incidentals to and from the Site.

1.5. Site Preparation

1.5.1. Protection:

1.5.1.1. Protect existing features with temporary barriers and enclosures as required by applicable local regulations.

1.5.1.2. Keep excavations clean, free of standing water, and loose soil or sediment.

1.5.1.3. Protect natural and man-made features required to remain undisturbed. Protect existing trees from damage unless otherwise required or located in an area to be occupied by new construction.

1.5.1.4. Protect buried utilities that are required to remain undisturbed.

1.5.1.5. Provide temporary structures to divert flow of surface water as appropriate.

1.5.2. Security and Safety:

1.5.2.1. Provide safety measures to ensure worker and public safety.

1.5.2.2. Ensure Site is secure during onsite Work, provide, install, and remove fencing, temporary hoarding, and other security measures as appropriate.

1.5.2.3. Site including all construction areas should be secured with locked fencing, temporary hoarding and security personnel as required.

1.6. Onsite Access Roads

1.6.1. Maintain onsite access roads as follows:

1.6.1.1. Obtain permission to use existing onsite access roads or to construct temporary roads.

1.6.1.2. Maintain and clean roads for duration of Work, keep dry and free of mud.

1.6.1.3. Repair damage incurred from use of roads.

1.6.1.4. Provide photographic documentation of roads used by construction vehicles before, during and after Work.

1.6.1.5. Clean onsite access roads as directed by the Departmental Representative.

1.7. Site Restoration

1.7.1. Final site grades must be within 5 cm of pre-existing grades before Work commenced, unless otherwise specified.

1.7.2. Re-establish pre-existing drainage, unless otherwise specified.

1.7.3. Clean permanent access roads of contamination resulting from project activity as required or as directed of Departmental Representative, with no increases to Contract Amount or Extension of Time for completion of the Work.

1.7.4. Upon Final Completion of Work, remove Non-Contaminated Soil and debris, trim slopes, and correct defects as directed by the Departmental Representative.
1.7.5. Protect newly graded areas from traffic and erosion and maintain free of trash or debris until demobilization is completed and accepted by the Departmental Representative.
1.7.6. Reinstate pre-existing utilities and other infrastructure to original location and condition, meeting current standards, codes, and other requirements, unless otherwise indicated or as directed by the Departmental Representative.
1.7.7. Decontaminate equipment used in construction processes and remove from Site at end of construction activities.
1.7.8. Remove all temporary structures including subsurface structures for shoring support.
1.7.9. Reinstate surface to pre-existing conditions, including surface material (eg vegetation, gravel, pavement), unless otherwise indicated or as directed by the Departmental Representative.

1.8. Existing Services

1.8.1. Size, depth and location of existing utilities and structures as specified are for guidance only. Completeness and accuracy are not guaranteed.
1.8.2. Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative. All utilities entering Site must be confirmed prior to subsurface disturbance (ie do not rely on as-built documents). As appropriate, confirm locations of buried utilities by independent utility locator and using hand test excavations or hydrovac methods.
1.8.3. Remove abandoned service lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.
1.8.4. Maintain and protect from damage all utilities and structures encountered, unless Work involves temporarily breaking, rerouting, or connecting existing utilities.
1.8.5. Where Work involves temporarily breaking, rerouting, or connecting into existing utilities, obtain permission from utility companies of intended interruption of services, and carry out Work at times determined by the authorities having jurisdiction.
1.8.6. Submit schedule to and obtain approval for any shutdown or closure of active service. Adhere to schedule accepted by Departmental Representative and provide notice to affected parties.
1.8.7. Provide temporary services as required to maintain critical systems.
1.8.8. Where unknown utilities are encountered, immediately verbally notify Departmental Representative and confirm findings in writing.

1.9. Existing As-Built Documents

1.9.1. The Departmental Representative will provide 2 sets of Drawings, 2 sets of Specifications, and 2 copies of the original AutoCAD files for “as-built” purposes.

1.9.2. As Work progresses, maintain accurate records to show all deviations from the Contract. Note changes as they occur on as-built Specifications, Drawings and Shop Drawings.
1.9.3. Drawings and Shop Drawings: legibly mark each item to record actual construction, including:
1.9.3.1. Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
1.9.3.2. Field changes of dimension and detail.
1.9.3.3. Changes made by change orders.
1.9.3.4. Details not on original Drawings.
1.9.3.5. References to related Shop Drawings and modifications.
1.9.4. Contract Specifications: legibly mark each item to record actual workmanship of construction, including:
1.9.4.1. Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
1.9.4.2. Changes made by addenda and change orders.
1.9.5. As-built information:
1.9.5.1. Record changes in red ink.
1.9.5.2. Mark on 1 set of Drawings, Specifications and Shop Drawings at Final Completion of project and, before final inspection, neatly transfer notations to second set.
1.9.5.3. Submit 1 set in editable AutoCAD 14 file format with all as-built information.
1.9.5.4. Submit all sets as directed by the Departmental Representative.
1.9.6. As required, surveying to be completed by a Land Surveyor for as-built documents.

2. PART 2 - PRODUCTS

2.1. Not Used
2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used
3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Preconstruction Meeting Minutes: within 2 Working Days of the Preconstruction Meeting, Submit meeting minutes.

1.3.2. Progress Meeting Minutes: within 2 Working Days of a Progress Meeting, Submit meeting minutes. Submit revised minutes within 2 Working Days of receiving comments by Departmental Representative.

1.3.3. Information for Progress Meetings: at least 2 Working Days prior to scheduled Progress Meetings, Submit all information in accordance with the Contract for Progress Meetings. Include:

1.3.3.1. Agenda for the proposed Progress Meeting.

1.3.3.2. Updated Project Schedule.

1.3.3.3. Copies of transport manifests and disposal receipts for all materials removed from Site.

1.3.3.4. Other information as directed by the Departmental Representative or relevant to agenda for upcoming progress meeting.

1.3.4. Final Site Inspection: within 2 Working Days of the Final Site Inspection, Submit meeting minutes.

1.3.5. Closeout Meetings: within 2 Working Days of the Closeout Meeting, Submit meeting minutes.

1.4. Administrative

1.4.1. Schedule and administer project meetings throughout the progress of the Work weekly and at the call of the Departmental Representative.

1.4.2. Prepare agenda for meetings.

1.4.3. Submit written notice with agenda of each meeting 2 Working Days in advance of meeting date as directed by the Departmental Representative.

1.4.4. Provide physical space and make arrangements for meetings, or arrange for teleconference meetings, as directed by Departmental Representative.

1.4.5. Preside at meetings.

1.4.6. Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

1.4.7. Maintain records of meeting minutes for a minimum of 2 years after Work is completed.

1.4.8. Representative of Contractor, Subcontractor(s) and Supplier(s) attending meetings must be qualified and authorized to act on behalf of party each represents.

1.5. Preconstruction Meeting

1.5.1. Within 5 Working Days after award of Contract, request a meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities.
1.5.2. Departmental Representative, Contractor, Superintendent, major Subcontractor(s), field inspectors and supervisors must be in attendance.
1.5.3. Establish time and location of meeting subject to approval by Departmental Representative and notify parties concerned at least 3 Working Days before meeting.
1.5.4. Agenda to include:
1.5.4.1. Appointment of official representative of participants in the Work, including Contractor's Superintendent and Departmental Representative.
1.5.4.2. Schedule of Work.
1.5.4.3. Schedule of Submittals.
1.5.4.4. Requirements for temporary facilities.
1.5.4.5. Site security.
1.5.4.6. Change orders, procedures, approvals required, administrative requirements.
1.5.4.7. Monthly Progress Payments, administrative procedures, hold backs.
1.5.4.8. Appointment of inspection and testing agencies or firms.
1.5.4.9. List of Subcontractor(s).

1.6. Progress Meetings

1.6.1. During course of Work schedule progress meetings weekly subject to approval by Departmental Representative.
1.6.2. Contractor, Superintendent, major Subcontractor(s) involved in Work, and Departmental Representative are to be in attendance.
1.6.3. Agenda to include:
1.6.3.1. Review and acceptance of minutes of previous meeting.
1.6.3.2. Review health and safety, including incidents, near misses, and corrective measures.
1.6.3.3. Review Environmental Protection, including incidents, near misses, and corrective measures.
1.6.3.4. Review contractual compliance.
1.6.3.5. Review regulatory compliance.
1.6.3.6. Review communications, problems or concerns with community.
1.6.3.7. Review of Work progress since previous meeting.
1.6.3.8. Field observations, problems, conflicts.
1.6.3.9. Updated progress schedule detailing activities planned over next 2 week period. Include review of progress with respect to previously established dates for starting and stopping various stages of Work.
1.6.3.10. Problems which impede construction schedule.

1.6.3.11. Corrective measures and procedures to regain projected schedule.
1.6.3.12. Revision to construction schedule.
1.6.3.13. Progress schedule, during succeeding Work period.
1.6.3.14. Review submittal schedules: expedite as required.
1.6.3.15. Maintenance of quality standards.
1.6.3.16. Quantities of material transported, treated, and disposed.
1.6.3.17. Review proposed changes for effect on construction schedule and on Final Completion date.
1.6.3.18. Other business.
1.6.4. Submit draft Progress Meeting Minutes for review and comment by Departmental Representative. Incorporate comments into final Progress Meeting Minutes.

1.7. Toolbox Meetings

1.7.1. During the course of the Work, schedule daily toolbox meetings at the start of each Work shift. Multiple meetings are required if the Contractor works multiple shifts within a 24-hour period.
1.7.2. All on Site workers to attend, including Contractor, Superintendent, major Subcontractor(s), and environmental consultants. Departmental Representative may attend.
1.7.3. Agenda to include:
1.7.3.1. Planned Work activities and environmental considerations for that shift.
1.7.3.2. Coordination activities required between Contractor, Subcontractor(s), Departmental Representative, and other contractor(s) including environmental consultant.
1.7.3.3. Health and Safety items.
1.7.3.4. Environmental Protection items.

1.8. Final Site Inspection

1.8.1. Within 5 Working Days of completion of Site Works but prior to Demobilization, request a meeting on Site to review the Site.
1.8.2. Departmental Representative, Contractor, Superintendent, major Subcontractor(s), field inspectors and supervisors must be in attendance.
1.8.3. Establish time and location of meeting subject to approval by Departmental Representative and notify parties concerned at least 3 Working Days before meeting.
1.8.4. Agenda to include:
1.8.4.1. Inspect removal of all temporary equipment, materials, supplies, and facilities.
1.8.4.2. Inspect final surface grades.
1.8.4.3. Inspect final vegetation.
1.8.4.4. Inspect permanent facilities for performance and damage.
1.8.4.5. Document all damage, deficiencies, missing items, and non-conformance.

1.8.5. If required, and in the opinion of the Departmental Representative, perform another Final Site Inspection after resolving all documented damage, deficiencies, missing items, and non-conformance.

1.9. Closeout Meeting

1.9.1. Within 10 Working Days of completion of the Work, request a meeting to review the project.

1.9.2. Departmental Representative, Contractor, Superintendent, major Subcontractor(s), field inspectors and supervisors must be in attendance.

1.9.3. Establish time and location of meeting subject to approval by Departmental Representative and notify parties concerned at least 3 Working Days before meeting.

1.9.4. Agenda to include:

1.9.4.1. Review Certificate of Completion.

1.9.4.2. Review final payment.

1.9.4.3. Identify lessons learned.

1.9.4.4. Perform Contractor Performance Evaluation Report Form.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Master Plan: within 10 Working Days after Contract award, Submit a Master Plan (baseline schedule).

1.3.2. Schedule of Interruption of Services: at least 5 Working Days prior to any shutdown or closure of active utilities or facilities Submit a schedule identifying type of service and dates of shutdown or closure.

1.3.3. Project Schedule and Updates: with Progress Payment, Submit a Project Schedule updated as appropriate. Progress Payment submission is incomplete without an updated Project Schedule acceptable to Departmental Representative.

1.4. Requirements

1.4.1. Ensure Master Plan and detail Project Schedules are practical and remain within specified Contract duration.

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

1.4.3. Limit activity durations to maximum of approximately 10 Working Days, to allow for progress reporting.

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

1.4.5. Include Work sequencing description and schedule:

1.4.5.1. Work Sequencing description must describe methods, means, and sequences to perform each major task.

1.4.5.2. Work Sequencing schedule must show on a Gantt chart, start, end and dependencies of each major task and also indicates Work to be performed in sequence and in parallel.

1.4.5.3. Major tasks includes all items identified on Unit Price Table.

1.5. Master Plan

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

1.5.2. Departmental Representative will review and return revised schedules within 5 Working Days.

1.5.3. Revise impractical schedule and resubmit within 5 Working Days.

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

1.6. Project Schedule

1.6.1. Develop detailed Project Schedule derived from Master Plan.

1.6.2. Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

1.6.2.1. Dates of commencement and completion of Work for each Description of Work identified on the Unit Price Table.

1.6.2.2. Dates of Submittals including Shop Drawings, product data, MSDS sheets and samples.

1.6.2.3. Dates of inspection and testing.

1.6.2.4. Final Completion date within the time period in accordance with the Contract, including Amendments.

1.7. Project Schedule Reporting

1.7.1. Update Project Schedule on monthly basis reflecting activity changes and completions, as well as activities in progress.

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

1.8. Project Meetings

1.8.1. 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.

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

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Shop Drawings: at least 5 Working Days prior to commencing applicable Work, Submit Shop Drawings signed by a Contractor's Qualified Professional.

1.4. General

1.4.1. Submission details to be commensurate for type of Work and Site conditions. Details depend on Work performed and Contractor's methods, means, and sequences.

1.4.2. Contractor’s responsibility for errors and omissions in Submittals is not relieved by the Departmental Representative’s review of Submittals.

1.4.3. Notify Departmental Representative in writing at time of Submittals, identifying deviations from requirements of Contract and stating reasons for deviations.

1.4.4. Contractor’s responsibility for deviations in Submittals from requirements of Contract is not relieved by the Departmental Representative’s review of Submittals unless Departmental Representative gives written acceptance of specific deviations.

1.4.5. Make any changes in Submittals which Departmental Representative requires to be in accordance with the Contract and resubmit as directed by the Departmental Representative.

1.4.6. Notify Departmental Representative in writing, when resubmitting, of any revisions other than those directed by the Departmental Representative.

1.4.7. Do not proceed with Work until relevant Submittals are finalized and have been accepted.

1.4.8. 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 responsibility of Contractor.

1.4.9. Review Submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each Submittal has been checked and coordinated with requirements of Work and Contract. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

1.4.10. Verify field measurements and affected adjacent Work are coordinated.

1.4.11. Adjustments made on Submittals by the Departmental Representative will not result in an increase the Contract Amount nor an Extension of Time for completion of the Work. If adjustments result in an increase to the Contract Amount or an Extension of Time for completion of the Work, notify Departmental Representative and receive approval prior to proceeding with Work.

1.4.12. Keep one final copy of each Submittal onsite.

1.5. Submission Requirements

1.5.1. Coordinate each Submittal with the requirements of the Work and the Contract. Individual Submittals will not be reviewed until:

1.5.1.1. Submittals are complete.

1.5.1.2. All related information is available.

1.5.2. Allow 10 Working Days for Departmental Representative's review of each Submittal, unless otherwise specified.

1.5.3. All Submittals are to be sent to Departmental Representative in duplicate as a hardcopy and in electronic format compatible with Departmental Representative's software.

1.5.4. Submittals must include:

1.5.4.1. Date and revision dates.

1.5.4.2. Project title and number.

1.5.4.3. Name and address of:

1.5.4.3.1. Subcontractor.

1.5.4.3.2. Supplier.

1.5.4.3.3. Manufacturer.

1.5.4.4. Signature of Superintendent, certifying approval of Submittals, verification of field measurements and in accordance with the Contract.

1.5.4.5. Contractor's Qualified Professional to sign and seal Submittals in accordance with the Contract or as required by the nature of the Submittal. Submittals to include at a minimum 1 hard copy of original ink sealed document.

1.5.4.6. Details of appropriate portions of Work as applicable.

1.6. Shop Drawings

1.6.1. Shop drawings are drawings, figures, diagrams, illustrations, schedules, performance charts, brochures and other data intended to illustrate details of a portion of the Work which are provided by the Qualified Professional of record.

1.6.2. Maximum sheet size: ANSI E (864 x 1118 mm).

1.6.3. Submit, as instructed by the Departmental Representative, 2 copies of shop drawings for each requirement requested in the specification sections and/or as instructed by the Departmental Representative.

1.6.4. Cross-reference shop drawing information to applicable portions of the Contract.

1.6.5. Qualified Professional to sign and seal each individual shop drawing.

1.6.6. Qualified Professional to sign and seal final design drawings and submit as instructed by the Departmental Representative upon Final Completion of the construction project. Final design drawings are prepared by a Qualified

Professional to reflect design changes made during the construction of the Remediation by Excavation project. Final design drawings are intended to incorporate addenda, change orders and other significant design changes, but not necessarily Site instructions.

1.6.7. Shop drawings must include:
1.6.7.1. The original date of issue.
1.6.7.2. The dates of all applicable revisions.
1.6.7.3. The project title.
1.6.7.4. The project address.
1.6.7.5. The project number.
1.6.7.6. Wherever applicable, the name(s) of the: Contractor, Subcontractor(s), Supplier(s), manufacturers, and separate detailers.
1.6.7.7. The sequence number for each shop drawing.
1.6.7.8. Identifications of all products and materials.
1.6.7.9. Relation to adjacent structures or materials.
1.6.7.10. Clearly identified field dimensions.
1.6.7.11. Applicable standards.

1.7. Shop Drawings Review

1.7.1. Departmental Representative's review of shop drawings is to determine if shop drawings are consistent with the general intent of the Contract and are in accordance with the Contract.
1.7.2. This review will not mean that Departmental Representative approves the detail design inherent in the shop drawings, responsibility for which will remain with Contractor submitting same.
1.7.3. This review will not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the Contract.
1.7.4. Without restricting the generality of the foregoing, be responsible for:
1.7.4.1. Dimensions to be confirmed and correlated at the Site.
1.7.4.2. Information that pertains solely to fabrication processes or to techniques of construction and installation.
1.7.4.3. Coordination of the Work of all sub-trades.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Contaminated Material and Non-Contaminated Material Management Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit plan detailing management of Contaminated Material and Non-Contaminated Material. Include:

1.3.1.1. Sequence, methods and means to ensure different categories of waste are segregated.

1.3.1.2. Sequence, methods and means to handle, transport, and store Contaminated Material and Non-Contaminated Material onsite.

1.3.1.3. Sequence, methods and means to transport Contaminated Material and Non-Contaminated Material offsite. Include name, vehicle type, and licenses of transporters. Include name, location, provincial or territorial authorizations, and evidence of compliance with municipal zoning and bylaws of all transfer stations and interim storage facilities.

1.3.1.4. Sequence, methods and means to treat Contaminated Material offsite. Include proposed treatment method, schedule for treatment, and name, location, provincial or territorial authorizations, and evidence of compliance with municipal zoning and bylaws of Treatment Facilities.

1.3.1.5. Sequence, methods and means to dispose Contaminated Material and Non-Contaminated Material offsite. Include name, location, provincial or territorial authorizations, and evidence of compliance with municipal zoning and bylaws of Disposal Facilities.

1.3.2. Transport Manifests: within 5 Working Days of offsite transport, Submit documentation verifying that material has been transported appropriately. Include:

1.3.2.1. Method of transport.

1.3.2.2. Name of transport company.

1.3.2.3. Weigh scale receipt including location, date, and weight of loading.

1.3.2.4. Weigh scale receipt including location, date, and weight of unloading.

1.3.3. Certificate of Treatment: within 30 Working Days of treatment at Treatment Facility, Submit documentation verifying that materials have been treated by Contractor. Include:

1.3.3.1. Issued by the Treatment Facility.

1.3.3.2. On company letterhead.

1.3.3.3. Name and location of facility where the material is being treated.

1.3.3.4. Date and weight for each shipment received and total weight received at the offsite facility.
1.3.3.5. Date and weight for each treatment event and total weight treated at the offsite facility.
1.3.3.6. Treatment methodology.
1.3.3.7. Laboratory certificates demonstrating treatment objectives were met.
1.3.3.8. Disposition of treated material.
1.3.3.9. Signed by identified authorized treatment company representative.
1.3.4. Certificate of Disposal: within 30 Working Days of disposal at Disposal Facility, Submit documentation verifying that materials have been disposed by Contractor. Include:
1.3.4.1. Issued by the Disposal Facility.
1.3.4.2. On company letterhead.
1.3.4.3. Name and location of facility where the material is being disposed.
1.3.4.4. Date and weight for each shipment received and total weight received at the Disposal Facility.
1.3.4.5. Identification of final ownership of material.
1.3.4.6. Signed by identified authorized disposal company representative.
1.3.5. Soil and Water Management Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit methods, means, and sequences for Soil and Water Management onsite for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include
1.3.5.1. Personnel and equipment decontamination.
1.3.5.2. Segregation of different Classifications are segregated.

1.4. Sequencing and Scheduling

1.4.1. Commence Work involving contact with Contaminated or potentially Contaminated Soil or Wastewater after all applicable Environmental Protection procedures (including those identified in Contaminated Soil and Non-Contaminated Soil Management Plan and Environmental Protection Plan) and facilities (including those identified in Site Layout) are operational and accepted by Departmental Representative.
1.4.2. Plan work sequencing and traffic patterns to prevent contamination of clean areas due to traffic or debris.

1.5. Drums

1.5.1. Provide, maintain, and operate drum staging pad as required.
1.5.2. Construct drum staging pad with sump capable of collecting leachate and rain runoff. Place impermeable liner that contours over top of berm, and collects leachate and runoff from staging pad which is conducted solely to sump on staging pad. Leachate is Contaminated Water.

1.5.3. Storage of solid or liquid waste: 200 L steel drums meeting Transportation and Dangerous Goods Act, closable lids, complete with labels for marking contents and date filled.
1.5.4. Storage of liquid waste: 200 L steel drums meeting Transportation and Dangerous Goods Act, closable lids, complete with labels for marking contents and date filled.
1.5.5. Storage of solid waste: 200 L steel drums meeting Transportation and Dangerous Goods Act, closable lids, complete with labels for marking contents and date filled.

1.6. Personnel Decontamination Facility

1.6.1. Provide an area or areas close to the workers' changing facilities to enable workers and other personnel leaving areas such as exclusion area to remove deleterious and Contaminated Soils from boots, clothing and skin surfaces.
1.6.2. Be responsible for ensuring that all materials, chemicals, protective clothing, wash water and deleterious materials are collected, treated and disposed of in accordance with applicable environmental standards and regulations.
1.6.3. Personnel Decontamination Facility to be available for use by persons other than the Contractor's workers and Subcontractors, including federal employees, other contractor(s), and environmental agencies. Provide use of facilities to other persons.

1.7. Equipment Decontamination Facility

1.7.1. Prior to commencing Work involving equipment contact with potentially Contaminated Soil, construct equipment decontamination facilities to accommodate the largest potentially contaminated equipment onsite.
1.7.2. Collect and contain equipment decontamination wastewater and sediment. Transfer collected wastewater and sediment to treatment facilities accepted by Departmental Representative.

1.8. Soil Stockpiling

1.8.1. Provide, maintain, and operate temporary storage/stockpiling facilities as per Contractor's Site Layout.
1.8.2. Segregate Contaminated Material from Non-Contaminated Material into separate stockpiles to prevent cross-contamination.
1.8.3. Prevent precipitation from infiltrating or from directly running off stockpiled materials. Cover stockpiled materials with an impermeable cover during periods of Work stoppage including at end of each Working Day and as instructed by the Departmental Representative.
1.8.4. Securely fasten covers over stockpiled material until material is loaded for offsite transport.

1.8.5. Store excavated Non-Contaminated Material only on non-contaminated surface areas. Ensure no contact between excavated Non-Contaminated Material and drainage of Contaminated Water or Contaminated Material.
1.8.6. Store excavated Contaminated Material in temporary stockpiles.
1.8.6.1. Install impermeable liner (eg asphalt or minimum 20 mil (0.5mm) polyethylene) below proposed stockpile locations to prevent contact between stockpile material and ground.
1.8.6.2. Cover stockpiled material when not being worked or sampled to prevent release of airborne dust, vapours, or odours, and to prevent saturation and leachate generation from material.
1.8.6.3. Prevent Non-Contaminated Water, such as surface water, from coming into contact with Contaminated Material stockpiles.
1.8.7. Segregate Contaminated Material into different treatment/disposal streams, including at a minimum:
1.8.7.1. Hazardous Waste
1.8.7.2. Waste Quality
1.8.8. Segregate different suspect material in discrete stockpiles to facilitate ex-situ characterization as instructed by the Departmental Representative.
1.8.9. Assist Departmental Representative in collection of stockpile samples for exsitu characterization. Ex-situ characterization may take up to 5 Working Days, not counting the day the sample is collected. No Standby Time charges or increases to Contract Amount or Extension of Time for completion of the Work can be incurred for Confirmation Sample results provided within 5 Working Days, not counting the day the sample is collected.
1.8.10. Do not remove Contaminated Material from stockpiles until exsitu characterization completed and as instructed by Departmental Representative.

1.9. Equipment Decontamination

1.9.1. At minimum, perform following steps during equipment decontamination: mechanically remove packed dirt, grit, and debris by scraping and brushing without using steam or high-pressure water to reduce amount of water needed and to reduce amount of contaminated rinsate generated.
1.9.2. If required, as directed by the Departmental Representative, use high-pressure, low-volume, hot water or steam supplemented by detergents or solvents as appropriate. Pay particular attention to tire treads, equipment tracks, springs, joints, sprockets, and undercarriages. Scrub surfaces with long handle scrub brushes and cleaning agent. Rinse off and collect cleaning agent. Air dry equipment in clean area before removing from Site or travelling on clean areas. Perform assessment as directed by the Departmental Representative to determine effectiveness of decontamination.
1.9.2.1. Take appropriate measures necessary to minimize drift of mist and spray during decontamination including provision of wind screens.

1.9.2.2. Collect decontamination wastewater and sediment which accumulate in decontamination location. Treat collected wastewater as Contaminated Water. Manage decontamination sediment as Hazardous Waste.

1.9.3. In the opinion of the Departmental Representative, each piece of equipment must be inspected by the Departmental Representative after decontamination and prior to travel on clean areas or demobilization from Site. Perform additional decontamination as required in the opinion of the Departmental Representative.

1.9.4. Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields.

1.10. Progress Decontamination

1.10.1. Decontaminate equipment after working in potentially contaminated Work areas and prior to subsequent Work or travel on clean areas.

1.11. Final Decontamination

1.11.1. Perform final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially Contaminated Soil prior to demobilization from Site.

1.12. **Contaminated Water**

1.12.1. Assume ownership of, and be responsible for Contaminated Water once it is loaded on a vehicle, barge, or other vessel for transport offsite or once it enters the Contaminated Water Treatment Plant.

1.12.2. Collect Contaminated Water that has, or potentially has, come into contact with Contaminated Material including excavation and stockpile areas, or is otherwise potentially contaminated from Work activities.

1.12.3. Transport and treat collected Contaminated Water at Contaminated Water Treatment Plant.

1.12.4. Discharge to environment: obtain Discharge Approval from authority having jurisdiction. Comply with Waterway Impact Requirements.

1.13. Contaminated Material Management

1.13.1. Remove all Contaminated Material within Work areas in accordance with the Contract and as instructed by the Departmental Representative.

1.13.2. Minimize generation of Contaminated Material to greatest extent practicable. Take necessary precautions to avoid mixing during excavation, handling, loading, stockpiling, and transport of Non-Contaminated Material with Contaminated Material, and Waste Quality with Hazardous Waste.

1.13.3. Segregate, excavate, handle, stockpile, load, transport, treat, and dispose Contaminated Material separately into the following classifications in accordance with the Contract or as instructed by the Departmental

Representative based on insitu results, field observations, field measurements, and/or ex-situ characterization:

1.13.3.1. Hazardous Waste

1.13.3.2. Waste Quality

1.13.4. Handle, stockpile, load, and transport Contaminated Material from the Site separately from material from other sites.

1.13.5. Treat and dispose Contaminated Material from the Site separately from material from other sites to the extent practicable as acceptable to the Departmental Representative.

1.13.6. Material characterization additional to information provided in Contract required by transport, Treatment Facility or Disposal Facility responsibility of Contractor.

1.14. Contaminated Material Transport-Offsite

1.14.1. Assume ownership of, and be responsible for, Contaminated Material once it is loaded on a vehicle, barge, or other vessel for transport.

1.14.2. Transport material as soon as practical. Do not unreasonably stockpile material onsite.

1.14.3. Cover material while being transported to prevent release of airborne dust, vapours, or odours, and to prevent saturation and leachate generation from material.

1.14.4. Excess water in soil or sediment must not be allowed to flow out of vehicle or vessel during transport.

1.14.5. Stabilize soil and sediment as necessary.

1.14.6. All vehicles, vessels and operators must be appropriately licensed and equipped to transport Hazardous Waste soil and sediment.

1.14.7. Barges must be inspected by an independent Marine Surveyor and Submit a copy of the Certificate of Seaworthiness to Departmental Representative.

1.14.8. Manifest and correlate weights of all material transported from Site documenting weight at removal from Site, movement, transfer stations, interim storage and treatment, and weight of material at final Disposal Facility. Submit all manifests, as instructed by the Departmental Representative.

1.14.9. Material transported with discrepancies in manifests must be resolved as required by regulations and as acceptable to the Departmental Representative. Discrepancies include:

1.14.9.1. No manifest or an incomplete manifest.

1.14.9.2. The material transported does not match the description in the manifest.

1.14.9.3. The amount transported differs by more than 5% in the manifest.

1.14.9.4. The material transported is in a hazardous condition.

1.15. Contaminated Material Transport-Onsite

1.15.1. .

1.15.2. Transport material to location shown on Drawings.

1.15.3. Place in Treatment Facility-Onsite in locations and thicknesses as shown on Drawings.

1.15.4. Be responsible for any damage to Treatment Facility-Onsite caused by placement.

1.16. Contaminated Material Disposition

1.16.1. Treat and dispose of Contaminated Material as follows, otherwise in accordance with the Contract, or as instructed by the Departmental Representative:

1.16.1.1. Hazardous Waste: May be treated at a Treatment Facility prior to disposal at a Disposal Facility.

1.16.1.2. Waste Quality: May be treated at a Treatment Facility prior to disposal at a Disposal Facility.

1.17. Contaminated Material Treatment-Offsite

1.17.1. Contaminated Material Treatment-Offsite: treat at Treatment Facility provided by Contractor and accepted by the Departmental Representative.

1.17.2. Treatment Facility must:

1.17.2.1. Be an existing offsite facility located in Canada.

1.17.2.2. Be designed, constructed and operated for the handling or processing of waste in such a manner as to change the physical, chemical or biological character or composition of waste amenable to treatment to lower than the BC *Contaminated Sites Regulation* applicable standards.

1.17.2.3. Hold a valid and subsisting permit, certificate, approval, or any other form of authorization issued by a province or territory for the treatment of soil or other material that is Hazardous Waste or Waste Quality, as applicable.

1.17.2.4. Comply with applicable municipal zoning, bylaws, and other applicable requirements.

1.17.3. Treat material as soon as practical and within 100 Working Days of leaving Site or as required by Contract unless otherwise accepted by Departmental Representative.

1.17.4. Material treated offsite must subsequently be disposed of at a Disposal Facility after treatment.

1.17.5. Treatment includes bioremediation, thermal desorption, and incineration. Treatment does not include blending, mixing, or dilution.

1.17.6. If proposed Treatment Facility is not acceptable to Departmental Representative, identify an alternate Treatment Facility that is acceptable.

1.17.7. Submit Certificates of Treatment for all material treated offsite.

1.18. Contaminated Material Disposal

1.18.1. Contaminated Material Disposal: dispose Contaminated Material at Disposal Facility provided by Contractor and accepted by the Departmental Representative.

1.18.2. Disposal Facility must:

1.18.2.1. Be designed, constructed and operated to prevent any pollution from being caused by the facility outside the area of the facility from waste placed in or on land within the facility.

1.18.2.2. Hold a valid and subsisting permit, certificate, approval, or any other form of authorization issued by a province or territory for the disposal of soil or other material that is Waste Quality.
1.18.2.3. Comply with applicable municipal zoning, bylaws, and other applicable requirements.
1.18.3. Dispose material as soon as practical and within 100 Working Days of leaving Site or as required by Contract unless otherwise accepted by Departmental Representative.
1.18.4. Material sent to a Disposal Facility must be permanently stored at that facility.
1.18.5. If proposed Disposal Facility is not acceptable to Departmental Representative, provide an alternate Disposal Facility that is acceptable.
1.18.6. Submit Certificates of Disposal for all material disposed offsite.

2. PART 2 - PRODUCTS

2.1. Not Used
2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used
3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Submit to Departmental Representative Submittals listed for review.
1.3.2. Work affected by Submittal must not proceed until review is complete.
1.3.3. Submit the following:
1.3.3.1. Health and Safety Plan.
1.3.3.2. Copies of reports or directions issued by federal and provincial health and safety inspectors.
1.3.3.3. Copies of incident and accident reports.
1.3.3.4. Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
1.3.3.5. Emergency Procedures.
1.3.3.6. Notice of Project.
1.3.4. The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 5 Working Days after receipt of the plan.
1.3.5. If changes are required, revise the plan as appropriate and resubmit to Departmental Representative within 5 Working Days.
1.3.6. Submittal of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It will not:
1.3.6.1. Be construed to imply approval by the Departmental Representative.
1.3.6.2. Be interpreted as a warranty of being complete, accurate and legislatively compliant.
1.3.6.3. Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

1.4. References

1.4.1. Government of Canada:
1.4.1.1. Canada Labour Code - Part II.
1.4.1.2. Canada Occupational Health and Safety Regulations.
1.4.2. National Building Code of Canada (NBC):
1.4.2.1. Part 8, Safety Measures at Construction and Demolition Sites.
1.4.3. Canadian Standards Association (CSA) as amended:
1.4.3.1. CSA Z797-2009 Code of Practice for Access Scaffold.

1.4.3.2. CSA S269.1-1975 (R2003) Falsework for Construction Purposes.
1.4.3.3. CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures.
1.4.4. National Fire Code of Canada 2010 (as amended):
1.4.4.1. Part 5 – Hazardous Processes and Operations and Division B as applicable and required.
1.4.4.2. FCC No. 302, Standard for Welding and Cutting.
1.4.5. American National Standards Institute (ANSI):
1.4.5.1. ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
1.4.6. Province of British Columbia (as appropriate):
1.4.6.1. Workers Compensation Act Part 3-Occupational Health and Safety.
1.4.6.2. Occupational Health and Safety Regulation.

1.5. Regulatory Requirements

1.5.1. Comply with codes, acts, bylaws, standards and regulations applicable to the performance of the Work in accordance with the Contract to ensure safe operations at Site.
1.5.2. 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 direct on the course of action to be followed.

1.6. Worker's Coverage

1.6.1. Comply fully with the relevant Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the Final Completion of the Work.
1.6.2. Maintain Workers coverage as required by relevant acts and regulations during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.7. Compliance with Regulations

1.7.1. 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.
1.7.2. 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.

1.8. Responsibility

1.8.1. Assume responsibility as the Prime Contractor for Work under this Contract.

1.8.1.1. Be responsible for health and safety of persons onsite, safety of property onsite and for protection of persons adjacent to Site and environment to extent that they may be affected by conduct of Work.
1.8.1.2. Comply with and enforce compliance by employees with safety requirements of Contract, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9. Health and Safety Coordinator
1.9.1. The Health and Safety Coordinator must:
1.9.1.1. 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.
1.9.1.2. Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.
1.9.1.3. Be on Site during execution of Work.

1.10. General Conditions
1.10.1. Provide safety barricades and lights around Site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
1.10.2. Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the Site:
1.10.2.1. Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.

1.11. Project/Site Conditions
1.11.1. Work at Site will involve contact with contaminants identified in Specifications and environmental reports.

1.12. Work Permits
1.12.1. Obtain specialty permits related to project before start of Work.

1.13. Filing of Notice
1.13.1. The Prime Contractor must complete and submit a Notice of Project as required by Provincial or Territorial authorities.
1.13.2. Provide copies of all notices to the Departmental Representative.

1.14. Health and Safety Plan
1.14.1. Conduct a site-specific hazard assessment based on review of Contract, required Work, and project Site. Identify any known and potential health risks and safety hazards.
1.14.2. Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
1.14.2.1. Primary requirements:

1.14.2.1.1. Contractor's safety policy.
1.14.2.1.2. Identification of applicable compliance obligations.
1.14.2.1.3. Definition of responsibilities for project safety/organization chart for project.
1.14.2.1.4. General safety rules for project.
1.14.2.1.5. Job-specific safe work procedures.
1.14.2.1.6. Inspection policy and procedures.
1.14.2.1.7. Incident reporting and investigation policy and procedures.
1.14.2.1.8. Occupational Health and Safety Committee/Representative procedures.
1.14.2.1.9. Occupational Health and Safety meetings.
1.14.2.1.10. Occupational Health and Safety communications and record keeping procedures.

1.14.2.2. 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.
1.14.2.3. List hazardous materials to be brought onsite as required by Work.
1.14.2.4. Indicate engineering and administrative control measures to be implemented at the Site for managing identified risks and hazards.
1.14.2.5. Identify personal protective equipment (PPE) to be used by workers.
1.14.2.6. Identify personnel and alternates responsible for site safety and health.
1.14.2.7. Identify personnel training requirements and training plan, including site orientation for new workers.

1.14.3. 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.
1.14.4. Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
1.14.5. Departmental Representative's review: the review of Health and Safety Plan by Public Service and Procurement Canada (PWGSC) will not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract.

1.15. Emergency Procedures

1.15.1. List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (ie names/telephone numbers) of:
1.15.1.1. Designated personnel from own company.
1.15.1.2. Regulatory agencies applicable to Work and as per legislated regulations.
1.15.1.3. Local emergency resources.
1.15.1.4. Departmental Representative and site staff.
1.15.2. Include the following provisions in the emergency procedures:
1.15.2.1. Notify workers and the first-aid attendant, of the nature and location of the emergency.

1.15.2.2. Evacuate all workers safely.
1.15.2.3. Check and confirm the safe evacuation of all workers.
1.15.2.4. Notify the fire department or other emergency responders.
1.15.2.5. Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
1.15.2.6. Notify Departmental Representative and Site staff.
1.15.3. Provide written rescue/evacuation procedures as required for, but not limited to:
1.15.3.1. Work at high angles.
1.15.3.2. Work in confined spaces or where there is a risk of entrapment.
1.15.3.3. Work with hazardous substances.
1.15.3.4. Underground work.
1.15.3.5. Work on, over, under and adjacent to water.
1.15.3.6. Workplaces where there are persons who require physical assistance to be moved.
1.15.4. Design and mark emergency exit routes to provide quick and unimpeded exit.
1.15.5. Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

1.16. Hazardous Products

1.16.1. Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
1.16.2. Where use of hazardous and toxic products cannot be avoided:
1.16.2.1. Notify Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as required.
1.16.2.2. As required, in conjunction with Departmental Representative, schedule to carry out Work during "off hours" when tenants have left the building.
1.16.2.3. Provide adequate means of ventilation as required.

1.17. Unforeseen Hazards

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

1.18. Posted Documents

1.18.1. Post legible versions of the following documents onsite:
1.18.1.1. Health and Safety Plan.
1.18.1.2. Sequence of Work.
1.18.1.3. Emergency procedures.
1.18.1.4. Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.

1.18.1.5. Notice of Project.
1.18.1.6. Floor plans or Site plans.
1.18.1.7. Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the Site for review by employees and workers.
1.18.1.8. Workplace Hazardous Materials Information System (WHMIS) documents.
1.18.1.9. Material Safety Data Sheets (MSDS).
1.18.1.10. List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
1.18.2. Post all Material Safety Data Sheets (MSDS) onsite, 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.
1.18.3. 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 accepted by the Departmental Representative.

1.19. Meetings

1.19.1. Attend health and safety preconstruction meeting and all subsequent meetings called by the Departmental Representative.
1.19.2. Ensure all site personnel attend a health and safety toolbox meeting at the beginning of each shift, which must include:
1.19.2.1. Sign-in of all attendees.
1.19.2.2. Planned Work activities and environmental considerations for that shift.
1.19.2.3. Hazards associated with these Work activities, including environmental hazards (eg potential for hypothermia, heat exhaustion, heat stroke).
1.19.2.4. Appropriate job-specific safe work procedures.
1.19.2.5. Required personal protective equipment (PPE).
1.19.2.6. Appropriate emergency procedures.
1.19.2.7. Review recent accidents on Site, including near misses.
1.19.3. Retain records of all health and safety meetings onsite during Work, and retain as corporate records for a minimum of 7 years after Work is completed.

1.20. Correction of Non-Compliance

1.20.1. Immediately address health and safety non-compliance issues identified by the Departmental Representative.
1.20.2. Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.
1.20.3. The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time.
1.20.4. Correct non-compliance.

1.21. Hazardous Occurrence Investigation and Reporting

1.21.1. Hazard includes:

1.21.1.1. Any source of potential damage, harm or adverse effects on life, health, property or environment at work. It refers to any biological, chemical, ergonomic, physical, psychosocial and safety factor that is reasonably likely to cause harm or damage to humans, other organisms, or the environment in the absence of its control. Sometimes a hazard is referred to as being the actual harm or the health effect it caused rather than the hazard. For example the disease tuberculosis might be called a hazard by some but in general the tuberculosis-causing bacteria would be considered the “hazard” or “hazardous biological agent”. Exposure to tuberculosis would be the hazardous incident. For types of Hazards refer to Annex 3 of the Standard on Hazard Prevention Program.

1.21.2. Hazardous Occurrence includes:

1.21.2.1. An event occurring at a PWGSC managed building or worksite, or through the course of an employee's work that results in, or has the potential to result in, a fatality, injury, illness, exposure to a hazardous substance or property damage or an escapement of a hazardous material. For the purpose of investigating, recording and reporting hazardous occurrences, the following are included under this term: disabling injuries, minor injuries and near-misses.

1.21.3. Hazardous Occurrence Investigation and Reporting Procedures:

1.21.3.1. Includes information regarding the person involved and the basic circumstances surrounding the hazardous occurrence.

1.21.3.2. Provides a detailed and thorough description of the hazardous occurrence and the sequence of events.

1.21.3.3. Indicates corrective measures that have been taken since the occurrence.

1.21.3.4. Requires the appointment of a qualified investigator.

1.21.3.5. Provides recommendations for additional corrective measures, if required.

1.21.4. Fatal or Serious Accidents Procedures:

1.21.4.1. Call emergency number to advise the police organization having jurisdiction to secure the scene and investigate the matter.

1.21.4.2. Advise the Departmental Representative of the fatality or serious accident within 1 hour.

1.21.4.3. No investigation will be conducted at the scene until the police service having jurisdiction has released the scene.

1.21.4.4. Unless authorized to do so, do not allow anyone to remove or in any way interfere with or disturb any wreckage, article or thing related to the incident except to the extent necessary to: save a life, prevent injury or relieve human suffering in the vicinity; maintain an essential public service; or prevent unnecessary damage to or loss of property.

1.22. Utility Clearance

1.22.1. Contractor is solely responsible for utility clearance.

1.22.2. Contractor will not rely upon Drawings or other information provided with utility locations.

1.23. Personal Protective Equipment Program

1.23.1. Submit Personal Protective Equipment (PPE) program to the Departmental Representative addressing as appropriate:

1.23.1.1. Donning and doffing procedures.

1.23.1.2. PPE selection based upon Site hazards.

1.23.1.3. PPE use and limitations of equipment.

1.23.1.4. Work mission duration, PPE maintenance and storage.

1.23.1.5. PPE decontamination and disposal.

1.23.1.6. PPE inspection procedures prior to, during, and after use.

1.23.1.7. Evaluation of effectiveness of PPE program, and limitations during temperature extremes, and other appropriate medical considerations.

1.23.1.8. Medical surveillance requirements for personnel assigned to work at Site.

1.23.1.9. Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment.

1.23.1.10. Site control measures employed at Site including site map, site work zones, use of 'buddy system', site communications including site security, alerting means for emergencies, standard operating procedures or safe work practices, and identification of nearest medical assistance.

1.23.1.11. Decontamination procedures for both personnel and equipment.

1.23.1.12. Emergency response requirements addressing: pre-emergency planning, personnel roles, lines of authority and communication, emergency recognition and prevention, safe distances and places of refuge, site security and control, evacuation routes and procedures, decontamination procedures not covered under decontamination section, emergency medical treatment and first aid, emergency alerting and response procedures, critique of response and follow-up, PPE and emergency equipment, site topography, layout, prevailing weather conditions, and procedures for reporting incidents to local, provincial, or federal agencies.

1.23.1.13. Written respiratory protection program for project activities.

1.23.1.14. Procedures dealing with heat and/or cold stress.

1.23.1.15. Spill containment program if waste material is generated, excavated, stored, or managed onsite.

1.24. Offsite Contingency and Emergency Response Plan

1.24.1. Prior to commencing Work involving handling of hazardous materials, develop offsite Contingency and Emergency Response Plan.

1.24.2. Plan must provide immediate response to serious site occurrence such as explosion, fire, or migration of significant quantities of toxic or hazardous material from Site.

1.25. Personnel Health, Safety, and Hygiene

1.25.1. Training: ensure personnel entering Site are trained in accordance with specified personnel training requirements. Training session must be completed by Health and Safety Officer.
1.25.2. Levels of Protection: establish levels of protection for each Work area based on planned activity and location of activity.
1.25.3. Personal Protective Equipment:
1.25.3.1. Ensure all site personnel are furnished with appropriate PPE.
1.25.3.2. Unless identified otherwise in site-specific health and safety plan, minimum PPE to include: industrial protective headwear, high-visibility safety apparel, and protective footwear.
1.25.3.3. Ensure that safety equipment and protective clothing is kept clean and maintained.
1.25.4. Develop protective equipment usage procedures and ensure that procedures are strictly followed by site personnel; include following procedures as minimum:
1.25.4.1. Ensure industrial protective headwear is of appropriate CSA Standard and meets other appropriate standards.
1.25.4.2. Ensure high-visibility safety apparel is of appropriate CSA Standard and meets other appropriate standards.
1.25.4.3. Ensure protective footwear is of appropriate CSA Standard and meets other appropriate standards.
1.25.4.4. Dispose of or decontaminate PPE worn onsite at end of each workday.
1.25.4.5. Decontaminate reusable PPE before reissuing.
1.25.4.6. Ensure site personnel have passed respirator fit test prior to entering potentially volatile contaminated work areas, as appropriate.
1.25.4.7. Ensure facial hair does not interfere with proper respirator fit.
1.25.5. Respiratory Protection:
1.25.5.1. Provide site personnel with extensive training in usage and limitations of, and qualitative fit testing for, air purifying and supplied-air respirators in accordance with specified regulations.
1.25.5.2. Develop, implement, and maintain respirator program.
1.25.5.3. Monitor, evaluate, and provide respiratory protection for site personnel.
1.25.5.4. Ensure levels of protection as listed have been chosen consistent with site-specific potential airborne hazards associated with major contaminants identified onsite.
1.25.5.5. In absence of additional air monitoring information or substance identification, retain an industrial hygiene specialist to determine minimum levels of respiratory protection required.
1.25.5.6. Immediately notify Departmental Representative when level of respiratory protection required increases.
1.25.5.7. Ensure appropriate respiratory protection during Work activities. As minimum requirement, ensure that persons entering potentially contaminated work areas are supplied with and use appropriate respiratory protection.
1.25.6. Heat Stress/Cold Stress: implement heat stress or cold stress monitoring program as applicable and include in site-specific Health and Safety Plan.

1.25.7. Personnel Hygiene and Personnel Decontamination Procedures. Provide minimum as follows:
1.25.7.1. Suitable containers for storage and disposal of used disposable PPE.
1.25.7.2. Potable water and suitable sanitation facility.
1.25.8. Emergency and First-Aid Equipment:
1.25.8.1. Locate and maintain emergency and first-aid equipment in appropriate location onsite including first-aid kit to accommodate number of site personnel; portable emergency eye wash; two 9 kg ABC type dry chemical fire extinguishers.
1.25.9. Site Communications:
1.25.9.1. Identify, supply and implement appropriate dedicated communication devices for Site and post emergency numbers near dedicated devices.
1.25.9.2. Ensure personnel use of "buddy" system and develop hand signal system appropriate for site activities.
1.25.9.3. Provide employee alarm system to notify employees of site emergency situations or to stop Work activities if necessary.
1.25.9.4. Furnish selected personnel with 2-way radios.
1.25.9.5. Safety Meetings: conduct mandatory daily safety meetings for personnel, and additionally as required by special or Work-related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Hold additional safety meetings on as-needed basis.

2. PART 2 - PRODUCTS

2.1. Not Used
2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used
3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Non-Contaminated Soil Transport and Disposal will be paid in accordance with unit rate price established for weight of material disposed. Measurement as recorded on weigh scale certified by Measurement Canada and results provided to Departmental Representative on Certificates of Disposal. Includes Treatment or any other processing of material required by Disposal Facility but not required by the Contract.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Environmental Protection Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit a plan detailing protection of the environment. Include:

1.3.1.1. Comprehensive overview of known or potential environmental issues to be addressed during Work.

1.3.1.2. Identify requirements that plan complies with. Includes: permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract.

1.3.1.3. Names and qualifications of persons responsible for ensuring adherence to Environmental Protection Plan.

1.3.1.4. Names and qualifications of persons responsible for manifesting material to be removed from Site.

1.3.1.5. Names and qualifications of persons responsible for training Site personnel.

1.3.1.6. Description of Environmental Protection personnel training program.

1.3.1.7. Communications identifying emergency contact list and conditions for implementing emergency contact. Emergency contact to include: Contractor emergency response team including Superintendent; Departmental Representative and alternate, and other contractor(s) and individuals as directed by the Departmental Representative; and federal, provincial, and municipal emergency contacts.

1.3.1.8. Work Area showing proposed activity in each portion of areas, such as exclusion zone(s), decontamination zone(s) and clean zone(s), and identifying areas of limited use or non-use. Ensure plan includes measures for marking limits of use areas and methods for protection of features to be preserved within authorized Work areas.

1.3.1.9. Drawings showing locations of proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials onsite.

1.3.1.10. Historical, Archaeological, Cultural Resources, Biological Resources and Valued Habitat Protection that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and valued habitat. Include procedures if previously unknown historical, archaeological, cultural, and biological resources are discovered during Work. Includes Species At Risk.

1.3.1.11. Non-Contaminated Soil and Water Management including onsite handling to manage Solid Waste, Sewage, and Wastewater.

1.3.1.12. Non-Contaminated Soil Transport and Disposal including transportation frequency and identifying offsite disposal facilities to manage Solid Waste.

1.3.1.13. Traffic Control including signage and traffic control personnel for Site ingress and egress. Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Ensure plans include measures to prevent mud transported onto public roads by vehicles or runoff, and mitigation measures if mud is transported onto public roads by vehicles or runoff. Vehicles and vehicle traffic must comply with all federal, provincial, and municipal laws and regulations.

1.3.1.14. Noise Control identifying methods, means, and sequences for preventing, monitoring, and controlling noise for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include thresholds and procedures if: noise does not comply with appropriate levels, or if there are public complaints.

1.3.1.15. Vibration Control identifying methods, means, and sequences for preventing, monitoring, and controlling vibration for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include thresholds and procedures if: vibration does not comply with appropriate levels, there are public complaints, or if onsite or offsite damage occurs.

1.3.1.16. Vapours, Dust, and Particulate Control identifying methods, means, and sequences for preventing, monitoring, and controlling vapours, dust and other airborne particulates for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include thresholds and procedures if: vapours, dust, and particulates do not comply with appropriate levels, there are public complaints, or if onsite or offsite damage occurs.

1.3.1.17. Contamination Prevention Plan identifying hazardous, deleterious or regulated substances to be used onsite; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with federal, provincial, and municipal laws and regulations for storage and handling of these materials.

1.3.1.18. Air Pollution Control Plan detailing provisions to assure that contaminants, dust, debris, materials, and trash, are contained onsite. Include procedures, in accordance with the Contract, if air pollution does not comply with appropriate levels, there are public complaints, or if onsite or offsite damage occurs.

1.3.1.19. Non-Contaminated Material Disposal Plan identifying methods and locations for solid waste disposal including clearing waste. Include name, location, provincial or territorial authorizations, and evidence of compliance with municipal zoning and bylaws of Landfill.

1.3.1.20. Wastewater Management Plan identifying methods and procedures for management and discharge of Contaminated and Non-Contaminated Water including surface waters and wastewater which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of groundwater, disinfection water, hydrostatic test water, and water used in flushing of lines. Include method of treatment and disposal.

1.3.1.21. Wastewater Disposal Plan identifying methods and locations for solid waste disposal including clearing waste. Include name, location, provincial or territorial authorizations, and evidence of compliance with Municipal zoning and bylaws of Disposal Facility and/or copy of municipal permit to discharge to sewer system

1.3.1.22. Spill Control identifying methods, means, and sequences for preventing, monitoring, and controlling spills for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Identify reporting requirements for spills. Identify locations and contents of spill kits.

1.3.1.23. Erosion and Sediment Control identifying methods, means, and sequences for preventing, monitoring, and controlling erosion and sedimentation for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract.

1.3.1.24. Work in or Adjacent to Waterways Control, as required, identifying methods, means, and sequences for preventing, monitoring, and controlling work in or adjacent to waterways for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract.

1.3.2. Submit amended Environmental Protection Plan if there changes to the assumed site conditions, changes to the Work procedures, or in the event that any methods and procedures are inadequate as directed by the Departmental Representative.

1.3.3. Submit Spill and Response Report for all Spills. Include: description of spill (location, time, quantity and quality), notifications (including copies of any reports forwarded to regulatory agencies), and describe any remediation

activities (time, quantity, quality, and fate of spill impacted material). Include environmental analytical results for spill or other environmental testing.

1.3.4. After hours work: at least 5 Working Days prior to commencing after hours work Submit a schedule showing requested dates, times, and reasons for after hours work. Approval will only be granted for reasons valid, if request can be reasonably accommodated by other contractors and Site users, and third parties are not adversely affected, in the sole opinion of the Departmental Representative.

1.3.5. Pollution Control Procedures Modification: immediately when pollution control procedures are inadequate, as instructed by the Departmental Representative, Submit modified procedures to resolve problem.

1.3.6. Pollution Control Remediation: immediately when soil, sediment or water contaminated by Contractor's activities are inadequate as instructed by the Departmental Representative, Submit remediation procedures.

1.4. Fires

1.4.1. Fires and burning of rubbish onsite not permitted.

1.5. Cleaning

1.5.1. Maintain cleanliness of Work and surrounding Site to comply with federal, provincial, and municipal fire and safety laws, ordinances, codes, and regulations applicable to the performance of the Work.

1.5.2. Coordinate cleaning operations with disposal operations to prevent accumulation of dust, dirt, debris, rubbish, and waste materials.

1.5.3. Ensure cleanup of the Work areas each day after Final Completion of Work.

1.6. Site Clearing and Plant Protection

1.6.1. Minimize stripping of Topsoil and vegetation. Use existing trails, roads or cut lines wherever possible to avoid disturbance to the riparian vegetation and prevent soil compaction.

1.6.2. Restrict tree and plant removal to areas in accordance with the Contract or as directed by the Departmental Representative. To greatest extent practicable, prune or top the vegetation instead of grubbing/uprooting. Protect all other trees and plants onsite and offsite.

1.6.3. Salvage all trees and plants to be removed in accordance with the Contract or as directed by the Departmental Representative.

1.6.4. Wrap salvaged trees in burlap, trees and shrubs adjacent to construction Work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.

1.6.5. Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

1.6.6. Minimize the removal of natural woody debris, rocks, sand or other materials from the banks, the shoreline or the bed of the waterbody below the ordinary high water mark. If material is removed from the waterbody, set it aside and return it to the original location once construction activities are completed.

1.6.7. Immediately stabilize shoreline or banks disturbed by any activity associated with the project to prevent erosion and/or sedimentation, preferably through re-vegetation with native species suitable for the site.

1.6.8. Restore bed and banks of the waterbody to their original contour and gradient; if the original gradient cannot be restored due to instability, a stable gradient that does not obstruct fish passage should be restored.

1.6.9. If replacement rock reinforcement/armouring is required to stabilize eroding or exposed areas, then ensure that appropriately-sized, clean rock is used; and that rock is installed at a similar slope to maintain a uniform bank/shoreline and natural stream/shoreline alignment.

1.7. Species At Risk

1.7.1. Protect all Species At Risk as identified in federal, provincial, and municipal laws and regulations.

1.7.2. Modify Work procedures, including stopping Work, as instructed by a Qualified Professional or Departmental Representative to protect Species At Risk.

1.8. Non-Contaminated Soil and Water Management

1.8.1. Solid waste

1.8.1.1. Remove all Non-Contaminated Soil within Work areas in accordance with the Contract and as directed by the Departmental Representative.

1.8.1.2. Assume ownership of, and be responsible for, Non-Contaminated Material once it is loaded on a vehicle, barge, or other vessel for transport offsite.

1.8.1.3. Remove surplus materials and temporary facilities from Site.

1.8.1.4. Dispose of waste offsite.

1.8.1.5. Do not burn or bury any waste onsite.

1.8.1.6. Do not discharge wastes into streams or waterways.

1.8.1.7. Do not dispose of volatile or hazardous materials such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

1.8.1.8. Dispose of all Non-Contaminated Soil at a Landfill Facility.

1.8.2. Sewage

1.8.2.1. Store Sewage from toilet facilities with wastewater from handbasins, and/or showers, for ultimate disposal.

1.8.2.2. Provide, operate, and maintain Sewage storage tanks to store Sewage Wastewater.

1.8.2.3. Transport and dispose of Sewage at a Disposal Facility, or discharge to municipal sanitary sewer system in compliance with Municipal requirements, as accepted by Departmental Representative.

1.8.2.4. Discharges: comply with applicable discharge limitations and requirements; do not discharge Sewage to Site sewer systems that do not conform to or are

in violation of such limitations or requirements; and obtain approval prior to discharge of Sewage.

1.8.3. Wastewater

1.8.3.1. Dewater various parts of Work including, excavations, structures, foundations, and Work areas, unless otherwise specified or directed by Departmental Representative.

1.8.3.2. Employ construction methods, plant procedures, and precautions that ensure Work, including excavations, are stable, free from disturbance, and dry.

1.8.3.3. Direct surface waters that have not contacted potentially Contaminated Soils to surface drainage systems.

1.8.3.4. Control surface drainage including ensuring that gutters are kept open, wastewater is not allowed across or over pavements or sidewalks except through accepted pipes or properly constructed troughs, and runoff from unstabilized areas is intercepted and diverted to suitable outlet.

1.8.3.5. Dispose of Wastewater in manner not injurious to public health or safety, to the environment, to onsite or offsite property, or to any part of Work completed or under construction.

1.8.3.6. Control disposal or runoff of Wastewater containing suspended materials or other harmful substances in accordance with local authority requirements.

1.8.3.7. Ensure pumped Wastewater into waterways, sewer or drainage systems is free of suspended materials. Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

1.8.3.8. Obtain permits to discharge Wastewater to environment or municipal system (sewer, ditches).

1.8.3.9. Do not discharge water which may have come in contact with potentially Contaminated Soil or otherwise be Contaminated directly offsite to the environment or to municipal system.

1.9. Non-Contaminated Soil Transport and Disposal

1.9.1. Assume ownership of, and be responsible for, Non-Contaminated Soil once it is loaded on a vehicle, barge, or other vessel for Transport. Assume ownership of, and be responsible for, Non-Contaminated Soil Disposed.

1.9.2. Transport material as soon as practical; do not unreasonably stockpile onsite.

1.9.3. Cover material while being transported to prevent release of airborne dust, vapours, or odours, and to prevent saturation and leachate generation from material.

1.9.4. Excess water in material must not be allowed to flow out of vehicle or vessel during transport.

1.9.5. Stabilize material as necessary.

1.9.6. All vehicles, vessels and operators must be appropriately licensed and equipped to transport Non-Contaminated Soil.

1.9.7. Barges must be inspected by an independent Marine Surveyor.

1.9.8. Non-Contaminated Soil Disposal: dispose all Non-Contaminated Soil, at Landfill Facility provided by Contractor and accepted by the Departmental Representative.
1.9.9. Landfill Facility must:
1.9.9.1. Be an existing offsite facility located in British Columbia or the Yukon.
1.9.9.2. Be designed, constructed and operated to prevent any pollution from being caused by the facility outside the area of the facility from waste placed in or on land within the facility.
1.9.9.3. Hold a valid and subsisting permit, certificate, approval, license, or other required form of authorization issued by the BC government or the Yukon government, as appropriate, for the Disposal of relevant Non-Contaminated Soil.
1.9.9.4. Comply with the BC Environmental Management Act and BC Landfill Criteria for Municipal Solid Waste, or Yukon Environment Act and Yukon Solid Waste Regulations, as appropriate.
1.9.9.5. Comply with applicable municipal zoning, bylaws, and other applicable requirements.
1.9.10. Dispose material as soon as practical and within 100 Working Days of leaving Site or as required by Contract unless otherwise accepted by Departmental Representative.
1.9.11. Material sent to a Landfill Facility must be permanently stored at that facility.
1.9.12. If proposed Landfill Facility is not acceptable to Departmental Representative, provide an alternate Landfill Facility that is acceptable.

1.10. Traffic Control

1.10.1. Ensure pedestrians have safe and unencumbered access in public areas. Provide traffic control personnel as required or as directed by Departmental Representative.
1.10.2. Comply with requirements of acts, regulations and bylaws 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.
1.10.3. Comply with current version of BC Ministry of Transportation and Infrastructure Traffic Control Manual for Work on Roadways.
1.10.4. Provide and maintain road access and egress to property fronting Site and in other areas in accordance with the Contract, except where other means of road access exist that are accepted.
1.10.5. Prevent tracking or spilling of debris or material onto public roads.
1.10.6. Immediately sweep or scrape up debris or material on public roads.
1.10.7. Clean public roads within a minimum 200 m radius of the Site entrance at least once per shift, or as directed by Departmental Representative.

1.11. Noise Control

1.11.1. Maintain acceptable noise levels not injurious or objectionable to public health or safety or to the environment.

1.11.2. Comply with applicable municipal noise bylaws and other applicable requirements unless otherwise specified or directed by Departmental Representative.
1.11.3. Obtain consent from Departmental Representative for all after hours Work, including weekends and holidays.
1.11.3.1. Proceed only as directed by the Departmental Representative.

1.12. Vibration Control
1.12.1. Maintain acceptable vibration levels not injurious to public health or safety, to the environment, to onsite or offsite property, or to any part of Work completed or under construction.

1.13. Vapours, Dust and Particulate Control
1.13.1. Execute Work by methods to minimize releasing vapours or raising dust from construction operations.
1.13.2. Implement and maintain vapours, dust and particulate control measures immediately as directed by the Departmental Representative during Work and in accordance with regulations and in accordance with the Contract.
1.13.3. Prevent vapours and fugitive dust from the Site from interfering with onsite and offsite uses.
1.13.4. Prevent vapours and dust from spreading to neighbouring properties.
1.13.5. Cover or wet down dry materials and rubbish to prevent vapours and blowing dust and debris. Provide dust control for temporary roads, excavations, and stockpiles.
1.13.6. Provide positive means to prevent vapours and airborne dust from dispersing into atmosphere. Use fresh (non-saline) water for dust and particulate control.
1.13.7. As minimum, use appropriate covers on vehicles, including trucks, barges, and trains, hauling vapour-generating or fine or dusty material. Use watertight vehicles to haul wet materials.
1.13.8. Inadequate procedures:
1.13.8.1. Stop relevant Work if dust and particulate control is not sufficient for controlling dusts and particulates into atmosphere, or when monitoring indicates that dust or particulate levels equal or exceed regulated or levels in accordance with the Contract.
1.13.8.2. Submit procedures proposed to resolve problem.
1.13.8.3. Make necessary changes to operations prior to resuming excavation, handling, processing, or other Work that can cause release of dusts or particulates.
1.13.8.4. Departmental Representative can stop relevant Work at any time when Contractor's Work procedures are inadequate to prevent release of dusts or particulates, or when monitoring indicates that dust or particulate levels equal or exceed regulated or levels in accordance with the Contract. Do not proceed with stopped Work until corrections accepted by Departmental Representative.

1.14. Spill Control

1.14.1. Pollution includes spills or other releases from Contractor's activities that could potentially contaminate soil, sediment, water, and atmosphere from discharge of hazardous, deleterious or regulated substances, including from equipment and material handling.

1.14.2. Prevent spills or releases.

1.14.3. Provide sequence, methods and means, and facilities to prevent spills or releases.

1.14.3.1. Maintain temporary erosion and pollution control features.

1.14.3.2. Do not store fuel onsite other than tanks forming part of the equipment.

1.14.3.3. Plan activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, poured concrete or other chemicals do not enter the watercourse.

1.14.3.4. Control emissions from equipment and plant to meet applicable authorities' emission requirements.

1.14.3.5. Contractor to regularly inspect all machinery on the Site to ensure it is in good repair and free of leaks.

1.14.4. Inadequate procedures:

1.14.4.1. Stop relevant Work if procedures are inadequate to prevent spills or other releases, or when monitoring indicates that release equals or exceeds regulated or levels in accordance with the Contract.

1.14.4.2. Submit procedures proposed to resolve problem.

1.14.4.3. Make necessary changes to operations prior to resuming excavation, handling, processing, or other Work that can cause spills or other releases.

1.14.4.4. Departmental Representative can stop relevant Work at any time when Contractor's Work procedures are inadequate to prevent spills or other releases, or when monitoring indicates that release equals or exceeds regulated quantities or levels in accordance with the Contract. Do not proceed with stopped Work until corrections accepted by Departmental Representative.

1.14.5. Be prepared to intercept, cleanup, and dispose of spills or other releases that can occur whether on land or water.

1.14.6. Spill kits and containment are to be maintained onsite and ready for deployment in the event of spills or other releases.

1.14.6.1. Spill kits are to include sufficient quantities of absorbent material, containers, booms, shovels and other tools, and personal protective equipment.

1.14.6.2. Spill response materials must be compatible with type of equipment being used or type of material being handled.

1.14.6.3. Spill kits are to be in close proximity to machinery.

1.14.6.4. During the Work there are to be trained and qualified personnel available that are ready to deploy spill kits when necessary.

1.14.7. Take immediate action using available resources to contain and mitigate effects on environment and persons from spill or release.

1.14.8. Promptly report spills and releases potentially causing damage to environment to:

1.14.8.1. Authority having jurisdiction or interest in spill or other release including conservation authority, water supply authorities, drainage authority, road authority, and fire department.

1.14.8.2. Contractor emergency response team including Superintendent

1.14.8.3. Departmental Representative and other contractor(s) and individuals as directed by the Departmental Representative.

1.14.9. Departmental Representative can collect samples for chemical analyses prior to, during, and upon Final Completion of Work to monitor potential pollution caused by Contractor's activities. Assist Departmental Representative in collection of samples.

1.14.10. Remediation of soil, sediment or water contaminated by Contractor's activities.

1.14.10.1. Remediate all soil, sediment or water contaminated by Contractor's activities associated with the Work onsite and offsite.

1.14.10.2. Remediation includes excavation, pumping, testing, transport, treatment and disposal as appropriate for the type of contamination incurred, and at a minimum in accordance with the Contract.

1.14.10.3. Submit procedures for remediating soil, sediment or water contaminated by Contractor's activities.

1.14.10.4. Remediate as directed by the Departmental Representative.

1.14.10.5. Contractor is responsible for any additional investigation, testing, and assessments required as acceptable to the Departmental Representative.

1.15. Erosion and Sediment Control

1.15.1. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas, from stockpiles, staging areas, and other Work areas. Prevent erosion and sedimentation.

1.15.2. Minimize amount of bare soil or sediment exposed at one time. Stabilize disturbed soil or sediment as quickly as practical. Strip vegetation, regrade, or otherwise develop to minimize erosion. Remove accumulated sediment resulting from construction activity from adjoining surfaces, drainage systems, and water courses, and repair damage caused by soil erosion and sedimentation as directed by the Departmental Representative.

1.15.3. Provide and maintain temporary erosion and sediment control measures.

1.15.3.1. Temporary erosion and sediment control measures are required to prevent erosion and migration of silt, mud, sediment, and other debris offsite or to other areas of Site where damage might result, or that might otherwise be required by laws and regulations.

1.15.3.2. Temporary erosion and sediment control measures include: silt fences, hay or straw bales, ditches, geotextiles, drains, berms, terracing, riprap, temporary drainage piping, vegetative cover, dikes, mulching, sediment traps, detention and retention basins, grading, planting, retaining walls, culverts, pipes, guardrails, temporary roads, and other measures appropriate to specific

condition. Also includes isolation measures (e.g., silt boom or silt curtain) for containing suspended sediment where in-water work is required (e.g., dredging, underwater cable installation).

1.15.3.3. Place silt fences and/or hay or straw bales in ditches to prevent sediment from escaping from ditch terminations.

1.15.3.4. Unless directed by the Departmental Representative, remove temporary erosion and sediment control devices upon Final Completion of Work. Temporary erosion and sediment control devices once removed become property of Contractor.

1.15.4. Whenever sedimentation is caused by stripping vegetation, regrading, or other development, remove it from adjoining surfaces, drainage systems, and watercourses, and repair damage as quickly as possible.

1.15.5. Construct fill areas to prevent erosion. Contain and stabilize waste material (e.g., dredging spoils, construction waste and materials, commercial logging waste, uprooted or cut aquatic plants, accumulated debris) above the high water mark of nearby waterbodies to prevent re-entry.

1.15.6. Do not disturb existing embankments or embankment protection in accordance with the Contract.

1.15.7. Inspect regularly, maintain, and repair erosion and sediment control measures and structures during the course of construction. Check erosion and sediment control measures weekly after each rainfall; during prolonged rainfall check daily. Erosion and sediment control measures must remain in place and in operation as necessary or until otherwise directed by the Departmental Representative.

1.15.8. If soil, sediment and debris from Site accumulate in low areas, storm sewers, roadways, gutters, ditches, or other areas where it is undesirable, remove accumulation and restore area to original condition, as directed by the Departmental Representative.

1.16. Work In or Adjacent to Waterways

1.16.1. Approvals and Practices:

1.16.1.1. Obtain Discharge Approval prior to commencing work which may impact waterways.

1.16.1.2. As required, comply with Fisheries Act Authorization and other relevant authorizations and in accordance with the Contract.

1.16.1.3. Follow practices described in Fisheries and Oceans Canada (September 1993) Land Development Guidelines for the Protection of Aquatic Habitat.

1.16.1.4. Follow practices described in BC Ministry of Environment (March 2004) Standards and Best Practices for Instream Works.

1.16.2. Timing

1.16.2.1. Time work in water to respect timing windows to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed.

1.16.2.2. Minimize duration of in-water work.

1.16.2.3. Conduct instream work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows.

1.16.2.4. Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.

1.16.3. Site Selection

1.16.3.1. Design and plan activities and works in wetland and waterbody such that loss or disturbance to aquatic habitat is minimized and sensitive spawning habitats are avoided.

1.16.3.2. Design and construct approaches to wetland and waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation.

1.16.3.3. Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the stream bed or the built structures.

1.16.3.4. Undertake all instream activities in isolation of open or flowing water to maintain the natural flow of water downstream and avoid introducing sediment into the watercourse.

1.16.4. Aquatic Life Protection

1.16.4.1. Ensure that all in-water activities, or associated in-water structures, do not interfere with aquatic life passage, constrict the channel width, or reduce flows.

1.16.4.2. Retain a Qualified Professional to ensure applicable permits for relocating fish are obtained and to capture any fish trapped within an isolated/enclosed area at the work site and safely relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the site.

1.16.4.3. Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish. Entrainment occurs when a fish is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself.

1.16.4.4. Avoid using explosives in or near water. Use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs. Blasting vibrations may also kill or damage fish eggs or larvae.

1.16.5. Operation of Machinery

1.16.5.1. Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.

1.16.5.2. Whenever possible, operate machinery on land above the high water mark, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody.

1.16.5.3. Limit machinery fording of the watercourse to a one-time event (ie over and back), and only if no alternative crossing method is available. If repeated

crossings of the watercourse are required, construct a temporary crossing structure.

1.16.5.4. Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (eg dominated by organic materials and silts) banks and beds. For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (eg swamp mats, pads) if minor rutting is likely to occur during fording.

1.16.5.5. Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Permits: at least 10 Working Days prior to mobilization to Site, Submit copies of all permits, certificates, approvals, or any other form of authorizations and all reporting required.

1.4. Laws, Regulations, Permits

1.4.1. Generally, provincial, territorial and municipal laws, regulations, bylaws and other requirements do not apply to federal lands, works or undertakings. Soil, sediment, water or other materials that are removed from federal lands may become subject to provincial, territorial or municipal laws and regulations.

1.4.2. Provincial, territorial or municipal standards may be used in relation to federal lands only as guidelines for the purpose of establishing remediation goals and objectives. The term "standards" is used in this part in order to maintain consistency in terminology throughout this document, and does not imply that standards contained in provincial, territorial or municipal laws and regulations apply on Federal lands, activities or undertakings.

1.4.3. Comply with certificates, licenses and other permits enforced at the location concerned required by regulatory federal, provincial, territorial or municipal authorities to complete the Work that have already been obtained.

1.4.4. Obtain and pay for certificates, licenses and other permits enforced at the location concerned required by regulatory federal, provincial, territorial or municipal authorities to complete the Work that have not already been obtained or that are required to be amended.

1.4.5. Provide applicable authorities with plans and information required for issue of acceptance certificates.

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

1.5. Codes, Bylaws, Standards

1.5.1. Meet or exceed requirements of Contract, standards, and codes applicable to the performance of the Work and referenced documents.

1.5.2. In any case of conflict or discrepancy, the most stringent requirements will apply.

1.5.3. Perform Work in accordance with the National Building Code of Canada (NBC), and other requirements or codes in accordance with the Contract, construction

standards and/or any other code or bylaw applicable to the performance of the Work.

1.5.4. Certificates, licenses and other permits enforced at the location concerned required by regulatory federal, provincial, territorial or municipal authorities to complete the Work: see 01 11 00.

1.5.5. Comply with all attachments, references, and reports relevant to Work, including environmental protection.

1.6. Smoking Environment

1.6.1. Smoking on the Site is not permitted.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used

3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Site Facilities - Provision will be paid in accordance with lump sum price established to design, temporarily provide for duration of Work, and erect all infrastructure in accordance with the Contract. Includes temporary structures and facilities, environmental protection, stockpile areas, access, onsite roadways, temporary hoarding, security fencing, federal signage, office facilities, sanitary facilities, stormwater management infrastructure, lighting, and utilities.

1.1.2. Site Facilities - Operation will be paid in accordance with unit rate price established to operate and maintain all infrastructure between mobilization and demobilization. Includes temporary structures and facilities, environmental protection, stockpile areas, access, onsite roadways, temporary hoarding, security fencing, federal signage, office facilities, sanitary facilities, stormwater management infrastructure, lighting, and utilities. Also includes ongoing services including administration, overhead, project management, security, surveying, noise monitoring, vibration monitoring, utilities, project meetings, inspections, progress Submittals, traffic control, health and safety, Environmental Protection cleaning, and operation during inclement weather. Also, includes living out allowances, travel and room and board.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Site Layout: within 10 Working Days after Contract award and prior to mobilization to Site, Submit Site Layout drawings showing existing conditions and facilities, construction facilities and temporary controls provided by Contractor. Include:

1.3.1.1. Equipment and personnel decontamination areas.

1.3.1.2. Means of ingress, egress and temporary traffic control.

1.3.1.3. Equipment and material staging areas.

1.3.1.4. Stockpile areas and construction details, including base preparation and water control features.

1.3.1.5. Exclusion areas, contaminant handling areas, and other areas identified in Contractor's site-specific Health and Safety Plan and Environmental Protection Plan.

1.3.1.6. Grading, including contours, required to construct temporary facilities.

1.3.1.7. Location of all temporary facilities including: Onsite Contaminated Water Treatment Plant, truck wash and decontamination units, office trailers, modular camp structures, parking, storage, environmental monitoring stations, above ground and underground utilities, roads, and other temporary facilities.

1.3.2. Signs: at least 5 Working Days prior to posting, Submit any signs viewable by public.

1.4. Utilities

1.4.1. Utilities not identified as being available on Site must be supplied at the Contractor's expense

1.4.2. Power is available at existing Site but the cost to connect is at the Contractor's expense.

1.4.3. Water supply is not available at existing Site and must be supplied at the Contractor's expense.

1.5. Fire Protection

1.5.1. Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.

1.6. Access and Delivery

1.6.1. Only the designated entrance in accordance with the Contract can be used for access to Site.

1.6.1.1. Maintain for duration of Contract.

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

1.6.2. Use of the Site will be granted to the Contractor through the Departmental Representative.

1.7. Installation and Removal

1.7.1. 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.

1.7.2. Identify areas which have to be graveled or otherwise treated to prevent tracking of mud.

1.7.3. Indicate use of supplemental or other staging area.

1.7.4. Provide construction facilities in order to execute work expeditiously.

1.7.5. Provide temporary utilities in order to execute Work expeditiously.

1.7.6. Remove from Site all such Work after use.

1.8. Site Storage/Loading

1.8.1. Confine work and operations of employees in accordance with the Contract. Do not unreasonably encumber premises with products.

1.8.2. Storage space must be limited to the Site.

1.8.3. Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.9. Construction Parking

1.9.1. Parking of private vehicles will not be permitted on Site.

1.9.2. Provide and maintain adequate access to project site.

1.10. Security

1.10.1. Be responsible for security of site and contents of site after working hours and during holidays. Provide onsite security personnel as appropriate and in accordance with the Contract.

1.10.2. Control access to Site and maintain a log of all personnel onsite. No non-Work visitors allowed without prior written consent of Departmental Representative.

1.11. Equipment, Tools and Materials Storage

1.11.1. Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

1.11.2. Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.12. Sanitary Facilities

1.12.1. Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

1.12.2. Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.13. Construction Signage

1.13.1. Provide and erect 2 project signs within 10 Working Days of mobilization in a location designated by Departmental Representative. Project signs to include: name of project, name of Client, information contact number in both official languages using graphic symbols to CAN/CSA-Z321. Project signs to be a minimum of 1200 x 2400mm unless otherwise directed by Departmental Representative

1.13.2. Contractor signage must be approved by Departmental Representative.

1.13.3. 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.

1.14. Protection and Maintenance of Traffic

1.14.1. Provide access and temporary relocated roads as necessary to maintain traffic.

1.14.2. Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

1.14.3. 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.

1.14.4. Protect travelling public from damage to person and property.

1.14.5. Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

1.14.6. Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
1.14.7. Construct access and haul roads necessary.
1.14.8. Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic must be avoided.
1.14.9. Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
1.14.10. Dust control: adequate to ensure safe operation at all times.
1.14.11. Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
1.14.12. Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
1.14.13. Provide snow removal during period of Work.
1.14.14. Remove, upon completion of work, haul roads designated by Departmental Representative.

1.15. Truck Wash and Decontamination Units

1.15.1. Operate the existing truck wash.
1.15.1.1. No vehicles which have come in contact with Contaminated Soil must leave the Site without passing through the truck wash.
1.15.1.2. The truck wash must provide, at a minimum, the ability to wash truck tires and load boxes to a minimum height of 1.7 m.
1.15.1.3. Truck wash must have a solid separation tank and all solids collected must be classified as Contaminated Soil and disposed of at a Disposal Facility.
1.15.1.4. Recycle or treat as Contaminated Water truck wash water.
1.15.2. Supply personnel decontamination units (minimum of 2) for use by hazardous material, testing and inspection personnel working in areas of hazardous materials and for general clean-up of personal protective equipment to remove Contaminated Soil. Provide decontamination units for work force
1.15.2.1. At least one personnel decontamination unit must have overhead shower capability.
1.15.2.2. The personnel decontamination units to be available to Departmental Representative and their consultants.
1.15.2.3. The personnel decontamination units are subject to acceptance of Departmental Representative.
1.15.3. The truck wash and personnel decontamination units must be maintained in good working order during onsite Work.
1.15.4. The truck wash must be emptied and cleaned during Site Decommissioning. This includes disposing of the wastewater offsite and removing sediments from the truck wash and piling onsite at the direction of the Departmental Representative.

1.16. Clean-Up

1.16.1. Remove construction debris, waste materials, packaging material from work site daily.
1.16.2. Clean dirt or mud tracked onto paved or surfaced roadways.
1.16.3. Store materials resulting from demolition activities that are salvageable.
1.16.4. Stack stored new or salvaged material not in construction facilities.

1.17. Storage Tanks
1.17.1. Abide by the Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations for stored petroleum products and allied petroleum products tank system located on federal or Aboriginal land, or within federal jurisdiction as described in the regulations.
1.17.2. Temporary storage tanks subject to the regulations must be registered with Environment Canada.
1.17.3. Mobile tanks subject to the regulations must be certified to be mobile.
1.17.4. Storage tanks to meet the following minimum requirements:
1.17.4.1. Corrosion protection.
1.17.4.2. Secondary containment.
1.17.4.3. Containment sumps, if applicable.
1.17.4.4. Overfill protection.
1.17.5. All components of tank system must bear certification marks indicating that they conform to the standards set out in the regulations.
1.17.6. Product transfer area must be designed to contain spills.
1.17.7. Prepare an emergency plan.
1.17.8. Prior to first filling, storage tanks must:
1.17.8.1. Be registered.
1.17.8.2. Be certified and marked.
1.17.8.3. Transfer area be constructed.
1.17.8.4. Emergency plan in place.

2. PART 2 - PRODUCTS

2.1. Not Used
2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used
3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Not Used.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Product Instructions: at least 10 Working Days before Substantial Performance of the Work is completed, Submit instructions and data by personnel experienced in maintenance and operation of products and equipment constructed and remaining onsite, if required.

1.3.2. Closeout Documents: within 20 Working Days of Final Completion of Site Restoration, Submit completion documents and as-built documents.

1.4. Completion Documents

1.4.1. Submit as directed by the Departmental Representative, a written certificate that the following have been performed:

1.4.1.1. Work has been completed and inspected by the Departmental Representative in accordance with the Contract.

1.4.1.2. Treatment and disposal of treatable soils have been completed and disposal of all other soils has been completed.

1.4.1.3. Damage has been repaired, deficiencies have been completed, missing items have been provided, and non-conformance has been corrected, in the opinion of the Departmental Representative.

1.4.1.4. Equipment and systems have been tested, adjusted and balanced, and are fully operational, as applicable.

1.4.1.5. Certificates required by the Fire Commissioner of Canada, and utility companies have been submitted, as applicable.

1.4.1.6. Operation of systems has been demonstrated to the personnel as directed by the Departmental Representative, as applicable.

1.4.1.7. Qualified Professional report documenting backfilling has met all requirements of the Contract.

1.4.1.8. Work is complete and ready for Final Site Inspection.

1.4.2. Defective products will be rejected, regardless of previous inspections. Replace defective products.

1.4.3. Prepare all documentation required as part of any permits or other authorizations obtained or otherwise the responsibility of the Contractor.

2. PART 2 - PRODUCTS

2.1. Not Used
2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used
3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Excavation will be paid in accordance with unit rate price established for volume of material removed to excavate to Contaminated Soil Extents according to Drawings. Measurement as recorded insitu Excavation volume of final Contaminated Soil Extents and overlying incidental material as Field Surveyed by Departmental Representative. Insitu volume is simple dimensions of excavation and does not consider exsitu bulking (expansion or swell) and insitu compaction (densifying) factors. Includes all onsite handling, loading, hauling, unloading and stockpiling. Material to be stockpiled within work area as directed by Departmental Representative.

1.1.2. Backfill–Imported will be paid in accordance with unit rate price established per weight for material imported for Backfill for Excavation. Measurement as recorded on weigh scale certified by Measurement Canada and results provided to Departmental Representative. Includes Contractor's analytical testing and inspections to demonstrate compliance with Contract, provision, all onsite and offsite handling, loading, hauling, unloading, placing, grading and compacting.

1.1.3. Backfill–Overburden will be paid in accordance with unit rate price established for volume of Overburden material suitable for reuse as Backfill for Excavation. Measurement as recorded insitu Excavation volume of final Contaminated Soil Extents and overlying incidental material as Field Surveyed by Departmental Representative. Insitu volume is simple dimensions of excavation and does not consider exsitu bulking (expansion or swell) and insitu compaction (densifying) factors. Includes all onsite handling, loading, hauling, unloading and stockpiling. Material to be stockpiled within work area as directed by Departmental Representative.

1.1.4. Backfill–Owner Supplied will be paid in accordance with unit rate price established for volume of material supplied by PWGSC from sources according to Drawings for Backfill for Excavation. Measurement as recorded insitu Excavation volume of final Contaminated Soil Extents and overlying incidental material as Field Surveyed by Departmental Representative. Insitu volume is simple dimensions of excavation and does not consider exsitu bulking (expansion or swell) and insitu compaction (densifying) factors. Includes all onsite and offsite handling, loading, hauling, unloading and stockpiling. Material to be stockpiled within work area as directed by Departmental Representative.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Temporary Hoarding: at least 5 Working Days prior to installation, Submit a description of temporary hoarding.

1.3.2. Contaminated Sites Excavation Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit methods, means, and sequences for Contaminated Sites Excavation for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include:

1.3.2.1. Excavation temporary slope and/or shoring design.

1.3.2.2. Support of structures design.

1.3.2.3. Methods, means, and sequences for excavation dewatering and heave protection.

1.3.2.4. Backfilling requirements. Meet or exceed requirements in accordance with the Contract and any other codes, bylaws, rules and regulations applicable to the performance of the Work. Backfilling requirements includes Imported Backfill and Owner Supplied Backfill.

1.3.2.5. Procedures for excavations adjacent to utilities or other structures if the excavation has the potential to impact utilities or other structures.

1.3.2.6. Monitoring and inspection requirements, including frequency or milestones when Contractor's Qualified Professional must inspect Works.

1.3.2.7. Sloping, Shoring, Excavation and Backfilling Plan must be signed and sealed by Contractor's Qualified Professional, as required by ground conditions, excavation depth, shoring type, or support type.

1.3.3. Import Backfill Material Quality: at least 5 Working Days prior to bringing material onsite, Submit documentation signed and sealed by Contractor's Qualified Professional verifying that material is acceptable for import and intended use. Include:

1.3.3.1. Grain-size distribution information.

1.3.3.2. Chemical analyses for Potential Contaminants of Concern, including metals.

1.3.3.3. Testing to be performed by Contractor's Qualified Professional at sufficient frequency to characterize all Imported Backfilled. Test using appropriate guidelines and practices.

1.3.4. Import Backfill Samples: at least 10 Working Days prior to bringing material to Site, Submit samples of Imported Backfilled.

1.3.4.1. Samples to be representative of all Imported Backfilled. Sample frequency subject to acceptance by Departmental Representative.

1.3.4.2. Submit sufficient sample size to allow geotechnical and environmental quality testing as directed by Departmental Representative.

1.3.5. Temporary Hoarding and Fencing: at least 5 Working Days prior to installation, Submit a description of temporary hoarding and fencing.

1.3.6. Monitoring and Testing Results: within 5 Working Days of sampling, Submit all monitoring and testing results. Include procedures, frequency of sampling, Quality Assurance and Quality Control testing and documentation to be

provided. Provide monitoring and testing results, including any assessments performed by Contractor's Qualified Professional. Include:

1.3.6.1. Backfill testing results, including geotechnical and environmental quality, confirming results meet requirements in Contract and Contaminated Sites Excavation Plan.

1.3.6.2. Compaction testing results, confirming results meet requirements in Contract and Contaminated Sites Excavation Plan.

1.3.7. Weigh Scale Certification: at least 5 Working Days prior to use, Submit a copy of the Measurement Canada, Weigh Scale Certification for any onsite or offsite weigh scale used during transportation, treatment or disposal.

1.3.8. Weigh Scale Slips: within 10 Working Days of measurement, Submit all onsite and offsite weigh scale slips for material.

1.4. Sequencing for Free Phase Products

1.4.1. When floating free phase substance (NonAqueous Phase Liquids) is present, remove free phase from saturated soil or sediment without further contaminating soil, sediment or groundwater prior to commencing other construction Work.

1.4.2. Collect free phase product (NAPL), load, and transport to a Treatment Facility.

2. PART 2 - PRODUCTS

2.1. Materials

2.1.1. Short term temporary liners and covers to be a minimum of 4 mil plastic.

2.1.2. Erosion and sediment control materials to meet the following minimum requirements:

2.1.2.1. Hay or Straw Bale: wire bound or string tied; securely anchored by at least 2 stakes or rebars driven through bale 300 mm to 450 mm into ground; chinked (filled by wedging) with hay or straw to prevent water from escaping between bales; and entrenched minimum of 100 mm into ground.

2.1.2.2. Silt Fence: assembled, ready to install unit consisting of geotextile attached to driveable posts. Geotextile: uniform in texture and appearance, having no defects, flaws, or tears that would affect its physical properties; and contain sufficient ultraviolet ray inhibitor and stabilizers to provide minimum 2-year service life from outdoor exposure.

2.1.2.3. Net Backing: industrial polypropylene mesh joined to geotextile at both top and bottom with double stitching of heavy-duty cord, with minimum width of 750 mm.

2.1.2.4. Posts: sharpened wood, approximately 50 mm square, protruding below bottom of geotextile to allow minimum 450 mm embedment; post spacing 2.4 m maximum. Securely fasten each post to geotextile and net backing using suitable staples.

2.1.3. Gradations to be within limits specified when tested to ASTM C117-13 (Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in

Mineral Aggregates by Washing) and ASTM C136-06 (Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates). Sieve sizes to SCC CAN/CGSB-8.1-88 (Sieves, Testing, Woven Wire, Inch Series) and CAN/CGSB-8.2-M88 (Sieves, Testing, Woven Wire, Metric Series).

2.1.4. Import fill materials to meet the following minimum requirements

2.1.4.1. Import fill materials must be granular aggregate composed of inert, clean, tough, durable particles of crushed rock, gravel and sand capable of withstanding the deleterious effects of exposure to water, freeze-thaw, handling, spreading and compacting. The aggregate particles must be uniform in quality and free from clay lumps, wood and free from an excess of flat or elongated pieces.

2.1.4.2. Import fill materials must originate from a clean source, and be the lesser of the Canadian Council of Ministers of the Environment Soil Quality Guidelines for Commercial and Industrial Land Uses, and the British Columbia Contaminated Sites Regulation Schedule 3.1 Urban Park (PL) for the top 3 m and CSR Schedule 3.1 Commercial (CL) below 3.

2.1.4.3. Import fill material that is cobble sized or larger (> 64mm) brought onsite must be tested by the Contractor for Acid Rock Drainage (ARD) and Metals Leaching (ML) potential using acid base accounting (ABA) for assessment of ARD potential and more specifically using the Modified Sobek Test Method. The potential for metals leaching must use Shake Flask Extraction (SFE) Method for analysis of metals leaching. See guidance document Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials MEND Report 1.20.1, Natural Resources Canada, Price 2009.

2.1.4.4. Any import fill material which has a discrete sample exceeding the standards or guidelines specified must be removed from the Site and replaced, including relevant placed material, as directed by the Departmental Representative, and an alternate source of backfill must be provided, with no increases to Contract Amount or Extension of Time for completion of the Work.

2.1.5. Import fill material additional testing:

2.1.5.1. Perform additional testing as directed by the Departmental Representative.

2.1.5.2. Facilitate testing by the Departmental Representative.

2.1.6. Asphalt, as required, must, at minimum, meet the specifications for: Upper Course #1 mix-type as specified in Section 32 12 16, Hot Mix Asphalt Concrete Paving; of the BC Master Municipal Construction Document (2009) Platinum Edition.

3. PART 3 - EXECUTION

3.1. Examination

3.1.1. Site Verification of Conditions:

3.1.1.1. Contractor to determine condition of existing Site and requirements to make the Site suitable for Work.

3.2. Site Preparation and Operation

3.2.1. Site Preparation and operation includes construction, operation and maintenance for the duration of the Work,

3.2.2. Remove and dispose all surficial Non-Contaminated Soil at a Landfill to allow access for Work.

3.2.3. Clearing and grubbing of the Site to allow access for Work.

3.2.3.1. Clearing consists of removing Non-Contaminated Soil vegetation above existing ground surface to facilitate Work. Includes: cutting off trees and brush vegetative growth, felled trees, previously uprooted trees and stumps. Dispose of Non-Contaminated Soil at a Landfill.

3.2.3.2. Grubbing consists of excavation of Non-Contaminated Soil below existing ground surface to facilitate Work. Includes: stumps, roots, boulders and rock fragments. Dispose of Non-Contaminated Soil at a Landfill.

3.2.4. Remove obstructions, ice and snow, from surfaces to be worked.

3.2.5. Stripping of Topsoil

3.2.5.1. Commence Topsoil stripping of areas according to Drawings after clearing and grubbing.

3.2.5.2. Strip Topsoil to depths according to Drawings. Do not mix Topsoil with other soils.

3.2.5.3. Stockpile Topsoil as directed by Departmental Representative.

3.2.5.4. Reuse Topsoil as Owner Supplied Backfill as directed by Departmental Representative. Dispose of unused Topsoil as directed by Departmental Representative.

3.2.6. Stripping of Overburden

3.2.6.1. Commence Overburden stripping of areas according to Drawings after stripping of Topsoil.

3.2.6.2. Strip Overburden to depths according to Drawings. Do not mix Overburden with other soils.

3.2.6.3. Stockpile Overburden as directed by Departmental Representative.

3.2.6.4. Testing of Overburden may be required if suspected of being Contaminated. Contaminated Overburden will be considered Contaminated Soil.

3.2.6.5. Reuse Overburden as Backfill as directed by Departmental Representative and agreed to by Contractor's Qualified Professional. Dispose of unused Overburden as Non-Contaminated Soil as directed by Departmental Representative.

3.2.7. Protection:

3.2.7.1. Protect existing features with temporary barriers and enclosures as required by applicable local regulations.

3.2.7.2. Protect natural and man-made features required to remain undisturbed. Unless otherwise required or located in an area to be occupied by new construction, protect existing trees from damage.

3.2.7.3. Protect buried utilities that are required to remain undisturbed.

3.2.7.4. Provide temporary structures to divert flow of surface water from excavation.

3.2.8. Security and Safety:
3.2.8.1. Provide safety measures to ensure worker and public safety.
3.2.8.2. Ensure Excavations are secure during onsite Work, provide, install, and remove fencing, temporary hoarding, and other security measures as required and specified.

3.3. Import Fill Material

3.3.1. Do not import fill material until Departmental Representative has completed and analysed testing. Testing and analysis will depend on parameters. Testing will be performed at industry regular (standard) turnaround times (i.e. not priority, emergency, same day or other rush turnaround times).
3.3.2. Departmental Representative will inspect import fill material, and will not allow import of fill material that varies from Submittal samples.

3.4. Design, Construction and Operation of Onsite Access Roads

3.4.1. Construct, operate and maintain the onsite access road(s) as required.
3.4.2. Design of temporary onsite access roads to be signed and sealed by Contractor's Qualified Professional.
3.4.3. Contractor's Qualified Professional to confirm that the temporary onsite access roads allow for the safe transport of materials and equipment.
3.4.4. Construction of the onsite access road(s) may require the removal of historic infrastructure.
3.4.5. Any temporary access, detour and haul roads associated with the project must be constructed to accommodate all required uses and be maintained throughout the course of construction operations in a safe, environmentally sound manner.
3.4.6. Location, alignment, design and construction of all detour, access and haul road(s) subject to the acceptance of the Departmental Representative.
3.4.7. Employ suitable measures to maintain quality, visibility, and safe conditions in the use of access, detour and haul road(s) associated with the Work.

3.5. Temporary Sloping and Shoring

3.5.1. Determine appropriate sloping or shoring to allow excavation of Contaminated Soil Extents according to Drawings or as directed by Departmental Representative.
3.5.2. Design Requirements:
3.5.2.1. Act as sloping or shoring structures for excavations as well as for stability of foundations and infrastructure during remediation/construction excavation procedures.
3.5.2.2. Allow excavation of all Contaminated Soil laterally and vertically on the Site to Contaminated Soil Extents in accordance with the Contract. Allow excavation of additional Contaminated Soil beyond Contaminated Soil Extents in order to result in no residual contamination at the Site based on field observations or Confirmation Samples.

3.5.2.3. Provide a safe working environment for personnel and equipment within the dewatered excavation area.

3.5.2.4. Additional sloping or shoring may be required to extend excavation beyond Contaminated Soil Extents according to Drawings. Revise Temporary Sloping and Shoring design as required by Contractor's Qualified Professional.

3.5.2.5. Temporary shoring cannot have any tiebacks or supports which extend beyond the project Site boundary.

3.5.2.6. Temporary shoring must not flex or bend when exposed while excavations are occurring on the Site.

3.5.2.7. Seismic Resistance of Temporary support:

3.5.2.7.1. Support structures are temporary structures only. Resistance to seismic loads will be at the discretion of the Qualified Professional.

3.5.2.7.2. Be responsible for any failures and resultant costs should the Temporary support fail due to a seismic event during the construction period.

3.5.2.8. All drawings to be signed and sealed by a Qualified Professional.

3.5.2.9. Temporary support designs to be completed in accordance with methods in current version of *Canadian Foundation Engineering Manual*.

3.5.2.10. Sloping and shoring structures are temporary structures only. Resistance to seismic loads will be at the discretion of the Contractor's Qualified Professional.

3.5.2.11. Be responsible for any failures and resultant costs should the temporary sloping or shoring fail due to a seismic event during the construction period.

3.5.2.12. All Shop Drawings of sloping and shoring design to be signed and sealed by Contractor's Qualified Professional.

3.5.2.13. Temporary sloping and shoring designs to be completed in accordance with methods in current version of Canadian Foundation Engineering Manual.

3.5.3. Installation:

3.5.3.1. All installation activities must take place on the Site. No staging or construction activities are to take place on adjacent properties.

3.5.3.2. Installation must be regularly inspected by Contractor's Qualified Professional.

3.5.4. Maintain side slopes of excavations in safe condition by appropriate methods and in accordance with relevant regulations.

3.5.5. Construct temporary Works to depths, heights and locations to meet project requirements.

3.5.6. During backfill operation:

3.5.6.1. Unless otherwise indicated or as directed by the Departmental Representative, remove temporary shoring from excavations.

3.5.6.2. Do not remove support until backfilling has reached respective levels of such bracing.

3.5.6.3. Remove support in increments that ensure compacted backfill is maintained at elevation at least 500 mm above toe of support.

3.5.7. Temporary sloping and shoring excavated material:

3.5.7.1. Material excavated for sloping or shoring may be re-used as backfill to replace material removed as accepted by Contractor's Qualified Professional and Departmental Representative.
3.5.7.2. Material excavated for sloping or shoring that is accepted for backfilling must follow procedures in accordance with requirements of Contractor's Qualified Professional and meet Contract Documents.
3.5.7.3. Material excavated for sloping or shoring not accepted must be removed from Site at Contractor's expense.

3.6. Dewatering and Heave Protection

3.6.1. Keep excavations free of water while Work is in progress unless otherwise indicated in Contract or as directed by the Departmental Representative.
3.6.2. Provide to Departmental Representative details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.
3.6.3. Plan for excavation below groundwater table to avoid quick conditions or heave.
3.6.4. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
3.6.5. Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.
3.6.6. Keep excavations, staging pads, and other Work areas free from water. Provide standby equipment to ensure continuous operation of dewatering system.
3.6.7. Dewatering Methods: includes sheeting and shoring; groundwater control systems; surface or free water control systems employing ditches, diversions, drains, pipes and/or pumps; and other measures necessary to enable Work to be carried out in dry conditions.
3.6.8. Separate Contaminated Water from Non-Contaminated Water and collect and divert to Contaminated Water Treatment Plant as required.

3.7. Excavation

3.7.1. Notify Departmental Representative at least 5 Working Days in advance of excavation operations.
3.7.2. Excavate to lines, grades, elevations and dimensions according to Drawings or as directed by Departmental Representative.
3.7.3. Excavate all Contaminated Soil laterally and vertically on the Site to Contaminated Soil Extents in accordance with the Contract. Excavate additional Contaminated Soil beyond Contaminated Soil Extents in order to result in no residual contamination at the Site based on field observations or Confirmation Samples
3.7.4. Elevations shown on Drawings, are approximate and final excavation elevations to be determined based on field conditions as instructed by the Departmental Representative.
3.7.5. Excavation must not interfere with bearing capacity of adjacent foundations and infrastructure.
3.7.6. Machine cut banks and slopes.

3.7.7. Protect bottom of excavations from excessive traffic.
3.7.8. Grade excavation top perimeter to prevent surface water run-off into excavation.
3.7.9. Keep excavated and stockpiled materials safe distance away from edge of excavation.
3.7.10. Restrict vehicle operations directly adjacent to open excavations.
3.7.11. Segregate and handle to minimize the amount of Hazardous Waste materials wherever possible, while complying with Hazardous Waste disposal regulations. Segregation of Hazardous Waste during excavation will be by visual and olfactory characteristics and available in-situ characterization.
3.7.12. Contaminated Material onsite classification will be based on available in-situ characterization or ex-situ characterization as instructed by Departmental Representative.
3.7.13. Non-Contaminated Material onsite classification will be based on available in-situ characterization or ex-situ characterization as instructed by Departmental Representative.
3.7.14. Remove Waste Oversize Debris.
3.7.14.1. Piles encountered during excavation must be cut off at base of excavation. Piles are not to be extracted beyond the base of the excavation.
3.7.14.2. Debris that impinges on infrastructure or neighbouring properties is not to be removed unless directed by Departmental Representative. Contractor's Qualified Professional to confirm debris can be removed without impacting infrastructure or neighbouring properties.
3.7.14.3. Reduce size of Oversize Debris to allow to be Transported, Treated, and Disposed, as required, as Non-Contaminated Soil or Contaminated Soil, as appropriate.
3.7.15. Remove Non-Contaminated Soil to Landfill Facility or re-use as Backfill - Owner Supplied according to Drawings and as directed by Departmental Representative.
3.7.16. Remove Contaminated Material to onsite Treatment Facility or offsite Treatment Facility or offsite Disposal Facility.
3.7.17. Earth bottoms of excavations to be undisturbed soil or sediment, level, free from loose, soft or organic material.
3.7.18. Notify Departmental Representative when bottom of excavation is reached based on drawing extents.
3.7.19. Provide assistance for collection of Confirmation Samples as directed to the Departmental Representative.
3.7.20. Obtain acceptance by Departmental Representative of completed excavation.

3.8. Soil Stockpiling

3.8.1. Provide, maintain, and operate temporary storage/stockpiling facilities as per Contractor’s Site Layout.
3.8.2. Segregate Contaminated Soil from Non-Contaminated Soil into separate stockpiles to prevent cross-contamination.

3.8.3. Prevent precipitation from infiltrating or from directly running off stockpiled materials. Cover stockpiled materials with an impermeable cover during periods of Work stoppage including at end of each Working Day and as directed by the Departmental Representative.

3.8.4. Securely fasten covers over stockpiled material until material is loaded for offsite transport.

3.8.5. Store excavated Non-Contaminated Soil only on non-contaminated surface areas. Ensure no contact between excavated Non-Contaminated Soil and drainage of Contaminated Water or Contaminated Soil.

3.8.6. Store excavated Contaminated Soil in temporary stockpiles.

3.8.6.1. Install impermeable liner (eg asphalt or minimum 20 mil (0.5mm) polyethylene) below proposed stockpile locations to prevent contact between stockpile material and ground.

3.8.6.2. Cover stockpiled material when not being worked or sampled to prevent release of airborne dust, vapours, or odours, and to prevent saturation and leachate generation from material.

3.8.6.3. Prevent Non-Contaminated Water, including surface runoff water, from coming into contact with Contaminated Soil stockpiles.

3.8.7. Segregate different suspect material in discrete stockpiles to facilitate ex-situ characterization for Classification as directed by the Departmental Representative.

3.8.8. Assist Departmental Representative in collection of stockpile samples for exsitu characterization. Ex-situ characterization may take up to 5 Working Days, not counting the day the sample is collected. No Standby Time charges or increases to Contract Amount or Extension of Time for completion of the Work can be incurred for Confirmation Samples results provided within 5 Working Days, not counting the day the sample is collected.

3.8.9. Do not remove Contaminated Soil from stockpiles until exsitu characterization completed and as directed by Departmental Representative.

3.9. Backfill Types and Compaction

3.9.1. Use only Imported Backfilled, Overburden Backfill, or Owner Supplied Backfill in accordance with the Contract and which has been recommended by Contractor's Qualified Professional, and previously accepted as a Submittal.

3.9.2. Compact material in accordance with the more stringent of Excavation Plan or Contract to ensure no long term settlement and is suitable for planned post-remediation use. Machine compact all fill materials unless otherwise according to Drawings.

3.10. Backfilling

3.10.1. Do not proceed with backfilling operations until completion of following:

3.10.1.1. Confirmation Samples collection, analysis, and assessment has been completed by the Departmental Representative. Confirmation Samples analysis and assessment may take up to 5 Working Days. No Standby Time charges or increases to Contract Amount or Extension of Time for completion of the Work can be incurred for Confirmation Samples results provided within 5 Working Days, not including day of sample collection.

3.10.1.2. Field Surveying has been completed by Departmental Representative for excavation volumes. Facilitate and assist with Field Surveying as requested by Departmental Representative, including surveying below water table for excavations in the wet.

3.10.1.3. Surveying has been completed by a Contractor's Qualified Professional (Land Surveyor) for As-Built documents, including final utilities locations.

3.10.1.4. Departmental Representative has inspected and excavation limits accepted by the Departmental Representative based on survey data and Confirmation Samples results.

3.10.1.5. Departmental Representative has inspected and accepted backfill material.

3.10.1.6. Proposed backfill material can be sampled and tested for geotechnical and environmental quality. Backfill material testing may take up to 5 Working Days not including day of sample collection.

3.10.1.7. Departmental Representative has inspected and accepted compaction results for previous lift.

3.10.1.8. Removal of shoring and bracing; backfilling of voids with satisfactory backfill material.

3.10.2. Areas to be backfilled to be free from debris, snow, ice, water and frozen ground to greatest extent practicable.

3.10.3. Do not use backfill material which is frozen or contains ice, snow or debris to greatest extent practicable.

3.10.4. Place backfill material in uniform layers not exceeding 300 mm compacted thickness, or in accordance with the Contract. Compact each layer to the satisfaction of the Contractor's Qualified Professional and in accordance with the Contract before placing succeeding layer. If backilling is allowed to proceed in the wet (ie underwater), use self-compacting backfill as required by Contractor's Qualified Professional in accordance with Excavation Plan.

3.10.5. Backfill compaction to be tested by Contractor's Qualified Professional in accordance with Excavation Plan.

3.10.6. Notify Departmental Representative when final backfill grade is reached.

3.10.7. Do not begin subsequent Work until surveying has been completed by the Departmental Representative for documentation.

3.11. Overburden and Owner Supplied Material Backfilling

3.11.1. Place in locations in excavation as directed by Departmental Representative.

3.11.2. Be responsible for compacting to the satisfaction of Contractor's Qualified Professional and in accordance with the Contract.

3.11.2.1. Collect and test samples as required by Contractor's Qualified Professional prior to placement.

3.11.2.2. Identify any geotechnical concerns prior, and obtain Departmental Representative approval to proceed, prior to placement.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Contaminated Soil Transport: will be paid in accordance with unit rate price established for weight of material transported. Measurement as recorded on weigh scale certified by Measurement Canada and results provided to Departmental Representative. Includes all handling, loading, hauling, unloading, transfer, interim storage, transport to and from intermediate locations, and final placement.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Contaminated Sites Transportation Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit methods, means, and sequences for Contaminated Sites Transportation for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include for each Transfer/Interim Storage Facility:

1.3.1.1. Letter from a Qualified Professional that the Transfer/Interim Storage Facility is appropriate for the quantity and quality of Contaminated Soil to be Transfered/Interim Stored, signed and sealed by Qualified Professional.

1.3.1.2. Letter from Transfer/Interim Storage Facility that they can accept the quantity and quality of Contaminated Soil to be Transfered/Interim Stored at the Facility, signed by an authorized representative of the Facility.

1.3.1.3. Copy of permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the Transfer/Interim Storage of relevant Contaminated Soil.

1.3.2. Certificate of Seaworthiness: Prior to barge shipments, Submit a Certificate of Seaworthiness by an independent licensed Marine Surveyor for all marine vessels transporting Contaminated Soil.

1.3.3. Transport Manifests: within 5 Working Days of offsite transport, Submit documentation verifying that material has been transported appropriately. Include:

1.3.3.1. Method of transport.

1.3.3.2. Name of transport company.

1.3.3.3. Weigh scale receipt including location, date, and weight of loading, as appropriate.

1.3.3.4. Weigh scale receipt including location, date, and weight of unloading.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Contaminated Soil Transport

3.1.1. Assume ownership of, and be responsible for, Contaminated Soil once it is loaded on a vehicle, barge, or other vessel for transport.

3.1.2. Transport material as soon as practical; do not unreasonably stockpile onsite.

3.1.3. Cover material while being transported to prevent release of airborne dust, vapours, or odours, and to prevent saturation and leaching from material.

3.1.4. All vehicles must be watertight. Excess water in material must not be allowed to flow out of vehicle or vessel during transport.

3.1.5. Stabilize material as necessary.

3.1.6. All vehicles, vessels and operators must be appropriately licensed and equipped to transport Contaminated Soil.

3.1.7. Barges must be inspected by an independent Marine Surveyor.

3.1.8. Manifest and correlate quantities of all Contaminated Soil transported from Site documenting quantity and quality removed from Site. Include all Transfer/Interim Storage, Treatment, and Disposal Facilities. Discrepancies in manifests must be resolved as required by regulations and as acceptable to the Departmental Representative. Discrepancies include:

3.1.8.1. No manifest or an incomplete manifest.

3.1.8.2. Material transported does not match the description in the manifest.

3.1.8.3. Amount transported differs by more than 5% in the manifest.

3.1.8.4. Material transported is in a hazardous condition.

3.1.9. Transfer/Interim Storage Facility must:

3.1.9.1. Be an existing offsite facility located in Canada or the United States.

3.1.9.2. Be designed, constructed and operated for the transfer or interim storage of Contaminated Soil.

3.1.9.3. Hold a valid and subsisting permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the transfer or interim storage of relevant Contaminated Soil.

3.1.9.4. Comply with applicable municipal zoning, bylaws, and other applicable requirements.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Contaminated Soil Disposal will be paid in accordance with unit rate price established for weight of material disposed. Measurement as recorded on weigh scale certified by Measurement Canada and results provided to Departmental Representative on Certificates of Disposal. Includes Treatment or any other processing of material required by Disposal Facility but not required by the Contract.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Contaminated Sites Disposal Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit methods, means, and sequences for Contaminated Sites Disposal for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract. Include for each Disposal Facility:

1.3.1.1. Letter from a Qualified Professional that the Disposal Facility is appropriate for the quantity and quality of Contaminated Soil to be Disposed, signed and sealed by Qualified Professional.

1.3.1.2. Letter from Disposal Facility that they can accept the quantity and quality of Contaminated Soil to be Disposed at the Facility, signed by an authorized representative of the Facility.

1.3.1.3. Copy of permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the Disposal of relevant Contaminated Soil.

1.3.2. Certificate of Disposal: within 30 Working Days of disposal at Disposal Facility, Submit documentation verifying that materials have been disposed by Contractor. Include:

1.3.2.1. Issued by the Disposal Facility.

1.3.2.2. On company letterhead.

1.3.2.3. Name and location of facility where the material is being disposed.

1.3.2.4. Date and weight for each shipment received and total weight received at the Disposal Facility.

1.3.2.5. Identification of acceptance of final ownership of material.

1.3.2.6. Signed by identified authorized disposal company representative..

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Contaminated Soil Disposal

3.1.1. Assume ownership of, and be responsible for, Contaminated Soil disposed.

3.1.2. Contaminated Soil Disposal: dispose all Contaminated Soil, including onsite or offsite treated Contaminated Soil that may no longer be contaminated, at Disposal Facility provided by Contractor and accepted by the Departmental Representative.

3.1.3. Disposal Facility must:

3.1.3.1. Be an existing offsite facility located in Canada or the United States.

3.1.3.2. Be designed, constructed and operated to prevent any pollution from being caused by the facility outside the area of the facility from waste placed in or on land within the facility.

3.1.3.3. Hold a valid and subsisting permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the Disposal of relevant Contaminated Soil.

3.1.3.4. Comply with applicable municipal zoning, bylaws, and other applicable requirements.

3.1.4. Dispose material as soon as practical and within 100 Working Days of leaving Site or as required by Contract unless otherwise accepted by Departmental Representative.

3.1.5. Material sent to a Disposal Facility must be permanently stored at that facility.

3.1.6. If proposed Disposal Facility is not acceptable to Departmental Representative, provide an alternate Disposal Facility that is acceptable.

END OF SECTION

Table 1: Hydrocarbon Stockpiles (HC #1 and HC #2)
Analytical Results

HC Soils

Parameter:		Field Tests	pH	Physical Tests	Moisture (%)	pH after HCl	pH, final	pH, initial	pH, leaching fluid	Solids (%)	Total Inorganics	Sulfur	Leachate Metals	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Beryllium (ug/L)	Boron (ug/L)	Cadmium (ug/L)	Chromium (ug/L)	Cobalt (ug/L)	Copper (ug/L)	Iron (ug/L)	Lead (ug/L)	Mercury (ug/L)	Molybdenum (ug/L)	Nickel (ug/L)	Selenium (ug/L)	Silver (ug/L)	Thallium (ug/L)	Uranium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)	Zirconium (ug/L)
BCCSR RL [3,4]:			-		-	-	-	-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BCCSR CL [3,5]:			-		-	-	-	-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BCHWR LQS [26,27]:			-		-	-	-	-	-	-		-		-	2500	100000	-	500000	500	5000	-	100000	-	5000	100	-	-	1000	5000	-	10000	-	500000	-
Sample ID	**Date Sampled**																																
HC-1	30/03/2016		7.86		4.04	1.3	5.37	9.03	4.92	96		3840		<100	<100	310	<100	<100	<100	<100	<100	32500	1200	**6840**	<2.0	<100	170	<100	<100	<100	<100	<100	8720	<100
HC-10	30/03/2016		6.76		4.18	1.25	5.02	6.92	4.92	95.8		31300		<100	<100	270	<100	<100	<100	<100	<100	73800	560	**142000**	<2.0	<100	<100	<100	<100	<100	<100	<100	4690	<100
HC-11	30/03/2016		7.08		5.42	1.23	4.96	6.97	4.92	94.6		20100		<100	<100	220	<100	<100	<100	<100	<100	86400	520	**150000**	<2.0	<100	<100	<100	<100	<100	<100	<100	5450	<100
HC-12	30/03/2016		7.01		6.4	1.24	5.09	6.51	4.92	94.9		29100		<100	<100	290	<100	140	<100	<100	<100	70700	1300	**141000**	<2.0	<100	<100	<100	<100	<100	<100	<100	5600	<100
HC-13	30/03/2016		7.82		5.67	1.32	5.23	8.69	4.92	94.3		21000		<100	<100	430	<100	100	100	<100	<100	42500	870	**87800**	<2.0	<100	250	<100	<100	<100	<100	<100	10500	<100
HC-14	30/03/2016		7.79		7.9	1.24	5.23	7.75	4.92	93.7		42700		<100	<100	350	<100	<100	<100	<100	<100	44200	910	**104000**	<2.0	<100	170	<100	<100	<100	<100	<100	9320	<100
HC-15	30/03/2016		7.89		4.79	1.41	5.34	6.54	4.92	95.2		14800		<100	<100	400	<100	<100	<100	<100	<100	22100	1060	**27700**	<2.0	<100	240	<100	<100	<100	<100	<100	11800	<100
HC-200	30/03/2016		7.83		3.92	1.3	5.27	6.71	4.92	96.1		14700		<100	<100	450	<100	<100	<100	<100	<100	24200	1030	**40500**	<2.0	<100	310	<100	<100	<100	<100	<100	12300	<100
HC-16	30/03/2016		7.38		6.18	1.36	5.1	6.33	4.92	93.8		50000		<100	<100	290	<100	<100	<100	<100	<100	51000	680	**139000**	<2.0	<100	<100	<100	<100	<100	<100	<100	4730	<100
HC-2	30/03/2016		7.97		4.39	1.17	5.31	8.93	4.92	95.6		4720		<100	<100	390	<100	<100	<100	<100	<100	28400	970	**6110**	<2.0	<100	130	<100	<100	<100	<100	<100	7070	<100
HC-3	30/03/2016		7.22		6.4	1.3	5.11	6.66	4.92	94.6		16200		<100	<100	320	<100	120	<100	<100	<100	77600	730	**140000**	<2.0	<100	120	<100	<100	<100	<100	<100	6890	<100
HC-4	30/03/2016		6.98		4.1	1.23	5.06	6.62	4.92	95.9		17700		<100	<100	240	<100	<100	<100	<100	<100	**152000**	520	**137000**	<2.0	<100	160	<100	<100	<100	<100	<100	7160	<100
HC-5	30/03/2016		7		4.12	1.26	5	6.66	4.92	95.9		11000		<100	<100	310	<100	<100	<100	<100	<100	**108000**	<500	**141000**	<2.0	<100	110	<100	<100	<100	<100	<100	5500	<100
HC-100	30/03/2016		7.09		5.9	1.25	5.03	6.62	4.92	96.7		14900		<100	<100	290	<100	<100	<100	<100	<100	83400	500	**144000**	<2.0	<100	<100	<100	<100	<100	<100	<100	4350	<100
HC-6	30/03/2016		6.73		4.5	1.3	5	6.49	4.92	95.3		12600		<100	<100	210	<100	<100	<100	<100	<100	84300	<500	**124000**	<2.0	<100	<100	<100	<100	<100	<100	<100	4520	<100
HC-7	30/03/2016		6.77		5.3	1.19	5.02	6.62	4.92	94.7		15500		<100	<100	220	<100	<100	<100	<100	<100	82900	520	**132000**	<2.0	<100	<100	<100	<100	<100	<100	<100	5610	<100
HC-8	30/03/2016		6.9		3.99	1.18	4.98	6.82	4.92	96		12800		<100	<100	230	<100	<100	<100	<100	<100	85700	<500	**143000**	<2.0	<100	<100	<100	<100	<100	<100	<100	4380	<100
HC-9	30/03/2016		6.88		9.8	1.27	5.01	6.93	4.92	93.7		17300		<100	<100	330	<100	120	<100	<100	<100	71400	720	**141000**	<2.0	<100	<100	<100	<100	<100	<100	<100	5580	<100

Table 1: Hydrocarbon Stockpiles (HC #1 and HC #2)
Analytical Results

Parameter:	Total Metals	Aluminium	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium
BCCSR RL [3,4]:		40000 [9]	20 [10]	10 [8]	700 [7]	85 [11]	8500 [9]	1 - 20 [12]	-	60 [8,23]	25 [6,8]	75 - 150 [13]	35000 [9]	120 [14]	30 [9]	-	2000 [7]	10 [6]	80 [7]	70 - 150 [15]	-	-	1 [8]	-	20 [10]	-
BCCSR CL [3,5]:		250000 [9]	40 [10]	10 [8]	1500 [7,8]	85 - 350 [17]	50000 [9]	1 - 75 [18]	-	60 [8,23]	25 [8]	75 - 1500 [19,24]	150000 [9]	120 - 2000 [20,24]	450 [9]	-	2000 [7]	75 [6,7]	150 [7]	70 - 250 [21]	-	-	1 [8]	-	40 [10]	-
BCHWR LQS [26,27]:		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample ID	**Date Sampled**																									
HC-1	30/03/2016	11000	1.63	**17.1**	30.2	0.0766	3	2.85	11100	14.4	7.19	**3320**	23800	**501**	12.5	3960	192	0.0638	11.1	27	358	1090	0.659	220	1.33	613
HC-10	30/03/2016	11700	8.79	**90**	35.4	0.1	4	**7.86**	10700	22.7	16.8	**43000**	60700	**14900**	12.9	4150	219	0.218	**142**	28.2	452	1130	**7.29**	215	12.2	560
HC-11	30/03/2016	11500	6.49	**62.8**	31.8	0.0879	4	**6.34**	9410	18.2	13.4	**27200**	44500	**16800**	13.2	4530	197	0.22	**101**	26.9	399	1130	**5.48**	185	8.45	558
HC-12	30/03/2016	11900	8.64	**88.2**	36.1	0.11	4	**8.08**	10000	13.8	14.5	**35800**	50300	**27700**	12.1	3870	176	0.305	**134**	23.4	368	1180	**7.42**	177	11.3	607
HC-13	30/03/2016	11500	7.33	**65.5**	42.7	0.0912	4	11.1	11800	17.5	15.7	**32600**	42500	**6450**	12.2	4370	193	0.295	**108**	52	412	1060	**6.22**	253	10.9	587
HC-14	30/03/2016	11500	8.56	**108**	0.772	0.0946	5	11.6	15400	15.7	20.3	**63300**	61300	**22900**	12.5	4040	217	0.726	**191**	48.5	359	1030	**10.8**	323	17	580
HC-15	30/03/2016	11100	6.79	**84.4**	34.2	0.0876	4	9.87	14000	18.5	12.3	**16700**	38900	**5720**	14.2	3980	190	0.166	58.1	50	384	1160	**3.04**	324	6.71	639
HC-200	30/03/2016	11500	7.01	**79.3**	31	0.0785	3	9.28	12200	22.1	12.9	**17300**	40200	**5540**	13.3	4390	181	0.207	55.7	48.2	393	1040	**3.07**	243	6.25	602
HC-16	30/03/2016	8880	13.2	**151**	0.294	0.0773	4	**12.6**	12300	13.9	21	**75100**	69600	**31400**	9.6	3370	151	0.902	**210**	31.7	362	907	**11.7**	182	**21.1**	419
HC-2	30/03/2016	11800	2.43	**21.5**	33.3	0.0734	3	3.3	14200	19.7	8.3	**4030**	28300	**660**	14	4300	224	0.0746	14.5	30.1	399	1080	0.914	316	1.98	684
HC-3	30/03/2016	12200	6.29	**65.2**	42.8	0.086	4	**5.39**	10800	19.2	12.4	**21900**	44500	**10400**	12.5	4430	227	0.116	**94.5**	32.2	438	1160	**4.57**	293	7.57	584
HC-4	30/03/2016	12200	8.68	**73.6**	39.2	0.0942	4	**5.31**	9870	20.6	11.9	**27200**	50400	**13800**	11.4	4120	216	0.216	**112**	27	442	1180	**6.35**	255	8.26	660
HC-5	30/03/2016	12100	4.48	**44.6**	38.1	0.0805	3	3.39	8950	20.3	9.8	**14400**	38300	**7190**	11.4	4690	219	0.154	68.3	20	462	1090	**3.63**	173	5.08	600
HC-100	30/03/2016	11500	5.4	**54.3**	28	0.0868	3	**3.81**	9000	18.6	10.4	**19500**	42400	**13000**	11.8	4150	169	0.204	79.8	22.9	391	1030	**3.98**	200	6.07	544
HC-6	30/03/2016	12400	5.33	**47.6**	42.7	0.1	3	**4.73**	9960	15.1	9.27	**16000**	35500	**10200**	11.1	4180	206	0.174	72.1	20.8	405	1420	**3.63**	215	5.48	603
HC-7	30/03/2016	12300	6.15	**65.5**	31	0.0931	3	**4.25**	9700	14.4	10.6	**21300**	38100	**14300**	10.9	4140	177	0.216	**85.6**	22.4	387	1080	**3.99**	203	7.1	634
HC-8	30/03/2016	11700	4.27	**44.7**	38.1	0.0894	3	**3.85**	8690	15.7	10.5	**17800**	36700	**11700**	12.1	4210	191	0.151	76	23	425	1230	**3.16**	229	5.47	577
HC-9	30/03/2016	11600	6.05	**54.3**	30.5	0.0886	3	**5.33**	9540	14.5	11.5	**23400**	37200	**13900**	11.8	4130	185	0.223	**90.2**	24	402	1020	**4.4**	231	7.48	601

Table 1: Hydrocarbon Stockpiles (HC #1 and HC #2)
Analytical Results

Parameter:	Strontium	Thalium	Tin	Titanium	Uranium	Vanadium	Zinc	BTEX	Benzene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Styrene	Toluene	Xylenes	EPH	EPH10-19	EPH19-32	LEPH	HEPH	VPH	VH6-10	VPH	PHCs	F1 (C6-C10) - BTEX	F1 nC6-10 uncorrected	F2 (C10-C16)	F3 (C16-C34)	F4 (C34-C50)	F4G nC34-50 sg
BCCSR RL [3,4]:	9500 [9]	9 [10]	50 [10]	-	100 [6]	150 [7]	150 - 200 [16]		6.5 [8]	200 [7,8]	-	-	5 [10]	150 [7]	20 [8]		-	-	1000 [9,10]	1000 [9,10]		-	200 [9,10]		200 [25]	-	-	-	-	-
BCCSR CL [3,5]:	150000 [9]	25 [10]	300 [10]	-	150 [8]	300 [7]	150 - 2000 [22,24]		6.5 [8]	200 [8]	-	-	50 [10]	200 [8]	20 [8]		-	-	2000 [9,10]	5000 [9,10]		-	200 [9,10]		200 [25]	-	-	-	-	-
BCHWR LQS [26,27]:	-	-	-	-	-	-	-		-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
Sample ID	**Date Sampled**																													
HC-1	30/03/2016	52.7		0.904	662	0.525	64.9	646	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
HC-10	30/03/2016	49.6		1.39	785	0.99	80.8	2760	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
HC-11	30/03/2016	51.5		1	739	0.846	65.7	1640	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
HC-12	30/03/2016	48.2		1.46	645	0.767	58.3	2690	<0.0050	<0.010	<0.040	<0.040	<0.030	<0.020	<0.040		-	-	-	-		<10	<10		<10	<10	50	530	230	1600
HC-13	30/03/2016	52.4		2.25	677	0.766	51.3	1850	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
HC-14	30/03/2016	56		2.23	644	1.11	51.1	3190	<0.0050	<0.010	<0.040	<0.040	<0.030	<0.020	<0.040		900	3300	900	3300		<10	<10		<10	<10	520	3800	790	
HC-15	30/03/2016	54.9		2.36	719	1.72	69.7	3180	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
HC-200	30/03/2016	54.9		2.03	569	0.642	80.6	3030	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
HC-16	30/03/2016	41.4		3.18	496	1	50.1	4640	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
HC-2	30/03/2016	62.4		1.19	747	0.802	70.8	751	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
HC-3	30/03/2016	52.7		1.24	828	1.11	77.8	1400	<0.0050	<0.010	<0.040	<0.040	<0.030	<0.020	<0.040		-	-	-	-		<10	<10		<10	<10	210	860	160	
HC-4	30/03/2016	54.9		1.08	790	1.11	80.1	1450	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
HC-5	30/03/2016	47.6		0.801	751	0.75	72.7	909	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
HC-100	30/03/2016	39.6		0.844	639	0.719	77.5	961	<0.0050	<0.010	<0.040	<0.040	<0.030	<0.020	<0.040		190	420	190	420		<10	<10		<10	<10	89	660	190	1100
HC-6	30/03/2016	43.5		0.943	791	0.821	62	1110	<0.0050	<0.010	<0.040	<0.040	<0.030	<0.020	<0.040		170	320	170	320		<10	<10		<10	<10	78	530	120	
HC-7	30/03/2016	51.5		0.941	694	0.8	64.8	1180	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
HC-8	30/03/2016	43.5		0.77	690	0.72	67.8	933	-	-	-	-	-	-	-		-	-	-	-		-	-		-	-	-	-	-	-
HC-9	30/03/2016	43.4		0.94	685	0.836	55.1	1370	<0.0050	<0.010	<0.040	<0.040	<0.030	<0.020	<0.040		-	-	-	-		<10	<10		<10	<10	64	650	170	450

Table 1: Hydrocarbon Stockpiles (HC #1 and HC #2)
Analytical Results

	Parameter:	PAH	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b,j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	VOC	Methyl tert-butyl ether (MTBE)
	BCCSR RL [3,4]:		950 [9]	-	2.5 [7]	1 [10]	5 [6]	1 [10]	-	1 [10]	200 [9]	1 [10]	50 [7]	600 [9]	1 [10]	0.6 [7]	5 [10]	10 [10]		4000 [9]
	BCCSR CL [3,5]:		15000 [9]	-	30 [7]	10 [10]	30 [6]	10 [10]	-	10 [10]	4500 [9]	10 [10]	200 [7]	9500 [9]	1 [10]	20 [7]	50 [10]	100 [10]		20000 [9]
	BCHWR LQS [26,27]:		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
Sample ID	**Date Sampled**																			
HC-1	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
HC-10	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
HC-11	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
HC-12	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		<0.10
HC-13	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
HC-14	30/03/2016		0.18	<0.014	<0.069	0.079	0.04	0.083	<0.050	0.026	0.13	<0.050	0.42	0.26	<0.050	0.046	0.44	0.36		<0.10
HC-15	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
HC-200	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
HC-16	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
HC-2	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
HC-3	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		<0.10
HC-4	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
HC-5	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
HC-100	30/03/2016		0.029	<0.0050	0.015	0.038	<0.020	0.027	<0.050	<0.020	0.06	<0.050	0.23	0.03	<0.050	<0.010	0.096	0.17		<0.10
HC-6	30/03/2016		0.031	<0.0050	0.012	0.04	<0.020	0.026	<0.050	<0.020	0.058	<0.050	0.23	0.031	<0.050	<0.010	0.099	0.16		<0.10
HC-7	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
HC-8	30/03/2016		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
HC-9	30/03/2016																			<0.10

Table 1: Analytical Results - Notes

(1) All values are reported as µg/g unless otherwise noted.
(2) - = No standard or not analyzed.
(3) BCCSR = BC Environmental Management Act, Contaminated Sites Regulation, B.C. Reg. 375/96 - includes amendments up to B.C. Reg. 116/2018, June 14, 2018.
(4) BCCSR RL_{LD} = Schedule 3.1, Part 1 (Matrix), Column 6, Residential Low Density and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 7, Residential Low Density and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 7, Residential Low Density.
(5) BCCSR CL = Schedule 3.1, Part 1 (Matrix), Column 8, Commercial and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 9, Commercial and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 9, Commercial.
(6) Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil.
(7) Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants.
(8) Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine. If Marine is not specified then the standard Marine and Freshwater.
(9) Schedule 3.1, Part 2, Generic Numerical Soil Standards to Protect Human Health.
(10) Schedule 3.1, Part 3, Generic Numerical Soil Standards to Protect Ecological Health.
(11) Beryllium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (85 ug/g).
(12) Cadmium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (20 ug/g).
(13) Copper varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (150 ug/g).
(14) Lead varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (120 ug/g).
(15) Nickel varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (150 ug/g).
(16) Zinc varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
200 if pH>=8.0
(17) Beryllium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
100 if pH>=5.0 and pH<5.5
200 if pH>=5.5 and pH<6.0
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (350 ug/g).
(18) Cadmium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (75 ug/g).
(19) Copper varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
650 if pH>=6.5 and pH<7.0
1500 if pH>7.0
(20) Lead varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
300 if pH>=5.5 and pH<6.0
1500 if pH>=6.0 and pH<6.5
2000 if pH>6.5
(21) Nickel varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
250 if pH>=7.5 and pH<8.0
And/or, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (250 ug/g).
(22) Zinc varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
2000 if pH>=8.0
(23) Chromium - more stringent standard of chromium hexavalent and trivalent is applied.
(24) Upper-cap concentrations of 1,500 µg/g for copper, 2,000 µg/g for lead, and 2,000 µg/g for zinc are applied (site-specific remediation criteria).
(25) Schedule 3.1, Part 2 (To Protect Human Health) & Part 3 (To Protect Ecological Health), Generic Numerical Soil Standards (equivalent to C6-C10 minus BTEX).
(26) BCHWR = BC Environmental Management Act, Hazardous Waste Regulation, B.C. Reg. 63/88 includes amendments up to B.C. Reg. 243/2016, November 1, 2017.
(27) BCHWR LQS = Schedule 4, Table 1, Leachate Quality Standards.

Table 2a: Cell 3a and 3b Pre-Stabilization
Analytical Results

	Parameter:	Field Tests	pH	Total Inorganics	Sulfur	Total Metals	Aluminium	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
	BCCSR RL [3,4]:		-		-		40000 [9]	20 [10]	10 [8]	700 [7]	85 [11]	8500 [9]	1 - 20 [12]	-	60 [8,23]	25 [6,8]	75 - 150 [13]	35000 [9]	120 [14]	30 [9]	-	2000 [7]	10 [6]	80 [7]	70 - 150 [15]	-	-	1 [8]	-	20 [10]	200 [7]	9500 [9]	9 [10]	50 [10]	-	100 [6]	150 [7]	150 - 200 [16]
	BCCSR CL [3,5]:		-		-		250000 [9]	40 [10]	10 [8]	1500 [7,8]	85 - 350 [17]	50000 [9]	1 - 75 [18]	-	60 [8,23]	25 [8]	75 - 1500 [19,24]	150000 [9]	120 - 2000 [20,24]	450 [9]	-	2000 [7]	75 [6,7]	150 [7]	70 - 250 [21]	-	-	1 [8]	-	40 [10]	1000 [7]	150000 [9]	25 [10]	300 [10]	-	150 [8]	300 [7]	150 - 2000 [22,24]
	Sample ID	Date Sampled																																			
Cells 3a and 3b	C3-17	22/03/2016	7.79		1440		10900	1.03	**24.5**	28	0.0777	2	4.98	8570	22	8.42	**8550**	27200	115	11.4	3530	196	0.0313	4.54	176	420	852	0.83	251	0.483	588	44.7	0.288	716	0.733	88.3	616
	C3-18	22/03/2016	7.83		1250		11100	0.832	**65.3**	22.6	0.0942	2	4.02	7870	25.7	7.81	**9690**	34700	63.1	11.9	3540	198	0.0268	2.36	162	387	836	1.53	283	0.489	578	39.9	0.477	745	0.743	107	499
	C3-19	22/03/2016	7.73		1900		11200	0.95	**13.6**	23.5	0.0868	2	8.23	8890	24.3	9.03	**8780**	32700	117	12.4	3510	205	0.0636	4.69	134	393	747	0.687	272	0.593	595	44.7	0.523	772	0.677	97.6	880
	C3-20	22/03/2016	7.71		910		10400	0.616	2.64	24.8	0.0784	2	20.5	10500	15.4	8.24	**3850**	17200	65	12.9	3420	204	0.0502	1.27	62.7	342	873	<0.200	223	0.335	587	52.7	0.245	678	0.616	62	1630
	C3-200	22/03/2016	7.73		937		10300	0.645	2.5	26.5	0.0806	2	23.3	10600	19.7	8.54	**3740**	23100	62.6	13.1	3390	202	0.0621	1.33	64.2	353	839	0.219	230	0.371	582	53.3	0.256	697	0.611	85.8	1730
	C3-24	30/03/2016	7.59		4600		11400	1.42	**9.92**	39.2	0.0842	3	3.84	15400	13.7	9.51	**8220**	22200	326	15.3	4150	228	0.0939	12.4	40	460	1020	0.753	302	1.1	643	82.1	0.375	685	0.734	60.1	721
	C3-25	30/03/2016	7.62		4350		11700	1.95	**11.4**	34.6	0.0931	3	3.26	12900	14.1	9.95	**6310**	25000	404	17.3	4470	243	0.118	14.5	63.9	518	1190	0.953	232	1.31	641	69.6	0.526	683	0.851	63.7	609
	C3-27	30/03/2016	7.65		4240		11500	0.642	7.07	34.4	0.084	4	2.94	13900	23.1	11.4	**10100**	24800	313	18.6	4430	250	0.0437	7.01	91.6	393	1070	0.278	312	0.555	622	81	0.252	737	0.726	64.2	500
	C3-28	30/03/2016	7.41		3670		11100	1.57	7.39	30.3	0.072	3	1.78	9040	14.4	10.5	**6200**	24600	172	14	4670	231	0.103	10.1	106	426	1060	0.771	237	0.979	534	45.2	0.457	618	0.622	64.5	383
	C3-30	30/03/2016	7.62		1910		11800	0.736	**12.1**	29.6	0.0928	3	2.76	9900	17.2	10.8	**6100**	24900	113	12.3	4080	226	0.0452	5.14	111	383	953	0.3	233	0.484	600	57.8	0.504	735	0.623	74.1	422
	C3-300	30/03/2016	7.67		4240		11300	2.23	**11.6**	31.1	0.0734	2	3.56	11400	17.1	12.1	**4220**	26600	369	11.5	4010	198	0.187	14.7	237	427	1100	1.25	230	1.58	635	59.9	0.51	712	0.495	79	624
	C3-34	30/03/2016	7.56		4390		11600	3.08	**16.5**	33.3	0.0727	2	3.22	9780	19.7	12.4	**4840**	28400	574	11.5	4490	238	0.18	22.2	250	435	1140	1.73	240	2.12	637	57.2	0.962	718	0.714	71.2	551
	C3-35	30/03/2016	7.67		2870		11100	1.9	8.96	28.9	0.076	2	5.66	10900	22.8	14.3	**7140**	28900	129	11.2	3890	221	0.0531	4.17	331	402	1020	0.291	359	1.14	572	59.7	0.808	689	0.695	90.4	774
	C3-36	30/03/2016	7.66		1730		11500	0.773	6.74	34.1	0.08	2	2.77	7930	17.8	12.6	**6740**	24900	98.5	10.8	3990	233	0.0321	3.69	249	421	888	<0.200	272	0.464	549	47.8	0.623	706	0.701	72.6	468

Table 2a: Analytical Results - Notes

(1) All values are reported as µg/g unless otherwise noted.
(2) - = No standard or not analyzed.
(3) BCCSR = BC Environmental Management Act, Contaminated Sites Regulation, B.C. Reg. 375/96 - includes amendments up to B.C. Reg. 116/2018, June 14, 2018.
(4) BCCSR RL_{LD} = Schedule 3.1, Part 1 (Matrix), Column 6, Residential Low Density and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 7, Residential Low Density and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 7, Residential Low Density.
(5) BCCSR CL = Schedule 3.1, Part 1 (Matrix), Column 8, Commercial and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 9, Commercial and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 9, Commercial.
(6) Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil.
(7) Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants.
(8) Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine. If Marine is not specified then the standard Marine and Freshwater.
(9) Schedule 3.1, Part 2, Generic Numerical Soil Standards to Protect Human Health.
(10) Schedule 3.1, Part 3, Generic Numerical Soil Standards to Protect Ecological Health.
(11) Beryllium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (85 ug/g).
(12) Cadmium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (20 ug/g).
(13) Copper varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (150 ug/g).
(14) Lead varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (120 ug/g).
(15) Nickel varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (150 ug/g).
(16) Zinc varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
200 if pH>=8.0
(17) Beryllium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
100 if pH>=5.0 and pH<5.5
200 if pH>=5.5 and pH<6.0
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (350 ug/g).
(18) Cadmium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (75 ug/g).
(19) Copper varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
650 if pH>=6.5 and pH<7.0
1500 if pH>7.0
(20) Lead varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
300 if pH>=5.5 and pH<6.0
1500 if pH>=6.0 and pH<6.5
2000 if pH>6.5
(21) Nickel varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
250 if pH>=7.5 and pH<8.0
And/or, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (250 ug/g).
(22) Zinc varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
2000 if pH>=8.0
(23) Chromium - more stringent standard of chromium hexavalent and trivalent is applied.
(24) Upper-cap concentrations of 1,500 µg/g for copper, 2,000 µg/g for lead, and 2,000 µg/g for zinc are applied (site-specific remediation criteria).
(25) Schedule 3.1, Part 2 (To Protect Human Health) & Part 3 (To Protect Ecological Health), Generic Numerical Soil Standards (equivalent to C6-C10 minus BTEX).
(26) BCHWR = BC Environmental Management Act, Hazardous Waste Regulation, B.C. Reg. 63/88 includes amendments up to B.C. Reg. 243/2016, November 1, 2017.
(27) BCHWR LQS = Schedule 4, Table 1, Leachate Quality Standards.

Table 2b: Amended Hazardous Waste - Cell 3a
Analytical Results

		Parameter:	Leachate Metals	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Beryllium (ug/L)	Boron (ug/L)	Cadmium (ug/L)	Chromium (ug/L)	Cobalt (ug/L)	Copper (ug/L)	Iron (ug/L)	Lead (ug/L)	Mercury (ug/L)	Molybdenum (ug/L)	Nickel (ug/L)	Selenium (ug/L)	Silver (ug/L)	Thallium (ug/L)	Uranium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)	Zirconium (ug/L)
		BCHWR LQS [3,4]:		-	2500	100000	-	500000	500	5000	-	100000	-	5000	100	-	-	1000	5000	-	10000	-	500000	-
	Sample ID	**Date Sampled**																						
Cell 3a	C7A2	30/03/2016		<100	<100	230	<100	<100	<100	<100	<100	38400	<500	<100	<2	<100	380	<100	<10	<100	<100	<100	5940	<100
	C7B2	30/03/2016		<100	<100	150	<100	<100	<100	<100	<100	280	<500	<100	<2	<100	<100	<100	<10	<100	<100	<100	<100	<100
	C7C2	30/03/2016		<100	<100	170	<100	<100	<100	<100	<100	390	<500	<100	<2	<100	<100	<100	<10	<100	<100	<100	<100	<100
	C7D2	30/03/2016		<100	<100	230	<100	<100	<100	<100	<100	5630	<500	<100	<2	<100	370	<100	<10	<100	<100	<100	2500	<100
	C8A	30/03/2016		<100	<100	260	<100	330	<100	<100	<100	10700	910	<100	<2	<100	140	<100	<10	<100	<100	<100	3940	<100
	C8B	30/03/2016		<100	<100	280	<100	<100	100	<100	<100	17800	<500	<100	<2	<100	140	<100	<10	<100	<100	<100	7590	<100
	C8C	30/03/2016		<100	<100	280	<100	<100	110	<100	<100	10700	<500	<100	<2	<100	190	<100	<10	<100	<100	<100	8000	<100

Table 2b: Analytical Results - Notes

(1) All values are reported as µg/g unless otherwise noted.
(2) - = No standard or not analyzed.
(3) BCHWR = BC Environmental Management Act, Hazardous Waste Regulation, B.C. Reg. 63/88 includes amendments up to B.C. Reg. 243/2016, November 1, 2017.
(4) BCHWR LQS = Schedule 4, Table 1, Leachate Quality Standards.

Table 2c: Amended Hazardous Waste - Cell 3b
Analytical Results

		Parameter:	Leachate Metals	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Beryllium (ug/L)	Boron (ug/L)	Cadmium (ug/L)	Chromium (ug/L)	Cobalt (ug/L)	Copper (ug/L)	Iron (ug/L)	Lead (ug/L)	Mercury (ug/L)	Molybdenum (ug/L)	Nickel (ug/L)	Selenium (ug/L)	Silver (ug/L)	Thallium (ug/L)	Uranium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)	Zirconium (ug/L)
		BCHWR LQS [3,4]:		-	2500	100000	-	500000	500	5000	-	100000	-	5000	100	-	-	1000	5000	-	10000	-	500000	-
	Sample ID	**Date Sampled**																						
Cell 3b	C5G	30/03/2016		<100	<100	260	<100	<100	160	<100	<100	60900	<500	220	<2	<100	330	<100	<10	<100	<100	<100	13900	<100
	C5H	30/03/2016		<100	<100	250	<100	<100	190	<100	<100	29000	<500	200	<2	<100	380	<100	<10	<100	<100	<100	16400	<100
	C5I	30/03/2016		<100	<100	290	<100	<100	220	<100	<100	39000	<500	300	<2	<100	460	<100	<10	<100	<100	<100	21300	<100
	C6A	30/03/2016		<100	<100	240	<100	<100	100	<100	<100	10800	<500	<100	<2	<100	200	<100	<10	<100	<100	<100	7240	<100
	C6B	30/03/2016		<100	<100	240	<100	<100	150	<100	<100	29000	<500	120	<2	<100	270	<100	<10	<100	<100	<100	12200	<100
	C6C	30/03/2016		<100	<100	240	<100	<100	<100	<100	<100	10200	<500	<100	<2	<100	210	<100	<10	<100	<100	<100	6540	<100
	C6D	30/03/2016		<100	<100	290	<100	320	<100	<100	<100	69200	<500	180	<2	<100	220	<100	<10	<100	<100	<100	7830	<100

Table 2c: Analytical Results - Notes

(1) All values are reported as µg/g unless otherwise noted.
(2) - = No standard or not analyzed.
(3) BCHWR = BC Environmental Management Act, Hazardous Waste Regulation, B.C. Reg. 63/88 includes amendments up to B.C. Reg. 243/2016, November 1, 2017.
(4) BCHWR LQS = Schedule 4, Table 1, Leachate Quality Standards.

Table 3a: Cell 4 Pre-Stabilization Results
Analytical Results

	Parameter:	Field Tests	pH	Total Inorganics	Sulfur	Total Metals	Aluminium	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
	BCCSR RL [3,4]:		-		-		40000 [9]	20 [10]	10 [8]	700 [7]	85 [11]	8500 [9]	1 - 20 [12]	-	60 [8,23]	25 [6,8]	75 - 150 [13]	35000 [9]	120 [14]	30 [9]	-	2000 [7]	10 [6]	80 [7]	70 - 150 [15]	-	-	1 [8]	-	20 [10]	200 [7]	9500 [9]	9 [10]	50 [10]	-	100 [6]	150 [7]	150 - 200 [16]
	BCCSR CL [3,5]:		-		-		250000 [9]	40 [10]	10 [8]	1500 [7,8]	85 - 350 [17]	50000 [9]	1 - 75 [18]	-	60 [8,23]	25 [8]	75 - 1500 [19,24]	150000 [9]	120 - 2000 [20,24]	450 [9]	-	2000 [7]	75 [6,7]	150 [7]	70 - 250 [21]	-	-	1 [8]	-	40 [10]	1000 [7]	150000 [9]	25 [10]	300 [10]	-	150 [8]	300 [7]	150 - 2000 [22,24]
	Sample ID	Date Sampled																																				
Cell 4	C4-1	16/03/2016	4.23		49300		9680	**121**	**260**	65.3	0.0945	2	**232**	5060	32.5	**27.1**	**22200**	**44900**	**12100**	10.1	3760	225	10	49.8	33.9	421	1040	**16.7**	224	**48.5**	402	44.6	-	26	565	1.83	53.4	**58700**
	C4-100	18/03/2016	4.87		14700		10800	**29.6**	**101**	76.4	0.0787	2	**25.3**	6120	15.5	15.4	**16900**	**41100**	**4100**	9.06	4320	225	1.28	79.8	**160**	478	1230	**9.49**	292	**21.4**	457	40.7	-	5.62	669	0.714	52.3	**5530**
	C4-2	16/03/2016	4.43		32000		9770	**46.4**	**141**	97.4	0.0645	2	**60.5**	6070	21.3	18.8	**37000**	**55500**	**5930**	9.39	3800	292	3.03	**111**	39	445	1180	**15**	220	**30.4**	466	44.9	-	8.04	668	0.865	61	**12100**
	C4-3	18/03/2016	4.91		15400		10500	**31.5**	**100**	69.1	0.0649	2	**24.7**	6220	18.2	14.1	**14900**	**40800**	**3170**	8.49	4310	235	1.48	72.7	**159**	547	1170	**8.65**	200	**21.4**	465	42	-	6.39	640	0.627	53.3	**4450**
	C4-5	18/03/2016	4.77		17100		9810	**30.5**	**100**	74.4	0.0784	2	**24.9**	7070	30.2	14.8	**16400**	**45100**	**4140**	8.97	4200	217	1.31	**90.4**	88.2	490	1180	**10.1**	226	**24.6**	406	45.8	-	6.58	671	0.637	50.9	**4940**
	C4-6	18/03/2016	4.97		15100		10900	**40.1**	**79.7**	76.6	0.0818	2	**30.4**	8070	19	10.6	**15500**	**41400**	**3990**	9.46	3720	220	1.41	65.3	**132**	457	1140	**6.73**	243	**28.4**	633	46	-	5.31	658	0.732	53.6	**5950**
	C4-7	18/03/2016	6.72		18800		10900	17.9	**80.1**	59.1	0.0947	2	**15.2**	9120	16	9.25	**26300**	**43000**	**7800**	9.45	4080	212	0.947	**108**	23.4	420	1130	**7.95**	217	15	553	46.1	-	3.03	701	0.731	49.9	**3670**
	C4-8	18/03/2016	5.63		24200		11600	**37.3**	**123**	104	0.104	3	**48.2**	8450	26.2	11.6	**28600**	**60600**	**5550**	9.85	4370	237	2.78	**124**	32.6	560	1350	**10.9**	289	**24.8**	500	45.5	-	7.95	778	1.1	61.1	**10300**

Table 3a: Cell 4 Pre-Stabilization Results
Analytical Results

(1) All values are reported as µg/g unless otherwise noted.
(2) - = No standard or not analyzed.
(3) BCCSR = BC Environmental Management Act, Contaminated Sites Regulation, B.C. Reg. 375/96 - includes amendments up to B.C. Reg. 116/2018, June 14, 2018.
(4) BCCSR RL_{LD} = Schedule 3.1, Part 1 (Matrix), Column 6, Residential Low Density and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 7, Residential Low Density and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 7, Residential Low Density.
(5) BCCSR CL = Schedule 3.1, Part 1 (Matrix), Column 8, Commercial and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 9, Commercial and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 9, Commercial.
(6) Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil.
(7) Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants.
(8) Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine. If Marine is not specified then the standard Marine and Freshwater.
(9) Schedule 3.1, Part 2, Generic Numerical Soil Standards to Protect Human Health.
(10) Schedule 3.1, Part 3, Generic Numerical Soil Standards to Protect Ecological Health.
(11) Beryllium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (85 ug/g).
(12) Cadmium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (20 ug/g).
(13) Copper varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (150 ug/g).
(14) Lead varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (120 ug/g).
(15) Nickel varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (150 ug/g).
(16) Zinc varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
200 if pH>=8.0
(17) Beryllium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
100 if pH>=5.0 and pH<5.5
200 if pH>=5.5 and pH<6.0
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (350 ug/g).
(18) Cadmium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (75 ug/g).
(19) Copper varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
650 if pH>=6.5 and pH<7.0
1500 if pH>7.0
(20) Lead varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
300 if pH>=5.5 and pH<6.0
1500 if pH>=6.0 and pH<6.5
2000 if pH>6.5
(21) Nickel varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
250 if pH>=7.5 and pH<8.0
And/or, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (250 ug/g).
(22) Zinc varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
2000 if pH>=8.0
(23) Chromium - more stringent standard of chromium hexavalent and trivalent is applied.
(24) Upper-cap concentrations of 1,500 µg/g for copper, 2,000 µg/g for lead, and 2,000 µg/g for zinc are applied (site-specific remediation criteria).
(25) Schedule 3.1, Part 2 (To Protect Human Health) & Part 3 (To Protect Ecological Health), Generic Numerical Soil Standards (equivalent to C6-C10 minus BTEX).
(26) BCHWR = BC Environmental Management Act, Hazardous Waste Regulation, B.C. Reg. 63/88 includes amendments up to B.C. Reg. 243/2016, November 1, 2017.
(27) BCHWR LQS = Schedule 4, Table 1, Leachate Quality Standards.

Table 3b: Amended Hazardous Waste - Cell 4
Analytical Results

		Parameter:	Leachate Metals	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Beryllium (ug/L)	Boron (ug/L)	Cadmium (ug/L)	Chromium (ug/L)	Cobalt (ug/L)	Copper (ug/L)	Iron (ug/L)	Lead (ug/L)	Mercury (ug/L)	Molybdenum (ug/L)	Nickel (ug/L)	Selenium (ug/L)	Silver (ug/L)	Thallium (ug/L)	Uranium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)	Zirconium (ug/L)
		BCHWR LQS [3,4]:		-	2500	100000	-	500000	500	5000	-	100000	-	5000	100	-	-	1000	5000	-	10000	-	500000	-
	Sample ID	**Date Sampled**																					
Cell 4	L4A	30/03/2016		<100	<100	220	<100	<100	<100	<100	<100	190	<500	<100	<2	180	<100	<100	<10	<100	<100	<100	<100	<100
	L4B	30/03/2016		<100	<100	180	<100	<100	<100	<100	<100	250	<500	<100	<2	180	<100	<100	<10	<100	<100	<100	<100	<100
	L4C	30/03/2016		<100	<100	250	<100	<100	<100	<100	<100	240	<500	<100	<2	210	<100	<100	<10	<100	<100	<100	<100	<100
	L6A	30/03/2016		<100	<100	250	<100	<100	<100	<100	<100	260	<500	<100	<2	100	<100	<100	<10	<100	<100	<100	<100	<100
	L6B	30/03/2016		<100	<100	220	<100	<100	<100	<100	<100	320	<500	<100	<2	110	<100	<100	<10	<100	<100	<100	<100	<100
	L6C	30/03/2016		<100	<100	250	<100	<100	<100	<100	<100	320	<500	<100	<2	140	<100	<100	<10	<100	<100	<100	<100	<100

Table 3b: Analytical Results - Notes

(1) All values are reported as µg/g unless otherwise noted.
(2) - = No standard or not analyzed.
(3) BCHWR = BC Environmental Management Act, Hazardous Waste Regulation, B.C. Reg. 63/88 includes amendments up to B.C. Reg. 243/2016, November 1, 2017.
(4) BCHWR LQS = Schedule 4, Table 1, Leachate Quality Standards.

Table 4: Transfer Shed Pre- Stabilization
Analytical Results

	Sample ID	Parameter: / Date Sampled	**Field Tests**	pH	**Physical Tests**	Moisture (% w/w)	pH after HCl	pH, final	pH, initial	pH, leaching fluid	**Leachate Metals**	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Beryllium (ug/L)
		BCCSR RL [3,4]		-		-	-	-	-	-		-	-	-	-
		BCCSR CL [3,5]		-		-	-	-	-	-		-	-	-	-
		BCHWR LQS [26,27]		-		-	-	-	-	-		-	2500	100000	-
				-		-	-	-	-	-		-	2500	100000	-
Transfer Shed	SP-C2-10	13/03/2015		7.31		14.2	1.23	5.18	8.34	4.97		<100	<100	260	<100
Transfer Shed	SP-C2-24	17/03/2015		7.35		14.4	1.38	5.37	8.35	4.97		<100	<100	370	<100

	Sample ID	Parameter: / Date Sampled	Boron (ug/L)	Cadmium (ug/L)	Chromium (ug/L)	Cobalt (ug/L)	Copper (ug/L)	Iron (ug/L)	Lead (ug/L)	Mercury (ug/L)	Molybdenum (ug/L)	Nickel (ug/L)	Selenium (ug/L)	Silver (ug/L)	Thallium (ug/L)	Uranium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)	Zirconium (ug/L)	**Total Inorganics**	Sulfur
		BCCSR RL [3,4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
		BCCSR CL [3,5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
		BCHWR LQS [26,27]	500000	500	5000	-	100000	-	5000	100	-	-	1000	5000	-	10000	-	500000	-		-
			500000	500	5000	-	100000	-	5000	100	-	-	1000	5000	-	10000	-	500000	-		-
Transfer Shed	SP-C2-10	13/03/2015	<100	260	<100	<100	**133000**	570	**69600**	<2.0	<100	810	<100	<100	<100	<100	<100	27600	<100		2810
Transfer Shed	SP-C2-24	17/03/2015	<100	440	<100	<100	**100000**	860	**6330**	<2.0	<100	420	<100	<100	<100	<100	<100	42600	<100		4850

Table 4: Transfer Shed Pre- Stabilization
Analytical Results

	Sample ID	Date Sampled / Parameter:	Total Metals	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Tin	Titanium	Vanadium	Zinc
		BCCSR RL [3,4]		40000 [9]	20 [10]	10 [8]	700 [7]	85 [11]	8500 [9]	1 - 20 [12]	-	60 [8,23]	25 [6,8]	75 - 150 [13]	35000 [9]	120 [14]	-	2000 [7]	10 [6]	80 [7]	70 - 150 [15]	-	-	1 [8]	-	20 [10]	200 [7]	9500 [9]	50 [10]	-	150 [7]	150 - 200 [16]
		BCCSR CL [3,5]		250000 [9]	40 [10]	10 [8]	1500 [7,8]	85 - 350 [17]	50000 [9]	1 - 75 [18]	-	60 [8,23]	25 [8]	75 - 1500 [19,24]	150000 [9]	120 - 2000 [20,24]	-	2000 [7]	75 [6,7]	150 [7]	70 - 250 [21]	-	-	1 [8]	-	40 [10]	1000 [7]	150000 [9]	300 [10]	-	300 [7]	150 - 2000 [22,24]
		BCHWR LQS [26,27]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sample ID	Date Sampled																														
				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transfer Shed	SP-C2-10	13/03/2015		12700	1.13	11.1	37.6	0.086	<1	9	9520	13.7	15.3	7630	18800	308	4630	263	0.12	13	144	518	1260	1	601	2.75	539	52.9	11	684	49	1580
Transfer Shed	SP-C2-24	17/03/2015		15300	4.47	34	51.9	0.092	<1	20	10300	18.3	12.4	7580	21500	954	5100	263	0.476	24	88	503	1300	1.9	3850	6.16	954	59.7	9.1	794	44	3620

Table 1: Analytical Results - Notes

(1) All values are reported as µg/g unless otherwise noted.
(2) - = No standard or not analyzed.
(3) BCCSR = BC Environmental Management Act, Contaminated Sites Regulation, B.C. Reg. 375/96 - includes amendments up to B.C. Reg. 116/2018, June 14, 2018.
(4) BCCSR RL_{LD} = Schedule 3.1, Part 1 (Matrix), Column 6, Residential Low Density and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 7, Residential Low Density and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 7, Residential Low Density.
(5) BCCSR CL = Schedule 3.1, Part 1 (Matrix), Column 8, Commercial and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 9, Commercial and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 9, Commercial.
(6) Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil.
(7) Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants.
(8) Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine. If Marine is not specified then the standard Marine and Freshwater.
(9) Schedule 3.1, Part 2, Generic Numerical Soil Standards to Protect Human Health.
(10) Schedule 3.1, Part 3, Generic Numerical Soil Standards to Protect Ecological Health.
(11) Beryllium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (85 ug/g).
(12) Cadmium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (20 ug/g).
(13) Copper varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (150 ug/g).
(14) Lead varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (120 ug/g).
(15) Nickel varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (150 ug/g).
(16) Zinc varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
200 if pH>=8.0
(17) Beryllium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
100 if pH>=5.0 and pH<5.5
200 if pH>=5.5 and pH<6.0
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (350 ug/g).
(18) Cadmium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (75 ug/g).
(19) Copper varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
650 if pH>=6.5 and pH<7.0
1500 if pH>7.0
(20) Lead varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
300 if pH>=5.5 and pH<6.0
1500 if pH>=6.0 and pH<6.5
2000 if pH>6.5
(21) Nickel varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
250 if pH>=7.5 and pH<8.0
And/or, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (250 ug/g).
(22) Zinc varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
2000 if pH>=8.0
(23) Chromium - more stringent standard of chromium hexavalent and trivalent is applied.
(24) Upper-cap concentrations of 1,500 µg/g for copper, 2,000 µg/g for lead, and 2,000 µg/g for zinc are applied (site-specific remediation criteria).
(25) Schedule 3.1, Part 2 (To Protect Human Health) & Part 3 (To Protect Ecological Health), Generic Numerical Soil Standards (equivalent to C6-C10 minus BTEX).
(26) BCHWR = BC Environmental Management Act, Hazardous Waste Regulation, B.C. Reg. 63/88 includes amendments up to B.C. Reg. 243/2016, November 1, 2017.
(27) BCHWR LQS = Schedule 4, Table 1, Leachate Quality Standards.

Table 5: Cell 1
Analytical Results

		Parameter:	Field Tests	pH	Physical Tests	Moisture (%)	pH after HCl	pH, final	pH, initial	pH, leaching fluid	Solids (%)	Total Inorganics	Sulfur	Leachate Metals	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Beryllium (ug/L)	Boron (ug/L)	Cadmium (ug/L)	Chromium (ug/L)	Cobalt (ug/L)	Copper (ug/L)	Iron (ug/L)	Lead (ug/L)	Mercury (ug/L)	Molybdenum (ug/L)	Nickel (ug/L)	Selenium (ug/L)	Silver (ug/L)	Thallium (ug/L)	Uranium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)	Zirconium (ug/L)
		BCCSR RL [3,4]:		-		-	-	-	-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		BCCSR CL [3,5]:		-		-	-	-	-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		BCHWR LQS [26,27]:		-		-	-	-	-	-	-		-		-	2500	100000	-	500000	500	5000	-	100000	-	5000	100	-	-	1000	5000	-	10000	-	500000	-
	Sample ID	Date Sampled																																	
Cell 1	C4-10	18/03/2016		7.12		5.47	1.2	5.05	6.32	4.92	94.5		4050		<100	<100	320	<100	<100	<100	<100	<100	<100	42000	740	1610	<2.0	<100	<100	<100	<100	<100	<100	<100	<100	6370	<100
	C4-4	18/03/2016		4.45		5.28	1.26	4.92	5.18	4.9	94.7		9420		<100	<100	150	<100	<100	<100	<100	<100	<100	15400	750	2480	<2.0	<100	<100	<100	<100	<100	<100	<100	<100	1940	<100
	C4-9	18/03/2016		4.41		8.49	1.2	4.91	5.06	4.92	91.5		17500		<100	<100	340	<100	<100	<100	<100	<100	<100	15500	<500	2880	<2.0	<100	<100	<100	<100	<100	<100	<100	<100	5030	<100

Table 5: Cell 1
Analytical Results

Total Metals	Aluminium	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
	40000 [9]	20 [10]	10 [8]	700 [7]	85 [11]	8500 [9]	1 - 20 [12]	-	60 [8,23]	25 [6,8]	75 - 150 [13]	35000 [9]	120 [14]	30 [9]	-	2000 [7]	10 [6]	80 [7]	70 - 150 [15]	-	-	1 [8]	-	20 [10]	200 [7]	9500 [9]	9 [10]	50 [10]	-	100 [6]	150 [7]	150 - 200 [16]
	250000 [9]	40 [10]	10 [8]	1500 [7,8]	85 - 350 [17]	50000 [9]	1 - 75 [18]	-	60 [8,23]	25 [8]	75 - 1500 [19,24]	150000 [9]	120 - 2000 [20,24]	450 [9]	-	2000 [7]	75 [6,7]	150 [7]	70 - 250 [21]	-	-	1 [8]	-	40 [10]	1000 [7]	150000 [9]	25 [10]	300 [10]	-	150 [8]	300 [7]	150 - 2000 [22,24]
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12900	5.97	**27.3**	51	0.0921	3	5.61	8930	17.4	7.46	**4100**	29700	**821**	15.8	4920	267	0.335	28.3	28.6	537	1250	**2.33**	262	3.63	637	46.8		1.16	828	1.2	54.2	**918**
	10700	9.93	**52.6**	50.8	0.0785	2	**3.8**	6360	19	8.48	**8770**	**44500**	**2350**	8.81	4150	208	0.42	79.8	30.3	763	1250	**6.41**	228	9.2	513	43.7		1.97	683	0.665	66.9	**591**
	11400	**43.1**	**136**	109	0.0915	2	**28.6**	6690	26.8	8.15	**15300**	**55000**	**3370**	8.23	4840	270	2.16	**103**	21.5	835	2150	**8.19**	223	**24.1**	474	40.7		8.57	843	1.09	50.6	**6400**

Table 5: Cell 1
Analytical Results

(1) All values are reported as µg/g unless otherwise noted.
(2) - = No standard or not analyzed.
(3) BCCSR = BC Environmental Management Act, Contaminated Sites Regulation, B.C. Reg. 375/96 - includes amendments up to B.C. Reg. 116/2018, June 14, 2018.
(4) BCCSR RL_{LD} = Schedule 3.1, Part 1 (Matrix), Column 6, Residential Low Density and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 7, Residential Low Density and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 7, Residential Low Density.
(5) BCCSR CL = Schedule 3.1, Part 1 (Matrix), Column 8, Commercial and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 9, Commercial and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 9, Commercial.
(6) Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil.
(7) Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants.
(8) Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine. If Marine is not specified then the standard Marine and Freshwater.
(9) Schedule 3.1, Part 2, Generic Numerical Soil Standards to Protect Human Health.
(10) Schedule 3.1, Part 3, Generic Numerical Soil Standards to Protect Ecological Health.
(11) Beryllium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (85 ug/g).
(12) Cadmium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (20 ug/g).
(13) Copper varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (150 ug/g).
(14) Lead varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (120 ug/g).
(15) Nickel varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (150 ug/g).
(16) Zinc varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
200 if pH>=8.0
(17) Beryllium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
100 if pH>=5.0 and pH<5.5
200 if pH>=5.5 and pH<6.0
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (350 ug/g).
(18) Cadmium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (75 ug/g).
(19) Copper varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
650 if pH>=6.5 and pH<7.0
1500 if pH>7.0
(20) Lead varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
300 if pH>=5.5 and pH<6.0
1500 if pH>=6.0 and pH<6.5
2000 if pH>6.5
(21) Nickel varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
250 if pH>=7.5 and pH<8.0
And/or, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (250 ug/g).
(22) Zinc varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
2000 if pH>=8.0
(23) Chromium - more stringent standard of chromium hexavalent and trivalent is applied.
(24) Upper-cap concentrations of 1,500 µg/g for copper, 2,000 µg/g for lead, and 2,000 µg/g for zinc are applied (site-specific remediation criteria).
(25) Schedule 3.1, Part 2 (To Protect Human Health) & Part 3 (To Protect Ecological Health), Generic Numerical Soil Standards (equivalent to C6-C10 minus BTEX).
(26) BCHWR = BC Environmental Management Act, Hazardous Waste Regulation, B.C. Reg. 63/88 includes amendments up to B.C. Reg. 243/2016, November 1, 2017.
(27) BCHWR LQS = Schedule 4, Table 1, Leachate Quality Standards.

Table 6: Cell 5
Analytical Results

	Parameter:	Field Tests	pH	Total Inorganics	Sulfur	Total Metals	Aluminium	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
	BCCSR RL [3,4]:		-		-		40000 [9]	20 [10]	10 [8]	700 [7]	85 [11]	8500 [9]	1 - 20 [12]	-	60 [8,23]	25 [6,8]	75 - 150 [13]	35000 [9]	120 [14]	30 [9]	-	2000 [7]	10 [6]	80 [7]	70 - 150 [15]	-	-	1 [8]	-	20 [10]	200 [7]	9500 [9]	9 [10]	50 [10]	-	100 [6]	150 [7]	150 - 200 [16]
	BCCSR CL [3,5]:		-		-		250000 [9]	40 [10]	10 [8]	1500 [7,8]	85 - 350 [17]	50000 [9]	1 - 75 [18]	-	60 [8,23]	25 [8]	75 - 1500 [19,24]	150000 [9]	120 - 2000 [20,24]	450 [9]	-	2000 [7]	75 [6,7]	150 [7]	70 - 250 [21]	-	-	1 [8]	-	40 [10]	1000 [7]	150000 [9]	25 [10]	300 [10]	-	150 [8]	300 [7]	150 - 2000 [22,24]
	Sample ID	Date Sampled																																				
Cell #5	C5-1	30/03/2016	7.75		11600		14800	21.3	34.9	60.4	0.0987	5	29.3	19000	19.6	12.8	10100	34800	848	26.4	4950	264	3.43	51.2	27.5	529	1380	2.77	264	12	857	85.5	-	1.7	920	2.25	75.9	4820
	C5-100	30/03/2016	7.4		3640		17000	5.99	21.7	50	0.122	6	13.3	14600	20.4	13.4	3720	29500	413	32.3	5710	281	0.301	17.7	129	674	1560	1.05	253	3.69	844	71.3	-	0.709	947	3.72	69	1490
	C5-3	30/03/2016	7.46		39500		18100	24.6	29.1	97.4	0.133	11	159	17900	18.8	24.4	19400	44100	1990	38.9	6160	342	3.55	92.6	66.1	948	1740	13.3	250	16.1	928	84.6	-	4.56	929	6.39	57	30700
	C5-4	30/03/2016	7.63		4470		15900	6.24	19	53.9	0.125	5	9.64	15100	15.7	11.7	4710	28800	482	26.9	5340	295	0.317	26.6	27.6	651	1380	1.48	240	4.63	765	76.1	-	0.846	823	2.91	63.7	1370
	C5-5	30/03/2016	7.34		3410		18700	5.96	15.7	50.4	0.132	7	12.1	15300	18.2	12.9	2870	29900	397	37.7	6150	316	0.301	16.9	131	721	1670	0.95	248	3.59	914	79.7	-	0.776	994	4.81	69.4	1480
	C5-7	30/03/2016	7.66		2090		15600	5.7	15.6	52.3	0.118	4	4.29	19200	14.7	7.91	2590	27100	396	18.4	4930	248	0.218	18.1	20	561	1320	1.3	221	3.63	703	102	-	0.991	858	1.82	57.1	769
	C5-8	30/03/2016	7.35		3680		18600	3.11	14.3	46.4	0.132	6	10.4	13300	16.4	14.8	3290	29100	2360	38	6230	323	0.153	15.6	107	721	1740	0.992	225	2.2	878	69.5	-	0.631	1030	4.74	66.1	1450
	C5-9	30/03/2016	7.66		3640		15200	4.09	14.2	45.6	0.108	5	8.02	16100	15.8	8.39	3510	26500	1330	22.2	5130	252	0.201	18.9	23.5	643	1360	1.04	276	2.88	777	76.3	-	0.823	859	2.53	59.4	1020

Table 6: Cell 5
Analytical Results

(1) All values are reported as µg/g unless otherwise noted.
(2) - = No standard or not analyzed.
(3) BCCSR = BC Environmental Management Act, Contaminated Sites Regulation, B.C. Reg. 375/96 - includes amendments up to B.C. Reg. 116/2018, June 14, 2018.
(4) BCCSR RL_{LD} = Schedule 3.1, Part 1 (Matrix), Column 6, Residential Low Density and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 7, Residential Low Density and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 7, Residential Low Density.
(5) BCCSR CL = Schedule 3.1, Part 1 (Matrix), Column 8, Commercial and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 9, Commercial and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 9, Commercial.
(6) Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil.
(7) Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants.
(8) Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine. If Marine is not specified then the standard Marine and Freshwater.
(9) Schedule 3.1, Part 2, Generic Numerical Soil Standards to Protect Human Health.
(10) Schedule 3.1, Part 3, Generic Numerical Soil Standards to Protect Ecological Health.
(11) Beryllium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (85 ug/g).
(12) Cadmium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (20 ug/g).
(13) Copper varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (150 ug/g).
(14) Lead varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (120 ug/g).
(15) Nickel varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (150 ug/g).
(16) Zinc varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
200 if pH>=8.0
(17) Beryllium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
100 if pH>=5.0 and pH<5.5
200 if pH>=5.5 and pH<6.0
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (350 ug/g).
(18) Cadmium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (75 ug/g).
(19) Copper varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
650 if pH>=6.5 and pH<7.0
1500 if pH>7.0
(20) Lead varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
300 if pH>=5.5 and pH<6.0
1500 if pH>=6.0 and pH<6.5
2000 if pH>6.5
(21) Nickel varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
250 if pH>=7.5 and pH<8.0
And/or, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (250 ug/g).
(22) Zinc varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
2000 if pH>=8.0
(23) Chromium - more stringent standard of chromium hexavalent and trivalent is applied.
(24) Upper-cap concentrations of 1,500 µg/g for copper, 2,000 µg/g for lead, and 2,000 µg/g for zinc are applied (site-specific remediation criteria).
(25) Schedule 3.1, Part 2 (To Protect Human Health) & Part 3 (To Protect Ecological Health), Generic Numerical Soil Standards (equivalent to C6-C10 minus BTEX).
(26) BCHWR = BC Environmental Management Act, Hazardous Waste Regulation, B.C. Reg. 63/88 includes amendments up to B.C. Reg. 243/2016, November 1, 2017.
(27) BCHWR LQS = Schedule 4, Table 1, Leachate Quality Standards.

Table 7: Heede Crane Cobbles
Analytical Results

	Parameter:	Field Tests	pH	Total Inorganics	Sulfur	Sulfur (elemental)	Sulfur (elemental) (% w/w)	Total Metals	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Tin	Titanium	Vanadium	Zinc
	BCCSR RL [3,4]:		-		-	-	-		40000 [9]	20 [10]	10 [8]	700 [7]	85 [11]	8500 [9]	1 - 20 [12]	-	60 [8,23]	25 [6,8]	75 - 150 [13]	35000 [9]	120 [14]	-	2000 [7]	10 [6]	80 [7]	70 - 150 [15]	-	-	1 [8]	-	20 [10]	200 [7]	9500 [9]	50 [10]	-	150 [7]	150 - 200 [16]
	BCCSR CL [3,5]:		-		-	-	-		250000 [9]	40 [10]	10 [8]	1500 [7,8]	85 - 350 [17]	50000 [9]	1 - 75 [18]	-	60 [8,23]	25 [8]	75 - 1500 [19,24]	150000 [9]	120 - 2000 [20,24]	-	2000 [7]	75 [6,7]	150 [7]	70 - 250 [21]	-	-	1 [8]	-	40 [10]	1000 [7]	150000 [9]	300 [10]	-	300 [7]	150 - 2000 [22,24]
	Sample ID	Date Sampled																																		
Heede Crane Cobbles	SP-C2-1	11/03/2015	6.95	1680				14800	0.61	8.2	35.3	<1	<1	**5.5**	8150	14.3	14	**4600**	19300	**192**	5290	269	0.081	9.1	**119**	531	1250	0.8	512	1.52	580	48	10	727	49	**850**
	SP-C2-10	13/03/2015	7.31	2810				12700	1.13	**11.1**	37.6	<1	<1	9	9520	13.7	15.3	**7630**	18800	**308**	4630	263	0.12	13	**144**	518	1260	1	601	2.75	539	52.9	11	684	49	**1580**
	SP-C2-100	12/03/2015	7.07	2560				13900	1.16	**10.5**	37.3	<1	<1	9.4	8380	13.8	17.9	**7870**	19000	**266**	4680	296	0.132	12	**166**	469	1280	0.9	614	2.76	605	47.7	12	772	53	**1520**
	SP-C2-11	16/03/2015	7.3	3780				11700	2.06	**47.1**	37	<1	<1	9.5	8840	12	11.3	**7280**	22300	**284**	4230	246	0.158	42	**82**	496	1200	2.3	577	3.73	527	51.1	11	635	43	**1250**
	SP-C2-12	16/03/2015	7.24	3550				12800	1.02	**51.7**	38	<1	<1	**15.6**	12600	14.4	17.1	**7700**	18400	**209**	4670	273	0.09	9.2	**176**	527	1340	0.9	694	2.43	582	65.2	11	677	49	**2180**
	SP-C2-13	17/03/2015	7.26	2420				15100	1.01	**18.4**	43.4	<1	<1	13.4	11100	15.4	11.1	**4320**	20500	**262**	4700	300	0.125	13	45	572	1510	0.9	3530	2.46	912	69.3	9.1	786	44	**1550**
	SP-C2-14	17/03/2015	7.27	2220				13800	1.29	**22.8**	49.2	<1	<1	11.3	8550	16	10.7	**5650**	20200	**234**	4650	276	0.102	13	50	541	1620	0.7	3540	2.63	820	55.1	10	770	39	**1270**
	SP-C2-16	20/03/2015	7.67	2510				16600	1.39	**17.7**	52.8	<1	<1	11.7	12000	17.2	10.7	**4680**	21900	**588**	5070	306	0.246	15	54	581	1560	1.2	3620	3.18	919	74.5	8.8	848	46	**1680**
	SP-C2-2	11/03/2015	6.89	2490				14100	0.75	8.9	39.9	<1	<1	**8.7**	8130	14.3	12.9	**5350**	19800	**215**	5000	279	0.149	12	**86**	592	1350	0.9	609	1.93	561	47.3	11	782	51	**1270**
	SP-C2-200	12/03/2015	7.17	2310				13200	0.76	9.7	47.5	<1	<1	11.2	9970	12.7	12.6	**7660**	18700	**211**	4890	287	0.116	15	**72**	472	1380	0.9	545	2.41	675	58.3	11	807	48	**1730**
	SP-C2-23	17/03/2015	7.41	4820				13500	5.08	**23.9**	56.1	<1	<1	**21.1**	9430	17.1	12.3	**6000**	19700	**929**	4500	239	0.548	19	**79**	479	1260	1.7	3620	5.84	867	60.3	9.9	690	39	**3660**
	SP-C2-24	17/03/2015	7.35	4850				15300	4.47	**34**	51.9	<1	<1	20	10300	18.3	12.4	**7580**	21500	**954**	5100	263	0.476	24	**88**	503	1300	1.9	3850	6.16	954	59.7	9.1	794	44	**3620**
	SP-C2-25	17/03/2015	7.42	4880				14700	4.17	**22.6**	55.5	<1	<1	**23.1**	14100	16	11.1	**7010**	21000	**771**	4370	246	0.443	18	**75**	531	1350	1.7	3570	6.81	998	91.3	9.3	756	46	**313**
	SP-C2-26	17/03/2015	7.35	2850				14500	2.17	**19.1**	51.2	<1	<1	13.2	8740	14.6	11.7	**6200**	18400	**521**	4530	252	0.259	17	**77**	473	1230	1.2	3560	4.31	923	60.1	11	742	40	**2000**
	SP-C2-27	16/03/2015	7.23	2100				14100	1.05	**22**	37.8	<1	<1	9.7	9890	15.2	11.2	**5320**	20700	**234**	4960	295	0.12	13	56	566	1340	1	608	2.53	633	55.7	11	731	52	**1400**
	SP-C2-28	16/03/2015	7.19	2160				12500	0.59	9	33.7	<1	<1	8.1	8340	12.3	13.1	**8690**	15800	**157**	4380	253	0.064	7.7	**103**	497	1200	0.6	584	1.73	596	47.2	12	650	45	**1310**
	SP-C2-29	18/03/2015	7.46	2640				15100	1.66	**15.9**	45.4	<1	<1	**16.5**	10500	15	10	**4420**	19200	**373**	4650	261	0.254	12	34	511	1360	1.1	3820	3.07	991	65.3	10	779	45	**2565**
	SP-C2-3	11/03/2015	6.87	2110				14300	0.56	6.8	35.8	<1	<1	**5.2**	8280	14.2	19.1	**5410**	18000	**207**	4850	278	0.09	9.3	**213**	467	1300	0.6	672	1.49	534	41.6	12	858	50	**828**
	SP-C2-30	18/03/2015	7.47	2560				14600	1.28	**10.8**	43.7	<1	<1	**26.2**	10200	14	10.5	**6200**	17400	**327**	4470	249	0.194	11	47	517	1300	1	3450	2.72	960	66.7	10	748	43	**3250**
	SP-C2-300	17/03/2015	7.42	4860				13200	4.01	**25.7**	88.1	<1	<1	**19.8**	10000	14.7	11	**6100**	21600	**829**	4040	227	0.47	22	**72**	477	1240	1.8	3370	7.07	869	58.9	11	687	38	**3280**
	SP-C2-31	18/03/2015	7.51	1750				16200	0.93	9.9	49.5	<1	<1	6.6	12500	13.9	9.3	**2310**	19000	**285**	5220	304	0.128	7.1	31	616	1540	0.7	3810	1.79	946	83	9.1	871	46	**1070**
	SP-C2-32	18/03/2015	7.35	2110				15000	1.22	**20.1**	43.7	<1	<1	9.8	9750	14.1	11.4	**3820**	17400	**320**	4500	271	0.173	8.9	67	543	1360	0.8	3400	2.11	862	59.4	11	718	41	**1510**
	SP-C2-4	11/03/2015	6.85	2650				13400	0.76	10	39.1	<1	<1	**5.6**	7420	13.3	13.6	**6270**	19700	**205**	4660	261	0.313	12	**123**	508	1240	1.2	567	1.93	536	40.8	12	766	48	**918**
	SP-C2-400	17/03/2015	7.4	3890				13900	3.39	**20.3**	46.7	<1	<1	**18.5**	10700	13.3	12.5	**7530**	18600	**563**	4400	255	0.292	15	**79**	488	1310	1.2	3370	5.34	853	62.8	9.3	731	39	**2770**
	SP-C2-5	12/03/2015	7.05	6940				12800	1.19	**17.3**	35.4	<1	<1	7.1	10400	12.1	12.4	**8570**	22500	**5160**	4540	267	0.12	21	**73**	510	1310	2.8	498	3.6	573	63.9	11	724	48	**1120**
	SP-C2-6	11/03/2015	6.95	2570				14100	0.73	8.5	40.5	<1	<1	**10.3**	8090	14.4	18.1	**7530**	19600	**189**	5040	296	0.086	11	**122**	533	1450	0.8	589	1.84	592	44.9	10	788	52	**1560**
	SP-C2-7	12/03/2015	7.12	2800				12200	4.48	**12**	36.1	<1	<1	9.7	8080	12.2	14.6	**8540**	18100	**311**	4440	261	0.135	13	**138**	478	1200	1.1	639	3.44	538	47.5	12	674	47	**1700**
	SP-C2-8	12/03/2015	7.23	2740				11800	2.19	**11.6**	33.2	<1	<1	**14.8**	9730	11.4	12.5	**12700**	16500	**244**	4350	263	0.119	13	**81**	477	1150	0.9	557	2.07	564	49.5	12	622	41	**2460**
	SP-C2-9	13/03/2015	7.31	1870				12000	0.78	8.8	34.8	<1	<1	7.5	8510	10.9	11.4	**5010**	16700	**237**	4470	252	0.094	10	**97**	450	1180	0.8	471	1.93	609	49.4	10	623	41	**1400**
	SP-TF-150303-1	03/03/2015	5.04	1270				14400	0.57	4.9	33.4	<1	63	**2.7**	4390	13.4	11.4	**4500**	17100	61	4930	233	0.065	4.9	**120**	398	1020	0.6	853	0.53	431	26.2	12	731	46	**388**
	SP-TF-150303-2	03/03/2015	6.18	2760				12600	0.4	4.7	32.6	<1	62	**4.6**	6050	12.8	14.1	**5010**	16400	84	4120	195	0.073	5.9	**182**	396	1090	0.6	786	0.76	520	36.7	11	607	43	**710**
	SP-TF-150303-3	03/03/2015	4.93	1490				14100	0.73	5.8	40.7	<1	65	**3.5**	4300	13	12.2	**3770**	17800	59	4750	217	0.119	5.6	**141**	411	1160	1.5	912	0.93	434	27.5	12	773	48	**485**
	SP-TF-150303-4	03/03/2015	5.16	1670				14800	0.55	4.8	40	<1	70	**6.9**	4510	14.1	9.4	**3950**	18600	87	5130	233	0.105	5.5	52	397	1140	0.6	881	0.88	513	29.6	11	788	51	**924**
	SP-TF-150303-5	03/03/2015	6.64	2200				13200	0.46	4.2	33.5	<1	57	**7**	7100	13.6	13.4	**4300**	15700	90	4400	233	0.075	5.6	**130**	448	1130	0.6	898	0.95	457	36.6	12	691	43	**929**
	SP-TF-150303-6	03/03/2015	4.78	1710				14200	0.99	6	41.3	<1	72	**5.2**	3700	13.3	9.5	**3350**	19200	**195**	4960	232	0.194	8.9	54	397	1110	0.7	840	1.48	443	25.9	11	770	49	**755**
	SP-TF-150306-10	06/03/2015	7.09	2920				11800	0.35	7.7	32.6	<1	2.9	6.1	7130	10.7	8.7	**4020**	15500	**132**	4070	212	0.115	8.2	26	437	1110	0.7	1050	1.05	566	46.4	12	593	35	**859**
	SP-TF-150306-11	06/03/2015	5.43	3830				16100	0.21	8.2	42.3	<1	2.3	**5.3**	5790	15.3	8.9	**5010**	20800	**170**	5090	238	0.114	12	32	579	1340	0.8	1340	1.16	522	37.8	13	804	50	**739**
	SP-TF-150306-7	06/03/2015	5.9	1990				12400	0.33	6	34.3	<1	59	**5.3**	4950	11.7	11	**5920**	16000	73	4260	223	0.074	6.7	**81**	432	1150	0.6	314	0.74	507	33	11	621	41	**863**
	SP-TF-150306-8	06/03/2015	6.21	3360				13400	0.6	**14.2**	37.3	<1	6	**8.5**	7500	12.6	11.7	**8150**	19800	**236**	4760	248	0.215	15	**75**	493	1170	1.6	1080	2.2	614	47.7	13	732	43	**1130**
	SP-TF-150306-9	06/03/2015	6.81	3080				15000	0.35	8.5	42.3	<1	7	**7.4**	8340	12.8	10.2	**6910**	20200	154	5410	275	0.119	9.8	37	543	1410	0.8	1160	1.23	652	53.4	11	780	45	**1300**

Table 7: Heede Crane Cobbles
Analytical Results

(1) All values are reported as µg/g unless otherwise noted.
(2) - = No standard or not analyzed.
(3) BCCSR = BC Environmental Management Act, Contaminated Sites Regulation, B.C. Reg. 375/96 - includes amendments up to B.C. Reg. 116/2018, June 14, 2018.
(4) BCCSR RL_{LD} = Schedule 3.1, Part 1 (Matrix), Column 6, Residential Low Density and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 7, Residential Low Density and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 7, Residential Low Density.
(5) BCCSR CL = Schedule 3.1, Part 1 (Matrix), Column 8, Commercial and/or Schedule 3.1, Part 2 (Generic - Human Health), Column 9, Commercial and/or Schedule 3.1, Part 3 (Generic - Ecological Health), Column 9, Commercial.
(6) Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil.
(7) Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants.
(8) Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine. If Marine is not specified then the standard Marine and Freshwater.
(9) Schedule 3.1, Part 2, Generic Numerical Soil Standards to Protect Human Health.
(10) Schedule 3.1, Part 3, Generic Numerical Soil Standards to Protect Ecological Health.
(11) Beryllium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (85 ug/g).
(12) Cadmium varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (20 ug/g).
(13) Copper varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (150 ug/g).
(14) Lead varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
And/or, Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil applies (120 ug/g).
(15) Nickel varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (150 ug/g).
(16) Zinc varies with pH as follows for BCCSR RL_{LD}, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
200 if pH>=8.0
(17) Beryllium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
85 if pH<5.0
100 if pH>=5.0 and pH<5.5
200 if pH>=5.5 and pH<6.0
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (350 ug/g).
(18) Cadmium varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
1 if pH<5.5
1.5 if pH>=5.5 and pH<6.0
2 if pH>=6.0 and pH<6.5
3.5 if pH>=6.5 and pH<7
15 if pH>=7 and pH<7.5
Otherwise, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (75 ug/g).
(19) Copper varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
75 if pH<6.0
150 if pH>=6.0 and pH<6.5
650 if pH>=6.5 and pH<7.0
1500 if pH>7.0
(20) Lead varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
120 if pH<5.5
300 if pH>=5.5 and pH<6.0
1500 if pH>=6.0 and pH<6.5
2000 if pH>6.5
(21) Nickel varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
70 if pH<7.5
250 if pH>=7.5 and pH<8.0
And/or, Schedule 3.1, Part 1, Environmental Protection, Toxicity to soil invertebrates and plants applies (250 ug/g).
(22) Zinc varies with pH as follows for BCCSR CL, Schedule 3.1, Part 1, Environmental Protection, Groundwater flow to surface water used by aquatic life, Marine:
150 if pH<8.0
2000 if pH>=8.0
(23) Chromium - more stringent standard of chromium hexavalent and trivalent is applied.
(24) Upper-cap concentrations of 1,500 µg/g for copper, 2,000 µg/g for lead, and 2,000 µg/g for zinc are applied (site-specific remediation criteria).
(25) Schedule 3.1, Part 2 (To Protect Human Health) & Part 3 (To Protect Ecological Health), Generic Numerical Soil Standards (equivalent to C6-C10 minus BTEX).
(26) BCHWR = BC Environmental Management Act, Hazardous Waste Regulation, B.C. Reg. 63/88 includes amendments up to B.C. Reg. 243/2016, November 1, 2017.
(27) BCHWR LQS = Schedule 4, Table 1, Leachate Quality Standards.

Log of Monitoring Well: MW09-48D

Project Name/No: FSTW Event #15 / 457-007.13

Client: Environment Canada

Date Drilled: September 8th and 9th, 2009

Site Location: PEC Site, West Vancouver, BC

Drilling Company: Sonic Drilling

Drilling Method: Sonic

Logged by: Cody Cameron/Dave Khan

HEMMERA

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)	Backfill details
		Ground Surface	3.57 / 0.00						
0 / 1		**SAND (Fill)** fine to medium sand, trace silt, trace cobbles, loose, orange brown.		MW09-48D-1					
1 / 2		at 0.7 m color is yellow/brown.							
2 / 3		at 1.22 m dark grey silt, some fine sand, trace wood, trace cobbles.		MW09-48D-2					
			1.54 / 2.03						
3 / 4		**SAND** well graded sand, trace cobbles, orange.		MW09-48D-3					
4 / 5		at 2.90 m there is a 15 cm thick silt layer with peat and some fine sand.		MW09-48D-4					
5 / 6		at 3.05 m well graded sand, some gravel/cobbles, trace silt, orange/grey.		MW09-48D-5					
6 / 7		at 6.10 m well graded sand is grey.		MW09-48D-6					
7 / 8		at 9.14 m slight decrease in gravel/cobble percentage, medium grey.		MW09-48D-7					
9 / 10				MW09-48D-8					
10 / 11			-7.71 / 11.28						
11 / 12		**GRAVEL_COBBLES** some medium to coarse sand.	-8.62 / 12.19	MW09-48D-9					
12 / 13									

Backfill details: Concrete; Bentonite; GW Elev: 0.068 mNVD — October 9th, 2009; Bentonite

Well location: PEC Site

Depth to water level (TOC): 3.753 m

Date of water level: October 9th, 2009

Borehole diameter: 0.15 m

Well casing diameter: 5.08 cm

Well casing material: PVC

Well screen slot size: 0.025 cm

Well screen interval (bgs): 22.74 to 24.26 m

Depth of well (TOC): 24.4 m

Well Elevation (TOC): 3.685 m NVD

Ground Elevation: 3.57 m NVD

Log of Monitoring Well: MW09-48D

Project Name/No: FSTW Event #15 / 457-007.13

Client: Environment Canada

Date Drilled: September 8th and 9th, 2009

Site Location: PEC Site, West Vancouver, BC

Drilling Company: Sonic Drilling

Drilling Method: Sonic

Logged by: Cody Cameron/Dave Khan

HEMMERA

Sheet: 2 of 2

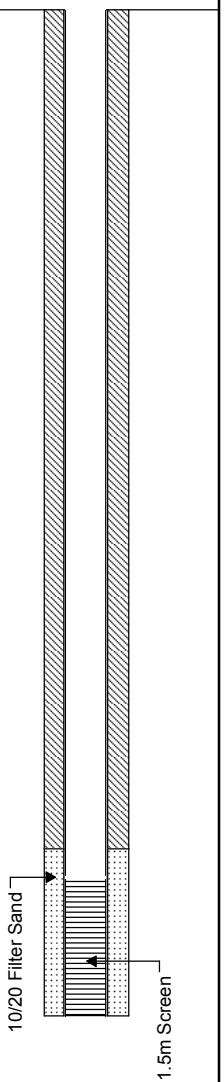
SUBSURFACE PROFILE

Depth	Symbol	Description
14		**SAND** fine to medium sand, trace to some silt - coarser with depth.
		from 13.41 to 15.24 m gravel/cobbles with some coarse sand and silt, orange.
15		at 15.24 m fine to medium sand, some silt, brown.
		from 15.74 to 16.81 m cobbles and gravel with some medium to coarse sand, trace silt, brown.
16		at 16.81 m well graded sand, trace silt, brown.
		at 18.30 m well graded sand (predominantly coarse-grained), compact to dense, brown.
17		at 21.34 m trace gravel noted.
18		
19		
20		
21		
22		
23		
24		
25		End of Log
26		
27		

SAMPLE

Depth/Elev (m)	Sample ID	Analysed Y,N	Sample Type	Vapour ppm (0 250 500)	LEL % (0 50 100)
	MW09-48D-9				
	MW09-48D-10				
	MW09-48D-11				
	MW09-48D-11				
	MW09-48D-12				
	MW09-48D-14				
-20.81					
24.38	MW09-48D-15				

Backfill details



Well location: PEC Site

Depth to water level (TOC): 3.753 m

Date of water level: October 9th, 2009

Borehole diameter: 0.15 m

Well casing diameter: 5.08 cm

Well casing material: PVC

Well screen slot size: 0.025 cm

Well screen interval (bgs): 22.74 to 24.26 m

Depth of well (TOC): 24.4 m

Well Elevation (TOC): 3.685 m NVD

Ground Elevation: 3.57 m NVD

HEMMERA ENVIROCHEM

LOG OF MONITORING WELL

Monitoring Well MW90A

Client: Environment Canada Project: PEC Full Scale Post-Installation Drilling

Project No.: 457-002.01 Location: PEC Site Supervised by: M. Choi

Drilling Co.: Beck Drilling and Environmental Services Ltd. Drilling Method: Becker Hammer

Monitoring Well Location: See Site Plan Date Completed: 25 Apr 01

SAMPLE		Depth Scale	Graphic Log	Stratigraphic Description	Elev. / Depth	Type 2 Well Diagram
Sample Interval	Sample I.D.	(ft) (m)		Top of Pipe Elevation (mNVD): 3.72 Surface Elevation (mNVD): 3.83	(m)	
	No sample taken	5 1 10 2 15 3 20 4 5 6		Blind bit used - no soil log recorded	-2.3 6.1	Cement Bentonite chips 10/20 silica filter sand pack Coarse silica filter sand pack 0.025 cm slot, 5 cm diameter PVC well screen

SAMPLE TYPE: WC Wash Cuttings

BRID2 45701.GPJ 37753

HEMMERA ENVIROCHEM

LOG OF MONITORING WELL

Monitoring Well MW90B

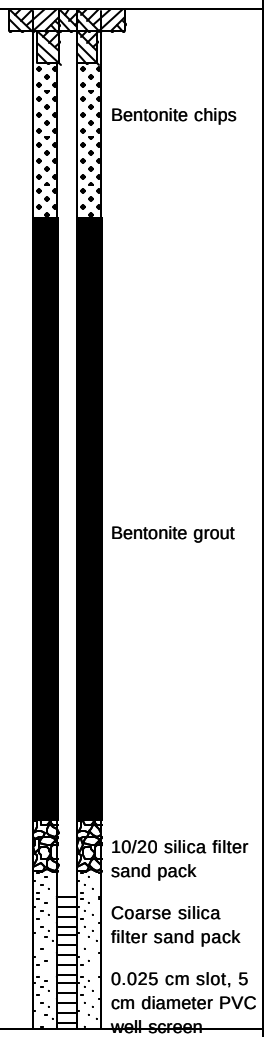
Client: Environment Canada Project: PEC Full Scale Post-Installation Drilling

Project No.: 457-002.01 Location: PEC Site Supervised by: M. Choi

Drilling Co.: Beck Drilling and Environmental Services Ltd. Drilling Method: Becker Hammer

Monitoring Well Location: See Site Plan Date Completed: 24 Apr 01

SAMPLE		Depth Scale	Graphic Log	Stratigraphic Description	Elev. Depth	Type 2 Well Diagram
Sample Interval	Sample I.D.	(ft) (m)		Top of Pipe Elevation (mNVD): 3.78 Surface Elevation (mNVD): 3.87	(m)	
	No sample taken			Blind bit used - no soil log recorded		
					-8.0 11.9	



SAMPLE TYPE: WC Wash Cuttings

BRID2 45701.GPJ 37753

HEMMERA ENVIROCHEM

LOG OF MONITORING WELL

Monitoring Well MW90C

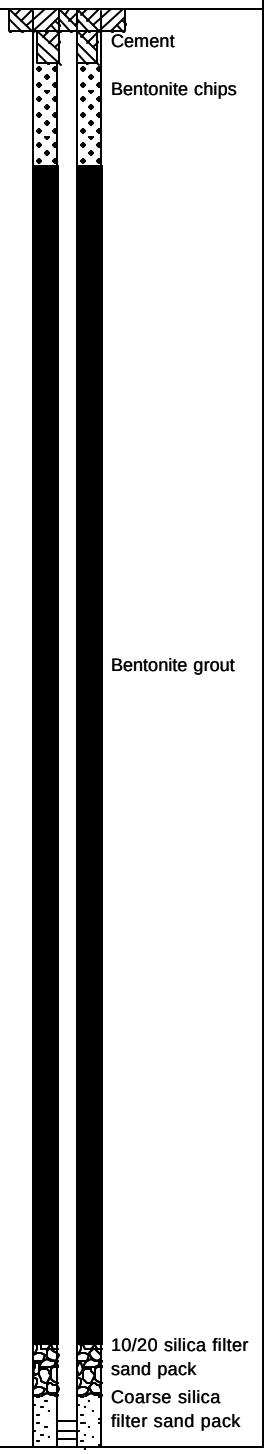
Client: Environment Canada | Project: PEC Full Scale Post-Installation Drilling

Project No.: 457-002.01 | Location: PEC Site | Supervised by: M. Choi

Drilling Co.: Beck Drilling and Environmental Services Ltd. | Drilling Method: Becker Hammer

Monitoring Well Location: See Site Plan | Date Completed: 23 Apr 01

SAMPLE		Depth Scale	Graphic Log	Stratigraphic Description	Elev. Depth	Type 2 Well Diagram
Sample Interval	Sample I.D.	(ft) (m)		Top of Pipe Elevation (mNVD): 3.71 Surface Elevation (mNVD): 3.82	(m)	
	No sample taken			Blind bit used - no soil log recorded		



SAMPLE TYPE: WC Wash Cuttings

BRID2 45701.GPJ 37753

LOG OF MONITORING WELL

Monitoring Well MW90C

Client: Environment Canada Project: PEC Full Scale Post-Installation Drilling

Project No.: 457-002.01 Location: PEC Site Supervised by: M. Choi

Drilling Co.: Beck Drilling and Environmental Services Ltd. Drilling Method: Becker Hammer

Monitoring Well Location: See Site Plan Date Completed: 23 Apr 01

SAMPLE		Depth Scale		Graphic Log	Stratigraphic Description	Elev. / Depth	
Sample Interval	Sample I.D.	(ft)	(m)			(m)	
			17			-14.2 18.0	0.025 cm slot, 5 cm diameter PVC well screen

SAMPLE TYPE: WC Wash Cuttings

HEMMERA ENVIROCHEM

LOG OF MONITORING WELL

Monitoring Well MW90D

Client: Environment Canada Project: PEC Full Scale Post-Installation Drilling

Project No.: 457-002.01 Location: PEC Site Supervised by: M. Choi

Drilling Co.: Beck Drilling and Environmental Services Ltd. Drilling Method: Becker Hammer

Monitoring Well Location: See Site Plan Date Completed: 23 Apr 01

SAMPLE		Depth Scale	Graphic Log	Stratigraphic Description	Elev. Depth	Type 2 Well Diagram
Sample Interval	Sample I.D.	(ft) (m)		Top of Pipe Elevation (mNVD): 3.68 Surface Elevation (mNVD): 3.81	(m)	
	No sample taken			Blind bit used - no soil log recorded		Cement Bentonite chips Bentonite grout

SAMPLE TYPE: WC Wash Cuttings

BRID2 45701.GPJ 37753

LOG OF MONITORING WELL

Monitoring Well MW90D

Client: Environment Canada Project: PEC Full Scale Post-Installation Drilling

Project No.: 457-002.01 Location: PEC Site Supervised by: M. Choi

Drilling Co.: Beck Drilling and Environmental Services Ltd. Drilling Method: Becker Hammer

Monitoring Well Location: See Site Plan Date Completed: 23 Apr 01

SAMPLE		Depth Scale		Graphic Log	Stratigraphic Description	Elev. / Depth	
Sample Interval	Sample I.D.	(ft)	(m)			(m)	
		60	17				
			18				
		65	19				
			20				
		70	21				
			22				
		75	23				
			24			-20.3 / 24.1	10/20 silica filter sand pack; Coarse silica filter sand pack; 0.025 cm slot, 5 cm diameter PVC well screen

SAMPLE TYPE: WC Wash Cuttings

BRID2 45701.GPJ 37753

HEMMERA ENVIROCHEM

LOG OF MONITORING WELL

Monitoring Well MW90E

Client: Environment Canada Project: PEC Full Scale Post-Installation Drilling

Project No.: 457-002.01 Location: PEC Site Supervised by: M. Choi

Drilling Co.: Beck Drilling and Environmental Services Ltd. Drilling Method: Becker Hammer

Monitoring Well Location: See Site Plan Date Completed: 23 Apr 01

SAMPLE		Depth Scale	Graphic Log	Stratigraphic Description	Elev. Depth	Type 2 Well Diagram
Sample Interval	Sample I.D.	(ft) (m)		Top of Pipe Elevation (mNVD): 3.69 Surface Elevation (mNVD): 3.78	(m)	
	No sample taken			Blind bit used - no soil log recorded		Cement Bentonite chips Bentonite grout

SAMPLE TYPE: WC Wash Cuttings

BRID2 45701.GPJ 37753

LOG OF MONITORING WELL

Monitoring Well MW90E

Client: Environment Canada Project: PEC Full Scale Post-Installation Drilling

Project No.: 457-002.01 Location: PEC Site Supervised by: M. Choi

Drilling Co.: Beck Drilling and Environmental Services Ltd. Drilling Method: Becker Hammer

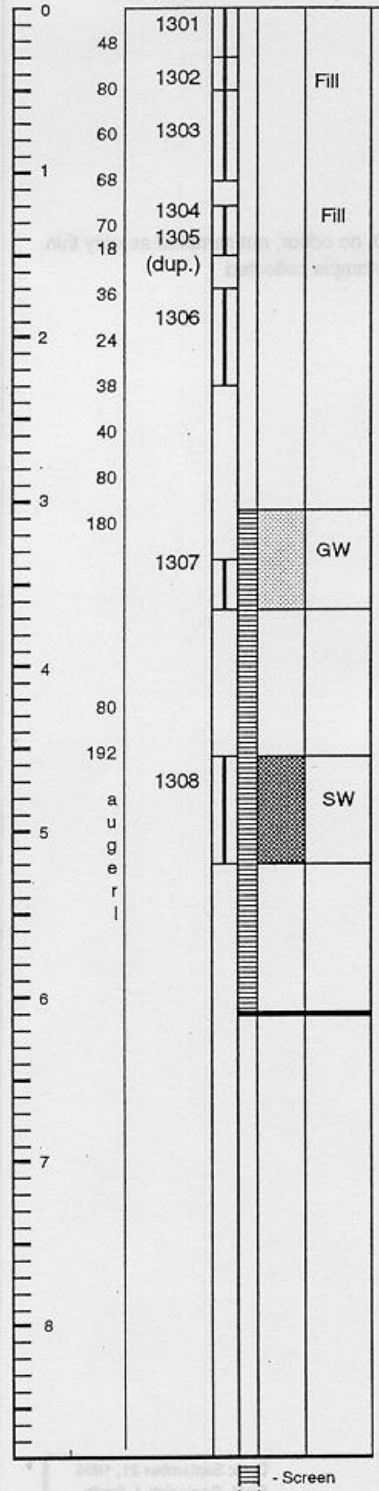
Monitoring Well Location: See Site Plan Date Completed: 23 Apr 01

SAMPLE		Depth Scale		Graphic Log	Stratigraphic Description	Elev. / Depth (m)	
Sample Interval	Sample I.D.	(ft)	(m)				
		60	18				
		65	20				
		70	21				
		75	23				
		80	24				
		85	26				
		90	27				
		95	29			-25.8 / 29.6	10/20 silica filter sand pack; Coarse silica filter sand pack; 0.025 cm slot, 5 cm diameter PVC well screen

SAMPLE TYPE: WC Wash Cuttings

BRID2 45701.GPJ 37753

Geological Boring Log
PWGSC - North Vancouver
Borehole OW13



Surface SAND and GRAVEL

0 - 0.2 m brown SAND and GRAVEL; plastic bag

0.2 - 1.0 m dry hard SAND, light grey with orange mottle

1.0 - 1.2 m black WOOD waste and SAND

1.2 - 1.5 m dark brown and grey SAND with WOOD (black, burnt?) pieces.
Brown sand at 1.5 m

1.5 - 3.0 m Plastic bag at top, grey and brown SAND, trace black stain, no odour; to brown coarse SAND, moist to wet at end. Pushed rock; therefore poor recovery.

3.0 - 3.4 m brown SAND; trace plastic debris.

3.4 - 3.7 m rusty orange SAND, GRAVEL, and COBBLES

3.7 - 4.6 m difficult drilling, rocks, no recovery

4.6 - 5.2 m Grey coarse SAND. Wet; water in split spoon.

5.2 - 6.1 m no recovery, tough drilling.

E.O.H. at 6.10 m

- Screen
- Sand
- Bentonite
- Blank
- Undisturbed Split Spoon Sample
- Disturbed Soil Sample
- Beginning of wet conditions or water

Client Name: PWGSC
Site Location: North Vancouver
Drilling Contractor: Uniwide
Project No. : 20749-011-310
Sampling Method: Hollow stem with split spoon sampler

Date: September 14, 1995
Field Geologist: J. Smith

Norecol, Dames & Moore

HEMMERA ENVIROCHEM

LOG OF MONITORING WELL

Monitoring Well OW13-B

Client: Environment Canada | Project: PEC Additional Wells

Project No.: 457-003.03 | Location: PEC Site | Supervised by: R. Arellano

Drilling Co.: Beck Drilling and Environmental Services Ltd. | Drilling Method: Becker Hammer

Monitoring Well Location: See Site Plan | Date Completed: 22 Feb 02

SAMPLE				Depth Scale		Graphic Log	Stratigraphic Description	Elev. / Depth (m)	Well TOP Elevation (mNVD): 3.40
Sample Interval	Analysis (Not analysed /analysed)	Sample I.D. (% recovery in split spools)	Water Conductivity (uS/cm)	(ft)	(m)		Surface Elevation (mNVD): 3.46		Road box
							SAND and GRAVEL - trace cobble, 15.2 cm of fine to coarse grained sandy ore concentrate		Cement (0-0.34 m)
					1				Bentonite chips (0.34-0.91 m)
	Metals	OW13-B-1 (50%)		5					
					2		- 15.2 cm of wood waste at 2.0 m	1.3	
	Metals	OW13-B-2 (75%)					SAND - fine to coarse grained, some fine coarse gravel	2.1	
							- gravelly at 2.7 m	0.7	
	Metals	OW13-B-3 (50%)					GRAVEL and COBBLE - sandy, dense, brown, wet	2.7	
				10	3				Bentonite grout (0.91-6.40 m)
	Cond.	Water grab	2050						
					4				
				15					
	Metals grain size	OW13-B-4			5				Fine sand (6.40-6.71 m)
									10/20 Filter Sand (6.71-8.53 m)
				20	6				
					7				0.025 cm slot, 5 cm diameter PVC well screen (7.01-8.53 m)
				25					
	Metals grain size	OW13-B-5	259		8		**- copper: 98 mg/kg**		
							- possible 15 cm thin silt zone at 8.5 m	-5.4	
					9		SAND and COBBLE - sandy, some silt and	8.8	
				30					

SAMPLE TYPE: SS Split Spoon; WC Wash Cuttings; ST Shelby Tube

PEC WELL LOG2 4570303.GPJ 37405

HEMMERA ENVIROCHEM

LOG OF MONITORING WELL

Monitoring Well OW13-B

Client: Environment Canada Project: PEC Additional Wells

Project No.: 457-003.03 Location: PEC Site Supervised by: R. Arellano

Drilling Co.: Beck Drilling and Environmental Services Ltd. Drilling Method: Becker Hammer

Monitoring Well Location: See Site Plan Date Completed: 22 Feb 02

SAMPLE				Depth Scale		Graphic Log	Stratigraphic Description	Elev. Depth
Sample Interval	Analysis (Not analysed /analysed)	Sample I.D. (% recovery in split spoons)	Water Conductivity (uS/cm)	(ft)	(m)			(m)
	Metals **grain size**	OW13-B-6					clay - red/brown oxide at 9.3 m to 9.8 m	
					10			
				35				-7.2 10.7

PEC WELL LOG2 4570303.GPJ 37405

SAMPLE TYPE:

SS Split Spoon

WC Wash Cuttings

ST Shelby Tube