Public Works and Government Services Canada

Requisition No.: _____

Buy and Sell ID No.: _____

Specifications for

Esquimalt Graving Dock: Parcel IM-901 Remediation

825 Admirals Road, Esquimalt, BC

Project No. R.099299.001 January 23, 2019

APPROVED BY:

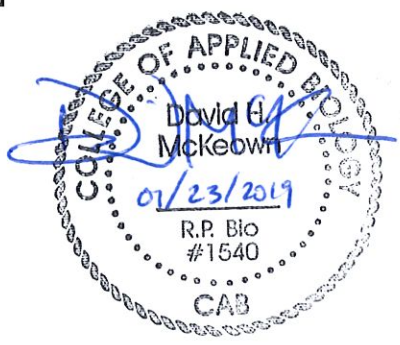
_____ 2019-01-25
Regional Manager ES Date

Jeff Kingsley 2019-01-28
Construction Safety Coordinator Date

TENDER:

Will Govenlock 2019-01-28
Project Manager Date

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



Canada

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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. Not Used.

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. Site access restrictions are as follows:

1.4.1.1.1. Access to site shall be provided through rear entrance to Esquimalt Graving Dock along Maplebank Road.

1.4.1.1.2. Site access requires security clearance of contractor and contractor's employees. Contractor must have Designated Organization Screening (DOS) when submitting a bid. All employees must have Reliability Clearance and take the Esquimalt Graving Dock Site Safety Orientation prior to working on site.

1.4.1.1.3. Request for access to the site must be received by the Departmental Representative at least 24 hours prior.

1.4.1.2. Neighbouring or sensitive sites restrictions are as follows:

1.4.1.2.1. Site is located in proximity to sensitive marine environment. Stormwater drainages onsite lead to aquatic environment and are to be maintained and protected from deleterious substances and sedimentation inputs.

1.4.1.2.2. Adjacent buildings and associated foundations, supports and utilities are to remain during work. Monitoring for building settlement may be required as directed by the Departmental Representative.

1.4.1.2.3. Existing electrical transformer to remain on site and may be active during work. Protection of features is required. Adhere to work offsets as per Drawings.

1.4.1.2.4. Common roadways and site access must be kept clear at all times.

1.4.1.2.5. Traffic control to be provided by Contractor as required.

1.4.1.2.6.

1.4.1.3. Classes of Soil based on Environmental Quality Criteria are:

1.4.1.3.1. Waste Quality

1.4.1.4. Soil classification based on insitu testing; exsitu testing may be required as directed by the Departmental Representative.

1.4.1.5. Treatment of Contaminated Water at offsite treatment facility as required.

1.4.1.6. Excavation of Contaminated Soil as per Drawings. Contractor solely responsible for excavating to Remedial Excavation Limits. Excavation Limits on Drawings based on a nominal 1:1 slope for volume estimating purposes only; actual shoring and/or slope requirements responsibility of the Contractor.
1.4.1.7. Transportation of Contaminated Soil to facilities.
1.4.1.8. Disposal of Contaminated Soil. All material identified as Contaminated on the Site must be disposed of at a Disposal Facility, including material that has been Treated.
1.4.1.9. Restoration of site as per Drawings. Backfill and compact excavation areas and install utility hook-ups for future washroom facility in general accordance with drawings or as directed by the Departmental Representative.
1.4.1.10. Complete asphalt surfacing of disturbed areas according to Drawings.

1.5. Location

1.5.1. The Site location is shown on Drawings.

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 and as represented during bidder meeting.

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. 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 on 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 of Prime Contractor and control 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 neighbouring properties. Offsite access, occupancy, 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 2019 March 31.
1.10.4. Completion of the Work: no later than 2019 March 31. 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 Days are Monday to Sunday.
1.11.1.2. Working Hours are 07:00 to 19:00.
1.11.2. Work outside of Working Day and Working Hours subject to approval of 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 classes based on Environmental Quality Criteria. Includes Hazardous Waste Quality, Waste Quality, Non-Contaminated Quality. Sub-classification based on specific parameters as identified in Contract. 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: 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 Quality and Waste Quality. Does not include Non-Contaminated Quality material. Relevant regulations, unless otherwise in accordance with the Contract or as directed by the Departmental Representative, include:

1.2.5.1. Canadian Council of Ministers of the Environment (CCME) *Canadian Environmental Quality Guidelines*, the CCME *Canada-wide Standard for Petroleum Hydrocarbons (PHC) in Soil*, and the Federal Contaminated Sites Action Plan (FCSAP) *Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites*.

1.2.5.2. BC *Hazardous Waste Regulation*, BC *Contaminated Sites Regulation*, and BC *Approved Water Quality Guidelines*.

1.2.5.3. Yukon *Special Waste Regulation*, Yukon *Contaminated Sites Regulation*.

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

1.2.7. Contaminated Water Treatment Plant: an 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.

1.2.8. 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.
1.2.9. Contract: see General Conditions.
1.2.10. Contract Amount: see General Conditions.
1.2.11. Contractor: see General Conditions.
1.2.12. Departmental Representative: see General Conditions.
1.2.13. 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.
1.2.14. Disposal Facility: an offsite facility specifically used to introduce Contaminated Soil into the environment for the purpose of final burial.
1.2.15. 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.
1.2.16. 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.
1.2.17. 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.
1.2.18. Environmental Quality Criteria: numerical material criteria used on Site based on Standards and/or Guidelines specified by the Canadian Council of Ministers of the Environment and/or BC *Contaminated Sites Regulation* or Yukon *Contaminated Sites Regulation*, as applicable, using appropriate Land Use and Site-specific Factors.
1.2.19. Excavation Extents: lateral and vertical extents of Soil to be excavated to meet remediation goals. Includes Overburden, as applicable. Extents on Drawings are approximate and may vary based on field observations or Confirmation Samples.
1.2.20. Extension of Time: see General Conditions.
1.2.21. Extension of Time on Contracts: PWGSC form requesting an Extension of Time.
1.2.22. Facility Authority:
1.2.22.1. For facilities within provincial or territorial jurisdiction: the relevant provincial or territorial ministry.

1.2.22.2. For facilities on First Nation reserve land in Canada not subject to the First Nation Land Management regime: Indigenous and Northern Affairs Canada.
1.2.22.3. 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.
1.2.22.4. For facilities in the United States of America: either or both of the Environmental Protection Agency and the relevant State, as appropriate.
1.2.23. Final Completion: see General Conditions.
1.2.24. Hazardous Waste Quality: Contaminated material which meets the applicable Regulatory definition of Hazardous Waste.
1.2.25. Land Treatment Facility: equivalent of Soil Treatment Facility.
1.2.26. Landfill Facility: an offsite facility specifically used to introduce Non-Contaminated Quality Soil into the environment for the purpose of final burial.
1.2.27. 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.
1.2.28. Non-Contaminated Quality: material that does not exceed applicable Environmental Quality Criteria.
1.2.29. On Site Instruction: notices, instructions, or directions issued by the Departmental Representative to the Contractor.
1.2.30. On Site Notice: notice or other communication issued by the Contractor to the Departmental Representative.
1.2.31. 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.
1.2.32. Overburden: Non-Contaminated Quality Soil excavated incidentally as required above or adjacent to Contaminated Soil. Includes Topsoil.
1.2.33. 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.
1.2.34. Prime Contractor: see General Conditions “Contractor”, BC Occupational Health and Safety Regulations “Prime Contractor”, and Yukon Occupational Health and Safety Act “Constructor”.
1.2.35. Progress Payment: see General Conditions.
1.2.36. Progress Survey: Survey conducted using equipment such as tape measurements, non-differential GPS, theodolite, or truck counts. Not a survey conducted by a Qualified Professional Surveyor.
1.2.37. PWGSC: Public Works and Government Services Canada (also known as PSPC: Public Services and Procurement Canada). Representative of Canada with control of the Site.

1.2.38. Qualified Professional: a person who is registered in relevant jurisdiction (BC or Yukon, as appropriate) with his or her appropriate professional college/association, acts under that professional college/association's code of ethics, and is subject to disciplinary action by that professional college/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:

1.2.38.1. Association of the Chemical Profession of British Columbia.

1.2.38.2. British Columbia College of Applied Biology.

1.2.38.3. British Columbia Institute of Agrologists.

1.2.38.4. Engineers and Geoscientists British Columbia.

1.2.38.5. Engineers Yukon.

1.2.39. Qualified Professional Surveyor: a person who is registered in relevant jurisdiction (BC or Canada (for Yukon), as appropriate) with his or her appropriate professional college/association, acts under that professional college/association's code of ethics, and is subject to disciplinary action by that professional college/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:

1.2.39.1. Association of British Columbia Land Surveyors.

1.2.39.2. Association of Canada Lands Surveyors.

1.2.40. Quote: Contractor’s cost estimate issued to the Departmental Representative as per the relevant Contemplated Change Notice via an On Site Notice.

1.2.41. Remediation by Excavation: complete excavation of Contaminated Soil and incidental Non-Contaminated Quality Soil to the Site boundaries or limits of excavation as appropriate for the purpose of remediating the Site to meet numerical standards or site specific remedial objectives. Includes disposal. Does not include risk assessment or risk management of material onsite. Does not include encapsulation or solidification in place.

1.2.42. Sewage: 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.

1.2.43. Site: work area available to Contractor according to Drawings. Does not include shared or public areas, including common roads.

1.2.44. Soil: unconsolidated mineral or organic material, rock, fill, and sediment deposited on land, and other solid material excavated incidentally. Includes Topsoil and Overburden. Includes cleared and grubbed vegetation, litter, rubbish, debris, cobbles, boulders, excess construction material, lumber, steel, plastic, concrete, and asphalt and other waste material.

1.2.45. Soil Treatment Facility: facility for bioremediating contaminated soil. Includes Treatment Cells, Staging Cells, and ancillary Access Roads.

1.2.46. Special Waste: Yukon equivalent of Hazardous Waste.

1.2.47. Subcontractor: see General Conditions.

1.2.48. 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.
1.2.49. Substantial Performance: see General Conditions.
1.2.50. Superintendent: see General Conditions
1.2.51. Supplier: see General Conditions.
1.2.52. Topsoil: Overburden excavated incidentally above Contaminated Soil Extents that is a surface organic layer to facilitate vegetation growth.
1.2.53. Transfer/Interim Storage Facility: an offsite facility specifically used to transfer or short term storage Contaminated Soil during offsite transport.
1.2.54. 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.
1.2.55. Waste Quality: material that exceeds applicable Environmental Quality Criteria.
1.2.56. Wastewater: Non-Contaminated Quality Water that is not Sewage.
1.2.57. Work: see General Conditions.

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.
1.3.2. Daily Work Records: at the end of each shift Submit daily Work records, during onsite Work. Include:
1.3.2.1. Quantities for each Description of Work identified in the Unit Price Table and Change Orders.
1.3.2.2. Description of Work performed.
1.3.2.3. Current Site conditions.
1.3.2.4. General information including: date, time shift started and ended, Subcontractor(s) onsite, Health and Safety items, and Environmental Protection items.
1.3.2.5. Signature of Superintendent.
1.3.3. Cash Flow: with each Progress Payment, Submit a cash flow forecast. Include:
1.3.3.1. 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.
1.3.3.2. Progress Payments will not be processed until cash flow has been accepted by the Departmental Representative.

1.3.4. 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.
1.3.5. Quality Management Plan: within 10 Working Days after Contract award, Submit a quality management plan. Include:
1.3.5.1. Details on planned review, inspection and testing to provide Quality Assurance and Quality Control for the Work.
1.3.5.2. Subcontractors responsible for review, inspection and testing.
1.3.5.3. Schedule of submittals of review, inspection and testing results.
1.3.6. 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.
1.3.7. Weigh Scale Certification: at least 5 Working Days prior to use, Submit a copy of the Measurement Canada, Weigh Scale Certification for any offsite weigh scale used during excavation, transportation, treatment or disposal.
1.3.8. Weigh Scale Slips: within 10 Working Days of measurement, Submit all offsite weigh scale slips for material.

1.4. Laws and Regulations

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.

1.5. 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. Smoking Environment

1.6.1. Smoking on the Site is not permitted.

1.7. System of Measurement

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

1.8. Documents Required

1.8.1. Maintain 1 copy each of the following posted at the job Site:
1.8.1.1. General Conditions.
1.8.1.2. Drawings.
1.8.1.3. Specifications.
1.8.1.4. Addenda or other modifications to Contract.
1.8.1.5. Change orders.
1.8.1.6. Copy of current Work schedule.
1.8.1.7. Reviewed and final Shop Drawings Submittals.
1.8.1.8. One set of record Shop Drawings and Specifications for “as-built” purposes.
1.8.1.9. Field and laboratory test reports.
1.8.1.10. Reviewed and accepted Submittals.
1.8.1.11. Health and Safety documents, including all daily toolbox meetings, Notice of Project, and utility clearances.
1.8.1.12. Environmental Protection Plan.
1.8.1.13. Final Meeting Minutes, Agendas and associated attachments.
1.8.1.14. Permits and other approvals.

1.9. Setting out of Work

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

1.10. Works Coordination

1.10.1. Coordinate Work of Subcontractors.
1.10.1.1. Designate one person to be responsible for review of Contract and Shop Drawings and managing coordination of Work.
1.10.2. Convene meetings between Subcontractors whose Work interfaces and ensure awareness of areas and extent of interface required.
1.10.2.1. Provide each Subcontractor with complete Drawings and Specifications for Contract, to assist them in planning and carrying out their respective work.
1.10.2.2. Develop coordination drawings when required, illustrating potential interference between Work of various trades and distribute to affected parties.
1.10.2.3. Facilitate meeting and review coordination drawings. Ensure Subcontractors agree and sign off on coordination drawings.
1.10.2.4. Publish minutes of each meeting.
1.10.2.5. Submit a copy of coordination drawings and meeting minutes as directed by the Departmental Representative.

1.10.3. Submit Shop Drawings and order of prefabricated equipment or rebuilt components only after coordination meeting for such items has taken place.
1.10.4. Work coordination:
1.10.4.1. Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of spatial interference.
1.10.4.2. 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.
1.10.4.3. Ensure disputes between Subcontractors are resolved.
1.10.5. Failure to coordinate Work is responsibility of Contractor.

1.11. Record Keeping

1.11.1. 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.
1.11.2. 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.
1.11.3. Maintain adequate records to support information provided to Departmental Representative.
1.11.4. 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.
1.11.5. Maintain bills of ladings for minimum of 300 Working Days from date of shipment or longer period required by applicable law or regulation.

1.12. Change Documents

1.12.1. Change Documents do not relieve Contractor of any obligation.
1.12.2. Change Documents do not change the Contractor's responsibility for sequencing, methods and means.
1.12.3. Change Documents do not change by any reason the status of the Contractor, including the function of Prime Contractor or as supervisor.
1.12.4. Change Documents include:
1.12.4.1. 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.

1.12.4.2. 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.

1.12.4.3. 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.

1.12.4.4. 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.

1.13. Inspection

1.13.1. 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.

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

1.13.3. 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.

1.13.4. 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. Also includes Preconstruction Condition Survey and Preconstruction As-Built Documents.

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.

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.

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, installing additional utility infrastructure for future washroom facility as per Drawings or as directed by the Departmental Representative, final grading, paving, 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, Postconstruction Condition Survey 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 disturbance, Submit drawings identifying all infrastructure, including utilities, on the Site. Update drawings as directed by the Departmental Representative.

1.3.2. Preconstruction Condition Survey: at least 5 Working Days prior to commencing any disturbance, Submit a report documenting condition of buildings, utilities,

roadways, pathways, landscaping, significant vegetation, and other infrastructure both onsite and adjacent sites that may be potentially impacted by the Work.

1.3.3. 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.

1.3.4. 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.

1.3.5. Postcontruction Condition Survey: within 10 days of completing site Work, Submit a report documenting condition of buildings, utilities, roadways, pathways, landscaping, significant vegetation, and other infrastructure both onsite and adjacent sites that may be potentially impacted by the Work.

1.3.6. Closeout Documents: within 20 Working Days of Final Completion of Site Restoration, Submit Completion Documents.

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 or as directed by the Departmental Representative.

1.5.1.2. 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.

1.5.1.3. Protect buried utilities that are required to remain undisturbed or in continuous operation during the Work, as identified on Drawings.

1.5.1.4. 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. Provide onsite personnel security 24 hours/ day 7 days/week as appropriate or in accordance with Contract.

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

1.6. Existing Services

1.6.1. Size, depth and location of existing utilities and structures as specified are for guidance only. Completeness and accuracy are not guaranteed.

1.6.2. 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 (i.e., 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.
1.6.3. Remove abandoned service lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.
1.6.4. Maintain and protect from damage all utilities and structures encountered, unless Work involves temporarily breaking, rerouting, or connecting existing utilities.
1.6.5. 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.
1.6.6. 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.
1.6.7. Provide temporary services as required to maintain critical systems.
1.6.8. Where unknown utilities are encountered, immediately verbally notify Departmental Representative and confirm findings in writing.

1.7. Existing As-Built Documents

1.7.1. The Departmental Representative will provide paper copies of the Construction Documents as per the Special Instructions to Bidders. Electronic copies of data and drawings in their native format are available on request.
1.7.2. 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.
1.7.3. Drawings and Shop Drawings: legibly mark each item to record actual construction, including:
1.7.3.1. Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
1.7.3.2. Field changes of dimension and detail.
1.7.3.3. Changes made by change orders.
1.7.3.4. Details not on original Drawings.
1.7.3.5. References to related Shop Drawings and modifications.
1.7.4. Contract Specifications: legibly mark each item to record actual workmanship of construction, including:
1.7.4.1. Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
1.7.4.2. Changes made by addenda and change orders.
1.7.5. As-built information:
1.7.5.1. Record changes in red ink.

1.7.5.2. 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.
1.7.5.3. Submit 1 set in editable AutoCAD 14 file format with all as-built information.
1.7.5.4. Submit all sets as directed by the Departmental Representative.
1.7.6. As required, surveying to be completed by a Qualified Professional Surveyor for as-built documents.

1.8. Onsite Access Roads

1.8.1. Maintain onsite access roads as follows:
1.8.1.1. Obtain permission to use existing onsite access roads or to construct temporary roads.
1.8.1.2. Maintain and clean roads for duration of Work, keep dry and free of mud.
1.8.1.3. Repair damage incurred from use of roads.
1.8.1.4. Provide photographic documentation of roads used by construction vehicles before, during and after Work.
1.8.1.5. Clean onsite access roads as directed by the Departmental Representative.

1.9. Site Restoration

1.9.1. Final site grades must be within 5 cm of pre-existing grades before Work commenced, unless otherwise specified.
1.9.2. Re-establish pre-existing drainage, unless otherwise specified.
1.9.3. Clean permanent access roads of contamination resulting from project activity as required or as directed by Departmental Representative, with no increases to Contract Amount or Extension of Time for completion of the Work.
1.9.4. Upon Final Completion of Work, remove Non-Contaminated Quality Soil and Debris, trim slopes, and correct defects as directed by the Departmental Representative.
1.9.5. 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.
1.9.6. 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.
1.9.7. Reinstate surface to pre-existing conditions, including surface material (e.g., vegetation, gravel, pavement), unless otherwise indicated or as directed by the Departmental Representative.

1.10. Completion Documents

1.10.1. Submit as directed by the Departmental Representative, a written certificate that the following have been performed:
1.10.1.1. Work has been completed, and inspected and accepted by the Departmental Representative, in accordance with the Contract.

1.10.1.2. Treatment and Disposal of treatable soils have been completed and Disposal of all other soils has been completed.
1.10.1.3. 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.
1.10.1.4. Qualified Professional report documenting backfilling has met all requirements of the Contract.
1.10.2. Defective products will be rejected, regardless of previous inspections. Replace defective products.
1.10.3. 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. 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 or as directed by Departmental Representative. 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 (tailgate) 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, including hazards, mitigation measures, and emergency procedures.
1.7.3.2. Review previous relevant incident or near-miss reports, both from Site and other Sites.
1.7.3.3. Coordination activities, and roles and responsibilities, required between Contractor, Subcontractor(s), Departmental Representative, other contractor(s) including environmental consultant, site users, and protection of general public and offsite resources.
1.7.3.4. Health and Safety items, including PPE requirements.
1.7.3.5. Environmental Protection items, including emergency equipment.

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 to 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.

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 Soil and Water Management Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit methods, means, and sequences for Contaminated Soil and Contaminated 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

1.3.1.1. Personnel and equipment decontamination.

1.3.1.2. Segregation of different Classifications of Contaminated Soil and/or Water, as applicable.

1.4. Sequencing and Scheduling

1.4.1. Commence Work involving contact with Contaminated or potentially Contaminated Soil or Water after all applicable Environmental Protection procedures (including those identified in Contaminated Soil and Water 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 connected 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.

1.6. 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. Equipment Decontamination

1.8.1. 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.

1.8.2. 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.

1.8.2.1. Take appropriate measures necessary to minimize drift of mist and spray during decontamination including provision of wind screens.

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

1.8.3. 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.

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

1.9. Progress Decontamination

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

1.10. Final Decontamination

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

1.11. Contaminated Soil and Water Management

1.11.1. Remove all Contaminated Soil and Water within Work areas in accordance with the Contract and as directed by the Departmental Representative. Remove Non-Contaminated Quality Soil and Water incidental to the Work or as directed by the Departmental Representative.

1.11.2. Material and Water will be Classified based on insitu results, field observations, field measurements, and/or ex-situ characterization as directed by the Departmental Representative.

1.11.3. Departmental Representative solely responsible for Classification. Contractor cannot re-Classify material.

1.11.4. Contractor solely responsible for Transportation, Treatment, and Disposal based on Classification by Departmental Representative.

1.11.5. Handle (including Excavate, Transport, Treat, and Dispose) material separately into the classifications in accordance with the Contract or as directed by the Departmental Representative. Take necessary precautions to avoid mixing of different classifications.

1.11.6. Material characterization (e.g., sampling and testing) additional to information provided in Contract as required for Transportation, Treatment Facility or Disposal Facility responsibility of Contractor.

1.11.7. Material segregation additional to Contract as required for Transportation, Treatment Facility or Disposal Facility responsibility of Contractor.

1.12. Soil Stockpile Construction

1.12.1. Stockpile material within work area in locations identified by Departmental Representative.

1.12.2. Provide, maintain, and operate temporary storage/stockpiling facilities as per Contractor's Site Layout.

1.12.3. Segregate Contaminated Soil into separate Classifications, and segregate Contaminated Soil from Non-Contaminated Quality Soil, into separate stockpiles to prevent cross-contamination.

1.12.4. Prevent precipitation into Stockpiles 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.

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

1.12.6. Store excavated Non-Contaminated Quality Soil only on Non-Contaminated Quality surface areas. Ensure no contact between Non-Contaminated Quality Soil and Contaminated Soil.
1.12.7. Store excavated Contaminated Soil in temporary stockpiles.
1.12.7.1. Install impermeable liner (e.g., asphalt or minimum 20 mil (0.5mm) polyethylene) below proposed stockpile locations to prevent contact between stockpile material and ground.
1.12.7.2. 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. Cover to be impermeable (e.g., minimum 5 mil polyethylene) and securely fashioned to prevent blowing off.
1.12.7.3. Prevent Non-Contaminated Quality Water, including surface runoff water, from coming into contact with Contaminated Soil stockpiles.
1.12.8. Segregate different suspect material in discrete stockpiles to facilitate ex-situ characterization for Classification as directed by the Departmental Representative.
1.12.9. 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 Samples results provided within 5 Working Days, not counting the day the sample is collected.
1.12.10. Do not remove Contaminated Soil from stockpiles until exsitu characterization completed and as directed by Departmental Representative.

1.13. Stockpile Facility Loading

1.13.1. Place Contaminated Soil in Stockpiles Facility in locations and thicknesses according to Contract.
1.13.2. Soil cannot be placed within 1.5m of the berms or sump to maintain adequate drainage and to avoid damaging the liner or geotextile material
1.13.3. Mechanical equipment cannot work within 1.5m of the sump or berms.
1.13.4. Trucks are only to operate in Stockpiles Facility when there is a minimum of 1m of soil present. Trucks should minimize or eliminate turning while in facility. Trucks cannot dump directly on liner but only on areas with 1m of soil present and the dumped soil must remain 1.5m from the sump and berms when placed.
1.13.5. Tracked equipment is only to operate in Stockpiles Facility when there is a minimum of 0.5m of soil present.
1.13.6. Be responsible for, and make good repairs of, any damage to Stockpiles Facility caused by placement or amendment.

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.
1.4.7. Yukon Territory (as appropriate):
1.4.7.1. Occupational Health and Safety Act.
1.4.7.2. Workers' Compensation Act.
1.4.7.3. 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 (i.e., 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 (e.g., 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 (PPE):

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. References

1.1.1. Government of Canada.
1.1.1.1. Canada Labour Code – Part II
1.1.1.2. Canada Occupational Health and Safety Regulations
1.1.2. National Building Code of Canada (NBC):
1.1.2.1. Part 8, Safety Measures at Construction and Demolition Sites.
1.1.3. Canadian Standards Association (CSA) as amended:
1.1.3.1. CSA Z797-2009 Code of Practice for Access Scaffold
1.1.3.2. CSA S269.1-1975 (R2003) Falsework for Construction Purposes
1.1.3.3. CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structure
1.1.3.4. CSA Z1006-10 – Management of Work In Confined Space
1.1.4. National Fire Code of Canada 2010 (as amended)
1.1.4.1. Part 5 – Hazardous Processes and Operations and Division B as applicable and required.
1.1.5. American National Standards Institute (ANSI):
1.1.5.1. ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
1.1.6. Province of British Columbia:
1.1.6.1. Workers Compensation Act Part 3-Occupational Health and Safety.
1.1.6.2. Occupational Health and Safety Regulation
1.1.7. NMS Section 00 01 10 Specification Index (Appendix A through E)
1.1.8. Esquimalt Graving Dock (EGD) Contractors Safety Booklet (as amended)

1.2. Related Sections

1.2.1. 01 11 00 Summary of Work
1.2.2. 01 11 55 General Instructions
1.2.3. 01 25 20 Mobilization and Demobilization
1.2.4. 01 35 13.43 Special Procedures for Contaminated Sites
1.2.5. 01 35 29.14 Health and Safety for Contaminated Sites
1.2.6. 01 35 43 Environmental Procedures
1.2.7. 02 61 00.02 Contaminated Sites Excavation

1.3. Workers' Compensation Board Coverage

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

1.4. Compliance with Regulations

1.4.1. 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.
1.4.2. It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

1.5. Submittals
1.5.1. Submit to Departmental Representative submittals listed for review in accordance with Section 01 33 00.
1.5.2. Work effected by submittal shall not proceed until review is complete.
1.5.3. Submit the following:
1.5.3.1. Site Specific Safety Plan.
1.5.3.2. Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
1.5.3.3. Copies of incident and accident reports.
1.5.3.4. Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
1.5.3.5. Copy of Contractors' Construction Safety Manual.
1.5.3.6. Emergency Procedures.
1.5.4. The Departmental Representative will review the Contractor's Site Specific Safety Plan and Emergency Procedures, and provide comments to the Contractor within 5 (five) days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.
1.5.5. Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.
1.5.6. Submission of the Site Specific Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:
1.5.6.1. Be construed to imply approval by the Departmental Representative.
1.5.6.2. Be interpreted as a warranty of being complete, accurate and legislatively compliant.
1.5.6.3. Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

1.6. Responsibility
1.6.1. Assume responsibility as the Prime Contractor for work under this contract.
1.6.2. Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

1.6.3. Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
1.6.4. All contractor workers must attend an EGD Safety Orientation prior to any work starting.
1.6.5. The contractor is responsible for reviewing the Esquimalt Graving Dock (EGD) Contractors Safety Handbook and ensuring that the Site Specific Safety Plan and the EGD Contractors Safety Handbook are harmonized.

1.7. Health and Safety Coordinator

1.7.1. The Contractor shall appoint a Health and Safety Coordinator who shall:
1.7.1.1. 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.
1.7.1.2. Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.
1.7.1.3. Be on site during execution of the work.

1.8. General Conditions

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

1.9. Utility Clearance

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

1.10. Project/Site Conditions

1.10.1. Work at the site will involve contact with:
1.10.1.1. PWGSC and other Federal employees,
1.10.1.2. EGD (federal) operational staff,
1.10.1.3. Ship repair and other contractors,
1.10.1.4. Work over and under water, Protection Against Drowning Refer to COHS Section A Part X11-Safety Materials, Equipment, Devices and Clothing – Section 12.11 inclusive.
1.10.1.5. Overhead cranes,

1.10.1.6. Work at heights, **(2.4m on Crown Owned Property)**
1.10.1.7. Unpredictable weather conditions,
1.10.1.8. Threat of tsunami and earthquake, and
1.10.1.9. Confined space and restricted access space.
1.10.1.10. Work with hazardous substances.
1.10.1.11. See Pre-construction Hazard Assessment Appendix E.

1.11. Regulatory Requirements

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

1.12. Work Permits

1.12.1. Obtain specialty permits related to project before start of work.

1.13. Filing of Notice

1.13.1. The Prime Contractor shall submit a Notice of Project to the Provincial authorities.
1.13.2. Provide copies of all notices to the Departmental Representative.

1.14. Site Specific Safety Plan

1.14.1. Conduct a site-specific hazard assessment based on a review of Contract documents, required work, and all project work sites. Identify any known and potential health risks and safety hazards.
1.14.2. Develop, implement, and enforce the Site Specific 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 communication and record keeping procedures.
1.14.2.1.11. EGD Contractors Safety Handbook

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 on site 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 Site Specific Safety 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 Site Specific Safety Plan as required, and resubmit to the Departmental Representative for review.
1.14.5. Departmental Representative's review: the review of the contractors' Site Specific Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Site Specific Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.

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 (i.e. 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 other PWGSC staff as required. (Reference: See EGD Contractors Safety Handbook)
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 PWGSC 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. At least once each year, emergency drills must be held to ensure awareness and effectiveness of emergency exit routes and procedures, and a record of the drills must be kept.
1.15.6. 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 labeling 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. Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per [Section 013300].
1.16.2.2. 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 in accordance with NMS Sections as indicated in Section 000110 Specification Index.

1.17. Off Site Contingency and Emergency Response Plan

1.17.1. Prior to commencing Work involving handling of hazardous materials, develop off site Contingency and Emergency Response Plan.
1.17.2. 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.
1.17.3. Notification of fire departments [4.17 – Worksafe BC Regulations Part 4 Buildings, Structures, Equipment, and Site Conditions]
(1) An employer having at a workplace hazardous products covered by WHMIS, explosives, pesticides, radioactive material, consumer products or hazardous wastes in quantities which may endanger firefighters, must ensure the local fire department is notified of the nature and location of the hazardous materials or substances and methods to be used in their safe handling.
(2) Subsection (1) does not apply to a workplace
(a) where materials are kept on site for less than 15 days if the employer ensures an alternative effective means for notification of fire departments is in place in the event of fire or other emergency, or
(b) which is not within the service area of a fire department.
[Amended by B.C. Reg. 30/2015, effective August 4, 2015.]

1.18. Personal Protective Clothing and Equipment

1.18.1. Work shall be performed in compliance with Part 8 – Personal Protective Clothing and Equipment, and Part 5 – Chemical Agents and Biological Agents, (as applicable) Worksafe B.C. OHS Regulations.

1.19. Asbestos Hazard

1.19.1. Modifications to spray- or trowel-applied asbestos surfaces can be hazardous to health.

1.19.2. Removal and handling of asbestos will be performed as per Worksafe B.C. Regulations Part 6 Substance Specific Requirements Asbestos and all applicable regulations.

1.20. PCB Removals

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

1.20.2. When applicable, remove, handle, transport and dispose of as indicated in Section 00 01 10 Specification Index.

1.21. Removal of Lead-Containing Paints

1.21.1. All paints containing TCLP lead concentrations above 5 ppm are classified as hazardous.

1.21.2. Carry out demolition and any other activities involving lead-containing paints in accordance with Worksafe B.C. Regulations Part 6 Substance Specific Requirements lead and all applicable regulations.

1.22. Silica

1.22.1. Carry out work in accordance with Worksafe BC regulations.

1.23. Electrical Safety Requirements

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

1.23.1.1. Before undertaking any work, coordinate required energizing and de-energizing of new and existing circuits with Departmental Representative.

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

1.23.1.3. Develop, implement and enforce a communication plan with Departmental Representative and EGD maintenance staff for all electrical work and lockout procedures.

1.24. Electrical Lockout

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

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

1.26. Falsework
1.26.1. Design and construct falsework in accordance with CSA S269.1-1975 (R2003).

1.27. Scaffolding
1.27.1. Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2009 and B.C. Occupational Health and Safety Regulations.

1.28. Confined Spaces
1.28.1. Carry out work in confined spaces in compliance with Worksafe B.C. Part 9 Confined Spaces and SCA Z1006-10 Management of Work in Confined Space.

1.29. Restricted Access
1.29.1. Contractor shall perform a hazard assessment and develop an appropriate restricted access entry and emergency rescue plan in accordance with Worksafe B.C. regulations.

1.30. Confined Space and Restricted Space Outside of Defined Work Site
1.30.1. Carry out work in confined spaces in compliance with Worksafe B.C. Part 9 Confined Spaces and CSA Z1006-10 Management of Work in Confined Spce. Coordinate all confined space entry work with PWGSC Departmental Representative through the contractor's confined space entry permit system.
1.30.2. Contractor shall perform a hazard assessment and develop an appropriate restricted access entry and emergency rescue plan in accordance with Worksafe B.C. regulations. Coordinate all restricted access space entry work with the Departmental Representative prior to entry.
1.30.3. The Contractor is required to provide a reasonable amount of time to the Departmental Representative for making arrangements for entry and/or access to

Confined Space or Restricted Access spaces located outside the designated work site.

1.31. Powder-Actuated Devices

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

1.32. Fire Safety and Hot Work

1.32.1. Coordinate all hot work with Departmental Representative through the contractors' hot work permit system.

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

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

1.33. Fire Safety Requirements

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

1.33.2. Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.34. Fire Protection and Alarm System

1.34.1. Fire protection and alarm systems shall not be:

1.34.1.1. Obstructed.

1.34.1.2. Shut off.

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

1.34.2. Do no use fire hydrants, standpipes and hose systems for purposes other than firefighting.

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

1.35. Unforeseen Hazards

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

1.36. Posted Documents

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

1.36.1.1. Site Specific Health and Safety Plan.

1.36.1.2. Sequence of work.

1.36.1.3. Emergency procedures.

1.36.1.4. Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
1.36.1.5. Notice of Project.
1.36.1.6. Floor plans or site plans.
1.36.1.7. Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
1.36.1.8. Workplace Hazardous Materials Information System (WHMIS) documetns.
1.36.1.9. Material Safety Data Sheets (MSDS).
1.36.1.10. List of names of Health and Safety Coordinator, Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
1.36.2. Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
1.36.3. Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

1.37. Meetings
1.37.1. Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.
1.37.2. All personnel employed by the contractor and its subcontractors shall attend the EGD Safety Orientation presentation prior to starting work at the EGD Work Site.

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

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. 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. 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.

1.3.1.4. 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.

1.3.1.5. 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.

1.3.1.6. 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 as appropriate and commensurate with site conditions and surroundings. Include procedures if previously unknown historical, archaeological, cultural, and biological resources are discovered during Work. Includes Species At Risk.

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

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

1.3.1.9. Traffic Control including signage and traffic control personnel for Site ingress and egress. Vehicles and vehicle traffic must comply with all federal, provincial, and municipal laws and regulations.

1.3.1.10. 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.

1.3.1.11. 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.

1.3.1.12. 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.

1.3.1.13. 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.

1.3.1.14. 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.

1.3.1.15. 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.

1.4. Cleaning

1.4.1. 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.

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

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

1.5. Site Clearing and Plant Protection

1.5.1. 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.

1.5.2. 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.

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

1.5.4. 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.

1.5.5. 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.

1.5.6. 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.

1.5.7. 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.

1.5.8. 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.
1.5.9. 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.

1.6. Archaeological
1.6.1. Attend archaeological awareness training provided by Departmental Representative.
1.6.2. Abide by Chance Find Procedures developed by Departmental Representative.

1.7. Species At Risk
1.7.1. Protect all Species At Risk, including meeting all 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 Quality Soil and Water Management
1.8.1. Solid waste
1.8.1.1. Remove all Non-Contaminated Quality Soil within Work areas in accordance with the Contract and as directed by the Departmental Representative.
1.8.1.2. Remove surplus materials and temporary facilities from Site.
1.8.1.3. Do not burn or bury any waste onsite.
1.8.1.4. Do not discharge wastes into streams or waterways.
1.8.1.5. Do not dispose of volatile or hazardous materials such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
1.8.1.6. Dispose of all Non-Contaminated Quality 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.
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 Quality Soil Transport and Disposal

1.9.1. Assume ownership of, and be responsible for, Non-Contaminated Quality Soil once it is loaded on a vehicle, barge, or other vessel for Transport. Assume ownership of, and be responsible for, Non-Contaminated Quality 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 Quality Soil.
1.9.7. Barges must be inspected by an independent Marine Surveyor for stability and safety.
1.9.8. Non-Contaminated Quality Soil Disposal: dispose all Non-Contaminated Quality 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 Quality 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.

1.14.2.1. Maintain temporary erosion and pollution control features.

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

1.14.2.3. 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.

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

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

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

1.14.3. Inadequate procedures:

1.14.3.1. 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.

1.14.3.2. Submit procedures proposed to resolve problem.

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

1.14.3.4. 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.

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

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

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

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

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

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

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

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

1.14.7.1. Authority having jurisdiction or interest in spill or other release including conservation authority, water supply authorities, drainage authority, road authority, and fire department.
1.14.7.2. Contractor emergency response team including Superintendent
1.14.7.3. Departmental Representative and other contractor(s) and individuals as directed by the Departmental Representative.
1.14.8. 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.
1.14.9. Remediation of soil, sediment or water contaminated by Contractor's activities.
1.14.9.1. Remediate all soil, sediment or water contaminated by Contractor's activities associated with the Work onsite and offsite.
1.14.9.2. 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.
1.14.9.3. Submit procedures for remediating soil, sediment or water contaminated by Contractor's activities.
1.14.9.4. Remediate as directed by the Departmental Representative.
1.14.9.5. 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. Implement an Erosion and Sediment Control Plan for the site that minimizes risk of sedimentation of the waterbody during all phases of the project. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear.
1.15.2. Install effective erosion and sediment control measures before starting work to prevent sediment from entering a water body.
1.15.3. Manage water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering a waterbody. For example, pumping/diversion of water to a vegetated area, construction of a settling basin or other filtration system.
1.15.4. Implement site 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).
1.15.5. 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. Regular inspection and maintenance of erosion and sediment control measures and structures during the course of construction.
1.15.7. Repair erosion and sediment control measures and structures if damage occurs.

1.15.8. Remove non-biodegradable erosion and sediment control materials once site is stabilized.

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 as required.

1.1.2. Site Facilities - Operation will be paid in accordance with lump sum 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 as required. 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. Duration based on Master Plan.

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 as applicable: 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. Provide supplied utilities for entire work force, including Subcontractors and Departmental Representative and their consultants

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, unless otherwise agreed to by Departmental Representative.

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 must, unless otherwise directed by Departmental Representative, include: name of Client, name of Project, and information contact number in both official languages using graphic symbols to CAN/CSA-Z321. Project signs to be a minimum of 1200 x 2400mm.

1.13.2. Contractor signage must be approved by Departmental Representative.

1.13.3. Contractor signage must include at a minimum:

1.13.3.1. Name of Contractor.

1.13.3.2. Emergency contact number.

1.13.3.3. Personal Protective Equipment requirements.

1.13.3.4. Other pertinent safety warnings (e.g., “open excavation”).

1.13.4. 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. Where applicable, traffic to include pedestrian traffic.

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

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

1.14.4. Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around

and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.

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

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

1.14.7. Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

1.14.8. Construct access and haul roads necessary.

1.14.9. Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic must be avoided.

1.14.10. Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

1.14.11. Dust control: adequate to ensure safe operation at all times.

1.14.12. Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

1.14.13. Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

1.14.14. Provide snow removal during period of Work.

1.14.15. Remove, upon completion of work, haul roads designated by Departmental Representative.

1.15. Truck Wash and Decontamination Units

1.15.1. Supply, install and operate truck wash, including the installation of a water supply.

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. Alternatives to a truck wash, including isolating truck traffic from contact with contaminated material, may be approved by the Departmental Representative. Alternatives will not be accepted if, in the opinion of the Departmental Representative, the alternatives are not adequately designed or performing.

1.15.3. 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

1.15.3.1. At least one personnel decontamination unit must have overhead shower capability.

1.15.3.2. The personnel decontamination units to be available to Departmental Representative and their consultants.

1.15.3.3. The personnel decontamination units are subject to acceptance of Departmental Representative.
1.15.4. The truck wash and personnel decontamination units must be maintained in good working order during onsite Work.
1.15.5. The truck wash and personnel decontamination units must be removed from the Site during Site Decommissioning.

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. Excavation will be paid in accordance with unit rate price established for volume of material removed to excavate to Remedial Excavation Extents according to Drawings. Includes temporary sloping and shoring design and construction. Includes all onsite handling, loading, hauling, unloading and stockpiling, as required. Measurement as recorded insitu Excavation volume using Progress Survey for interim measurement and Contractor's Qualified Professional Surveyor for final excavation extents (As-Built). Insitu volume is simple dimensions of excavation and does not consider exsitu bulking (expansion or swell) and insitu compaction (densifying) factors.

1.1.2. Backfill–Imported will be paid in accordance with unit rate price established per weight for material imported for Backfill for Excavation. 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. Measurement as recorded on weigh scale certified by Measurement Canada and results provided to Departmental Representative.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. 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:

1.3.1.1. Excavation temporary slope and/or shoring design.

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

1.3.1.3. Support of structures design.

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

1.3.1.5. 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.

1.3.1.6. Backfilling design for utilities or other infrastructure to be reinstated or new.

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

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

1.3.2. 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:

1.3.2.1. Grain-size distribution information.

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

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

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

1.3.3.1. Samples to be representative of all Imported Backfill. Sample frequency subject to acceptance by Departmental Representative.

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

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

1.3.5. 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:

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

1.3.5.2. Compaction testing results, confirming results meet requirements in Contract and Excavation Plan.

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 geotechnical 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.

2.1.5. Import fill materials to meet the following minimum environmental quality requirements for the site:

2.1.5.1. Environmental Quality Criteria.

2.1.5.2. 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.

2.1.5.3. Any import fill material which has a discrete sample exceeding the environmental quality requirements specified must be removed from the Site and replaced, including relevant placed material, as directed by the Departmental Representative. An alternate source of backfill must be

provided, with no increases to Contract Amount or Extension of Time for completion of the Work.

2.1.5.4. Environmental quality requirements may be modified by the Departmental Representative taking into consideration background concentrations, commercially available material, and site-specific factors and/or land use.

2.1.6. Import fill material additional testing:

2.1.6.1. Perform additional testing as directed by the Departmental Representative to confirm suitability.

2.1.6.2. Facilitate testing by the Departmental Representative to confirm suitability.

2.1.7. 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 current version 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 Quality 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 Quality 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 Quality Soil at a Landfill.

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

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

3.2.5. Decommission monitoring wells encountered incidentally within final Contaminated Soil Extents.

3.2.5.1. Decommission monitoring wells extending below the Contaminated Soil Extents in accordance with methods in BC Groundwater Protection Regulation or the Yukon Environment Protocol 7: Groundwater Monitoring Well Installation, Sampling and Decommissioning, as appropriate.

3.2.5.2. Protect monitoring wells outside Contaminated Soil Extents. Replace damaged monitoring wells as directed by the Departmental Representative at Contractor's expense.

3.2.6. Protection:

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

3.2.6.2. 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.

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

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

3.2.7. Security and Safety:

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

3.2.7.2. 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. Onsite Access Roads

3.4.1. Construct, operate and maintain the onsite access roads 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 roads 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 roads 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 roads associated with the Work.

3.5. Temporary Sloping and Shoring

3.5.1. Design, supply, install, and remove appropriate sloping or shoring to allow excavation of Remedial Excavation Extents according to Drawings or as directed by Departmental Representative.

3.5.2. Drawings show nominal slopes and excavation limits for volume estimating purposes only, and are not for construction. Contractor's Qualified Professional to determine safe and optimal slopes and excavation limits.

3.5.3. Design Requirements:

3.5.3.1. Act as sloping or shoring structures for excavations as well as for stability of foundations and infrastructure during remediation/construction excavation procedures.

3.5.3.2. Allow excavation of all Contaminated Soil laterally and vertically on the Site to Remedial Excavation Extents in accordance with the Contract. Allow excavation of additional Contaminated Soil beyond Remedial Excavation Extents in order to result in achieving remedial objectives at the Site based on field observations or Confirmation Samples.

3.5.3.3. Provide a safe working environment for personnel and equipment within the excavation area, including collection of confirmatory samples or other work that may be required at the base of the excavation.

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

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

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

3.5.3.7. Sloping and shoring structures are temporary structures only. Resistance to seismic loads will be at the discretion of the Contractor's Qualified Professional. Be responsible for any failures and resultant costs should the temporary sloping or shoring fail due to a seismic event during the construction period.

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

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

3.5.4. Installation:

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

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

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

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.

3.6. 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 Quality 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 as determined by Contractor's Qualified Professional or as directed by Departmental Representative.
3.7.3. Excavate all Contaminated Soil laterally and vertically on the Site to Remedial Excavation Extents in accordance with the Contract. Excavate additional Contaminated Soil beyond Remedial Excavation Extents in order to result in meeting remedial objectives at the Site based on field observations or Confirmation Samples
3.7.4. Excavation must not interfere with bearing capacity of adjacent foundations and infrastructure.
3.7.5. Machine cut banks and slopes.
3.7.6. Protect bottom of excavations from excessive traffic.
3.7.7. Grade excavation top perimeter to prevent surface water run-off into excavation.
3.7.8. Keep excavated and stockpiled materials safe distance away from edge of excavation.
3.7.9. Restrict vehicle operations directly adjacent to open excavations.
3.7.10. Remove Oversize Debris.
3.7.10.1. Piles encountered during excavation must be cut off at base of excavation. Piles are not to be extracted beyond the base of the excavation.

3.7.10.2. 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.

3.7.10.3. Reduce size of Oversize Debris to allow to be Transported, Treated, and Disposed, as required, as Non-Contaminated Quality Soil or Contaminated Soil, as appropriate.

3.7.11. Remove Non-Contaminated Quality Soil to Landfill Facility or re-use as Backfill - Owner Supplied according to Contract and as directed by Departmental Representative.

3.7.12. Earth bottoms of excavations to be undisturbed cobble or boulder, level to extent possible, free from loose, soft or organic material.

3.7.13. Notify Departmental Representative when bottom of excavation is reached based on Remedial Excavation Extents.

3.7.14. Provide assistance for collection of Confirmation Samples as directed by the Departmental Representative.

3.7.15. Obtain acceptance by Departmental Representative of completed excavation.

3.8. Soil Stockpiling

3.8.1. Stockpile material within work area in locations identified by Departmental Representative.

3.8.2. Provide, maintain, and operate temporary storage/stockpiling facilities as per Contractor's Site Layout.

3.8.3. Segregate Contaminated Soil from Non-Contaminated Quality Soil into separate stockpiles to prevent cross-contamination.

3.8.4. 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.

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

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

3.8.7. Store excavated Contaminated Soil in temporary stockpiles.

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

3.8.7.2. 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. Cover to be impermeable (e.g., minimum 5 mil polyethylene) and securely fashioned to prevent blowing off.

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

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

3.8.9. 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 Samples results provided within 5 Working Days, not counting the day the sample is collected.

3.8.10. 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 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 Contract.

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. Surveying has been completed by the Contractor's Qualified Professional for final excavation limits and As-Built documents, including final utilities locations.

3.10.1.3. Departmental Representative has inspected and accepted Remedial Excavation Extents by the Departmental Representative based on survey data and Confirmation Samples results.

3.10.1.4. Departmental Representative has inspected and accepted backfill material.

3.10.1.5. 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.

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

3.10.1.7. 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 (i.e., 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.

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. Includes all handling, stabilization, loading, hauling, unloading, transfer, interim storage, and transport to and from intermediate locations and final placement location. Measurement as recorded on weigh scale certified by Measurement Canada and results provided to Departmental Representative.

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 for stability and safety.

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. Includes Treatment or any other processing of material not required by the Contract but required by Regulations, Disposal Facility, or for other reasons. Measurement as recorded on weigh scale certified by Measurement Canada and results provided to Departmental Representative on Certificates of Disposal.

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.

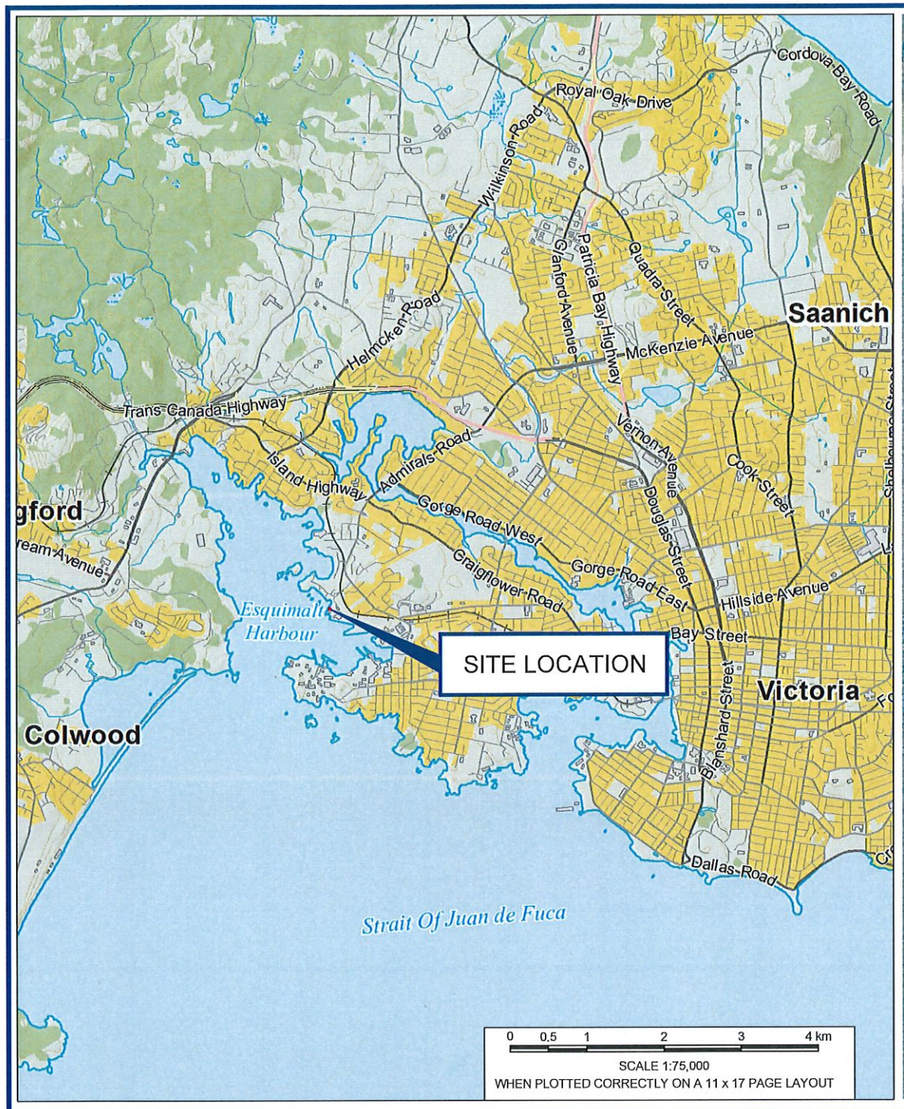
3. PART 3 - EXECUTION

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 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

DRAWINGS

Esquimalt Graving Dock Parcel IM-901 Remediation
825 Admirals Road, Esquimalt, BC
SLR Project No.: 205.03877.00001



NOTES:
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BASEDATA:
© Department of Natural Resources Canada, All rights reserved;National Road Network, National Railway Network Geobase®, Downloaded March 2014; Fresh Water Atlas, GeoBC®, Downloaded December 2014

- Rail Line
- Contour (20m)
- Watercourse
- Wetlands
- Buildings
- Wooded Area
- Developed Area
- Highway
- Arterial
- Local / Street

LEGEND:
- PROPERTY BOUNDARY
- SITE LOCATION

OFFICE OF APPLIED BIOLOGY
Donald McKeown
01/23/2019
R.P. Bio #1540
CAB

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PUBLIC SERVICES AND PROCUREMENT CANADA
ESQUIMALT GRAVING DOCK PARCEL IM-901
825 ADMIRALS ROAD
VICTORIA, BC

EGD PARCEL IM-901 - REMEDIAL SPECIFICATIONS

SITE LOCATION AND SURROUNDING LAND USE

Date: January 23, 2019
Project No. 205.03877.00001
Drawing No. 1

SLR global environmental solutions

Cadfile name: S_205-03877-00001-A2.dwg

NOTES:
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LEGEND:

- SITE BOUNDARY
- FENCE
- CONCRETE BARRIERS AND BOLLARDS
- BOREHOLE (SLR, 2013 / 2017)
- BOREHOLE (SRK, 1993)
- TEST PIT (GOLDER, 2003)
- A A' CROSS SECTION A-A'
  CROSS SECTION B-B'
  CROSS SECTION C-C'
- UTILITIES AND SYMBOLS
  CONCRETE TRENCH DRAIN

SOIL LABORATORY ANALYSIS RESULTS

- CONCENTRATIONS LESS THAN OR EQUAL TO APPLICABLE CCME IL GUIDELINES
- CONCENTRATIONS EXCEED APPLICABLE CCME IL GUIDELINES
- NOT ANALYZED

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01/23/2019
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0 2.5 5 10 m

SCALE 1:150
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10 U

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PUBLIC SERVICES AND PROCUREMENT CANADA
ESQUIMALT GRAVING DOCK PARCEL IM-901
825 ADMIRALS ROAD
VICTORIA, BC

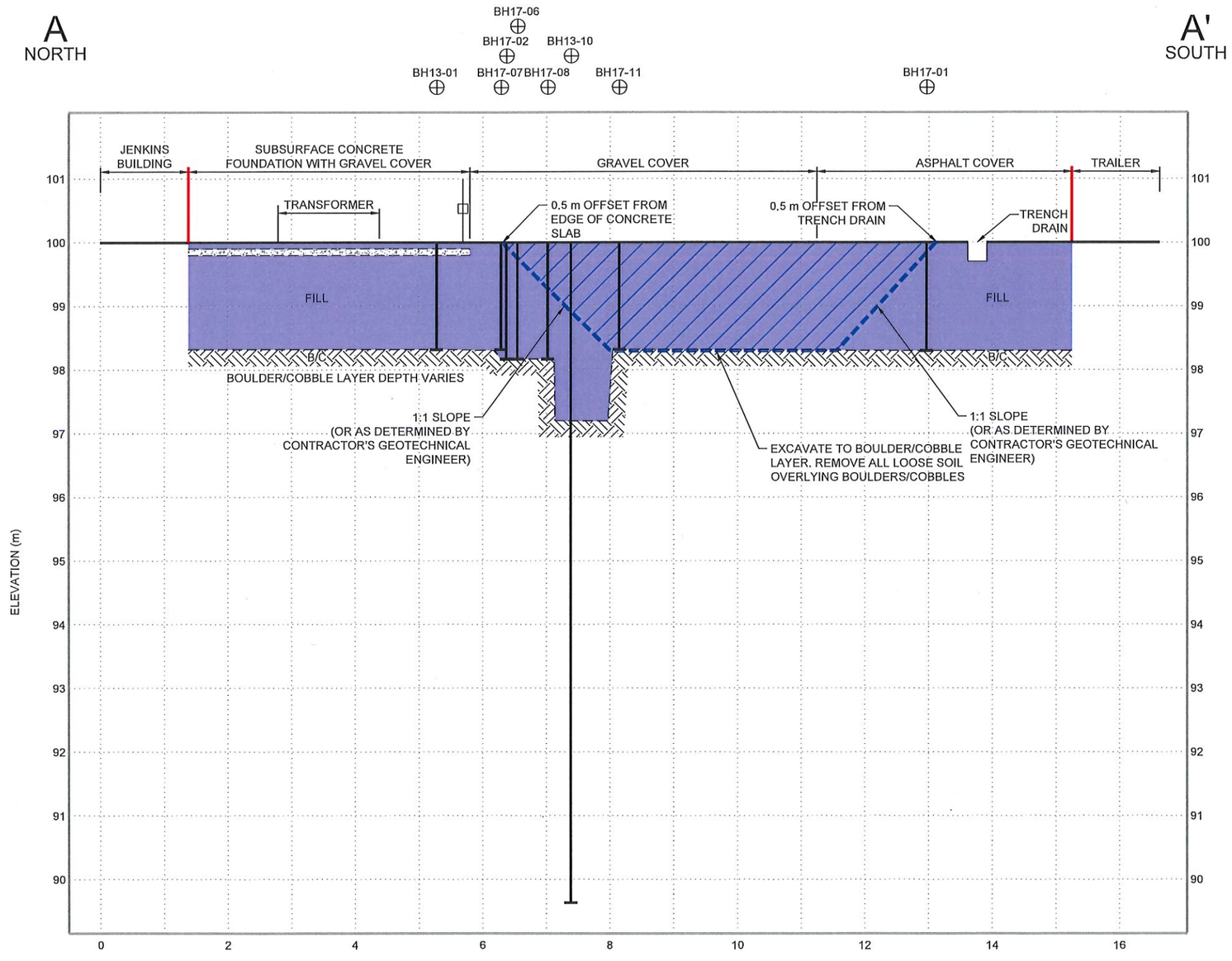
EGD PARCEL IM-901 - REMEDIAL SPECIFICATIONS

SITE PLAN AND EXISTING CONDITIONS

Date: January 23, 2019
Project No. 205.03877.00001
Drawing No. 2

SLR global environmental solutions

Cadfile name: S_205-03877-00001-A2.dwg



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LEGEND:

- SITE BOUNDARY
- CONCRETE BARRIERS AND BOLLARDS
- PROPOSED LIMITS OF EXCAVATION
- PROPOSED BACKFILL TO GRADE APPROPRIATELY COMPACTED AND PAVED FOR FUTURE USE
- BOREHOLE (SLR, 2013 / 2017)
- CON — CONCRETE
- FILL — HETEROGENEOUS FILL
- BR — BOULDER/COBBLE
- WELL
- SCREENED INTERVAL
- BOREHOLE OR TESTPIT
- END OF HOLE

NOTES: GROUNDWATER TABLE ANTICIPATED TO BE BELOW BASE OF EXCAVATION

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0 0.5 1 2 3 4 m

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PUBLIC SERVICES AND PROCUREMENT CANADA
ESQUIMALT GRAVING DOCK PARCEL IM-901
825 ADMIRALS ROAD
VICTORIA, BC

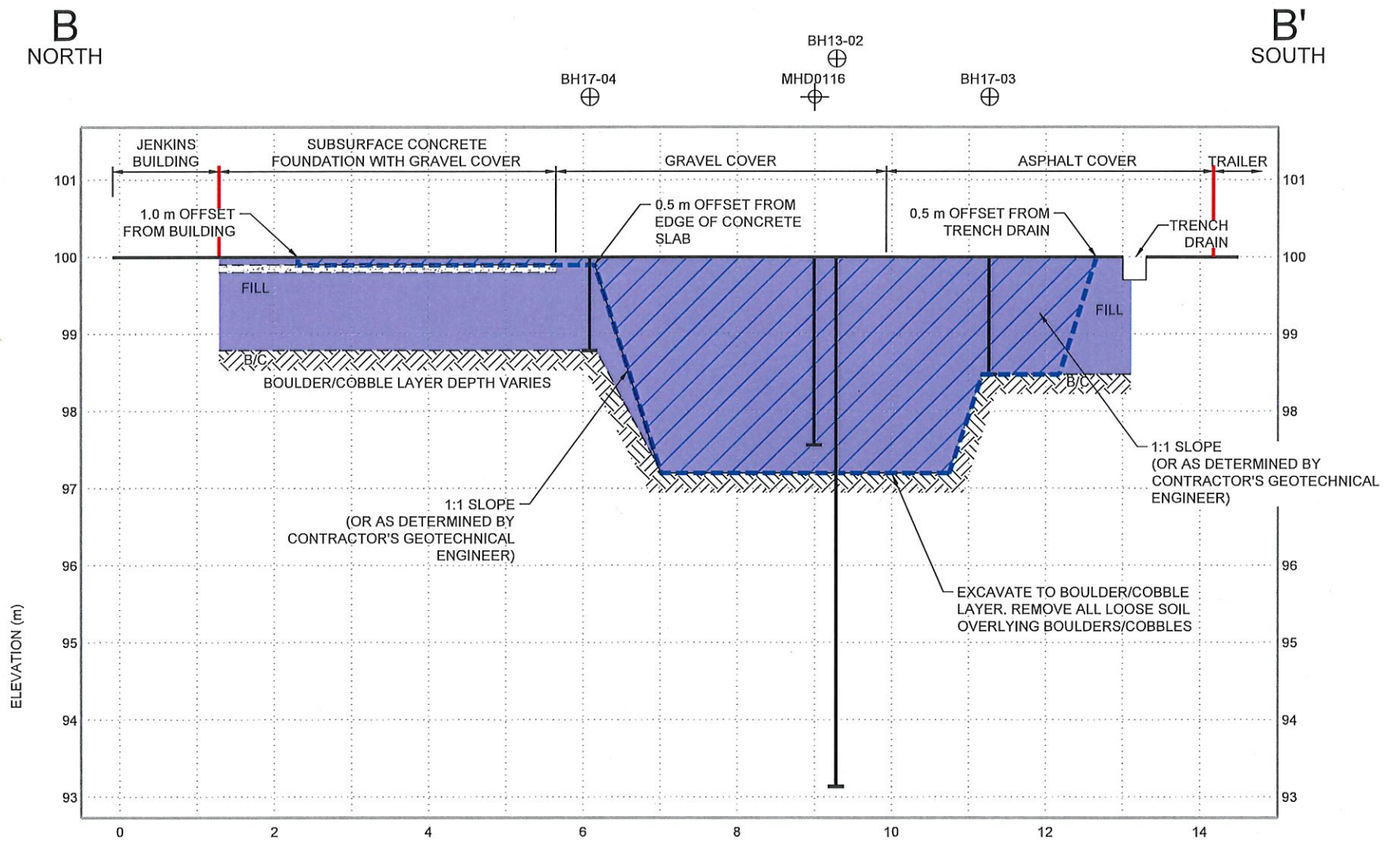
EGD PARCEL IM-901 - REMEDIAL SPECIFICATIONS

CROSS SECTION A-A'

Date: January 23, 2019
Project No. 205.03877.00001
Drawing No. 3

SLR global environmental solutions

Cadfile name: S_205-03877-00001-A2.dwg



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LEGEND:

- SITE BOUNDARY
- PROPOSED LIMITS OF EXCAVATION
- PROPOSED BACKFILL TO GRADE APPROPRIATELY COMPACTED AND PAVED FOR FUTURE USE
- BOREHOLE (SLR, 2013 / 2017)
- BOREHOLE (SRK, 1993)
- FILL — HETEROGENEOUS FILL
- B/C — BOULDER/COBBLE
- WELL
- SCREENED INTERVAL
- BOREHOLE OR TESTPIT
- END OF HOLE

NOTES: GROUNDWATER TABLE ANTICIPATED TO BE BELOW BASE OF EXCAVATION

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CAB

0 0.5 1 2 3 4 m

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PUBLIC SERVICES AND PROCUREMENT CANADA
ESQUIMALT GRAVING DOCK PARCEL IM-901
825 ADMIRALS ROAD
VICTORIA, BC

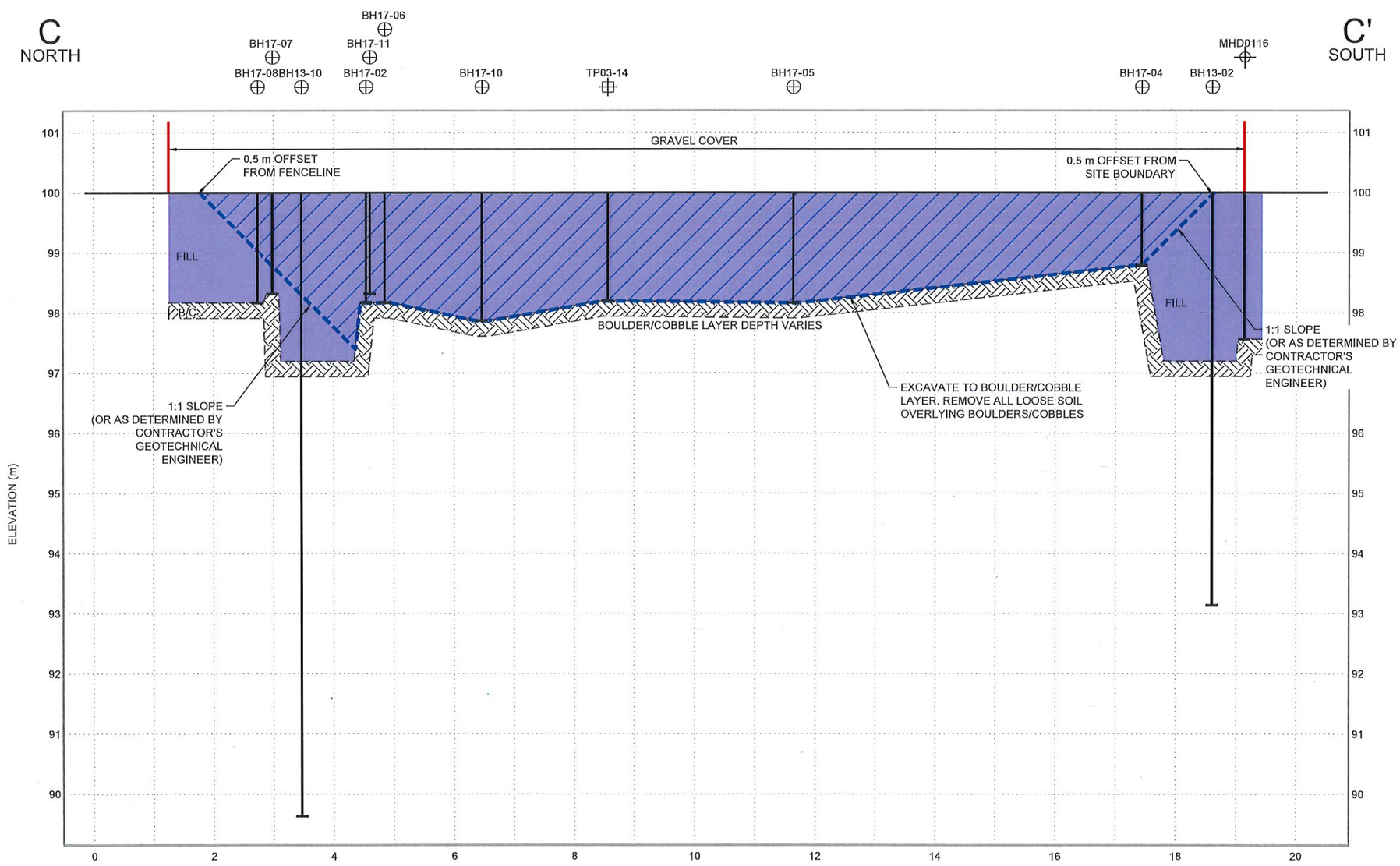
EGD PARCEL IM-901 - REMEDIAL SPECIFICATIONS

CROSS SECTION B-B'

Date: January 23, 2019
Project No. 205.03877.00001
Drawing No. 4

SLR global environmental solutions

Cadfile name: S_205-03877-00001-A2.dwg



NOTES:
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LEGEND:

- SITE BOUNDARY
- PROPOSED LIMITS OF EXCAVATION
- PROPOSED BACKFILL TO GRADE APPROPRIATELY COMPACTED AND PAVED FOR FUTURE USE
- BOREHOLE (SLR, 2013 / 2017)
- TEST PIT (GOLDER, 2003)
- FILL — HETEROGENEOUS FILL
- BC — BOULDER/COBBLE
- WELL
- SCREENED INTERVAL
- BOREHOLE OR TESTPIT
- END OF HOLE

NOTES: GROUNDWATER TABLE ANTICIPATED TO BE BELOW BASE OF EXCAVATION

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David H. McKeown
01/23/2019
R.P. Bio #1540
CAB

0 0.5 1 2 3 4 m

SCALE 1:75
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PUBLIC SERVICES AND PROCUREMENT CANADA
ESQUIMALT GRAVING DOCK PARCEL IM-901
825 ADMIRALS ROAD
VICTORIA, BC

EGD PARCEL IM-901 - REMEDIAL SPECIFICATIONS

CROSS SECTION C-C'

Date: January 23, 2019
Project No. 205.03877.00001
Drawing No. 5

SLR global environmental solutions

Cadfile name: S_205-03877-00001-A2.dwg

NOTES:
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LEGEND:

- SITE BOUNDARY
- FENCE
- CONCRETE BARRIERS AND BOLLARDS
- PROPOSED LIMITS OF EXCAVATION

UTILITIES AND SYMBOLS
- CONCRETE TRENCH DRAIN

NOTES:
- NO ON-SITE WATER TREATMENT
- SOIL STOCKPILING TO BE LIMITED AS DIRECTED BY DEPARTMENT REPRESENTATIVE
- CONTRACTOR TO IDENTIFY ALL ON-SITE UTILITIES
- PROTECT BURIED UTILITIES TO REMAIN UNDISTURBED AS DIRECTED BY DEPARTMENT REPRESENTATIVE

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01/23/2019
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CAB

0 2.5 5 10 m

SCALE 1:150
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NAD 1983 UTM Zone 10 U

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PUBLIC SERVICES AND PROCUREMENT CANADA
ESQUIMALT GRAVING DOCK PARCEL IM-901
825 ADMIRALS ROAD
VICTORIA, BC

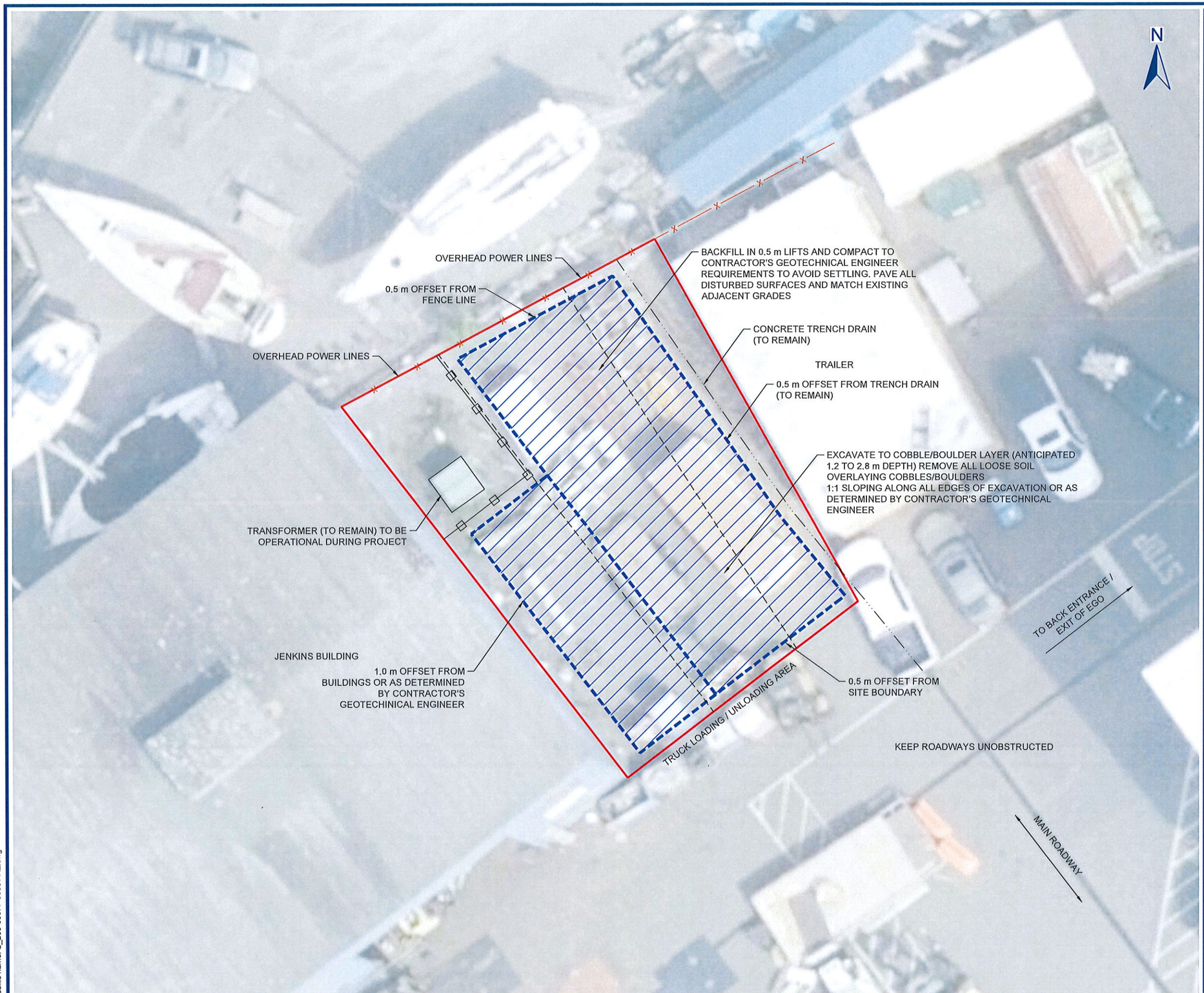
EGD PARCEL IM-901 - REMEDIAL SPECIFICATIONS

PROPOSED REMEDIAL PLAN

Date: January 23, 2019
Project No. 205.03877.00001
Drawing No. 6

SLR global environmental solutions

Cadfile name: S_205-03877-00001-A2.dwg



NOTES:
NOT A LEGAL SURVEY. ALL FEATURES AND MEASUREMENTS TO BE CONFIRMED BY CONTACTOR.

REFERENCED FROM CAPITAL REGIONAL DISTRICT WMS AND SITE RECONNAISSANCE INFORMATION. IMAGERY © 2018 CAPITAL REGIONAL DISTRICT (IMAGE DATE: 2015).

LEGEND:

- SITE BOUNDARY
- FENCE
- CONCRETE BARRIERS AND BOLLARDS
- PROPOSED LIMITS OF EXCAVATION
- PROPOSED BACKFILL TO GRADE APPROPRIATELY COMPACTED AND PAVED FOR FUTURE USE

COLLEGE OF APPLIED BIOLOGY
David H. McKeown
01/23/2019
R.P. Bio #1540
CAD

0 2.5 5 10 m

SCALE 1:150
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10 U

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

PUBLIC SERVICES AND PROCUREMENT CANADA
ESQUIMALT GRAVING DOCK PARCEL IM-901
825 ADMIRALS ROAD
VICTORIA, BC

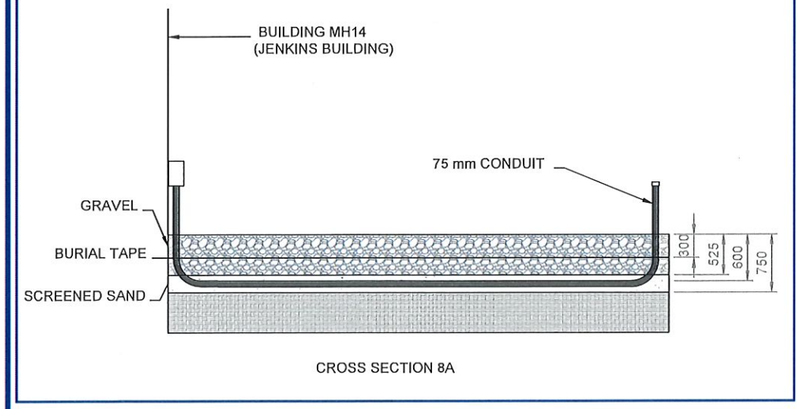
EGD PARCEL IM-901 - REMEDIAL SPECIFICATIONS

SITE RESTORATION

Date: January 23, 2019
Project No. 205.03877.00001
Drawing No. 7

SLR global environmental solutions

Cadfile name: S_205-03877-00001-A2.dwg



CROSS SECTION 8A

NOTES:
NOT A LEGAL SURVEY. ALL FEATURES AND MEASUREMENTS TO BE CONFIRMED BY CONTACTOR.

LEGEND:

- FENCE
- FUTURE FACILITY/FEATURE

UTILITIES AND SYMBOLS

- CONCRETE TRENCH DRAIN
- PROPOSED U/G ELECTRICAL
- PROPOSED U/G SANITARY SEWER
- U/G SANITARY SEWER
- U/G STORM SEWER
- PROPOSED U/G WATER LINE
- U/G WATER LINE

NOTES:

- ALL DIMENSIONS, MEASUREMENTS AND LOCATIONS ARE APPROXIMATE AND ARE TO BE CONFIRMED BY CONTRACTOR FOLLOWING AWARD
- CONTRACTOR TO DETERMINE APPROPRIATE GRADES FOR UTILITY INSTALLATIONS FOR APPROVAL BY DEPARTMENTAL REPRESENTATIVE
- CONTRACTOR TO PERFORM APPROPRIATE WATER LINE PRESSURE TESTING FOLLOWING INSTALLATION
- WASHROOM FACILITY SUPPLY, DELIVERY, AND INSTALLATION NOT INCLUDED IN SCOPE. TO BE INSTALLED AT A LATER DATE

COLLEGE OF APPLIED BIOLOGY
David H. McKeown
01/23/2019
R.P. Bio
#1540
CAB

0 2.5 5 10 m

SCALE 1:150
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10 U

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

PUBLIC SERVICES AND PROCUREMENT CANADA
ESQUIMALT GRAVING DOCK PARCEL IM-901
825 ADMIRALS ROAD
VICTORIA, BC

EGD PARCEL IM-901 - REMEDIAL SPECIFICATIONS

UTILITY AND ELECTRICAL HOOK-UPS FOR FUTURE WASHROOM FACILITY

Date: January 23, 2019
Project No. 205.03877.00001
Drawing No. 8

SLR global environmental solutions

Cadfile name: S_205-03877-00001-A2.dwg

APPENDIX A
Site Photographs

Esquimalt Graving Dock Parcel IM-901 Remediation
825 Admirals Road, Esquimalt, BC
SLR Project No.: 205.03877.00001

Photo 1: View of the EGD Parcel IM-901 site, facing northwest. Electrical transformer with barriers and bollards is seen on the left. Debris and equipment will be removed prior to remedial activities.

Photo 2: Alternate view of the Parcel IM-901 site, facing northwest. Jenkins Marine building is seen on the left and Intercon Marine trailer is seen to the right of the site boundary. Electrical transformer is behind the sea-can and temporary enclosure which are no longer present at the site.

Photo 3: Close-up view of the electrical transformer located at the northwest corner of the site, facing west. The transformer will remain active during the remedial activities. Sporadic invasive vegetation is seen within this section of the site.

Photo 4: Alternate view of the Parcel IM-901 site, facing north. Chain-link fence is seen along the northwest perimeter of the site. Existing gravel (left of red line) and paved (right of red line) surfaces are seen.

Photo 5: View of concrete trench drain with grated metal covering that runs along the northeast portion of the site, facing southeast. Trench drain is to remain during project with 0.5 m offset and isolated to prevent deleterious substances from entering stormwater system.

Photo 6: View of attempted borehole near BH17-02 adjacent to the electrical transformer at the northwest portion of the site, looking west. Subsurface concrete slab can be seen with overlying gravel and heterogeneous fill material.

Photo 7: View of concrete slab encountered below gravel and heterogeneous fill material adjacent to Jenkins Marine Building near BH17-04.

Photo 8: View of boulder/cobble layer encountered at 1.5 m bgs at location BH17-03 at southeast portion of site.

Photo 9: View of boulder/cobble layer encountered at 1.2 m bgs at location BH17-04 at the southwest portion of the site.

APPENDIX B
Investigation Test Pit and Borehole Logs

Esquimalt Graving Dock Parcel IM-901 Remediation
825 Admirals Road, Esquimalt, BC
SLR Project No.: 205.03877.00001

SLR CONSULTING (CANADA) LTD.

CLIENT: **PSPC**
PROJECT: **Supplimental Phase II ESA**
ADDRESS: **825 Admirals Rd. Victoria, BC**
SLR JOB NO: **205.03877.00000**

BOREHOLE LOG

BOREHOLE NO: BH17-01
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
					ASPHALT					
					SAND and GRAVEL Medium to coarse, rounded to sub-rounded, compact, wet from daylighting water (road base)					
					CLAY Some silt, soft, brown, wet					
		BH17-01A				0				
1									backfilled with sand and gravel from Lot 203	1.0
					firm @ 1.21 m					
		BH17-01B				0				
					BOULDER End of borehole at 1.7 m					

DRILLING METHOD: Vacuum Extraction/Daylighting

DRILL DATE: August 15, 2017 LOGGED BY: R. Prieto
DRILLED BY:

Notes: ■ GRAB SAMPLE

SLR CONSULTING (CANADA) LTD.

CLIENT: **PSPC**
PROJECT: **Supplimental Phase II ESA**
ADDRESS: **825 Admirals Rd. Victoria, BC**
SLR JOB NO: **205.03877.00000**

BOREHOLE LOG

BOREHOLE NO: BH17-02
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
					SAND and GRAVEL Medium to coarse, angular to sub-rounded, dark grey, compact, wet from daylighting water (road base)					
		BH17 -02A/B			**CLAY** Sandy, some gravel, trace wood and metal debris, medium plasticity, soft, dark brown, wet	25				
1									backfilled with sand and gravel from Lot 203	1.0
		BH17 -02C			**GRAVEL** Some sand, trace silt, angular to sub-angular, loose, dark grey, wet	0				
					End of borehole at 1.8 m					

DRILLING METHOD: Vacuum Extraction/Daylighting

DRILL DATE: August 15, 2017

LOGGED BY: R. Prieto
DRILLED BY:

Notes: ■ GRAB SAMPLE

SLR CONSULTING (CANADA) LTD.

CLIENT: **PSPC**
PROJECT: **Supplimental Phase II ESA**
ADDRESS: **825 Admirals Rd. Victoria, BC**
SLR JOB NO: **205.03877.00000**

BOREHOLE LOG

BOREHOLE NO: BH17-03
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
					ASPHALT					
					SAND and GRAVEL Medium to coarse, angular to sub-rounded, compact, light grey, moist (road base)					
		BH17-03A			**SAND and GRAVEL** Trace silt, trace cobbles, trace wood and metal debris, medium to coarse, angular to sub-rounded, compact, dark grey, moist	5			backfilled with sand and gravel from Lot 203	
1										1.0
		BH17-03B			**GRAVEL and COBBLES** Trace sand, angular, grey, dense, wet	0				
					BOULDER End of borehole at 1.5 m					

DRILLING METHOD: Vacuum Extraction/Daylighting

DRILL DATE: August 15, 2017 LOGGED BY: R. Prieto
DRILLED BY:

Notes: GRAB SAMPLE

SLR CANADA V5.2 EGD_GINT.GPJ SLR_CAN V5.2.GDT 11/3/17

SLR CONSULTING (CANADA) LTD.

CLIENT: **PSPC**
PROJECT: **Supplimental Phase II ESA**
ADDRESS: **825 Admirals Rd. Victoria, BC**
SLR JOB NO: **205.03877.00000**

BOREHOLE LOG

BOREHOLE NO: BH17-04
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
		BH17-04A			**SAND and GRAVEL** Trace wood and metal debris, medium to coarse, angular to sub-rounded, compact, dark grey, wet	0				
					SAND Some gravel, trace cobbles, coarse, angular to sub-angular, compact, grey, wet				backfilled with sand and gravel from Lot 203	
1		BH17-04B				0				1.0
					BOULDER End of borehole at 1.2 m					

DRILLING METHOD: Vacuum Extraction/Daylighting

DRILL DATE: August 15, 2017

LOGGED BY: R. Prieto
DRILLED BY:

Notes: ■ GRAB SAMPLE

SLR CONSULTING (CANADA) LTD.

CLIENT: **PSPC**
PROJECT: **Supplimental Phase II ESA**
ADDRESS: **825 Admirals Rd. Victoria, BC**
SLR JOB NO: **205.03877.00000**

BOREHOLE LOG

BOREHOLE NO: BH17-05
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
		BH17-05A			**SAND and GRAVEL** Trace cobbles, trace wood and metal debris, medium to coarse, angular to sub-rounded, compact, dark grey, wet	0			backfilled with sand and gravel from Lot 203	
1					**BOULDERS and COBBLES** Compact, grey, wet					1.0
		BH17-05B			**SAND** Some cobbles, trace gravel, coarse, compact, grey, wet	0				
					BOULDER End of borehole at 1.8 m					

DRILLING METHOD: Vacuum Extraction/Daylighting

DRILL DATE: August 15, 2017 LOGGED BY: R. Prieto
DRILLED BY:

Notes: ■ GRAB SAMPLE

SLR CONSULTING (CANADA) LTD.

CLIENT: **PSPC**
PROJECT: **Supplimental Phase II ESA**
ADDRESS: **825 Admirals Rd. Victoria, BC**
SLR JOB NO: **205.03877.00000**

BOREHOLE LOG

BOREHOLE NO: BH17-06
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
					GRAVEL Some sand, medium to coarse, angular to subangular, loose, grey, moist					
					GRAVEL Some cobbles, trace silt, trace metal debris, angular to sub-angular, loose, grey, moist					
1		BH17-06A							backfilled with imported sand and gravel / sand and gravel from Lot 203	1.0
					End of borehole at 1.8 m					

DRILLING METHOD: Vacuum Extraction/Daylighting

DRILL DATE: October 24, 2017

LOGGED BY: R. Prieto
DRILLED BY:

Notes: ■ GRAB SAMPLE

SLR CONSULTING (CANADA) LTD.

CLIENT: **PSPC**
PROJECT: **Supplimental Phase II ESA**
ADDRESS: **825 Admirals Rd. Victoria, BC**
SLR JOB NO: **205.03877.00000**

BOREHOLE LOG

BOREHOLE NO: BH17-07
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
1		BH17-07A			**GRAVEL** Trace sand, medium to coarse, angular to subangular, loose, grey, moist **GRAVEL** Some cobbles, some silt, angular to sub-angular, dense, dark grey, moist				backfilled with imported sand and gravel / sand and gravel from Lot 203	1.0
					End of borehole at 1.7 m					

DRILLING METHOD: Vacuum Extraction/Daylighting

DRILL DATE: October 24, 2017

LOGGED BY: R. Prieto
DRILLED BY:

Notes: ■ GRAB SAMPLE

SLR CONSULTING (CANADA) LTD.

CLIENT: **PSPC**
PROJECT: **Supplimental Phase II ESA**
ADDRESS: **825 Admirals Rd. Victoria, BC**
SLR JOB NO: **205.03877.00000**

BOREHOLE LOG

BOREHOLE NO: BH17-08
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
					GRAVEL Trace sand, medium to coarse, angular to subangular, loose, grey, moist					
					GRAVEL Some cobbles, trace sand, trace metal debris, angular to subangular, dense, grey, moist				backfilled with imported sand and gravel / sand and gravel from Lot 203	
1										1.0
		BH17-08A			**SILT** Gravelly, trace sand, soft, brown, moist					
					End of borehole at 1.8 m					

DRILLING METHOD: Vacuum Extraction/Daylighting

DRILL DATE: October 24, 2017

LOGGED BY: R. Prieto
DRILLED BY:

Notes: GRAB SAMPLE

SLR CONSULTING (CANADA) LTD.

CLIENT: **PSPC**
PROJECT: **Supplimental Phase II ESA**
ADDRESS: **825 Admirals Rd. Victoria, BC**
SLR JOB NO: **205.03877.00000**

BOREHOLE LOG

BOREHOLE NO: BH17-09
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
1		BH17-09A			**GRAVEL** Trace sand, medium to coarse, angular to subangular, loose, grey, moist **GRAVEL** Some cobbles, trace silt, angular to subangular, dense, grey, moist				backfilled with imported sand and gravel / sand and gravel from Lot 203	1.0
					End of borehole at 1.2 m					

DRILLING METHOD: Vacuum Extraction/Daylighting

DRILL DATE: October 24, 2017

LOGGED BY: R. Prieto
DRILLED BY:

Notes: ■ GRAB SAMPLE

SLR CONSULTING (CANADA) LTD.

CLIENT: **PSPC**
PROJECT: **Supplimental Phase II ESA**
ADDRESS: **825 Admirals Rd. Victoria, BC**
SLR JOB NO: **205.03877.00000**

BOREHOLE LOG

BOREHOLE NO: BH17-10
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
0					**GRAVEL** Some sand, medium to coarse, angular to subangular, loose, grey, moist					
					GRAVEL Some silt, some cobbles, angular to subangular, dense, grey, moist				backfilled with imported sand and gravel / sand and gravel from Lot 203	
1		BH17-10A								1.0
2										2.0
					End of borehole at 2.1 m					

DRILLING METHOD: Vacuum Extraction/Daylighting

DRILL DATE: October 24, 2017

LOGGED BY: R. Prieto
DRILLED BY:

Notes: ■ GRAB SAMPLE

SLR CANADA V5.2 EGD_GINT.GPJ SLR_CAN V5.2.GDT 11/3/17

SLR CONSULTING (CANADA) LTD.

CLIENT: **PSPC**
PROJECT: **Supplimental Phase II ESA**
ADDRESS: **825 Admirals Rd. Victoria, BC**
SLR JOB NO: **205.03877.00000**

BOREHOLE LOG

BOREHOLE NO: BH17-11
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
1		BH17-11A			**GRAVEL** Trace sand, medium to coarse, angular to subangular, loose, grey, moist **GRAVEL** Some cobbles, trace silt, trace metal debris, angular to sub-angular, dense, brown, moist				backfilled with imported sand and gravel / sand and gravel from Lot 203	1.0
					End of borehole at 1.7 m					

DRILLING METHOD: Vacuum Extraction/Daylighting

DRILL DATE: October 24, 2017

LOGGED BY: R. Prieto
DRILLED BY:

Notes: ■ GRAB SAMPLE

SLR CONSULTING (CANADA) LTD.

CLIENT: **PWGSC**
PROJECT: **Munroe Head Soil Characterization**
ADDRESS: **Esquimalt Graving DockVictoria, BC**
SLR JOB NO: **205.03627.00000**

BOREHOLE LOG

BOREHOLE NO: BH13-01
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100	COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
1		A B C		**FILL** Silty, sandy gravelly FILL, some asphalt and brick, some sub-angular cobbles, brown, wet **SAND** Angular coarse SAND that looks like coal slegg (though no odour/reading on Eagle) under fill layer, above cobble layer (in a band), BLACK, wet **GRAVEL** silty GRAVEL and coarse grained sands, with cobbles and boulders, BH13-10 stepped out 1.5m to East to continue drilling (Rig did not fit in area daylighting began in), grey, dry End of borehole at 1.7 m	0 0 0			Mixture of silica sand and bentonite	1.0

NW corner of East side of Jenkins Marine Building

BOREHOLE METHOD: Daylighting and SONIC

BOREHOLE DATE: March 7, 2013 LOGGED BY: CC

Notes: ■ GRAB SAMPLE

SLR CONSULTING (CANADA) LTD.

CLIENT: **PWGSC**
PROJECT: **Munroe Head Soil Characterization**
ADDRESS: **Esquimalt Graving DockVictoria, BC**
SLR JOB NO: **205.03627.00000**

BOREHOLE LOG

BOREHOLE NO: BH13-02
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
0		A		**SAND and GRAVEL** some silt, loose, brown and grey, moist	0				0
1		B		**CLAY** silty compact CLAY, trace gravel, brownish grey, wet	0			mixture of silica sand and bentonite	1.0
		C		**GRAVEL** silty GRAVEL, occasional boulder, shell fragments, compact, brown, moist	0				
2									2.0
		D		**SAND** silty fine grained SAND with some gravel, grey, dry	30				
3									3.0
				COBBLES angular cobbles (blast rock), Very little recovery in this area due to substrate, bluish grey, dry					
4								backfilled with drill cuttings	4.0
5									5.0
6				**BEDROCK** Pulvarised rock came out as silty till-like powder, dense, light grey, dry	330				6.0
		E							
				End of borehole at 6.9 m					
				SE corner on East side of Jankins Marine Building					

BOREHOLE METHOD: Daylighting and SONIC

BOREHOLE DATE: March 7, 2013 LOGGED BY: CC

Notes: GRAB SAMPLE
SONIC CORE SAMPLE

SLR CONSULTING (CANADA) LTD.

CLIENT: **PWGSC**
PROJECT: **Munroe Head Soil Characterization**
ADDRESS: **Esquimalt Graving DockVictoria, BC**
SLR JOB NO: **205.03627.00000**

BOREHOLE LOG

BOREHOLE NO: **BH13-10**
SURFACE ELEVATION:

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv)	COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
0				as in BH13-01				mixture of silica sand and bentonite	0
2		A		**CLAY** silty CLAY with angular gravel and trace cobbles, some orange mottles, greyish brown, wet	25				2.0
3				**GRAVEL** sub angular GRAVEL with coarse sand, reddish brown					3.0
				COBBLE angular blast rock - COBBLE sized, not sampleable					
6		B		**GRAVEL** silty clayey GRAVEL, tight, trace cobbles, dk grey, wet	15			backfilled with drill cuttings	6.0
7				**GRAVEL** as previous, but loose and with some shell fragments, dk grey, wet					7.0
8		C / D (dup)			5				8.0
9		E		**SAND** gravelly SAND with some silt and clay, lots of shell fragments., grey, wet	1760				9.0
10		F		**TILL** TILL, tight, some cobbles, light grey, dry	0				10.0
				End of borehole at 10.4 m					

1.5m to southeast of BH13-01 (stepped out to accomodate larger than expected rig)

BOREHOLE METHOD: Daylighting and SONIC

BOREHOLE DATE: March 7, 2013 LOGGED BY: CC

Notes: ■ SONIC CORE SAMPLE

TP03-14

Location: East of Jenkins Marine
UTM: 468111.62 E, 5365113.22 N
Elevation: 4.80 m
Date: July 17, 2003
Logged By: D. Smith

Depth (m)	Description	Sample (Interval, m) [Headspace, ppm]	Comments
0-0.15	Loose, dry, 19 mm crush GRAVEL (Fill, in parking area)		Weather: Sunny ~22°C
0.15-0.45	Loose, moist, dark brown to black, gravelly SAND, with cobbles, iron staining, trace brick debris, metal pieces	SA1 (0.2-0.4)	Excavator: Hitachi EX200 SA 1: SCN: 7305-07
0.45-1.8	Loose to compact, moist, brown, angular GRAVEL, trace sand, with cobbles and boulders (angular shotrock), some shell debris	SA2 (1.5-1.7)	Soil wet to saturated at 1.7m SA 2: SCN: 7305-08
1.8	EOH – sidewalls unstable		

Remarks: Depth to seepage: N/A
Depth to standing water: N/A
Rate of seepage: N/A
Terminated: Sidewalls unstable
Test pit dimensions: ~2.5 m x 4 m x 1.8 m

TP03-14 excavated to 1.8 m

FIELD DRILLING LOG

PAGE ____ of ____

PROJECT NAME: ESQUIMALT NUMBER: P217212		BORING NUMBER: MHD0116	COORDINATES: or LOCATION: S/E Corner of Motor Storage Bldg
LOGGED BY: SCHWIEGER APPROVED BY:		SURFACE ELEVATION: UNKNOWN	GWL DEPTH: NONE (encountered) DEPTH: (static)
DRILLING METHODS: ROTARY	HOLE DIAMETER: 8 in	FLUID USED: NONE	DATE STARTED: 8/18/93 COMPLETED: 8/18/93
HAZARDOUS WASTE REMARKS: CUTTINGS PLACED IN BORING		SAFETY NOTES: LEVEL D	

DEPTH (FT)	SAMPLE TYPE & NO.	SAMPLE DEPTH INTERVAL	BLOWS COUNT	RECOVERY LENGTH / %	PROFILE	DESCRIPTION	WELL CONSTRUCTION SUMMARY: NO WELL COMPLETED
0						0-0.5 GRAVEL + PLANT ROTS	0
	MHD 0116 01	1-8				0.5-8 TAN CLAY & GRAVEL. NO ODORS. NO STAINING PID = 0.1 ppm	
5							
						8 AUGER REFUSAL / BEDROCK TD = 8'	
10							

NOTES: ANALYTICAL SAMPLES

	DEPTH
MHA0116-0	1-8

APPENDIX C
Soil Analytical Data

Esquimalt Graving Dock Parcel IM-901 Remediation
825 Admirals Road, Esquimalt, BC
SLR Project No.: 205.03877.00001

TABLE 1: SOIL ANALYTICAL RESULTS - CCME - PETROLEUM HYDROCARBON CONSTITUENTS AND MTBE (mg/kg)

Sample ID	BH17-01A	BH17-01B	BH17-02A	BH17-02B (BFD of BH17-02A)	BH17-02C	BH17-03A	BH17-03B	BH17-04A	BH17-04B	BH17-05A	BH17-05B	CCME ILcg	CCME ILfg
Date	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017		
Depth (m)	0.6-0.9	1.2-1.5	0.3-0.8	0.3-0.8	1.5-1.8	0.3-0.6	1.2-1.5	0.2-0.3	0.9-1.2	0.5-0.8	1.5-1.8		
HSVL (ppmv)	LTDL	LTDL	25	25	LTDL	5	LTDL	10	LTDL	35	LTDL	ns	ns
200 mesh (>.075 mm)	4.62	3.24	19.5	28.1	83.2	90.5	93.4	91.7	88.4	70.6	78.9	ns	ns
200 mesh (<.075 mm)	95.4	96.8	80.5	71.9	16.8	9.54	6.61	8.29	11.7	29.4	21.1	ns	ns
Texture	Fine	Fine	Fine	Fine	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	ns	ns
Benzene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	**0.070**	< 0.0050	0.03	0.0068
Ethylbenzene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.071	0.012	0.082	0.018
Toluene	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	0.023	0.23	< 0.020	0.37	0.08
Xylenes	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	0.52	< 0.040	11	2.4
Styrene	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	50	50
MTBE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	ns	ns

Notes:
m - metres
mg/kg - milligrams per kilogram
HSVL (ppmv) - headspace vapour level (parts per million by volume)
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
MTBE - methyl tert-butyl ether
LTDL - less than detection limit
ns - no standard listed

BOLD	Exceeds CCME ILcg: CCME Canadian Soil Quality Guidelines for BTEX, Industrial Coarse-grained Surface (10-5 incremental risk guideline)
BOLD	Exceeds CCME ILfg: CCME Canadian Soil Quality Guidelines for BTEX, Industrial Fine-grained Surface (10-5 incremental risk guideline)

TABLE 2: SOIL ANALYTICAL RESULTS - CCME - METALS PARAMETERS (mg/kg)

Sample ID	BH17-01A	BH17-01B	BH17-02A	BH17-02B (BFD of BH17-02A)	BH17-02C	BH17-02C REPEAT	BH17-03A	BH17-03B	BH17-04A	BH17-04B	BH17-05A	BH17-05B	BH17-06A	BH17-07A	BH17-09A	BH17-10A	BH17-11A	CCME IL
Date	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	24-Oct-2017	24-Oct-2017	24-Oct-2017	24-Oct-2017	24-Oct-2017	
Depth (m)	0.6-0.9	1.2-1.5	0.3-0.8	0.3-0.8	1.5-1.8	1.5-1.8	0.3-0.6	1.2-1.5	0.2-0.3	0.9-1.2	0.5-0.8	1.5-1.8	1.5-1.8	1.4-1.5	0.9-1.2	1.5-1.8	1.2-1.5	
pH	7.73	7.79	**8.16**	**8.06**	**8.17**	**---**	7.95	**8.35**	7.59	**8.49**	7.60	7.84	7.09	7.68	7.52	7.99	6.87	>6<8
Aluminum	28900	31600	28500	30000	30100	31000	23600	28100	19700	17500	33900	28200	---	---	---	---	---	ns
Antimony	0.24	0.94	4.69	33.0	17.3	8.20	0.83	0.43	3.18	**44.0**	14.1	6.37	---	---	---	---	---	40
Arsenic	7.48	8.01	**21.1**	**13.1**	**41.7**	**22.8**	5.17	2.43	10.8	**92.1**	**24.1**	**11.4**	**---**	**---**	**---**	**---**	---	12
Barium	82.7	95.8	257	163	810	658	85.5	62.1	130	69.0	221	132	---	---	---	---	---	2000
Beryllium	0.54	0.55	0.47	0.56	0.61	0.58	0.37	0.27	0.32	0.25	0.58	0.34	---	---	---	---	---	8
Bismuth	0.13	0.13	0.26	0.17	3.79	0.43	< 0.10	< 0.10	0.14	0.19	0.24	0.14	---	---	---	---	---	ns
Cadmium	0.132	0.102	1.11	0.499	4.16	3.38	0.499	0.361	2.29	0.254	4.99	2.34	---	---	---	---	---	22
Calcium	10800	12600	14000	13600	23200	24400	12900	73900	11600	12100	22000	17300	---	---	---	---	---	ns
Chromium (total)	59.4	66.2	64.7	60.3	66.1	74.4	43.3	57.6	49.7	37.8	**129**	73.7	**---**	**---**	**---**	**---**	---	87
Cobalt	20.8	22.1	24.1	22.0	31.9	32.2	17.1	31.2	17.0	20.4	30.3	22.4	---	---	---	---	---	300
Copper	68.1	77.5	**757**	**236**	**5670**	**1130**	**212**	**329**	**267**	**128**	**888**	**437**	**---**	**---**	**---**	**---**	**---**	91
Iron	45300	48000	74700	51900	85500	86600	39700	55500	42300	32700	69100	49600	---	---	---	---	---	ns
Lead	9.02	40.2	**609**	491	**2500**	**1730**	136	63.0	309	86.9	**892**	333	**1670**	487	144	29.0	475	600
Lithium	27.2	28.8	20.2	25.4	16.6	16.0	13.1	9.2	11.1	10.9	17.7	11.4	---	---	---	---	---	ns
Magnesium	12900	13400	12500	12600	13600	14800	10200	19900	10700	9960	16600	14800	---	---	---	---	---	ns
Manganese	821	859	928	884	1300	1220	597	664	660	558	981	802	---	---	---	---	---	ns
Mercury	0.065	0.070	0.328	0.145	1.54	1.05	0.189	0.280	0.437	0.771	1.15	0.700	---	---	---	---	---	50
Molybdenum	0.31	0.35	1.57	0.60	2.31	1.71	0.87	0.46	1.49	8.43	4.14	3.38	---	---	---	---	---	40
Nickel	49.1	52.7	73.5	53.5	84.6	98.5	62.8	55.0	39.6	27.8	63.9	52.9	---	---	---	---	---	89
Phosphorus	782	847	1430	1150	2110	2330	724	767	846	683	1490	1050	---	---	---	---	---	ns
Potassium	1520	1660	1360	1620	1130	892	680	402	630	940	1060	703	---	---	---	---	---	ns
Selenium	< 0.50	< 0.50	< 0.50	< 0.50	0.55	<0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	---	---	---	---	---	2.9
Silver	0.095	0.090	0.455	0.163	3.52	0.665	0.123	0.138	0.155	0.156	0.433	0.192	---	---	---	---	---	40
Sodium	586	652	591	602	728	723	290	858	317	339	364	303	---	---	---	---	---	ns
Strontium	63.3	68.6	143	128	279	214	69.3	505	57.2	45.3	95.1	71.3	---	---	---	---	---	ns
Thallium	0.068	0.078	0.062	0.075	0.066	0.057	< 0.050	0.066	< 0.050	0.057	0.066	< 0.050	---	---	---	---	---	1
Tin	0.58	0.65	53.8	11.6	**565**	84.6	9.80	6.96	7.06	8.03	27.0	15.5	---	---	---	---	---	300
Titanium	1300	1570	1190	1410	1250	1220	1800	2070	1570	1060	1670	1510	---	---	---	---	---	ns
Uranium	0.358	0.390	0.407	0.406	0.543	0.426	0.319	0.280	0.319	0.460	0.630	0.365	---	---	---	---	---	300
Vanadium	109	120	108	113	117	133	105	147 (1)	95.4	71.0	133 (1)	108	---	---	---	---	---	130
Zinc	89.4	92.1	**679**	293	**2170**	**1860**	175	129	**467**	344	**889**	**419**	**---**	**---**	**---**	**---**	**---**	360
Zirconium	6.95	8.01	6.12	7.45	3.93	4.15	5.47	2.95	3.20	3.88	3.93	2.95	---	---	---	---	---	ns

Notes:
m - metres
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed
(1) Concentration less than the regional background soil quality estimate for Vancouver Island: vanadium = 250 mg/kg
BOLD Exceeds CCME IL: CCME Canadian Environmental Quality Guidelines, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Industrial

TABLE 3: SOIL ANALYTICAL RESULTS - CCME - PAH PARAMETERS (mg/kg)

Sample ID	BH17-01A	BH17-01B	BH17-02A	BH17-02B (BFD of BH17-02A)	BH17-02C	BH17-03A	BH17-03B	BH17-04A	BH17-04B	BH17-05A	BH17-05B	CCME ILsc	CCME ILi	CCME TPE
Date	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017			
Depth (m)	0.6-0.9	1.2-1.5	0.3-0.8	0.3-0.8	1.5-1.8	0.3-0.6	1.2-1.5	0.2-0.3	0.9-1.2	0.5-0.8	1.5-1.8			
Acenaphthene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.037	< 0.0050	< 0.0050	2.6	0.083	0.40	0.36	ns	ns	ns
Acenaphthylene	< 0.0050	< 0.0050	< 0.0050	0.012	0.15	0.0073	< 0.0050	0.12	0.17	0.12	0.070	ns	ns	ns
Anthracene	< 0.0040	< 0.0040	0.0043	0.018	0.15	0.0058	0.0059	3.5	0.29	0.61	0.61	32	ns	ns
Benzo(a)anthracene	< 0.020	< 0.020	< 0.020	0.096	0.58	0.047	0.037	4.4	1.1	1.2	1.1	ns	10	ns
Benzo(a)pyrene	< 0.020	< 0.020	< 0.020	0.085	0.67	0.071	0.043	**3.3**	1.3	0.97	0.91	72	1.4	ns
Benzo(b)fluoranthene	< 0.020	< 0.020	0.021	0.069	0.51	0.058	0.032	2.0	0.87	0.80	0.61	ns	10	ns
Benzo(b&j)fluoranthene	< 0.020	< 0.020	0.021	0.12	0.89	0.095	0.054	3.6	1.5	1.3	1.1	ns	ns	ns
Benzo(g,h,i)perylene	< 0.050	< 0.050	< 0.050	0.064	0.49	0.066	< 0.050	1.7	0.91	0.57	0.53	ns	ns	ns
Benzo(k)fluoranthene	< 0.020	< 0.020	< 0.020	0.045	0.30	0.033	< 0.020	1.1	0.59	0.46	0.35	ns	10	ns
Chrysene	< 0.020	< 0.020	0.028	0.13	0.84	0.073	0.047	5.7	1.3	1.7	1.6	ns	ns	ns
Dibenzo(a,h)anthracene	< 0.020	< 0.020	< 0.020	< 0.020	0.11	< 0.020	< 0.020	0.60	0.21	0.19	0.17	ns	10	ns
Fluoranthene	< 0.020	< 0.020	0.034	0.19	1.6	0.071	0.067	7.2	2.5	2.4	2.0	180	ns	ns
Fluorene	< 0.020	< 0.020	< 0.020	< 0.020	0.10	< 0.020	< 0.020	3.4	0.080	0.52	0.49	ns	ns	ns
Indeno(1,2,3-c,d)pyrene	< 0.020	< 0.020	< 0.020	0.053	0.43	0.049	0.026	1.4	0.78	0.51	0.44	ns	10	ns
2-Methylnaphthalene	< 0.020	< 0.020	< 0.020	< 0.020	0.042	< 0.020	< 0.020	3.8	0.028	0.35	0.32	ns	ns	ns
Naphthalene	< 0.010	< 0.010	< 0.010	< 0.010	0.036	< 0.010	< 0.010	4.5	0.017	0.36	0.32	ns	22	ns
Phenanthrene	< 0.010	0.010	0.030	0.11	1.3	0.044	0.031	17	1.2	3.4	3.0	ns	50	ns
Pyrene	< 0.020	< 0.020	0.035	0.19	1.6	0.079	0.069	9.6	2.6	2.8	2.4	ns	100	ns
Benzo(a)pyrene Equivalency	0.024	0.024	0.026	0.13	1.0	0.11	0.066	5.0	1.9	1.5	1.4	ns	ns	5.3
Low MW PAHs, Total	< 0.050	< 0.050	< 0.050	0.14	1.8	0.058	< 0.050	35	1.9	5.9	5.3	ns	ns	ns
High MW PAHs, Total	< 0.050	< 0.050	0.12	0.97	7.5	0.58	0.34	39	13	12	11	ns	ns	ns
PAHs, Total	< 0.050	< 0.050	0.15	1.1	9.3	0.64	0.38	74	15	18	16	ns	ns	ns

Notes:
m - metres
PAH - polycyclic aromatic hydrocarbons
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard/guideline listed

BOLD	Exceeds CCME ILsc: CCME Canadian Soil Quality Guidelines for PAH, Industrial, Environmental Health guidelines, Soil Contact
BOLD	Exceeds CCME ILi: CCME Canadian Soil Quality Guidelines for PAH, Industrial, Environmental Health Guidelines, Provisional or Interim Soil Criteria
BOLD	Exceeds CCME TPE: CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health - B[a]P TPE

TABLE 4: SOIL ANALYTICAL RESULTS - CCME - PETROLEUM HYDROCARBON FRACTIONS (mg/kg)

Sample ID	BH17-01A	BH17-01B	BH17-02A	BH17-02B (BFD of BH17-02A)	BH17-02C	BH17-03A	BH17-03B	BH17-04A	BH17-04B	BH17-05A	BH17-05B	CCME ILphcf	CCME ILphc
Date	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017		
Depth (m)	0.6-0.9	1.2-1.5	0.3-0.8	0.3-0.8	1.5-1.8	0.3-0.6	1.2-1.5	0.2-0.3	0.9-1.2	0.5-0.8	1.5-1.8		
200 mesh (>.075 mm)	4.62	3.24	19.5	28.1	83.2	90.5	93.4	91.7	88.4	70.6	78.9	ns	ns
200 mesh (<.075 mm)	95.4	96.8	80.5	71.9	16.8	9.54	6.61	8.29	11.7	29.4	21.1	ns	ns
Texture	Fine	Fine	Fine	Fine	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	ns	ns
F1 (C6-10)	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	320	320
F2 (C10-16)	< 10	< 10	< 10	< 10	< 10	< 10	< 10	45	< 10	< 10	< 10	260	260
F3 (C16-34)	14	14	110	120	170	120	19	730	120	300	220	2500	1700
F4 (C34-50+)	< 10	< 10	49	53	66	140	18	150	99	170	130	6600	3300
F4 (Gravimetric)	---	---	---	---	---	180	---	---	---	---	---	6600	3300

Notes:
mg/kg - milligrams per dry kilogram
m - metres
F1 (C6-C10) excludes BTEX - benzene, toulene, ethylybenzene, xylene
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed

BOLD Exceeds CCME ILphcf: CCME Canada-Wide Standards for Petroleum Hydrocarbons (PHCs) in Surface Soil, Summary of Tier 1 Levels for PHC fractions(F1-F4) for Industrial Fine-grained surface soil, Most Stringent of All Exposure Pathways

BOLD Exceeds CCME ILphc: CCME Canada-Wide Standards for Petroleum Hydrocarbons (PHCs) in Surface Soil, Summary of Tier 1 Levels for PHC fractions(F1-F4) for Industrial Coarse-grained surface soil, Most Stringent of All Exposure Pathways

TABLE 5: SOIL ANALYTICAL RESULTS - CCME - PCB (mg/kg)

Sample ID	BH17-01A	BH17-01B	BH17-02A	BH17-02B (BFD of BH17-02A)	BH17-02C	BH17-03A	BH17-03B	BH17-04A	BH17-04B	BH17-05A	BH17-05B	CCME IL
Date	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	
Depth (m)	0.6-0.9	1.2-1.5	0.3-0.8	0.3-0.8	1.5-1.8	0.3-0.6	1.2-1.5	0.2-0.3	0.9-1.2	0.5-0.8	1.5-1.8	
Aroclor 1016	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Aroclor 1221	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Aroclor 1232	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Aroclor 1242	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Aroclor 1248	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Aroclor 1254	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	0.10	0.064	ns
Aroclor 1260	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	0.038	0.036	ns
Aroclor 1262	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Aroclor 1268	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Total PCB	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.14	0.10	33

Notes:
mg/kg - millograms per kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed
BOLD Exceeds CCME IL: CCME Canadian Environmental Quality Guidelines, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Industrial

TABLE 6: SOIL ANALYTICAL RESULTS - BC CSR - PETROLEUM HYDROCARBON CONSTITUENTS AND MTBE (mg/kg)

Sample ID	BH17-01A	BH17-01B	BH17-02A	BH17-02B (BFD of BH17-02A)	BH17-02C	BH17-03A	BH17-03B	BH17-04A	BH17-04B	BH17-05A	BH17-05B	S10 CSR IL
Date	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	
Depth (m)	0.6-0.9	1.2-1.5	0.3-0.8	0.3-0.8	1.5-1.8	0.3-0.6	1.2-1.5	0.2-0.3	0.9-1.2	0.5-0.8	1.5-1.8	
Benzene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.070	< 0.0050	2.5 (aw-f)
Ethylbenzene	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.071	0.012	200 (aw-f)
Toluene	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	0.023	0.23	< 0.020	0.5 (aw-f)
Xylenes	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	0.52	< 0.040	20 (aw-f)
Styrene	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	50 (eh)
MTBE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	20000(hh)
VPHs	< 10	---	< 10	< 10	---	< 10	---	< 10	< 10	< 10	---	200 (hh, eh)
EPHs (C10-19)	---	---	< 100	< 100	---	< 100	---	130	---	< 100	---	ns
EPHs (C19-32)	---	---	< 100	< 100	---	< 100	---	740	---	310	---	ns
LEPHs	---	---	< 100	< 100	---	< 100	---	110	---	< 100	---	2000 (hh, eh)
HEPHs	---	---	< 100	< 100	---	< 100	---	720	---	310	---	5000 (hh, eh)

Notes:
m - metres
mg/kg - milligrams per kilogram
HSVL (ppmv) - headspace vapour level (parts per million by volume)
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
EPH - extractable petroleum hydrocarbons
MTBE - methyl tert-butyl ether
VPHs - volatile petroleum hydrocarbons (C6-10), excluding benzene, ethylbenzene, toluene, xylenes and styrene
EPHs - extractable petroleum hydrocarbons
LEPHs - light extractable petroleum hydrocarbons (C10-19), excluding specific polycyclic aromatic hydrocarbon parameters
HEPHs - heavy extractable petroleum hydrocarbons (C19-32), excluding specific polycyclic aromatic hydrocarbon parameters
ns - no standard listed

INVERSE

Exceeds S10 CSR IL: Stage 10 (Omnibus) Amendments BC Contaminated Sites Regulation, Industrial Land (IL)
aw-f: Schedule 3.1 Part 1, Matrix Numerical Soil Standards to Protect Groundwater Flow to Surface Water Used by Freshwater Aquatic Wildlife (aw-f)
eh: Schedule 3.1 Part 3, Generic Numerical Soil Standards to Protect Ecological Health (eh)
hh: Schedule 3.1 Part 2, Generic Numerical Soil Standards to Protect Human Health (hh)
i: Schedule 3.1 Part 1, Matrix Numerical Soil Standards Intake of Contaminated Soil (i)
t: Schedule 3.1 Part 1, Matrix Numerical Soil Standards Toxicity to Soil Invertabrates and Plants (t)

TABLE 7: SOIL ANALYTICAL RESULTS - BC CSR - METALS PARAMETERS (mg/kg)

Sample ID	BH17-01A	BH17-01B	BH17-02A	BH17-02B (BFD of BH17-02A)	BH17-02C	BH17-02C REPEAT	BH17-03A	BH17-03B	BH17-04A	BH17-04B	BH17-05A	BH17-05B	BH17-06A	BH17-07A	BH17-09A	BH17-10A	BH17-11A	S10 CSR IL
Date	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	24-Oct-2017	24-Oct-2017	24-Oct-2017	24-Oct-2017	24-Oct-2017	
Depth (m)	0.6-0.9	1.2-1.5	0.3-0.8	0.3-0.8	1.5-1.8	1.5-1.8	0.3-0.6	1.2-1.5	0.2-0.3	0.9-1.2	0.5-0.8	1.5-1.8	1.5-1.8	1.4-1.5	0.9-1.2	1.5-1.8	1.2-1.5	
pH	7.73	7.79	8.16	8.06	8.17	---	7.95	8.35	7.59	8.49	7.60	7.84	7.09	7.68	7.52	7.99	6.87	ns
Aluminum	28900	31600	28500	30000	30100	31000	23600	28100	19700	17500	33900	28200	---	---	---	---	---	250000 (hh)
Antimony	0.24	0.94	4.69	33.0	17.3	8.20	0.83	0.43	3.18	44.0	14.1	6.37	---	---	---	---	---	40 (eh)
Arsenic	7.48	8.01	21.1	13.1	41.7	22.8	5.17	2.43	10.8	92.1	24.1	11.4	---	---	---	---	---	10 (aw-f)
Barium	82.7	95.8	257	163	810	658	85.5	62.1	130	69.0	221	132	---	---	---	---	---	1500 (t)
Beryllium	0.54	0.55	0.47	0.56	0.61	0.58	0.37	0.27	0.32	0.25	0.58	0.34	---	---	---	---	---	1@pH<6.5 (aw-f) 4@pH>=6.5<7.0 (aw-f) 30@pH>=7.0<7.5 (aw-f) 250@pH>=7.5<8.0 (aw-f) 350@pH>=8.0 (t)
Bismuth	0.13	0.13	0.26	0.17	3.79	0.43	< 0.10	< 0.10	0.14	0.19	0.24	0.14	---	---	---	---	---	ns
Cadmium	0.132	0.102	1.11	0.499	4.16	3.38	0.499	0.361	2.29	0.254	4.99	2.34	---	---	---	---	---	1@pH<7.0 (aw-f) 3@pH>=7.0<7.5 (aw-f) 20@pH>=7.5<8.0 (aw-f) 50@pH>=8.0 (aw-f)
Calcium	10800	12600	14000	13600	23200	24400	12900	73900	11600	12100	22000	17300	---	---	---	---	---	ns
Chromium (total)	59.4	66.2	64.7	60.3	66.1	74.4	43.3	57.6	49.7	37.8	129	73.7	---	---	---	---	---	250 (t)
Cobalt	20.8	22.1	24.1	22.0	31.9 (1)	32.2 (1)	17.1	31.2 (1)	17.0	20.4	30.3 (1)	22.4	---	---	---	---	---	25 (t)
Copper	68.1	77.5	757	236	5670	1130	212	329	267	128	888	437	---	---	---	---	---	75@pH<5.5 (aw-f) 100@pH>=5.5<6.0 (aw-f) 300@pH>=6.0 (t)
Iron	45300	48000	74700	51900	85500	86600	39700	55500	42300	32700	69100	49600	---	---	---	---	---	150000 (hh)
Lead	9.02	40.2	609	491	2500	1730	136	63.0	309	86.9	892	333	1670	487	144	29.0	475	200@pH<5.0 (aw-f) 350@pH>=5.0<5.5 (aw-f) 1000@pH>=5.5 (t)
Lithium	27.2	28.8	20.2	25.4	16.6	16.0	13.1	9.2	11.1	10.9	17.7	11.4	---	---	---	---	---	450 (hh)
Magnesium	12900	13400	12500	12600	13600	14800	10200	19900	10700	9960	16600	14800	---	---	---	---	---	ns
Manganese	821	859	928	884	1300	1220	597	664	660	558	981	802	---	---	---	---	---	2000 (t)
Mercury	0.065	0.070	0.328	0.145	1.54	1.05	0.189	0.280	0.437	0.771	1.15	0.700	---	---	---	---	---	75 (t)
Molybdenum	0.31	0.35	1.57	0.60	2.31	1.71	0.87	0.46	1.49	8.43	4.14	3.38	---	---	---	---	---	150 (t)
Nickel	49.1	52.7	73.5	53.5	84.6	98.5	62.8	55.0	39.6	27.8	63.9	52.9	---	---	---	---	---	90@pH<5.0 (aw-f) 100@pH>=5.0<5.5 (aw-f) 150@pH>=5.5<6.0 (aw-f) 200@pH>=6.0<6.5 (aw-f) 250@pH>=6.5 (t)
Phosphorus	782	847	1430	1150	2110	2330	724	767	846	683	1490	1050	---	---	---	---	---	ns
Potassium	1520	1660	1360	1620	1130	892	680	402	630	940	1060	703	---	---	---	---	---	ns
Selenium	< 0.50	< 0.50	< 0.50	< 0.50	0.55	<0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	---	---	---	---	---	1 (aw-f)
Silver	0.095	0.090	0.455	0.163	3.52	0.665	0.123	0.138	0.155	0.156	0.433	0.192	---	---	---	---	---	40 (eh)
Sodium	586	652	591	602	728	723	290	858	317	339	364	303	---	---	---	---	---	1000 (t)
Strontium	63.3	68.6	143	128	279	214	69.3	505	57.2	45.3	95.1	71.3	---	---	---	---	---	150000 (hh)
Thallium	0.068	0.078	0.062	0.075	0.066	0.057	< 0.050	0.066	< 0.050	0.057	0.066	< 0.050	---	---	---	---	---	25 (eh)
Tin	0.58	0.65	53.8	11.6	565	84.6	9.80	6.96	7.06	8.03	27.0	15.5	---	---	---	---	---	300 (eh)
Titanium	1300	1570	1190	1410	1250	1220	1800	2070	1570	1060	1670	1510	---	---	---	---	---	ns
Uranium	0.358	0.390	0.407	0.406	0.543	0.426	0.319	0.280	0.319	0.460	0.630	0.365	---	---	---	---	---	150 (aw-f)
Vanadium	109	120	108	113	117	133	105	147	95.4	71.0	133	108	---	---	---	---	---	300 (t)
Zinc	89.4	92.1	679	293	2170	1860	175	129	467	344	889	419	---	---	---	---	---	150@pH<6.0 (aw-f) 250@pH>=6.0<6.5 (aw-f) 350@pH>=6.5<7.0 (aw-f) 450@pH>=7.0 (t)
Zirconium	6.95	8.01	6.12	7.45	3.93	4.15	5.47	2.95	3.20	3.88	3.93	2.95	---	---	---	---	---	ns

Notes:
m - metres
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed
(1) Concentration less than the regional background soil quality estimate for Vancouver Island: cobalt = 50 mg/kg

INVERSE

Exceeds S10 CSR IL: Stage 10 (Omnibus) Amendments BC Contaminated Sites Regulation, Industrial Land (IL)
aw-f: Schedule 3.1 Part 1, Matrix Numerical Soil Standards to Protect Groundwater Flow to Surface Water Used by Freshwater Aquatic Wildlife (aw-f)
eh: Schedule 3.1 Part 3, Generic Numerical Soil Standards to Protect Ecological Health (eh)
hh: Schedule 3.1 Part 2, Generic Numerical Soil Standards to Protect Human Health (hh)
i: Schedule 3.1 Part 1, Matrix Numerical Soil Standards Intake of Contaminated Soil (i)
t: Schedule 3.1 Part 1, Matrix Numerical Soil Standards Toxicity to Soil Invertabrates and Plants (t)

TABLE 8: SOIL ANALYTICAL RESULTS - BC CSR - PAH PARAMETERS (mg/kg)

Sample ID	BH17-01A	BH17-01B	BH17-02A	BH17-02B (BFD of BH17-02A)	BH17-02C	BH17-03A	BH17-03B	BH17-04A	BH17-04B	BH17-05A	BH17-05B	S10 CSR IL
Date	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	
Depth (m)	0.6-0.9	1.2-1.5	0.3-0.8	0.3-0.8	1.5-1.8	0.3-0.6	1.2-1.5	0.2-0.3	0.9-1.2	0.5-0.8	1.5-1.8	
Acenaphthene	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.037	< 0.0050	< 0.0050	2.6	0.083	0.40	0.36	15000 (hh)
Acenaphthylene	< 0.0050	< 0.0050	< 0.0050	0.012	0.15	0.0073	< 0.0050	0.12	0.17	0.12	0.070	ns
Anthracene	< 0.0040	< 0.0040	0.0043	0.018	0.15	0.0058	0.0059	3.5	0.29	0.61	0.61	30 (t)
Benzo(a)anthracene	< 0.020	< 0.020	< 0.020	0.096	0.58	0.047	0.037	4.4	1.1	1.2	1.1	10 (eh)
Benzo(a)pyrene	< 0.020	< 0.020	< 0.020	0.085	0.67	0.071	0.043	3.3	1.3	0.97	0.91	50 (i)
Benzo(b)fluoranthene	< 0.020	< 0.020	0.021	0.069	0.51	0.058	0.032	2.0	0.87	0.80	0.61	ns
Benzo(b&j)fluoranthene	< 0.020	< 0.020	0.021	0.12	0.89	0.095	0.054	3.6	1.5	1.3	1.1	10 (eh)
Benzo(g,h,i)perylene	< 0.050	< 0.050	< 0.050	0.064	0.49	0.066	< 0.050	1.7	0.91	0.57	0.53	ns
Benzo(k)fluoranthene	< 0.020	< 0.020	< 0.020	0.045	0.30	0.033	< 0.020	1.1	0.59	0.46	0.35	10 (eh)
Chrysene	< 0.020	< 0.020	0.028	0.13	0.84	0.073	0.047	5.7	1.3	1.7	1.6	4500(hh)
Dibenzo(a,h)anthracene	< 0.020	< 0.020	< 0.020	< 0.020	0.11	< 0.020	< 0.020	0.60	0.21	0.19	0.17	10 (eh)
Fluoranthene	< 0.020	< 0.020	0.034	0.19	1.6	0.071	0.067	7.2	2.5	2.4	2.0	200 (t)
Fluorene	< 0.020	< 0.020	< 0.020	< 0.020	0.10	< 0.020	< 0.020	3.4	0.080	0.52	0.49	9500 (hh)
Indeno(1,2,3-c,d)pyrene	< 0.020	< 0.020	< 0.020	0.053	0.43	0.049	0.026	1.4	0.78	0.51	0.44	10 (eh)
2-Methylnaphthalene	< 0.020	< 0.020	< 0.020	< 0.020	0.042	< 0.020	< 0.020	3.8	0.028	0.35	0.32	950 (hh)
Naphthalene	< 0.010	< 0.010	< 0.010	< 0.010	0.036	< 0.010	< 0.010	4.5	0.017	0.36	0.32	20 (t)
Phenanthrene	< 0.010	0.010	0.030	0.11	1.3	0.044	0.031	17	1.2	3.4	3.0	50 (eh)
Pyrene	< 0.020	< 0.020	0.035	0.19	1.6	0.079	0.069	9.6	2.6	2.8	2.4	100 (eh)

Notes:
m - metres
PAH - polycyclic aromatic hydrocarbons
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard/guideline listed

INVERSE

Exceeds S10 CSR IL: Stage 10 (Omnibus) Amendments BC Contaminated Sites Regulation, Industrial Land (IL)
aw-f: Schedule 3.1 Part 1, Matrix Numerical Soil Standards to Protect Groundwater Flow to Surface Water Used by Freshwater Aquatic Wildlife (aw-f)
eh: Schedule 3.1 Part 3, Generic Numerical Soil Standards to Protect Ecological Health (eh)
hh: Schedule 3.1 Part 2, Generic Numerical Soil Standards to Protect Human Health (hh)
i: Schedule 3.1 Part 1, Matrix Numerical Soil Standards Intake of Contaminated Soil (i)
t: Schedule 3.1 Part 1, Matrix Numerical Soil Standards Toxicity to Soil Invertabrates and Plants (t)

TABLE 9: SOIL ANALYTICAL RESULTS - BC CSR - PCB (mg/kg)

Sample ID	BH17-01A	BH17-01B	BH17-02A	BH17-02B (BFD of BH17-02A)	BH17-02C	BH17-03A	BH17-03B	BH17-04A	BH17-04B	BH17-05A	BH17-05B	S10 CSR IL
Date	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	
Depth (m)	0.6-0.9	1.2-1.5	0.3-0.8	0.3-0.8	1.5-1.8	0.3-0.6	1.2-1.5	0.2-0.3	0.9-1.2	0.5-0.8	1.5-1.8	
Aroclor 1016	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Aroclor 1221	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Aroclor 1232	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Aroclor 1242	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Aroclor 1248	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Aroclor 1254	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	0.10	0.064	ns
Aroclor 1260	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	0.038	0.036	ns
Aroclor 1262	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Aroclor 1268	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.10	< 0.010	< 0.10	< 0.10	< 0.010	< 0.010	ns
Total PCB	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.14	0.1	35 (t)

Notes:
mg/kg - millograms per kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed

INVERSE

Exceeds S10 CSR IL: Stage 10 (Omnibus) Amendments BC Contaminated Sites Regulation, Industrial Land (IL)
aw-f: Schedule 3.1 Part 1, Matrix Numerical Soil Standards to Protect Groundwater Flow to Surface Water Used by Freshwater Aquatic Wildlife (aw-f)
eh: Schedule 3.1 Part 3, Generic Numerical Soil Standards to Protect Ecological Health (eh)
hh: Schedule 3.1 Part 2, Generic Numerical Soil Standards to Protect Human Health (hh)
i: Schedule 3.1 Part 1, Matrix Numerical Soil Standards Intake of Contaminated Soil (i)
t: Schedule 3.1 Part 1, Matrix Numerical Soil Standards Toxicity to Soil Invertabrates and Plants (t)

TABLE 10: SOIL ANALYTICAL RESULTS - BC CSR - SATURATED PASTE PARAMETERS (mg/kg)

Sample ID	BH17-02B	BH17-03A	BH17-04A	BH17-05A	S10 CSR IL
Date	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	
Depth	0.3-0.8	0.3-0.6	0.2-0.3	0.5-0.8	
Saturation %	81.0	53.9	54.0	78.6	ns
Chloride Ion	9.6	9.9	6.7	8.1	600 (aw-f)
Sodium Ion	18.3	7.5	5.9	14.0	1000 (t)

Notes:
mg/kg - milligrams per kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed

INVERSE

Exceeds S10 CSR IL: Stage 10 (Omnibus) Amendments BC Contaminated Sites Regulation, Industrial Land (IL)
aw-f: Schedule 3.1 Part 1, Matrix Numerical Soil Standards to Protect Groundwater Flow to Surface Water Used by Freshwater Aquatic Wildlife (aw-f)
eh: Schedule 3.1 Part 3, Generic Numerical Soil Standards to Protect Ecological Health (eh)
hh: Schedule 3.1 Part 2, Generic Numerical Soil Standards to Protect Human Health (hh)
i: Schedule 3.1 Part 1, Matrix Numerical Soil Standards Intake of Contaminated Soil (i)
t: Schedule 3.1 Part 1, Matrix Numerical Soil Standards Toxicity to Soil Invertabrates and Plants (t)

TABLE 11: LEACHATE ANALYTICAL RESULTS - METALS PARAMETERS (mg/L)

Sample ID	BH17-02A	BH17-02C	BH17-02C REPEAT	BH17-04B	BH17-05A	BH17-06A	BH17-07A	BH17-09A	BH17-10A	BH17-11A	HWR
Date	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	24-Oct-2017	24-Oct-2017	24-Oct-2017	24-Oct-2017	24-Oct-2017	
Depth (m)	0.3-0.8	1.5-1.8	1.5-1.8	0.9-1.2	0.5-0.8	1.5-1.8	1.4-1.5	0.9-1.2	1.5-1.8	1.2-1.5	
Antimony Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	ns
Arsenic Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	2.5
Barium Leachable	0.31	2.80	1.22	0.54	0.72	---	---	---	---	---	100
Beryllium Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	ns
Boron Leachable	<0.10	0.20	0.10	<0.10	<0.10	---	---	---	---	---	500
Cadmium Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	0.5
Chromium Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	5
Cobalt Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	ns
Copper Leachable	0.16	2.15	0.25	0.32	0.78	---	---	---	---	---	100
Iron Leachable	<0.50	<0.50	<0.50	<0.50	<0.50	---	---	---	---	---	ns
Lead Leachable	0.12	5.52	<0.10	<0.10	0.12	0.64	<0.10	<0.10	<0.10	0.22	5
Mercury Leachable	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	---	---	---	---	---	0.1
Molybdenum Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	ns
Nickel Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	ns
Selenium Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	1
Silver Leachable	<0.010	<0.010	<0.010	<0.010	<0.010	---	---	---	---	---	5
Thallium Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	ns
Uranium Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	10
Vanadium Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	ns
Zinc Leachable	0.41	6.24	1.01	0.56	1.48	---	---	---	---	---	500
Zirconium Leachable	<0.10	<0.10	<0.10	<0.10	<0.10	---	---	---	---	---	ns

Notes:
m - metres
mg/L - milligrams per liter
< - less than analytical detection limit indicated
ns - no standard listed
INVERSE Exceeds HWR: Table 1: Leachate Quality Standards for the New Hazardous Waste Regulation

TABLE 12: LEACHATE ANALYTICAL RESULTS - PAH PARAMETERS (µg/L)

Sample ID	BH17-02C	BH17-04A	BH17-04B	BH17-05A	HWR
Date	15-Aug-2017	15-Aug-2017	15-Aug-2017	15-Aug-2017	
Depth (m)	1.5-1.8	0.2-0.3	0.9-1.2	0.5-0.8	
Leachate Naphthalene	<0.10	0.61	<0.10	0.23	ns
Leachate 2-Methylnaphthalene	<0.10	0.18	<0.10	<0.10	ns
Leachate Quinoline	<0.50	<0.50	<0.50	<0.50	ns
Leachate Acenaphthylene	<0.10	<0.10	<0.10	<0.10	ns
Leachate Acenaphthene	<0.10	<0.10	<0.10	<0.10	ns
Leachate Fluorene	<0.10	<0.10	<0.10	<0.10	ns
Leachate Phenanthrene	0.34	0.12	0.32	<0.10	ns
Leachate Anthracene	<0.10	<0.10	<0.10	<0.10	ns
Leachate Acridine	<0.50	<0.50	<0.50	<0.50	ns
Leachate Fluoranthene	<0.10	<0.10	<0.10	<0.10	ns
Leachate Pyrene	<0.10	<0.10	<0.10	<0.10	ns
Leachate Benzo(a)anthracene	<0.10	<0.10	<0.10	<0.10	ns
Leachate Chrysene	<0.10	<0.10	<0.10	<0.10	ns
Leachate Benzo(b&j)fluoranthene	<0.10	<0.10	<0.10	<0.10	ns
Leachate Benzo(k)fluoranthene	<0.10	<0.10	<0.10	<0.10	ns
Leachate Benzo(a)pyrene	<0.10	<0.10	<0.10	<0.10	1
Leachate Indeno(1,2,3-cd)pyrene	<0.20	<0.20	<0.20	<0.20	ns
Leachate Dibenz(a,h)anthracene	<0.20	<0.20	<0.20	<0.20	ns
Leachate Benzo(g,h,i)perylene	<0.20	<0.20	<0.20	<0.20	ns
Total PAH Leachable	<0.50	0.90	<0.50	<0.50	ns
Low MW PAHs, Leachable	<0.50	0.90	<0.50	<0.50	ns
High MW PAHs, Leachable	<0.20	<0.20	<0.20	<0.20	ns

Notes:
µg/L - micrograms per litre
PAH - polycyclic aromatic hydrocarbons
< - less than analytical detection limit indicated
ns - no standard listed

INVERSE Exceeds HWR: Table 1: Leachate Quality Standards for the New Hazardous Waste Regulation

TABLE 13: RELATIVE PERCENT DIFFERENCE - PETROLEUM HYDROCARBON CONSTITUENTS AND MTBE IN SOIL (mg/kg)

Sample ID	BH17-02A	BH17-02B (BFD of BH17-02A)	5X MDL	RPD
Date	15-Aug-2017	15-Aug-17		
Benzene	< 0.0050	< 0.0050	0.025	nc
Ethylbenzene	< 0.010	< 0.010	0.05	nc
Toluene	< 0.020	< 0.020	0.1	nc
Xylenes	< 0.040	< 0.040	0.2	nc
Styrene	< 0.030	< 0.030	0.15	nc
MTBE	< 0.10	< 0.10	0.5	nc
VPHs	< 10	< 10	50	nc
EPHs (C10-19)	< 100	< 100	500	nc
EPHs (C19-32)	< 100	< 100	500	nc
LEPHs	< 100	< 100	500	nc
HEPHs	< 100	< 100	500	nc
Average				nc

Notes:
mg/kg - millograms per kilogram
% - percentage
< - less than analytical detection limit indicated
nc - not calculated if the concentration is < 5X MDL
BFD - blind field duplicate
MDL - method detection limit
RPD - relative percent difference
BOLD Exceeds recommended RPD targets for petroleum hydrocarbons (including BTEX and VPH) (> 60%)

TABLE 14: RELATIVE PERCENT DIFFERENCE - METALS PARAMETERS IN SOIL (mg/kg)

Sample ID	BH17-02A	BH17-02B (BFD of BH17-02A)	X5 MDL	RPD
Date	15-Aug-2017	15-Aug-2017		
Aluminum	28500	30000	500	5%
Antimony	4.69	33.0	0.5	**150%**
Arsenic	21.1	13.1	2.5	47%
Barium	257	163	0.5	45%
Beryllium	0.47	0.56	1	17%
Bismuth	0.26	0.17	0.5	42%
Cadmium	1.11	0.499	0.25	**76%**
Calcium	14000	13600	500	3%
Cobalt	24.1	22.0	1.5	9%
Copper	757	236	2.5	**105%**
Iron	74700	51900	500	36%
Lead	609	491	0.5	21%
Lithium	20.2	25.4	25	23%
Magnesium	12500	12600	500	1%
Manganese	928	884	1	5%
Mercury	0.328	0.145	0.25	**77%**
Molybdenum	1.57	0.60	0.5	**89%**
Nickel	73.5	53.5	4	31%
Phosphorus	1430	1150	50	22%
Potassium	1360	1620	500	17%
Selenium	< 0.50	< 0.50	2.5	nc
Silver	0.455	0.163	0.25	**94%**
Sodium	591	602	500	2%
Strontium	143	128	0.5	11%
Thallium	0.062	0.075	0.25	19%
Tin	53.8	11.6	0.5	**129%**
Titanium	1190	1410	5	17%
Uranium	0.407	0.406	0.25	0%
Vanadium	108	113	10	5%
Zinc	679	293	5	**79%**
Zirconium	6.12	7.45	2.5	20%
Average				40%

Notes:
mg/kg - millograms per kilogram
% - percentage
< - less than analytical detection limit indicated
nc - not calculated if the concentration is < 5X MDL
BFD - blind field duplicate
MDL - method detection limit
RPD - relative percent difference
BOLD Exceeds recommended RPD targets for metals (> 60%)

TABLE 15: RELATIVE PERCENT DIFFERENCE - PAH PARAMETERS IN SOIL (mg/kg)

Sample ID	BH17-02A	BH17-02B (BFD of BH17-02A)	X5 MDL	RPD
Date	15-Aug-2017	15-Aug-2017		
Acenaphthene	< 0.0050	< 0.0050	0.025	nc
Acenaphthylene	< 0.0050	0.012	0.025	nc
Anthracene	0.0043	0.018	0.02	nc
Benzo(a)anthracene	< 0.020	0.096	0.1	nc
Benzo(a)pyrene	< 0.020	0.085	0.1	nc
Benzo(b)fluoranthene	0.021	0.069	0.1	nc
Benzo(b&j)fluoranthene	0.021	0.12	0.1	nc
Benzo(g,h,i)perylene	< 0.050	0.064	0.25	nc
Benzo(k)fluoranthene	< 0.020	0.045	0.1	nc
Chrysene	0.028	0.13	0.1	nc
Dibenzo(a,h)anthracene	< 0.020	< 0.020	0.1	nc
Fluoranthene	0.034	0.19	0.1	nc
Fluorene	< 0.020	< 0.020	0.1	nc
Indeno(1,2,3-c,d)pyrene	< 0.020	0.053	0.1	nc
2-Methylnaphthalene	< 0.020	< 0.020	0.1	nc
Naphthalene	< 0.010	< 0.010	0.05	nc
Phenanthrene	0.030	0.11	0.05	nc
Pyrene	0.035	0.19	0.1	nc
Average				nc

Notes:
mg/kg - millograms per kilogram
% - percentage
< - less than analytical detection limit indicated
nc - not calculated if the concentration is < 5X MDL
BFD - blind field duplicate
MDL - method detection limit
RPD - relative percent difference
BOLD Exceeds recommended RPD targets for Polycyclic Aromatic Hydrocarbons (PAH) (> 75%)

TABLE 16: RELATIVE PERCENT DIFFERENCE - PETROLEUM HYDROCARBON FRACTIONS IN SOIL (mg/kg)

Sample ID	BH17-02A	BH17-02B (BFD of BH17-02A)	X5 MDL	RPD
Date	15-Aug-2017	15-Aug-2017		
F1 (C6-10)	< 10	< 10	50	nc
F2 (C10-16)	< 10	< 10	50	nc
F3 (C16-34)	110	120	50	9%
F4 (C34-50+)	49	53	50	nc
Average				9%

Notes:
mg/kg - millograms per kilogram
% - percentage
< - less than analytical detection limit indicated
nc - not calculated if the concentration is < 5X MDL
BFD - blind field duplicate
MDL - method detection limit
RPD - relative percent difference
BOLD Exceeds recommended RPD targets for Petroleum Hydrocarbon Fractions (> 60%)

TABLE 17: RELATIVE PERCENT DIFFERENCE - PCB IN SOIL (mg/kg)

Sample ID	BH17-02A	BH17-02B (BFD of BH17-02A)	X5 MDL	RPD
Date	15-Aug-2017	15-Aug-2017		
Aroclor 1016	< 0.010	< 0.010	0.050	nc
Aroclor 1221	< 0.010	< 0.010	0.050	nc
Aroclor 1232	< 0.010	< 0.010	0.050	nc
Aroclor 1242	< 0.010	< 0.010	0.050	nc
Aroclor 1248	< 0.010	< 0.010	0.050	nc
Aroclor 1254	< 0.010	< 0.010	0.050	nc
Aroclor 1260	< 0.010	< 0.010	0.050	nc
Aroclor 1262	< 0.010	< 0.010	0.050	nc
Aroclor 1268	< 0.010	< 0.010	0.050	nc
Total PCB	< 0.010	< 0.010	0.050	nc
Average				nc

Notes:
mg/kg - millograms per kilogram
% - percentage
< - less than analytical detection limit indicated
nc - not calculated if the concentration is < 5X MDL
BFD - blind field duplicate
MDL - method detection limit
RPD - relative percent difference
BOLD Exceeds recommended RPD targets for PCB (> 60%)

Summary of Soil Quality and Conditions

EGD Parcel IM-901

Summary of Soil Stratigraphy

Depth (m)	Interpretation	Lithology
0.00-0.05	N/A	Approximately 60% unpaved gravel (west section) and 40% asphalt (east section) at the site's surface
0.05 – ca.1.7 (min. 1.2 meter, max. 2.8 meters)	Fill	Strongly heterogeneous GRAVEL AND SAND Changing lithologies in distances as short as a meter; • medium to coarse grained and dark grey sand and gravel fill, • brown clay fill with varying amounts of silt and sand; • grey gravel and cobbles; • grey gravel; • sand with some gravel and trace cobbles; or • black angular coarse sand. Occasionally containing wood and metal debris. Bricks and shell fragments noted.
ca. 1.7 – ca. 6.0	Fill, blast rocks	Angular cobbles, BOULDERS and gravel
ca. 6.0 – ca. 9.0*	Fill	Grey, silty, clayey GRAVEL
ca. 9.0 –ca. 10.0*	Native	Grey, gravelly SAND with some silt and clay, lots of shell fragments
>10*	Native, till	Light grey SAND AND GRAVEL, some cobbles

(*) Shallow presence of BEDROCK at the most southeastern part of the site. Bedrock was encountered at ca. 5.7 m depth in BH13-02 and at ca. 3.05 m depth in MHD0116.

Summary of Soil Exceedance Data

Contaminant	Date	Location	Depth (m)	Concentration (mg/kg)	Applicable guidelines
METALS					**CCME IL**
Antimony	15-Aug-2017	BH17-04B	0.90-1.20	44	40
Arsenic	15-Aug-2017	BH17-02C	1.50-1.80	41.7	12
	15-Aug-2017	BH17-02C REPEAT	1.50-1.80	22.8	
	7-Mar-2013	BH13-01A	0.30-0.46	15.9	
	15-Aug-2017	BH17-05A	0.50-0.80	24.1	
	15-Aug-2017	BH17-02A	0.30-0.80	21.1	
	15-Aug-2017	BH17-02B	0.30-0.80	13.1	
	15-Aug-2017	BH17-04B	0.90-1.20	92.1	
Chromium (total)	15-Aug-2017	BH17-05A	0.50-0.80	129	87
	13-Mar-2013	BH13-10F	9.75-10.36	147	
Copper	15-Aug-2017	BH17-02C	1.50-1.80	5670	91
	15-Aug-2017	BH17-02C REPEAT	1.50-1.80	1130	
	7-Mar-2013	BH13-01A	0.30-0.46	925	
	15-Aug-2017	BH17-05A	0.50-0.80	888	
	15-Aug-2017	BH17-02A	0.30-0.80	757	
	15-Aug-2017	BH17-05B	1.50-1.80	437	
	15-Aug-2017	BH17-03B	1.20-1.50	329	
	7-Mar-2013	BH13-02C	1.22-1.68	273	
	13-Mar-2013	BH13-02D	2.44-2.74	270	
	15-Aug-2017	BH17-04A	0.20-0.30	267	
	7-Mar-2013	BH13-02B	0.91-1.22	253	
	15-Aug-2017	BH17-03A	0.30-0.60	212	
	15-Aug-2017	MHD0116-01	0.30-2.44	207	
	18-Aug-1993	BH1302E	6.10-6.86	200	
	13-Mar-2013	BH13-10A	1.68-2.29	158	
	13-Mar-2013	BH13-10B	6.10-6.86	149	

Contaminant	Date	Location	Depth (m)	Concentration (mg/kg)	Applicable guidelines
	13-Mar-2013	BH13-01C	1.52-1.68	146	
	7-Mar-2013	BH17-04B	0.90-1.20	128	
	15-Aug-2017	BH13-02A	0.30-0.61	112	
	7-Mar-2013	BH13-01B	0.61-0.76	104	
	7-Mar-2013	BH13-10D	8.23-8.84	101	
Lead	15-Aug-2017	BH17-02C	1.50-1.80	2500	600
	15-Aug-2017	BH17-02C REPEAT	1.50-1.80	1730	
	15-Aug-2017	BH17-05A	0.50-0.80	892	
	15-Aug-2017	BH17-02A	0.30-0.80	609	
	7-Mar-2013	BH13-02B	0.91-1.22	3440	
	15-Aug-2017	BH17-06A	1.50-1.80	1670	
Nickel	7-Mar-2013	BH17-02C REPEAT	1.50-1.80	98.5	89
	13-Mar-2013	BH13-10F	9.75-10.36	92.8	
Tin	15-Aug-2017	BH17-02	1.50-1.80	565	300
Vanadium	15-Aug-2017	BH17-02C REPEAT	1.50-1.80	133[(1)]	130
	15-Aug-2017	BH17-05A	0.50-0.80	133[(1)]	
	15-Aug-2017	BH17-03B	1.20-1.50	147[(1)]	
	7-Mar-2013	BH13-02C	1.22-1.68	162[(1)]	
	13-Mar-2013	BH13-02D	2.44-2.74	171[(1)]	
	7-Mar-2013	BH13-02B	0.91-1.22	149[(1)]	
	13-Mar-2013	BH13-02E	6.10-6.86	139[(1)]	
Zinc	15-Aug-2017	BH17-02C	1.50-1.80	2170	360
	15-Aug-2017	BH17-02C REPEAT	1.50-1.80	1860	
	7-Mar-2013	BH13-01A	0.30-0.46	509	
	15-Aug-2017	BH17-05A	0.50-0.80	889	
	15-Aug-2017	BH17-02A	0.30-0.80	679	
	15-Aug-2017	BH17-05B	1.50-1.80	419	
	15-Aug-2017	BH17-04A	0.20-0.30	467	
PAHs					CCME ILi
Benzo(a)pyrene	17-Jul-2003	TP03-14-1	0.20-0.40	1.44	1.44

Contaminant	Date	Location	Depth (m)	Concentration (mg/kg)	Applicable guidelines
	3-Jul-2013	BH13-01A	0.30-0.46	7.87	
	15-Aug-2017	BH17-04A	0.20-0.30	3.3	
Benzo(b)fluoranthene	3-Jul-2013	BH13-01A	0.30-0.46	11.40	10
		BTEX			CCME ILcg
Benzene	15-Aug-2017	BH17-05A	0.5-0.8	0.070	0.03

[1)] Concentration less than the regional background soil quality estimate for Vancouver Island (200 mg/kg)
m – meters
All concentrations are expressed in in mg/kg.
mg/kg – milligrams per dry kilogram
CCME IL: CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Industrial
CCME ILi: CCME Canadian Soil Quality Guidelines for PAH, Industrial, Environmental Health Guidelines, Provisional or Interim Soil Criteria.
CCME ILcg: CCME Canadian Soil Quality Guidelines for BTEX, Industrial Coarse-grained Surface (10^{-5} incremental risk guideline).

APPENDIX D
Construction Environmental Management Plan

Esquimalt Graving Dock Parcel IM-901 Remediation
825 Admirals Road, Esquimalt, BC
SLR Project No.: 205.03877.00001

global environmental solutions

Esquimalt Graving Dock Parcel IM-901 Remediation
825 Admirals Rd, Victoria, BC

Construction Environmental Management Plan

December 2018
SLR Project No.: 205.03877.00001

ESQUIMALT GRAVING DOCK PARCEL IM-901 REMEDIATION

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

825 ADMIRALS ROAD, VICTORIA, BC

SLR Project No.: 205.03877.00001

Prepared by
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Distribution: 1 copy – PSPC
1 copy – SLR Consulting (Canada) Ltd.

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ACRONYMS AND ABBREVIATIONS

BC ENV	Ministry of Environment and Climate Change Strategy
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
bgs	Below Ground Surface
CCME	Canadian Council of Ministers of the Environment
CEMP	Construction Environmental Management Plan
EBMPs	Environmental Best Management Practices
EGD	Esquimalt Graving Dock
EM	Environmental Monitor
DR	Departmental Representative
HWR	Hazardous Waste Regulation
IL	Industrial Land Use
Maxxam	Maxxam Analytics Inc.
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PHC	Petroleum Hydrocarbon Constituents
PSPC	Public Services and Procurement Canada
QEP	Qualified Environmental Professional
RAP	Remedial Action Plan
RL	Residential Land Use
ROA	Remedial Options Analysis
SDS	Safety Data Sheets
SLR	SLR Consulting (Canada) Ltd.
TCLP	Toxicity Characteristic Leaching Potential
VOC	Volatile Organic Compounds

1.0 INTRODUCTION

SLR Consulting (Canada) Ltd. (SLR) was retained by Public Services and Procurement Canada (PSPC) to prepare a construction environmental management plan (CEMP) in support of the proposed Parcel IM-901 Remediation Project located at the Esquimalt Graving Dock (EGD) in Esquimalt, BC ("the site"). This work was completed under the Remediation Contract Task Authorization (CTA) number EZ897-170838/001/PWY.

The location of the site is shown on Drawing 1 and a site plan is provided on Drawing 2.

1.1 Background and Site Description

The last tenant occupying parcel IM-901 (Intercon Marine) has vacated a small parcel of land (approximately 240 m^2) within the northeast portion of the EGD Munroe Head property. The site consists of a partially paved equipment laydown area located adjacent to the Jenkins Marine Building at the Munroe Head area of the EGD. Concerns relating to past activities at this site and reports of a potentially leaking electrical transformer prompted the need for assessment of the site's subsurface conditions to determine appropriate remedial options prior to re-development or re-leasing of the parcel.

In 2017, SLR conducted two test pitting programs using hydrovacuum methods to assess and characterize site soils down to the cobble/boulder layer at approximately 1.7 m depth. Results of the investigations, as well as older investigations, indicated concentrations of a variety of metals, benzo(a)pyrene, benzo(b)fluoranthene and/or benzene exceeded the Canadian Council of Ministers of the Environment (CCME) Industrial Land (IL) Use guidelines at several locations throughout the site.

1.2 Remedial Plan

In March 2018, SLR prepared a remedial options analysis (ROA) and remedial action plan (RAP) to address known soil contamination at the site. As directed by PSPC, remedial strategies were limited to opportunistic excavation with off-site disposal of contaminated soils from the site. The preferred remedial strategy involves excavation of areas that are accessible without removal or impact to existing infrastructure, buildings, and adjacent lease holders. The electrical transformer, on-site trench drain, and subsurface concrete slab adjacent to the Jenkins Marine building will be maintained during the remediation program (SLR, 2018).

Due to the constraints at the site, step out samples are likely not possible. Excavation will be conducted considering appropriate setbacks along the parcel boundaries and will be sloped in accordance with geotechnical stability requirements. Excavation depths will be extended to the top of the boulder layer which ranges from approximately 1.2 m to 2.8 m below ground surface (bgs) (average of 1.7 m bgs). Contaminated soil will be transported off-site for disposal at an appropriately permitted facility, and the site will be backfilled with imported fill material meeting regulatory standards and compacted prior to the area being paved.

Following remediation, backfilling and paving, the site is intended to house a new semi-portable washroom facility. As such, electrical and water services will need to be extended to the site. Specific details on the utility hook-ups were not available at the time of this report and will be provided at a later date by PSPC.

It is estimated that the complete remediation program would take approximately one week, not including contingency. The proposed schedule is as follows:

- Day 1: preparation and start excavation;
- Day 2-4: excavation; and
- Day 5-6: backfilling, restoration and paving.

1.2.1 Estimated Excavation Volume

The site has an area of approximately 240 m^2 and a contaminated, heterogeneous fill layer is expected to be present throughout the entire site, from surface to a boulder layer at approximately 1.7 m depth. The boulder layer depth can vary considerably within the site from approximately minimum 1.2 m to maximum 2.8 m.

The following excavation limitations are expected:

- To maintain wall stability in the excavation pit, a conservative safety excavation angle of 45º is assumed.
- An approximately 10 cm thick concrete slab foundation is believed to extend approximately 4 m from the western site boundary, covering an area of approximately 80 m^2 (4 m x 20 m) at the site. This concrete slab foundation was encountered at approximately 20 cm depth during a previous investigation (SLR, 2017) and is believed to be connected to the Jenkins Marine building. The concrete slab foundation is to be maintained which excludes the underlying area from the intended excavation works. Soil overlying the concrete slab will require removal.
- The concrete trench drain that crosses the site along the eastern edge from north to south under a grate will be maintained. A 0.5 m offset from this feature and a 45º excavation angle will be implemented along the eastern excavation walls.

Based on the above excavation limitations, it is expected that approximately 190 m^3 of contaminated soils will be removed. This includes the total excavation volume plus a 50% contingency based on levels of uncertainty.

The stability measures described above are based on common practice and are subject to review by the Contractor's geotechnical engineer.

1.3 Scope of Work

This CEMP addresses, but is not limited to, the following construction activities:

- Mobilization;
- Contractor facility set up (if required);
- Removal and disposal of existing paved surface (eastern section);
- Removal and disposal of on-site vegetation;
- Protection and retention of existing sub-surface concrete slab foundation;
- Protection and retention of the existing trench drain;
- Protection and retention of electrical transformer and associated utility lines;
- Installation of erosion and sediment controls;
- Removal and off-site disposal of contaminated soils;
- Installation of utility stubs for future semi-portable washroom facility; and

- Backfilling, site restoration and paving.

2.0 ENVIRONMENTAL RESPONSIBILITIES

The Contractor shall take all reasonable and necessary measures to ensure that any activities undertaken in the performance of the work are conducted in such a way as to minimize disturbance or damage to the environment. This includes protecting ground surfaces, watercourses, wildlife, fish and heritage and archaeological resources. It also includes minimizing disturbance to the general public and EGD workers. Any condition which has resulted from the Contractor's work and which constitutes, or which could result in, unnecessary damage or disturbance to property and the environment must be corrected to the satisfaction of and within the time period specified by the PSPC Departmental Representative (DR).

The Contractor will be required to prepare and submit for approval an Environmental Protection Plan (EPP) to address environmental risks and associated controls. If the Contractor encounters any additional or unforeseen activities during the execution of the project that may pose an environmental risk, the Contractor shall contact the PSPC DR and/or SLR environmental monitor (EM) for assistance prior to commencing or continuing work.

All components of the work shall be carried out in accordance with the principles listed below:

- Avoid causing environmental impacts;
- Restore or repair habitat if environmental impacts have been created; and
- Meet or exceed applicable environmental laws, regulations and other requirements, which may include, but not limited to:
    - *Fisheries Act* [1985];
    - *Fish Protection Act* [SBC 1997] c.21;
    - *Water Act* [RSBC 1996] c.483;
    - *Environmental Management Act* [SBC2003] c.53;
        - Spill Reporting Regulation (Reg.263/90);
        - Contaminated Sites Regulation (Reg.375/96);
        - Hazardous Waste Regulation (Reg.63/);
    - Waste Discharge Regulation (Reg.320/2004);
    - *Weed Control Act* [RSBC 1996, c.487];
    - *Transportation of Dangerous Goods Act* [1992, c.34];
    - *Canadian Environmental Protection Act* [1999, c.33];
    - *Species at Risk Act* [2002, c.29];
    - *Migratory Birds Convention Act* [1994, c.22];
    - British Columbia *Wildlife Act* [RSBC 1996] c.488; and
    - *Heritage Conservation Act* [RSBC 1996] c.187.

The Contractor shall complete project activities according to the work specifications, environmental requirements and best management practices. EGD's Environmental Best Management Practices (EBMPs) shall apply to all unspecified routine work (PSPC, 2016; Appendix A).

2.1 Pre-Construction Documents

Following selection, the Contractor will be expected to complete an EGD safety orientation prior to the commencement of the works and to submit pre-construction documents in accordance with the specifications including, but not limited to, the following:

- A Health and Safety Program;
- An EPP addressing components such as a Sedimentation and Erosion Control Plan and Spill Response Plan;
- An Excavation Plan;
- A Contaminated Soil and Water Management Plan;
- A Contaminated Site Transportation Plan;
- The disposal facility details;
- The backfill source and quality information; and
- Applicable security clearances and documents.

The Contractor will be expected to have read and understood the EGD EBMPs that are applicable to the intended work. The EBMPs are to be incorporated, where applicable, into the documents listed above.

2.2 Pre-Construction Site Planning

Liaison between PSPC, SLR and the Contractors, as well as between PSPC and the site users, will be necessary because the site is located in a highly active area. It is therefore expected that the remedial program will impact facilities and personnel in the immediate vicinity of the site. In addition, the excavation works are likely to increase traffic along the site access routes. Traffic management, site access, parking, and Contractor facilities are to be appropriately planned in coordination with the PSPC DR.

3.0 ENVIRONMENTAL MONITORING AND CONSTRUCTION SUPERVISION

In order to comply with Federal, Provincial and contractual environmental requirements, SLR will provide an experienced EM that will monitor all project activities. SLR's EM will work under the direct supervision of an SLR professional who meets the requirements of a BC Qualified Environmental Professional (QEP) including:

- Being registered and in good standing in BC with an appropriate professional organization;
- Having relevant expertise related to the project's environmental requirements; and
- Acting within that individual's area of expertise.

SLR's EM shall perform site inspections and verify the Contractor is adhering to the CEMP, the Contractor-prepared EPP, and applicable laws, regulations and EBMPs. SLR's EM will discuss environmental monitoring activities with the Contractor before construction begins. This will include a review of high risk environmental activities and the frequency of EM site visits. SLR's EM will be on site throughout the duration of the project.

3.1 Monitoring and Reporting

Inspections of all work areas will be conducted by SLR's EM during all phases of the Project to identify and rectify any potential sources of environmental impairment. Inspections will include all waste (e.g., hazardous, construction materials, and domestic refuse) storage areas, all hazardous materials storage areas, vehicle refuelling/maintenance/storage areas, general equipment inspections, and inspections of all active work areas. Inspections will also include inspections of erosion/sediment control devices, water management (if applicable) and areas of exposed soil.

All workers are required to report all incidents of potential environmental impairment to SLR's EM or the PSPC DR. In the event of a spill and as required, appropriately qualified environmental professionals will need to be retained by the Contractor at no additional cost to Canada to verify all spill-impacted soil is removed and that the incident is documented appropriately.

SLR will submit a daily report of environmental inspections to PSPC. Records of all inspections will be filed at the SLR Victoria office, and any potential sources of environmental impairment, and appropriate actions taken will be immediately reported to PSPC.

3.1.1 Environmental Incident Reporting

3.1.1.1 *Spill Preparedness*

All users operating at the EGD must have the capability to effectively manage spills resulting from their activities and operations. While completing project activities at the site, the Contractor must:

- Have adequate training in spill response;
- Have access to spill response equipment and materials appropriate to the work they are performing; and
- Have plans and procedures in place to respond to spills.

3.1.1.2 *Emergency Spill Response*

A spill is an unauthorized discharge or release of a material or substance into the environment that is equal to or exceeds the regulated amount for that deleterious substance. Spill management is designed to reduce the risk of a harmful exposure to individuals and the surrounding environment. Requirements for reporting spills are defined in the Federal *Transportation of Dangerous Goods Act* (2011) and *Canadian Environmental Protection Act* (1999).

All emergency spill response plans and activities on the site should follow the BC Guidelines for Industry Emergency Response Plans (1992). Key spill response activities include:

- Report the Spill – Applicable parties, including, but not limited to, the Contractor, SLR's EM and the PSPC DR. In the case of a reportable spill, the Contractor will call the 24-hour Emergency Management BC at 1-800-663-3456, and notify PSPC. A reportable spill is any volume of a substance spilled that exceeds the quantities outlined in Schedule 1 of the BC Spill Reporting Regulation;
- Stop the source, if possible – If it is safe to proceed, the Contractor or SLR's EM will direct preventative measures to remove or immobilize the source of the spill;
- Contain Spill Material – If it is safe to proceed, the Contractor will direct spill containment methods and identify the spill material, spill volume, and the potential hazards to people and the environment;
- Protect Area – Spill containment measures will remain in place until the spilled material is removed from the Site and no longer poses a risk to people or the surrounding environment. The Contractor will ensure that spill kits are restocked as required with material for future use;
- Remove material to an approved location for storage and/or disposal – It is advised an independent Contractor be used for spill cleanup. All contaminated soil and clean up

material shall be managed according to the BC *Environmental Management Act* (2003) and Contaminated Sites Regulation (2013). Waste should be transported only by a licensed hazardous waste hauler and disposed of only at an approved waste facility; and
- Prepare a Spill Report – the Contractor will complete an Environmental Incident Report for any on-site spill.

All spills at the EGD facility must be reported to the PSPC DR and to EGD Management. Environmental emergency contact information can be found in the EGD EBMP#14, in Appendix A.

4.0 EROSION AND SEDIMENT CONTROL

Ground disturbance from the work has the potential to create turbid or sediment laden water that may enter the trench drain which ultimately discharges to Esquimalt Harbour, potentially causing harm to fish and/or fish habitat. The trench drain will be protected during construction and remedial extents will be positioned to protect the drain infrastructure. Therefore, the chance of erosion and sedimentation from the remedial excavation at the site is considered low. However, erosion and sediment control measures shall be put in place as necessary to reduce erosion and sediment generation at the site. Erosion and sediment control measures may include:

- Restricting vehicle access to certain areas of the site;
- Slope texturing on exposed soils;
- Installing and maintaining filter fabric inside the trench drain collecting runoff from the site;
- Directing runoff and waste water from excavations where possible;
- Installing sediment fencing to ensure no sediment laden runoff enters any adjacent properties;
- If applicable, excavated soil must be stockpiled on 10 mil polyethylene (poly) and when inactive, completely cover and secure with 10 mil poly;
- If applicable, do not stockpile soil within 15 m of any drainage features, drains, ditches, and 30 m of any waterbody or water course; and
- If appropriate, application of water can be used for dust suppression.

Erosion and sediment control measures will be inspected by the Contractor within 24 hours after heavy rainfall events and maintained/repaired as necessary.

4.1 Pre-Excavation

The following sediment control measures shall be implemented prior to construction activities initiating at the site:

- The trench drain may collect flow from the site shall be fitted with filter fabric; and
- Sediment fencing shall be available on site. If needed, sediment fencing shall be properly installed between the site and adjacent properties to control off-site release of sediment-laden water.

4.2 During Excavation

The following sediment control measures will be implemented during excavation activities:

- Excavation activities, whenever possible, should not be carried out on rainy days;

- If sediment fencing is used on-site it must be inspected and maintained on a regular basis. Sediment fencing shall be:
    - Inspected daily and following each rain event; and
    - Immediately repaired and replaced if fallen, torn or degraded.
- Accumulated sediment must be removed, and disposed of in a location where it cannot be re-entrained.

Sediment fencing should be removed at project completion only if the risk of erosion and/or sediment release has been eliminated through site reinstating activities.

5.0 WATER MANAGEMENT

Water management is expected to be minimal during the project as there are no proposed works within the trench drain perimeter. Furthermore, the maximum excavation depth is expected to be shallower than the anticipated groundwater level, reducing the chance of water infiltrating the excavation footprint. However, given the proximity to Esquimalt harbour, there is a chance that groundwater levels may be tidally influenced at the site. In the case that groundwater infiltrates the remedial extents at a high tide cycle, the Contractor should cease all excavation activities and resume once tidal levels have receded.

The trench drain will be retained and protected during excavation. In the event of heavy precipitation, the following measures shall be followed:

- The trench shall be visually monitored daily by site personnel during remedial works to ensure drainage of large quantities of surface water are not overflowing into the remediation footprint;
- Divert and contain surficial stormwater runoff (i.e., water that has not entered the excavation footprint) with proper materials and filtration, prior to entering the drains (e.g., use filter cloth, hay bales, sand bags);
- During heavy stormwater events, ensure storm drains and trenches are kept clear of debris to prevent flooding;
- Conduct regular inspections of storm and trench drains to ensure they are kept clear of debris; and
- The Contractor should limit the incursion of site runoff into the excavation area by directing surface water runoff around the work area, to the extent possible.

Any water infiltrating and retained within the excavation area shall be pumped directly into water holding trucks and removed off site for characterization and off-site disposal by the Contractor.

The Contractor is to prepare and adhere to a Contaminated Soil and Water Management Plan for the project.

Additional information on water management can be found within the EGD EBMP#17 in Appendix A.

6.0 SOIL MANAGEMENT

The following sections provide a general overview of the soil management environmental requirements associated with Project activities. A detailed review of the EGD EBMPs relating to excavation and soils management can be found within EBMP#18 in Appendix A. The

Contractor is also required to prepare and adhere to a Contaminated Soil and Water Management Plan for the project.

6.1 Temporary Storage

Although on-site storage of soils is not expected to occur, in the event that soils must be temporarily stockpiled at the EGD, the following procedures have been designed to ensure environmental compliance:

- Imported backfill material should be stockpiled separately from removed contaminated soils;
- Soil shall not be stockpiled on roadways or driveways;
- Excavated soils must be stockpiled 15 m away from any drainage features, drains, ditches and 30 m away from any waterbody or watercourse; and
- Excavated soil must be staged on 10 mil poly and when inactive, covered with 10 mil poly, weighted down to secure the cover.

6.2 Sampling and Characterization

Confirmatory samples will be collected by SLR EM staff from excavation walls and floors in accordance with BC Ministry of Environment and Climate Change Strategy (BC ENV) Technical Guidance Document #1: *Site Characterization and Confirmation Testing* where possible. It should be noted that since the remedial excavation has been planned to remove soil to the upper limit of the cobble/boulder layer that occurs at approximately 1.7 m bgs, collection of representative floor soil samples to document remaining soil conditions may not be possible in some cases. It is assumed that up to 20 confirmatory samples (including blind field duplicates (BFDs)) will be collected for submission to Maxxam Analytics Inc. (Maxxam) for analysis of one or more of the following parameters:

- Total Metals;
- Polycyclic Aromatic Hydrocarbons (PAH);
- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX);
- Petroleum Hydrocarbon Constituents (PHC) – Fraction F1; and
- Volatile Organic Compounds (VOC).

Samples will be placed on rush turn-around-time at 100% surcharge to facilitate on-site decisions (i.e., further remedial excavations may be warranted pending results of confirmatory samples) prior to commencement of backfilling.

Once received from Maxxam, analytical results will be tabulated and compared to CCME IL soil guidelines. If warranted, based on initial chemistry results; further testing, including toxicity characteristic leaching potential (TCLP), may be recommended to verify soil contaminant concentrations do not exceed the BC Hazardous Waste Regulation (HWR) limits. Such testing may delay subsequent project activities at the discretion of the PSPC DR.

6.3 Soil Disposal

Excavated soils will be placed directly into dump trucks and removed from site for off-site disposal. The removed soils are to be regarded as IL+ waste for disposal, based on the comparison of *in-situ* analytical results (including leachability tests) to the BC CSR and BC HWR (SLR, 2017). Surplus soil must only be disposed of at a pre-approved licensed receiving facility

authorized under Municipal, Provincial or Federal legislation to accept the material being delivered. The Contractor will be responsible for providing soil waybills, soil manifest documents, etc. in accordance with the project specifications.

6.4 Imported Backfill

Imported fill quality documentation must be submitted to, and approved by, the PSPC DR prior to being imported to site.

The fill material is required to have been characterized by a QEP within the previous three months as per BC ENV, Technical Guidance document #1 – *Site Characterization and Confirmation Testing*. The imported backfill must be shown to meet the following CCME Residential Land (RL) Use guidelines prior to importation onto the site:

- CCME Canadian Environmental Quality Guidelines, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Residential (CCME RL) (metals).
- CCME Canadian Soil Quality Guidelines for PAHs, Residential, Environmental Health guidelines, Interim Soil Quality Criteria (CCME RLi).
- CCME Canadian Soil Quality Guidelines for PAHs, Residential, Environmental Health guidelines, Soil Contact (CCME RLsc).
- CCME Canadian Soil Quality Guidelines for PAHs, Residential, Environmental Health guidelines, Environmental Health (CCME RLe).
- CCME Soil Quality Guidelines for the Protection of Human Health (10^{-5}) (CCME SQGhh):
    - Use the 10^{-5} incremental cancer risk for human health guidelines/check values for parameters that are potentially carcinogenic.
    - The Benzo(a)Pyrene Total Potency Equivalency (B[a]P TPE), for the protection of direct contact with contaminated soil, is the sum of estimated cancer potency relative to B[a]P for all potentially carcinogenic unsubstituted PAHs. The B[a]P TPE value should be compared against the Industrial guideline: 5.3 B[a]P TPE.

Furthermore, as detailed in the EGD Soil Management Plan (SLR, 2014), the following items will be taken into account:

- PSPC DR will reserve the right to request additional testing of imported material at the source and at the deposit site to satisfy their requirements. All testing will be done at the Contractor's cost;
- Acceptance of material does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory; and
- All material brought to the site that does not meet the soil quality guidelines applicable for imported material as listed above, or does not perform to backfill specification requirements, should be removed from the property immediately at the Contractor's cost.

Geotechnical Requirements for Backfilling

Backfill will be compacted to a geotechnical engineer-specified density based on the future site use as defined by PSPC. A geotechnical engineering firm commissioned by the Contractor shall provide *in-situ* density testing of backfill soil as required.

7.0 GENERAL HOUSEKEEPING

Equipment laydown and material storage areas will be designated by the PSPC DR. The lay down area will include the following environmental considerations:

- Spill kits in all equipment;
- Larger spill kits are to be located at the project site and hazardous materials storage locations;
- Solid waste bin storage;
- Ensure trench and storm drains are kept clean and free of debris;
- Sweep and/or clean active work areas on a regular basis; and
- Recycling for construction and industrial materials.

Additional information on housekeeping can be found within the EGD EBMP#16 in Appendix A.

7.1 General Waste

General waste accumulated throughout the site shall be segregated and stored at a designated location prior to removal. Measures to ensure that appropriate care is given to general waste are as follows:

- Remove surplus construction material and waste from work sites, and dispose of in appropriately authorized facility;
- Recyclable and non-recyclable waste should be separated and stored in appropriately labelled, covered, waterproof containers for storage and transport;
- All waste material should be removed from site in a timely manner on an as needed basis and at a minimum at the completion of the project;
- Recyclable materials should be removed from site by an approved waste management company and taken to the appropriate facilities;
- Decommission erosion and sediment control materials and features following project completion (if no longer required); and
- All waste material (i.e. wood, cardboard, steel, concrete) shall be separated into individual bins and taken off-site to a certified disposal facility or recycling facility.

Additional information on waste management and recycling can be found within the EGD EBMP#6 in Appendix A.

7.2 Hazardous Materials Management

Hazardous waste will be managed to prevent contamination of soils or waterways from accidental spills and to prevent uncontrolled or accidental fires. Hazardous materials include “dangerous goods” and “controlled products”. These include, but are not limited to, fuels, oils, solvents, paints, greases, asbestos, polychlorinated biphenyl (PCB) oils, and batteries.

Hazardous materials used during excavation activities will be stored and handled in accordance with all applicable legislation and BMPs, for example, the *Transportation of Dangerous Goods Act*, and product-specific Safety Data Sheets (SDS).

General storage, handling and disposal requirements for hazardous waste include:

- Copies of SDS for any hazardous materials used during the project will be maintained by the Contractor and stored in an accessible location on site;
- The Contractor will ensure that all staff and subcontractors are adequately trained in handling and transportation of any hazardous materials they encounter during their job activities;
- Storage and handling of hazardous materials will be conducted to avoid loss and provide containment in the event of a spill;
- Transfer and temporary storage of hazardous materials and wastes will occur only in an area designated for this purpose. The designated area will be clearly labelled and controlled using barriers, anchored tarps, and/or separate storage containers;
- All containers used for storage or transfer will be labelled, handled and transported in accordance with the *Transportation of Dangerous Goods Act*;
- Disposal of hazardous wastes generated during the course of the project will be in compliance with *Environmental Management Act*, the *Transportation of Dangerous Goods Act* and the HWR; and
- The Contractor will maintain records for all hazardous waste/materials including:
    - Inventories of types and quantities of waste generated, stored or removed;
    - Hazardous Waste Manifests identifying licensed waste haulers and disposal destinations; and
    - Disposal certification documents.

In addition to the above, and as per the EGD EBMP#5, any containers placed directly over top or beside a trench drain have the potential to spill to the drain leading directly to the ocean. Therefore, hazardous materials must be stored and/or handled away from the on-site trench drain.

7.3 Fuel, Oil and Coolant Handling and Storage

SDS should be provided for all chemicals, lubricants and other controlled substances brought to site and should be available to workers at all times.

The Contractor and associated subcontractors will adhere to the following procedures for dealing with waste at the site. Measures to ensure proper fuel, oil and coolant handling and storage include:

- Copies of emergency response procedures will be maintained by the Contractor and stored in an accessible location on site;
- Oily and/or solvent soaked rags, if generated, should be stored in metal drums with secure fitting lids and should be disposed of by a qualified waste disposal company;
- The fuel storage and handling equipment shall comply with A Field Guide to Fuel Handling, Transportation and Storage (BC Ministry of Water, Land and Air Protection, 2002);
- Fuel containers are to be placed in spill containment bins or other such spill containment devices;
- Locate fuel containers, re-fuelling, equipment maintenance and repair sites on flat, stable ground, >30 m away from environmentally sensitive areas or drainages, or as directed by the PSPC DR;
- Store all tanks, barrels and containers greater than 23 L containing hydrocarbon products within impermeable containment area designated to contain 110% of the volume of the largest container. Surround the storage area with barricades to prevent damage;

- Vehicles and equipment, including their hydraulic fittings, shall be inspected daily to ensure that they are in good condition and free of leaks;
- Operate storage areas so that containment systems are effective during wet weather;
- All fuel supply trucks and vehicle tidy tanks shall be clean and well maintained at all times. All fuel or grease spills occurring from their use or operation are to be cleaned immediately. Poorly maintained fuel storage tanks will be taken off-site immediately and replaced with a new clean tank;
- The Contractor shall have and maintain a written Spill Contingency Plan on site with the required specifications and will include the names of those to be contacted;
- Containers shall not leak, and shall be sealed with a proper fitting cap or lid;
- Containers greater than 23 L, including 205 L drums must be transported upright and secured to prevent shifting and toppling;
- The fluid transfer system shall contain an accepted overflow preventer which will cut off fuel delivery prior to the tank becoming completely full. Sorbent pads shall be kept available at all areas where fuelling occurs;
- Inspect all temporary oil storage tanks to ensure there are no potential leaks prior to, during and after filling;
- Wrap hose connections with absorbent material to catch any leaks and drips during oil transfer to/from the storage tanks;
- If leaks are observed from any equipment while on-site, stop the equipment and place drip trays and/or sorbent matting under the leak immediately. “Repair the leak, or Replace the Tank, Hose or Connector Assembly”;
- Do not fill tanks to the top. Leave adequate head-space to ensure that overfilling does not occur;
- Containment areas shall be covered by a tarp to avoid rainwater accumulation;
- All containment basins shall be inspected daily for leaks and wear points;
- Containment basins shall be cleaned regularly and any accumulated waters removed;
- Where leaks or wear points are found, they shall be repaired promptly to restore full containment; and
- Additional major spill kits are to be located at the site.

In addition to the above, and as per the EGD EBMP#7, no fuel or oil transfers are to be completed next to drainage pathways to the marine environment (i.e., the on-site trench drain). The EGD EBMPs can be found in Appendix A, following the text.

8.0 WILDLIFE

A variety of wildlife is known to occupy areas of the EGD property. In some cases wildlife may use the facility as a nesting/breeding ground, while others are present for short periods of time during migration or to feed. Activities and operations at the EGD have the potential to impact the well-being of wildlife at the facility.

Such wildlife includes: deer, raccoon, mink, river otter, great blue heron, osprey, raven, Canada goose and a variety of other common waterfowl, nesting and songbirds and pollinators (e.g. bats, native bees). The Contractor shall adhere to the following general measures to mitigate wildlife impacts:

- Do not feed, attract or harass wildlife;
- All wildlife must be left alone. Do not approach or handle newborn or juvenile wildlife;

- Injured or orphaned wildlife must not be handled without proper experience and equipment;
- Report observations of injured or deceased animals to the PSPC DR;
- Food waste and garbage will be disposed of in animal-proof containers and removed from site on a daily basis;
- All staff and subcontractors will adhere to maximum speed limits and be alert while driving to avoid potential wildlife-vehicle collisions;
- Works will be occurring outside of the general nesting periods for most migratory birds that are protected under the Migratory Birds Convention Act. In the event that a bird nest is identified, SLR's EM will be notified and all protection will be afforded to the nest. Raptor nests are protected year-round and therefore are not to be disturbed. If a bird nest is identified, additional strategies for nest management may also be required at the direction of SLR's EM;
- If species-at-risk or provincially rare species are observed on the site, SLR's EM will be notified immediately. No interaction with the animal shall occur unless required and under appropriate Provincial or Federal permit; and
- Lighting will be limited to only essential work areas and night work will be avoided whenever possible.

Additional information on wildlife management can be found within the EGD EBMP#9 in Appendix A.

9.0 ARCHAEOLOGY

Because the fill material to be excavated was applied circa 1920, archeological findings are not expected. However, several archeological areas of interest were identified within the EGD area; the closest to the site is the Archaeological DcRu-12 area which is approximately 65 m from the site. Archeological awareness training will be provided to all site workers prior to excavation activities.

In the event that sites or artifacts of heritage or archaeological importance are discovered, the Contractor shall stop work immediately and contact the PSPC DR. If evidence of cultural artifacts are found (i.e. human bones, stone tools, shell deposits and rock paintings) the following procedures are to be followed:

- Immediately stop work in the vicinity of the suspected archaeological find and immediately notify the PSPC DR;
- Do not undertake any further work that could disturb the site;
- Do not move soil from the vicinity of the site;
- Do not move or collect the artifacts;
- Do not take pictures of the artifacts;
- Secure the area by staking or flagging off the affected location to prevent additional disturbances; and
- Do not backfill the area.

Additional information on archaeological considerations can be found within the EGD EBMP#18 in Appendix A.

10.0 NOISE

All work should comply with local noise bylaws unless exemptions have been obtained prior to commencing any site works. The following noise control measures should be implemented during construction:

- Equipment should be maintained in good working condition. Fleet vehicles should be maintained according to manufacturer's guidelines. Vehicles and equipment should be inspected on a regular basis and maintained as required;
- Standard practices and use of best available control technologies should be implemented to control equipment, including hand-held, and vehicle noise. Noise levels will be managed through the use of standard noise reduction mufflers. Mufflers are to be maintained in good working condition to meet their warranted operating efficiency;
- Schedule noisy activities for daytime hours 0700 hrs to 2300 hrs on weekdays, weekends and holidays; and
- The Contractor will consider the requirements of the *Municipality of Esquimalt Bylaw 2826 Maintenance of Property, Unsightly Properties and Nuisance Bylaw Part III Nuisances Noise Control*.

Additional information on noise and nuisance pollution can be found within the EGD EBMP#12 in Appendix A.

11.0 AIR QUALITY AND DUST CONTROL

Air quality may be affected by construction activities. Construction equipment and vehicles may temporarily emit greenhouse gases, deleterious substances, and particulate matter. In order to minimize the potential impacts to air quality, the following measures shall be implemented by the Contractor:

- The movement of equipment, vehicles, and wind over bare soil and/or unpaved roads may cause temporary fugitive dust emissions;
- Minimize the time unpaved surfaces are exposed or cover potential dust sources. Paved surfaces shall be swept regularly to reduce issues related to fugitive dust;
- Stockpiles should be covered with 10 mil poly sheets, if applicable;
- Apply water to dry soils, lay down areas, and work areas during periods of high wind and/or dry weather if there is evidence that wind erosion is a problem (e.g., drifting of stockpiles) or if dust control is required. When using water, caution shall be used to prevent run-off into adjacent catch basins, trenches, or ditches; and
- Do not use oils or other similar products as dust suppressants.

Additional information on dust suppression can be found within the EGD EBMP#10 in Appendix A.

11.1 Idle Reduction Strategies

In order to minimize greenhouse gas emissions during construction activities, the following practices shall be implemented by the Contractor:

- Ensure that all equipment is maintained in good working order and has properly functioning emission controls;

- Locate operating vehicles away from sensitive receptors such as fresh air intakes, air conditioners and windows; and
- Establish a staging zone for trucks that are waiting to load or unload material at the site, away from sensitive receptors.

Additional information on idle reduction and emissions management can be found within the EGD EBMP#11 in Appendix A.

12.0 VEGETATION MANAGEMENT

The site is located in a busy industrial area and is relatively cleared of vegetation with the exception of occasional shrubs and minor amounts of invasive plants (e.g., Himalayan blackberry). Should vegetation removal be required, the Contractor shall segregate invasive plant species from native plant species. Removal of invasive plant species shall require the Contractor to remove the entire adult plant, including all root structures. Invasive plant material should be contained in sturdy plastic bags or other sealable containers and disposed at a landfill / facility permitted to accept invasive plant material. The Contractor shall not chip removed invasive plant material and shall limit the potential spread of seeds during the removal and transport of the invasive plant material.

13.0 SITE RESTORATION

Following remediation and backfilling, the site will be paved. The Contractor will install utility stubs for water and electricity supply for a future semi-portable washroom facility at the site. Details of the utility hook-ups will be provided by PSPC at a later date.

At the conclusion of the remediation, the Contractor shall:

- Clean all work areas to pre-remediation condition and to the satisfaction of PSPC;
- Repair or replace as necessary any damage to roadways that has occurred as a result of the Contractor's usage of the site;
- Prepare and submit all post-construction submittals including details of geotechnical monitoring and survey results as well as transport and disposal tracking records for all material removed from site;
- Complete an as-built survey following site restoration including but not limited to final site grade; and
- Conduct a final site walkover with PSPC to inspect the site for any deficiencies. Once PSPC is satisfied, the Contractor can be released from the site.

14.0REFERENCES

British Columbia Contaminated Sites Regulation. 1997. Including amendments up to B.C. Reg. 6/2013, May 2013.

British Columbia Environmental Management Act. 2003, including amendments up to 2016.

British Columbia Ministry of Environment. 1992, including amendments up to 2002. BC Guidelines for Industry Emergency Response Plans.

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British Columbia Ministry of Water, Land and Air Protection. 2002. A Field Guide to Fuel Handling, Transportation & Storage. February 2002.

Canadian Environmental Protection Act. 1999. Includes SOR/2009-197 and SOR/2011-90.

Municipality of Esquimalt. 2014. Bylaw No. 2826 Maintenance of Property, Unsightly Properties and Nuisance Bylaw Part III Nuisances Noise Control.

Public Services and Procurement Canada Environmental Services. 2016. Esquimalt Graving Dock: Environmental Best Management Practices Version 5. October 2016.

SLR Consulting (Canada) Ltd. 2017. Supplemental Phase II Environmental Site Assessment at Esquimalt Graving Dock Parcel IM-901. November 2017.

SLR Consulting (Canada) Ltd. 2018. Remedial Options Analysis and Remedial Action Plan - Esquimalt Graving Dock Parcel IM-901. March 2018.

SLR Consulting (Canada) Ltd. 2014. 2013 / 2014 Soil Management Plan for Esquimalt Graving Dock and Munroe Head, Victoria, BC.

Transportation of Dangerous Goods Act. 1992. Includes SOR.2011-210 (Amendment 10) and SOR/2011-239 (Amendment 8).

15.0 LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by SLR Consulting (Canada) Ltd. (SLR) for Public Services and Procurement Canada (PSPC), hereafter referred to as the “Client”. It is intended for the sole and exclusive use of PSPC. The report has been prepared in accordance with the Scope of Work and agreement between SLR and the Client. Other than by the Client and as set out herein, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted unless payment for the work has been made in full and express written permission has been obtained from SLR.

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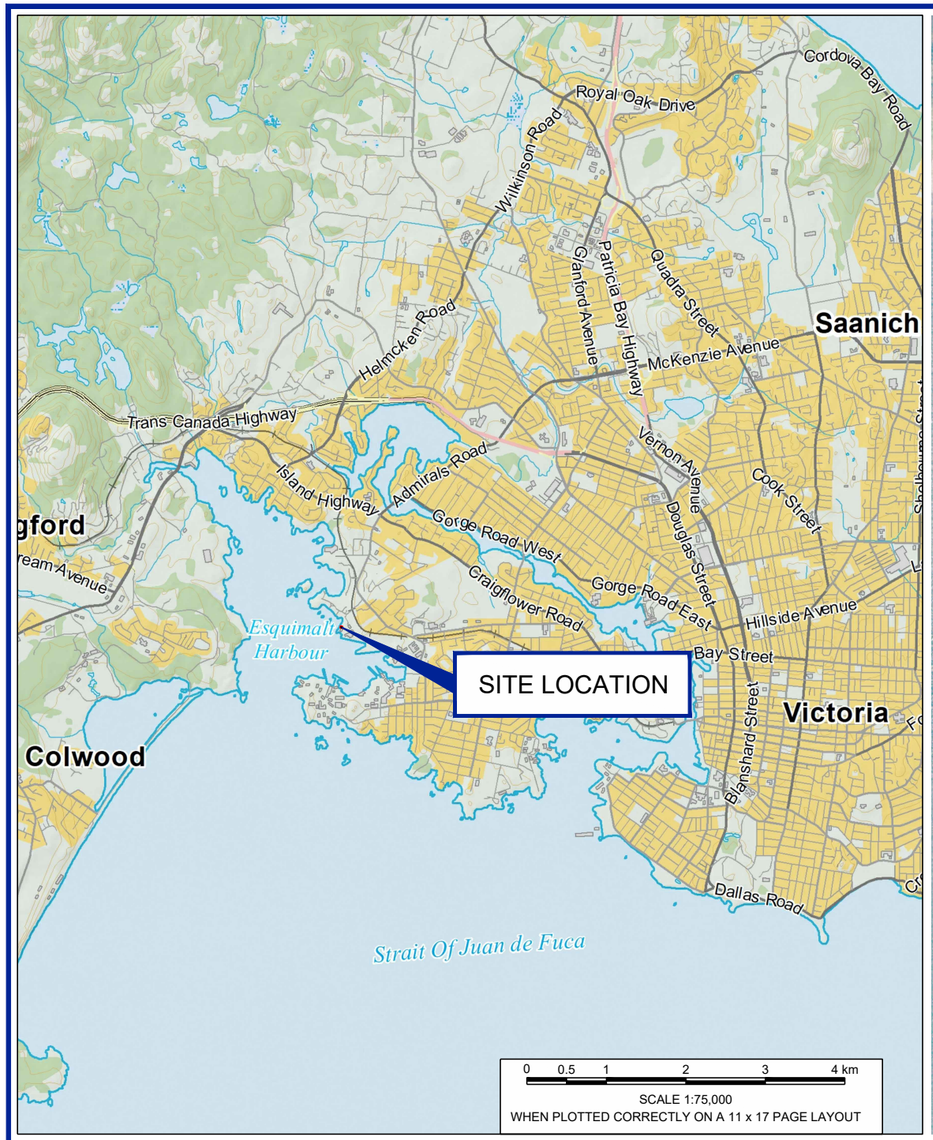
DRAWINGS

Construction Environmental Management Plan
Esquimalt Graving Dock Parcel IM-901 Remediation
SLR Project No.: 205.03877.00001



NOTES:
NOT A LEGAL SURVEY. ALL FEATURES AND MEASUREMENTS TO BE CONFIRMED BY CONTACTOR.

REFERENCED FROM CAPITAL REGIONAL DISTRICT WMS AND SITE RECONNAISSANCE INFORMATION. IMAGERY © 2018 CAPITAL REGIONAL DISTRICT (IMAGE DATE: 2015).

BASEDATA:
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- Rail Line
- Contour (20m)
- Watercourse
- Wetlands
- Buildings
- Wooded Area
- Developed Area
- Highway
- Arterial
- Local / Street

LEGEND:
- PROPERTY BOUNDARY
- SITE LOCATION

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

PUBLIC SERVICES AND PROCUREMENT CANADA
ESQUIMALT GRAVING DOCK PARCEL IM-901
825 ADMIRALS ROAD
VICTORIA, BC

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

SITE LOCATION AND SURROUNDING LAND USE

Date: December 20, 2018
Project No. 205.03877.00001
Drawing No. 1

SLR global environmental solutions

Cadfile name: S_205-03877-00001-A1.dwg

NOTES:
NOT A LEGAL SURVEY. ALL FEATURES AND MEASUREMENTS TO BE CONFIRMED BY CONTACTOR.

REFERENCED FROM CAPITAL REGIONAL DISTRICT WMS AND SITE RECONNAISSANCE INFORMATION. IMAGERY © 2018 CAPITAL REGIONAL DISTRICT (IMAGE DATE: 2015).

LEGEND:

- SITE BOUNDARY
- FENCE
- CONCRETE BARRIERS AND BOLLARDS
- UTILITIES AND SYMBOLS
- CONCRETE TRENCH DRAIN

0 2.5 5 10 m

SCALE 1:150
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10 U

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

PUBLIC SERVICES AND PROCUREMENT CANADA
ESQUIMALT GRAVING DOCK PARCEL IM-901
825 ADMIRALS ROAD
VICTORIA, BC

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

SITE PLAN AND EXISTING CONDITIONS

Date: December 20, 2018
Project No. 205.03877.00001
Drawing No. 2

SLR global environmental solutions

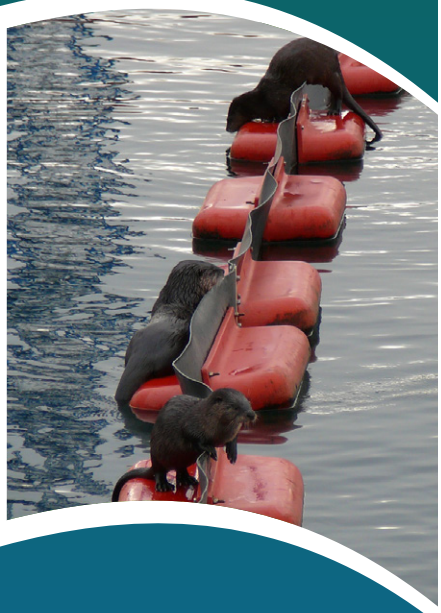
Cadfile name: S_205-03877-00001-A1.dwg

APPENDIX A
Esquimalt Graving Dock Environmental Best Management Practices

Construction Environmental Management Plan
Esquimalt Graving Dock Parcel IM-901 Remediation
SLR Project No.: 205.03877.00001

EGD
Esquimalt Graving Dock

Environmental Best Management Practices



Prepared by:
Public Services and Procurement Canada
Environmental Services

October 2016
Version: 05

INDEX

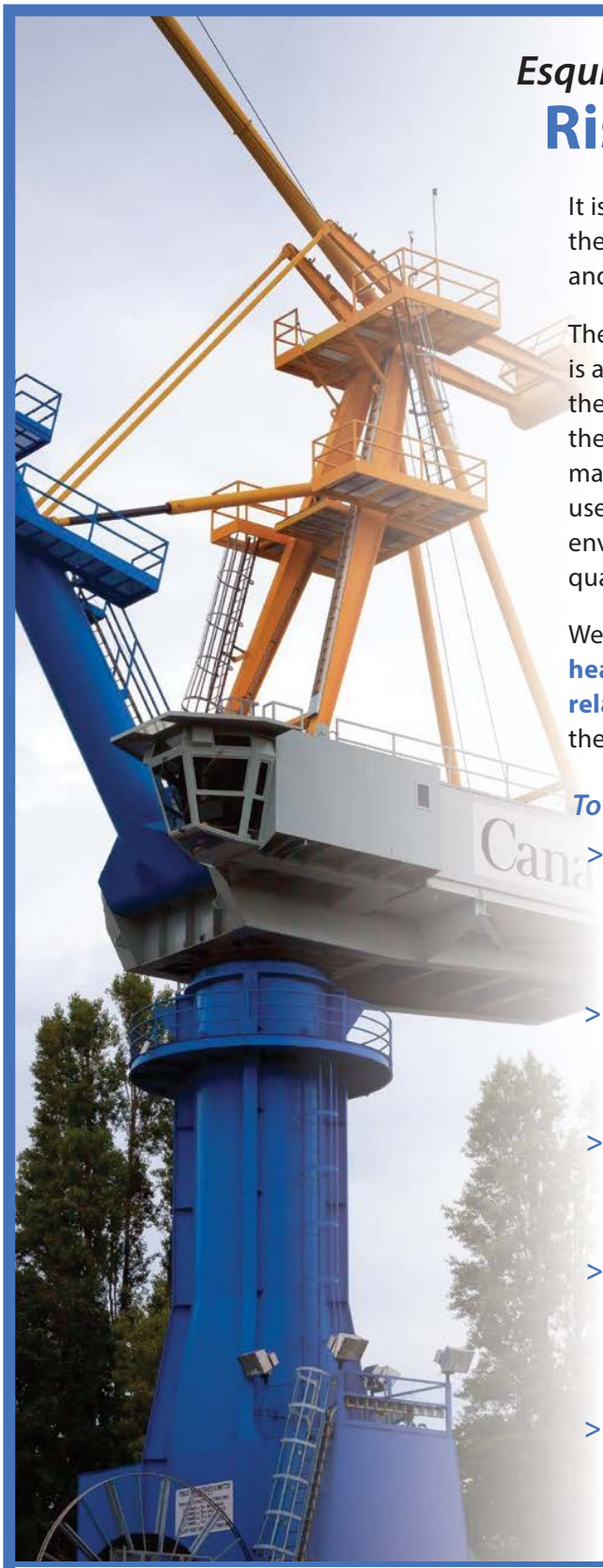
OVERVIEW

The **Esquimalt Graving Dock** (*EGD*) is a federal government owned and operated, multi-user ship repair and maintenance facility located in Esquimalt, British Columbia. The facility has been in operation since 1925, and provides service to local, Federal, and international vessels. The vessel repair and maintenance work at the EGD is carried out by privately owned shipyard repair contractors that rent the required sections of the drydock, lease upland work space from the government, and pay a fee for services such as cranes, compressed air, water, sewer and power.

The EGD is committed to managing the actual and potential health and safety, environmental, security, financial and public relations risks, while ensuring quality operations and services. In order to identify and manage these risks, the EGD has implemented an **Environmental Management System** (*EMS*) and a Risk Management Framework (*in conformance with the internationally recognized standards ISO 14001 and ISO 31000*). The EMS provides the framework for identifying environmental impacts, and ensures adequate controls are in place to effectively manage them.

This manual contains a series of **Environmental Best Management Practices** (*EBMPs*) developed to reduce impact to the environment related to common activities and operations at the Esquimalt Graving Dock. The manual contains guidance and recommendations for those operating at the EGD, and is intended to complement existing environmental legislation. It does not remove the responsibility of all contractors and companies operating at the EGD to abide by all applicable regulatory requirements and industry standards. All users of the facility are expected to follow the EBMPs.

For additional information contact the EGD Environmental Services Department.



Esquimalt Graving Dock

Risk Management Policy

It is the goal of the Esquimalt Graving Dock, in partnership with the ship repair industry, to be the premier ship repair, construction and maintenance facility on the west coast of North America.

The Esquimalt Graving Dock acknowledges that risk management is an integral part of attaining this goal. We recognize that risk is the effect of uncertainty on our operations and is inherent within the ship repair industry. Our objective is to identify, monitor and manage risk in order to prevent the harm of our employees, site users, contractors, neighbours, other stakeholders, the environment and our facility, while ensuring and maintaining quality operations and services.

We are committed to managing the actual and potential **health & safety, environmental, security, financial and public relation risks** pertaining to strategies, policies and practices at the Esquimalt Graving Dock.

To meet our commitment we will:

> *Implement systems and processes to consistently identify, measure, mitigate, minimize and report on risks, while continuing to uphold and adapt the established Environmental Management System and other relevant Management Frameworks.*

> *Meet or exceed applicable federal, provincial and municipal legislation and regulations, departmental policies, industry standards, practices and other requirements.*

> *Communicate openly with our employees to ensure they are aware of and understand our Risk Management Framework, the nature of our operations and their roles and responsibilities in managing risk.*

> *Monitor and review our Risk Management Framework to ensure we are meeting our goals. Ongoing oversight of the effectiveness of our Risk Management Framework is the responsibility of the Esquimalt Graving Dock Risk Management Team.*

> *Provide the necessary resources to effectively implement our Risk Management Framework, while continuing to improve our programs, procedures and operations.*

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

Jim Milne
Director
Esquimalt Graving Dock
Engineering Assets
Strategy Sector

David Latoski
Operations Manager
Esquimalt Graving Dock
Engineering Assets
Strategy Sector

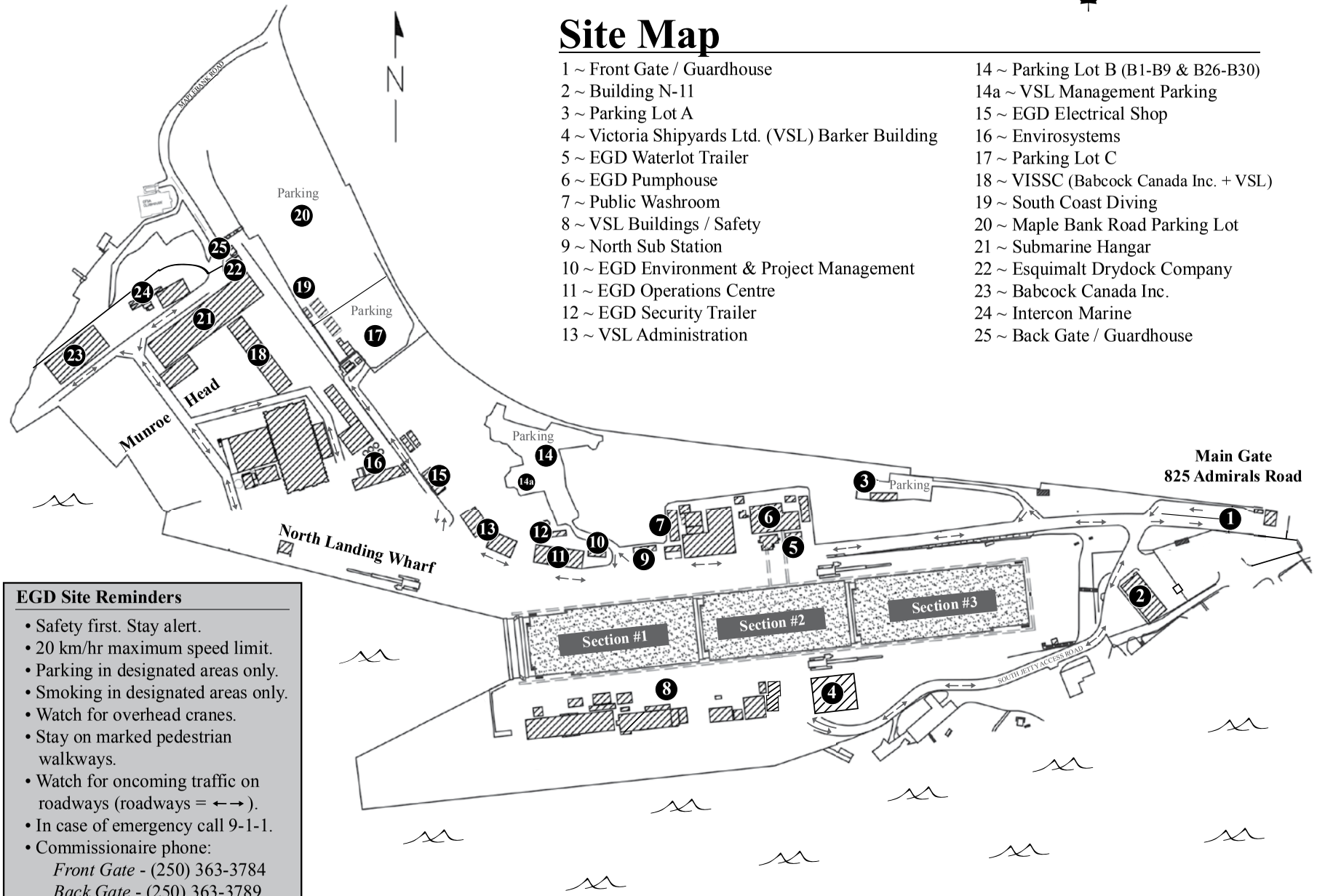
Canada

August 2015

EGD
Esquimalt Graving Dock

Site Map

1 ~ Front Gate / Guardhouse
2 ~ Building N-11
3 ~ Parking Lot A
4 ~ Victoria Shipyards Ltd. (VSL) Barker Building
5 ~ EGD Waterlot Trailer
6 ~ EGD Pumphouse
7 ~ Public Washroom
8 ~ VSL Buildings / Safety
9 ~ North Sub Station
10 ~ EGD Environment & Project Management
11 ~ EGD Operations Centre
12 ~ EGD Security Trailer
13 ~ VSL Administration
14 ~ Parking Lot B (B1-B9 & B26-B30)
14a ~ VSL Management Parking
15 ~ EGD Electrical Shop
16 ~ Envirosystems
17 ~ Parking Lot C
18 ~ VISSC (Babcock Canada Inc. + VSL)
19 ~ South Coast Diving
20 ~ Maple Bank Road Parking Lot
21 ~ Submarine Hangar
22 ~ Esquimalt Drydock Company
23 ~ Babcock Canada Inc.
24 ~ Intercon Marine
25 ~ Back Gate / Guardhouse



EGD Site Reminders

- Safety first. Stay alert.
- 20 km/hr maximum speed limit.
- Parking in designated areas only.
- Smoking in designated areas only.
- Watch for overhead cranes.
- Stay on marked pedestrian walkways.
- Watch for oncoming traffic on roadways (roadways = ←→).
- In case of emergency call 9-1-1.
- Commissionaire phone:
  Front Gate - (250) 363-3784
  Back Gate - (250) 363-3789

Environmental Best Management Practices

EBMP #1: Pressure Washing (High and Ultra High)

One of the first activities to occur on a drydocked vessel is pressure washing of the hull to remove salts, marine growth and residual paint, prior to surface preparation or painting. This typically involves pressure washing the underwater hull and/or super structure with water at 2,000 – 3,500 psi. This activity produces large volumes of paint contaminated wastewater (*e.g. washwater*). Ship repair contractors may also use an Ultra High Pressure (*UHP)* washing process (*from 40,000 – 55,000 psi*) to completely remove all paints, often eliminating the need for further surface preparation (*e.g. sandblasting*) prior to painting. UHP generates even larger volumes of wastewater and slurry solids. All wastewater created from pressure washing and UHP requires management (*i.e. assessment, collection, handling, treatment and disposal*).

Management of Wastewater on the Graving Dock Floor

- Ensure all wastes and wastewater discharges, resulting from hull and anchor chain washing, as well as dock bottom clean-up activities, are collected and disposed of properly.
- Close all sump well valves in the drydock floor collection system prior to and during pressure washing operations.
- Manage pumps to ensure they are handling the volume of washwater sufficiently.
- Manage washwater storage containers to ensure they are not overfilled.
- Divert contaminated wastewater, that falls outside of the drydock floor collection system, away from the tunnel drains.
- Direct non-contaminated water (*e.g. ballast water, cooling water, dock wall/moon pool leakage water*) away from contaminants on the drydock floor.
- Collect and dispose of stormwater that comes into contact with contaminants.
- Do not use detergents or additives in washwater.

Opening Sump Well Valves

Sump well valves in the drydock floor can be opened to manage rainwater under the following conditions ONLY:

- Dock floor has been pre-cleaned, prior to the completion of the work period.
- A filter cloth has been installed to reduce the migration of debris.

All wastewater containing paint contaminants must be directed to the collection trench drains and sump wells on the drydock floor, collected, and sent for proper treatment.

Antifoulant contaminated washwater entering the collection system (trench drains and sump wells) on the drydock floor.

The sill diversion pump removes clean seawater from the pool at the front of Section 1 (moon pool) and discharges into the tunnel drains through a hard pipe on the graving dock wall.

Sediment from the harbour often settles on dock bottom after dewatering. If this becomes contaminated with paint, etc., it must be disposed of.

The hull of a cruise ship being ultra high pressure washed.

Section 1 Considerations:
Caisson and Dock Wall Leakage & Drydock Floor Sediment

Managing Caisson and Dock Wall Leakage:

- Divert caisson leakage water away from pressure washing areas.
- Water leakage from the caisson can be diverted by using a sump pump connected to the PVC diversion pipe installed on the north wall of the drydock Section 1.
- Divert water leakage from the graving dock walls, during high tide, directly into the drainage tunnel.

Managing Entrained Sediment:

Harbour sediment may accumulate in the corners, trenches, keel blocks and sumps of the drydock Section 1 during normal docking procedure. Users of the section will need to consider management of this sediment and are responsible for removal and proper disposal if it becomes contaminated from their operations and activities on dock floor (*e.g. pressure washing wastewater, sandblast grit, paint chips, paint overspray, and other contaminants*).

Ultra High Pressure (UHP) Washing

Ultra high-pressure washing generates significant volumes of wastewater and sludge that may pose a challenge for collection and disposal.

- Prepare in advance for the management of UHP waste.
- Remove all water, sludge and debris, generated from UHP washing, from the drydock.
- Ensure the washwater and sludge is disposed of at an appropriately permitted facility.
- Disposal certificates may be requested, by EGD Management, to ensure washwater is being properly managed.

Management of Pressure Wastewater in Upland Areas/Dockside

- Perform pressure washing of small vessels and parts, in designated areas only, where wastewater management can be effectively achieved.
- Approval for pressure washing in upland areas (*including the use of a stormwater trench for water collection*) is required from EGD Management
- Wash vessel parts in a suitable contained area (*e.g. enclosed skip*).
- Completely block all drains in the area where pressure washing will occur (*e.g. cover nearby trench drains with filter cloth, place a foam bung in the trench drain to prevent migration of wash water should an incident occur*).
- Ensure sufficient equipment (*e.g. pumps, totes, tanks, foam blocks and sandbags*) is available for the timely collection, control and removal of washwater.
- Contaminated washwater requires proper treatment for disposal. Label containers.

A small vessel is power washed on the North Landing Wharf (NLW).

The trench drain is blocked and a sump pump is installed to collect wash water into a tote.

Example of high density styrofoam blocks used as a drain blocker on the NLW.

Large tank dockside with an attendant.

EBMP #2: Abrasive Blasting

Abrasive blasting is a common operation performed at the Esquimalt Graving Dock (*EGD*) to prepare vessel surfaces for painting. However, this operation creates challenges with respect to controlling air emissions and the waste materials generated.

The dust emissions generated from abrasive blasting operations can contain harmful environmental pollutants and have the potential to negatively effect employees, facility users, neighbours, equipment and infrastructure if it is not properly managed. Fugitive dust may also impact the local marine environment by entering the Esquimalt Harbour directly, or via stormwater runoff, and through direct deposit to uplands soil.

Waste grit may be highly contaminated with antifouling paint and other metals, which also poses a risk to the environment if not handled and disposed of properly.

Dust Control

- Establish dust suppression controls in advance of starting any work.
- Do not abrasive blast during conditions that render containment ineffective *(e.g. during windy conditions)*.
- No abrasive blasting of vessels shall be performed while vessels are docked alongside the North Landing Wharf or South Jetty.
- Minimize dust emissions by ensuring blast nozzles are angled perpendicular to the vessel and aimed slightly downward during blasting.
- Properly manage (*contained, covered and secure*) all sandblast product and wastes during transport.

ADEQUATE containment.

Hoarding (*Physical Containment*)

- Use containment such as tarps, shrouds or portable structures to prevent airborne particles from entering the atmosphere and surface waters.
- Containment should be large enough to adequately enclose or segregate the working area and reach the dock floor or walls.
- Ensure containment is properly installed (*connected and overlapped*) so there are no gaps.
- Used tarps with tears and holes should be replaced, repaired or doubled with additional layers.

INADEQUATE containment.

Water Use (*Fugitive Dust Suppression*)

- Where physical containment techniques are not sufficient to prevent fugitive dust emissions, water may be used to mitigate dust.
- Users may requisition use of Dust Suppression Units (*e.g. Dust Boss*) from the EGD. The units are highly effective at mitigating dust.
- Monitor areas where dust escapes physical containment and adjust dust suppression unit water spray accordingly.
- Do not allow water from the dust suppression units to enter other sections of the dock, especially in the case where another user occupies it.
- Do not allow water from the dust suppression units to come in contact with contaminants on the drydock floor or other work areas. Adjust water spray and relocate contaminants to mitigate impacts.
- Fire nozzle "water curtains" may only be used to control dust emissions when approved by EGD Management in advance. The dust suppression units generates a more effective water mist and uses significantly less fresh water during operation.

Waste Grit Management

- Cover trench drains and tunnel grates in work areas with filter cloth. Replace the cloth as required.
- Manage waste grit by sweeping it into central areas, away from trenches, tunnel grates and dock floor traffic.
- Remove waste grit from work areas as soon as possible.
- Store all waste grit in appropriate containers to prevent leakage.
- Cover all skips, storage bins, tanks, and hoppers to prevent dust emissions and spills.
- Characterize and dispose of waste grit in accordance with applicable provincial regulations.

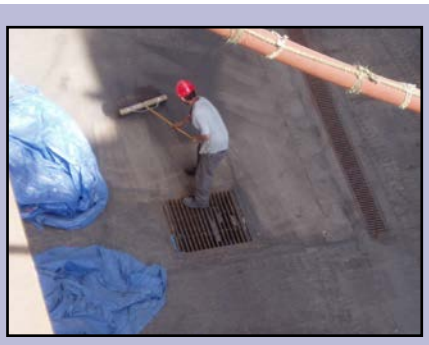
Dust suppression unit in operation.

Store all waste grit away from drains, to prevent contaminates migrating into the marine environment.

INADEQUATE waste grit storage.

ADEQUATE waste grit storage.

Environmental Best Management Practices



Clean up waste grit to prevent it from being washed into the drainage system by clean water (e.g. cooling water discharge, stormwater, dust suppression unit spray).

Store waste grit in appropriate containers.

Remove waste grit from work areas as soon as possible to prevent migration of contaminates throughout the drydock floor.

Keel / Bilge Blocks

Keel and bilge blocks on dock bottom present a challenge for the clean up of spent waste grit.

Waste grit must be removed from areas around excess blocks stored in the dock bottom. To prevent grit from collecting between the blocks, they can be relocated or covered prior to sandblasting.

Power washing at the base of the blocks can be effective in removing contaminants.

Environmental Best Management Practices

EBMP #3: Painting and Coating

Ship repair and maintenance often requires the painting and coating of vessel surfaces to protect them from corrosion or to inhibit the growth of marine life. The industrial nature of marine paints and solvents, in particular antifouling paints, may result in negative impacts to the environment and surrounding infrastructure, if not properly managed.

Spray Painting

Paint overspray has the potential to impact the marine environment, soils, neighbouring residences, and nearby equipment and infrastructure.

- Use containment such as tarps, shrouds or portable structures to prevent airborne particles from entering the atmosphere and surface waters.
    - Containment should be large enough to adequately enclose or segregate the working area.
    - Ensure containment is secured so there are no gaps.
    - Ensure that containment reaches the dock floor or walls.
    - Do not use keel blocks, dock floor or dock walls to test paint sprayers.
- Do not spray paint during conditions that render containment ineffective (*e.g. windy*).
- Place containment beneath and around structures being painted on dock floor and in work areas to ensure overspray does not reach the surrounding area (*e.g. during painting of anchor chains, or grates*).
- Manage overspray on the drydock floor to prevent safety hazards (*e.g. slippage*).
- When spray painting materials inside the stabilizer pockets, ensure the area is sealed and that the walls and floors are covered.
- For vessels docked in Section 1, ensure that overspray does not reach the caisson sill/moon pool water. Avoid docking vessels so they extend over sill area.

Spray Painting

ADEQUATE containment.

INADEQUATE containment.

INADEQUATE containment. Ensure tarps are in place to prevent overspray impacting the surrounding work area.

Environmental Best Management Practices

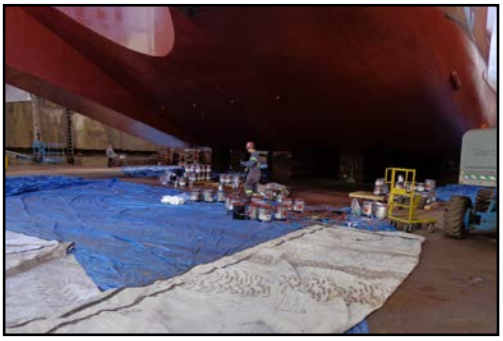
ADEQUATE containment on stablizer pocket doors.

Paint overspray due to INADEQUATE containment stablizer pocket doors.

Manual Painting

Painting by hand (*roller, brush*) can be conducted without shrouding the work area; however, the potential remains for product to migrate into the environment. Work spaces and product handling must be managed with care, similar to dockside painting.

- Containment should be large enough to adequately cover the work area and provide a barrier between the work and the environment (*e.g. dock floor, ocean and soil*).
- Ensure containment is secured so there are no gaps.
- Product container lids are to be secured.



ADEQUATE containment.

Painting Dockside

- Do not spray paint vessels docked alongside the wharves or jetties *(e.g. North Landing Wharf)*.
- Use rollers and brushes to paint vessels dockside.
- Ensure tarps are in place below work areas, as well as in between the vessel and the dock, to prevent spills and drips from entering the water.
- Ensure paint cans are stored securely when working alongside vessel edges.
- Ensure floor grates of manlifts are covered to prevent spills from going into the marine environment.
- Waste generated from painting and other activities such as grinding, hand tooling and welding, must be prevented from entering the marine environment.

While painting vessels docked alongside the wharves or jetties, do not spray paint. Take sufficient measures to prevent paint from entering the marine environment.

Environmental Best Management Practices

Empty paint cans must be properly stored on dock bottom and dock side.

Temporary Paint Storage/Mixing Areas

- Must be under cover to protect from inclement weather.
- Only in designated areas.
- Must be on secondary containment (*a tarp at minimum*).
- Ensure empty paint cans and other associated wastes from painting are stored properly, protected from the weather, and removed from dock bottom as soon as possible.
- Ensure empty paint containers being dried for disposal are protected from rain.
- Do not dispose of used paint containers that still contain wet paint.

IMPORTANT!

In rare situations (*e.g. shape of the vessel, combined with ideal weather conditions*) containment may not be necessary to prevent overspray from escaping the area.

In this situation, the User must notify EGD Management prior to beginning the work, and obtain approval (*in writing*) to paint without completely enclosing the vessel.

Restrictions and monitoring requirements will be applied.

To this date this has only been allowed in three situations:

- Painting underneath a flat bottom barge.
- Painting the underwater hull portion of the midsection of a cruise ship.
- Painting of a C-class ferry underwater hull area, during calm wind conditions.

Environmental Best Management Practices

EBMP #4:
Dry Dock Floor Management and Clean Up

Drain Management

- All sump well valves must be closed prior to and during power washing operations.
- Cover all tunnel drains and net cages during sandblasting, painting and power washing to prevent contaminants from entering the marine environment.
- In the case of a spill or release on dock bottom all sump well valves must be closed and all contaminated material contained and removed from dock bottom.
- Direct all contaminated water to the trench drain system, to avoid entering the tunnel drains.
- Collect and properly dispose of all contaminated water. Ensure sufficient equipment is available for contaminated water collection.
- Ensure all non-contaminated water is directed away from work areas and into the tunnel drain system (*e.g. ballast water, cooling water, caisson sill water*).

Hazardous Materials Managementt

- Store hazardous materials (*e.g. fuel, paint, waste oils*) away from the drains on dock bottom.
- Store hazardous materials to the inside of the trench drains so that any spills or releases can be captured.
- Store hazardous materials in areas protected from the weather, water curtains and other water sources.
- Ensure adequate spill response equipment is in close proximity to hazardous material transfer operations. At a minimum one spill kit is required per section of the graving dock.

Collect and properly dispose of all contaminated water.

Sediment Management

- Segregate any marine sediment, that may enter the dock during vessel transfer, from the waste generated during vessel repair. This is to reduce the amount of wastes requiring disposal.
- Collect and properly dispose of marine sediment that becomes contaminated with waste generated from vessel repair.
- Remove all contaminants and residues from the trench drains and sump wells prior to flooding at the end of work period.

Housekeeping

- Remove waste sandblast grit from the work area as soon as possible to prevent migration of grit contaminants into tunnel drain system.
- Store wastes collected from the dock floor in appropriate secondary containment and remove from dock bottom as soon as possible.

Residual paint in the cans may drip out of the skip and enter the marine environment through the drain systems.

Leaving garbage around the work site attracts wildlife such as seagulls, racoons and rats.

When cleaning dock bottom, skips of waste sandblast grit may leak contaminated water and should be removed as soon as possible.

All hazardous materials must be stored in appropriate containment and away from tunnel drain system.

Inspection and Cleanliness

- Prior to flooding, the drydock must be cleaned to meet the Esquimalt Graving Dock (*EGD*) *Standard of Cleanliness (see below),* as determined by the EGD undocking supervisor.
- Users must ensure that the dock floor is free of deleterious substances prior to flooding.
- Water may be used to clean the dock floor; however, any wastewater generated must be collected and disposed of properly.
- If a vessel occupies a shared portion of a dock section each User must clean the trench drains up to and including the section sump well.

ADEQUATE:
Example of a dock floor that would pass inspection.

INADEQUATE:
Example of a dock floor that would not pass inspection.

EGD Standards of Cleanliness

Due to the importance of drydock cleanliness prior to flooding, and since quantitative testing is impractical due to time and cost restrictions, the following guidelines will be used to assess cleanliness of drydock surfaces.

- All drydock surfaces, including stairwells and sills must meet the standard for "**residue free**" prior to flooding of the drydock. "**Residue free**" is considered met when a person of normal visual acuity, while standing, is unable to detect visible accumulations of potential pollutants.
- This includes, but is not restricted to:
    - the removal of abrasive grit,
    - paint residues or paint chips,
    - cutting and grinding wastes,
    - oil and grease,
    - food and drink containers,
    - ear plugs,
    - dust masks,
    - rope,
    - cigarette butts, or
    - any other refuse that may have been deposited during the work period.
- Debris of natural origin that may have been deposited during the previous flooding of the drydock, such as wood, sand, silt, seaweed, or marine life may be exempt from these requirements, as long as it will not contaminate the environment upon reintroduction.

AREAS IN NEED OF *SPECIAL ATTENTION*

ACCEPTABLE		NOT ACCEPTABLE
	RAMPS	
	SILLS	
	KEEL BLOCKS	
	TRENCH DRAINS	
	SUMP WELLS	

Environmental Best Management Practices

EBMP #5: Hazardous Materials Handling and Storage

A variety of hazardous materials are used, stored and transported by Users at the Esquimalt Graving Dock (*EGD*). If not handled appropriately, these materials have the potential to negatively impact worker health and safety, infrastructure and the environment. Hazardous materials commonly used at the EGD include: antifoulant paint, fuels and oils, antifreeze.

Storage

Users must have designated storage areas suitable for the materials they use on site. Where applicable, these areas must:

- Have appropriate secondary containment suitable to the quantity and nature of the material in that area.
- Ensure materials are stored in accordance with compatibility requirements.
- Be protected from the weather (*covered, lids secured, valves closed*).
- Have placards and proper ventilation.
- Have controlled access.
- Be located away from pathways to the marine environment.
- Be located on impervious surfaces (*e.g. concrete*).

Handling

All hazardous materials must be:

- Labelled appropriately with the owner name, product name, first aid information, and PPE requirements.
- Secured appropriately during transport.
- Transported by equipment that can sufficiently handle its weight and size.
- Transported in containers that are stable and not in need of repair (*e.g. totes with broken feet, excessive rust, faulty valves*).

ADEQUATE storage.

ADEQUATE storage.

INADEQUATE storage.

Any container holding hazardous materials must be clearly and properly labelled.

Areas to Avoid Storing Hazardous Materials

Trench Storm Drains
Any containers placed directly over top or beside a trench drain have the potential to spill to the drain leading directly to the ocean.

Storm Drains
Any containers placed directly over top or beside a storm drain have the potential to spill to the drain leading directly to the ocean.

Alongside Wharves and Jetties
Any containers placed alongside the edge of the wharves and jetties at the EGD have the potential to spill directly to the ocean, as there are no berms or secondary containment available.

Dock Floor Trench Drains
If a tote or drum is placed directly over or beside a trench drain, hazardous materials have the potential to flow down the drain and into the marine environment. Although the drains are designed for rapid containment and recovery, there is no guarantee that workers will be present to close drain valves during an incident.

Dock Floor Sump Wells
When the sump well valve is open the sump drains directly into the marine environment. Any containers placed on top of or adjacent to the sump well have the potential to enter the ocean if a spill were to occur.

Dock Floor Tunnel Grate Drains
Tunnel grate drains lead directly to the marine environment. Any containers placed directly over top of or beside a tunnel grate have the potential to impact the marine environment, should a spill occur.

Environmental Best Management Practices

Safety Data Sheet *(formerly Material Data Safety Sheet)*

A Safety Data Sheet (SDS) is a document that contains information on the potential hazards (*health, fire, reactivity and environmental*) and how to work safely with the product. SDSs also contains information on the use, storage, handling and emergency procedures all related to the hazards of the material. SDSs must be available (*electronically or hardcopy*) for all products stored on site and be readily available to all employees.

Storage Tanks and Totes

Storage tanks and totes are used for a variety of materials at the EGD, including: washwater, fuel products, bilge water, waste oil/fuel and other waste liquids. Storage tanks and totes may be considered portable/mobile, temporary or permanent. The regulatory requirements for proper use of these tanks vary and is dependent on a variety of factors.

Federal Regulation for Fuel Storage Tanks

The EGD is a Federal facility; therefore, storage tanks onsite need to comply with the Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations. Users may be required to register their tanks with Environment Canada. **Contact EGD Environmental Services for information.**

There are four different fuel tanks at the Esquimalt Graving Dock.

National Fire Code

The National Fire Code outlines the requirements for containment, labelling and location of flammable liquid storage.

Environmental Best Management Practices

EBMP #6: Waste Management and Recycling

Operations at the Esquimalt Graving Dock (*EGD*) generate a variety of waste streams including hazardous waste, controlled waste, biological waste, international waste, and general refuse and recyclables.

Hazardous Waste

Hazardous wastes generated at the EGD may include waste oil and oil filters, antifreeze, batteries, paint and solvents, oily rags and absorbent materials, spent grit, solids generated during power washing, mercury, PCB containing equipment and asbestos. Appropriate management of hazardous waste will reduce environmental liability associated with inappropriate disposal and storage as well as reduce the risk of human injury and environmental impact.

Hazardous waste storage should be segregated from new product storage.

- Ensure designated storage areas are away from active work areas.
- Ensure areas are covered to reduce exposure to environment and wildlife.
- Ensure that waste accumulation areas are organized.

Hazardous waste should be segregated into separate containers.

- Ensure containers used are appropriate for the type of waste (*e.g. separate drums for waste oil, oil filters, antifreeze, batteries, paint and solvents, oily rags and absorbent material, spent grit*).
- Store batteries in a manner that prevents leakage of acid to the environment.
- Properly dispose of contaminated clean-up materials (*e.g. absorbents, rags, etc.*).
- Do not dilute or mix hazardous waste, other hazardous or non-hazardous wastes.
- Cover waste containers to prevent exposure to weather (*e.g. rain*).

All hazardous waste must be carefully stored and disposed of.

Asbestos

All asbestos containers and asbestos-containing materials must be identified by signage and labelling in accordance with applicable legislation.

Companies that engage in asbestos related work at the EGD must be qualified to do so.

Clearly label all hazardous waste containers.

- Labels should include: type of waste, generator/company name, and contact information.

Controlled Waste

Controlled waste such as animal feces, sewage, contaminated grit, stormwater catch basin waste, creosote wood and dead animals can be disposed of at the **Capital Regional District (*CRD*) Hartland Landfill.**

Controlled waste disposal at requires a permit.

For more information about Controlled Waste disposal contact the CRD Hotline at (250) 360-3030.

Large scale food waste bin.

An example of a Waste Management Area at the EGD.

Food Waste

During normal activity at the EGD, food waste is collected in conveniently located and accessible receptacles onsite and disposed of at the landfill. During larger projects, however, alternative measures are taken to account for the increase in generated wastes.

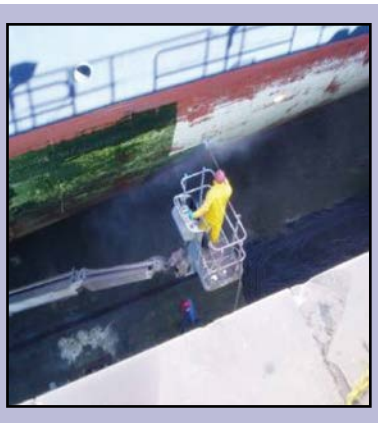
General Refuse

General refuse should be separated into categories to enable easy disposal. Users are responsible for properly disposing of refuse and recyclable materials. There are many containers throughout the site for disposal of common refuse materials (*e.g. steel, wood, glass, cardboard etc.*).

Biological Waste

Marine life removed from vessel hulls and sea chests may contain paint contaminants. This waste may be considered a controlled or hazardous waste and would need to be handled and disposed of accordingly.

Biological waste should be stored out of the sun, covered and removed from the facility quickly to prevent any odours from emanating.



Recycling

All Users of the EGD are responsible for collecting and disposing of the solid waste they generate from their activities, properties and vessels they are responsible for.

- Recycle solid waste such as plastic, glass, aluminum, mixed paper and cardboard. Recycling areas should be conveniently located and easily identifiable.
- Segregate other solid waste, such as scrap metal, wood, electronics, polystyrene foam and soft plastics for recycling at an approved facility.
- Leaf and yard waste collected on property should be composted or disposed of appropriately.
- Construction and demolition waste should be reused or recycled wherever cost effective and technically feasible.
- Encourage the use of recyclable products to reduce the solid waste impact on the environment.

International Waste

Like hazardous waste, International Wastes may pose a threat to human health and the environment.

Dunnage from vessels has been known to carry invasive species to local areas. Foreign dunnage must be identified, stored, and disposed of at an approved facility without delay.

Food wastes may carry pathogenic organisms that could cause illness to those handling it. Food wastes shall be kept in separate, closed containers. The **Canadian Food Inspection Agency *(CFIA)*** will inspect foreign vessels and issue directions on disposal.

EBMP #7:
Fuelling and Oil Transfer

The transfer of fuel and oil is a common activity at the Esquimalt Graving Dock (*EGD*). Transfer may be from ship to shore (*e.g. removal of waste fuel/oil*), from shore to ship (*e.g. refuelling a vessel from a truck)* or land based.

An accidental release during these operations has the potential to negatively impact the environment and health and safety of those at the facility.

- Prior to any fuelling or oil transfer operations:
    - the ***EGD Oil Transfer Checklist*** must be complete;
    - an emergency plan must be in place and readily available;
    - adequate spill response equipment must be available; and
    - personnel must be aware of spill response procedures.
- All transfer and storage equipment must be in good condition, tested, and properly connected.
- Do not place storage and transfer equipment near pathways to the marine environment (*e.g. storm drains, trench drains, edge of the dock*) without effective mitigation measures in place.

Vessel Fuelling and Bulk Oil Transfer
Definition of Oil: as described in the Canada Shipping Act **oil** is considered petroleum in any form, including: crude oil, fuel oil, sludge, oil refuse, gasoline, lube oil and refined products.

Berthed Vessels

- ALL berthed vessels receiving fuel from a truck or a barge require a containment boom.
- Transfers of fuel and oil to and from ALL berthed vessels require a containment boom.
- An ***EGD Oil Transfer Checklist*** must be filled out and signed by representatives from the truck and the vessel and submitted to EGD representatives in the Pumphouse prior to fuelling or oil transfer operations.
- Transfer operations must comply with the *Canada Shipping Act, Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals Subdivision 5*.

Vessels in Drydock

- ALL fuel and oil transfers occurring in the drydock require spill kits to be placed nearby and are not to be completed next to drainage pathways to the marine environment (*e.g. trench drains, sump wells, tunnel grate drains*).

On Land Transfers

- ALL fuel and oil transfers occurring on land require spill kits to be placed nearby and are not to be completed next to drainage pathways to the marine environment (*e.g. storm drains, edge of dock*).

Containment Boom Requisition

The Esquimalt Graving Dock has containment boom and deployment equipment available for requisition. To arrange for booking or rental, contact the EGD Operations Manager.

An orange inshore containment boom fully surrounds the vessel while being fuelled.

The hydraulic powered deployment reel with inshore containment boom available for requisition.

EXAMPLE SCENARIO REQUIREMENTS

Scenario 1: FUELLING A BERTHED VESSEL

- Completed and signed ***EGD Oil Transfer Checklist*** submitted to EGD Pumphouse.
- Containment boom deployed and effectively secured at both ends.
- Emergency response plan in place.
- Adequate spill response equipment and qualified personnel available.

EXAMPLE SCENARIO REQUIREMENTS (*Continued*)

Scenario 2: BULK OIL TRANSFER FROM A BERTHED VESSEL

- Completed and signed ***EGD Oil Transfer Checklist*** submitted to EGD Pumphouse.
- Containment boom deployed and adequately secured at both ends.
- Receiving containers located away from pathways to the harbour (*e.g. storm drains, edge of dock*).
- Receiving containers in secondary containment and in good condition.
- Emergency response plan in place.
- Adequate spill response equipment and qualified personnel available.

Scenario 3: FUELLING A VESSEL OR BULK OIL TRANSFER IN THE DRYDOCK

- Pumphouse operation on site prepared to shut down auxiliary pumps in case of an emergency.
- Receiving containers located away from pathways to the harbour (*e.g. trench drains, sump wells, tunnel grate drains*).
- Receiving containers in secondary containment and in good condition.
- Emergency response plan in place.
- Adequate spill response equipment and qualified personnel available.

Scenario 4: ONSHORE OIL TRANSFER BETWEEN CONTAINERS

- All containers located away from pathways to the harbour (*e.g. storm drains, edge of dock)*.
- Receiving containers in secondary containment and in good condition.
- Emergency response plan in place.
- Adequate spill response equipment and qualified personnel available.

Environmental Best Management Practices

EBMP #8: Invasive Species

Invasive species are a significant threat to the marine ecosystems of British Columbia. The Esquimalt Harbour is known to have a disproportionately high number of non-indigenous species. It has been widely recognized that the primary source of non indigenous marine species in local waters are the ballast tanks and hull surfaces of transoceanic vessels. Ship repair contractors are encouraged to report unusual species observed during hull cleaning activities.

Ballast Water

- Vessels must follow *Transport Canada Ballast Water Control and Management Regulations*

Ballast Tank Sediment

- Shipyards must follow *Transport Canada Ballast Water Control and Management Regulations*
- Sediments removed from the ballast tanks at the EGD must be contained, collected and disposed of at an authorized facility.
- Sediments must not be allowed to enter the harbour.

Anchor chain-growth

- All biological material removed from anchor chains must be contained, collected and disposed of appropriately.

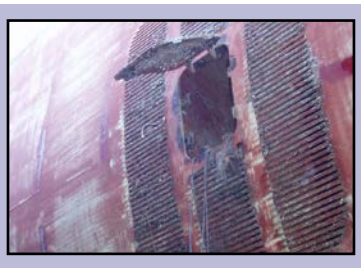
Sea chests

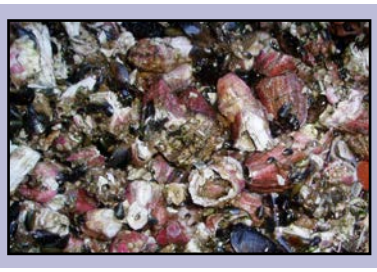
- All biological material removed from sea chests must be contained, covered and disposed of appropriately.
- Material must be stored away from direct sunlight/heat and disposed of as soon as possible, to avoid nuisance odour pollution.

Marine growth removed from vessel hulls must not be allowed to enter the harbour through the drydock drainage system.

INADEQUATE containment: Biological waste on drydock floor near drains.

INADEQUATE containment: Biological growth mixed with paint waste on drydock floor.





Sea chests, such as this one from a cruise ship docked at the EGD, often contain a significant amount of marine life.

If not managed appropriately, this marine life has the potential to negatively impact the local ecosystem of the harbour.

EBMP #9: Fish and Wildlife Management

The daily operations and activities of the Esquimalt Graving Dock (*EGD*) have the potential to negatively impact wildlife that frequents the property. The *EGD Wildlife Management Plan* has been developed to assist EGD employees and Users to properly manage interaction with fish and wildlife that are common to the facility.

Fish

Fish and other marine life have the potential to become stranded in the drydock during normal vessel docking/undocking operations. This may include, but is not limited to: salmon and other fish species, seals and octopus.

- The bubble curtain must be employed during vessel transfer into and out of the drydock.
- EGD employees must monitor the drydock for stranded fish and/or other marine life during dewatering and report cases to EGD Environmental Services.
- Whenever possible, EGD employees must retrieve fish and marine life and safely return them to the Esquimalt Harbour.
- Users are prohibited from removing fish and marine life from the drydock.

Report all cases of fish and marine life interaction with the drydock to EGD Environmental Services.

Wildlife

A variety of wildlife is known to occupy areas of the EGD property. In some cases wildlife may use the facility as a nesting/breeding ground, while others are present for short periods of time during migration or to feed. Activities and operations at the EGD have the potential to impact the well being of wildlife at the facility.

Such wildlife includes: deer, raccoon, mink, river otter, great blue heron, osprey, raven, Canada goose and a variety of other common waterfowl, nesting and songbirds and pollinators *(e.g. bats, native bees)*.

Bubble curtain employed during vessel transfer.

Stranded marine life must be carefully returned back to the Harbour.

Fisheries Act - Destruction of Fish

The EGD has received authorization for the destruction of fish associated with normal operation of the drydock from the Department of Fisheries and Oceans (*DFO*).

Conditions of the Authorization:

- Take all reasonable precautions to prevent the trapping and mortality of fish.
- Monitor the success of preventative measures and retrieval success.
- Report to the DFO annually.

Environmental Best Management Practices

- ALL wildlife must be left alone. Do not approach or handle newborn or juvenile wildlife.
- Injured or orphaned wildlife must not be handled without proper experience and equipment.
- Dispose of dead wildlife appropriately.
- Report observations of injured or deceased animals to EGD Environmental Services.
- Prior approval from EGD Environmental Services is required for the relocation or removal of nesting wildlife; a Migratory Bird Damage or Danger Permit is required to remove nests and retrieve eggs of migratory birds (*e.g. seagulls*).
- Never mistreat, remove or destroy any areas that could provide habitat for wildlife without prior approval and receipt of appropriate permits from the relevant authority.

Contact EGD Environmental Services for wildlife related information, incidents and interactions.
Contact the Front Gate Commissionaires for afterhours assistance.

A variety of wildlife is known to occupy areas of the Esquimalt Graving Dock property.

Incidents with wildlife are managed on a case by case basis.
Direction and/or assistance must be taken from the appropriate authority when required.

EBMP #10: Water Use

The Esquimalt Graving Dock (*EGD*) is considered a major consumer of fresh water. Water is provided to the facility by the Capital Regional District (*CRD*) distribution system, on a fee for use basis. Inefficient use of water may result in a negative economic and environmental impact. Water consumption and the quality of water are both considerations of the environmental management systems at the EGD.

Water Consumption
Large volumes of water are used during normal operations at the facility; because of this, the EGD is considered a high volume user of fresh water in the CRD. Users must be conscious of activities that consume high volumes of water and work to mitigate any water waste.

In order to reduce the amount of water consumed onsite:

- Mitigate dust in problem areas using high efficiency Dust Suppression Units, when physical containment techniques are not sufficient to prevent fugitive dust emissions.
- Use fire nozzle water curtains only when all other attempts to contain particulate emissions from sandblasting have failed. Water curtain use must be approved by EGD Management in advance.
- Avoid use of freshwater to clean work areas, where possible.
- Maintain fittings in buildings and on equipment to prevent leakages.

Water Consuming Activities

Activities associated with vessel surface preparation and dust control use significant amounts of water.

Conventional pressure washing and ultra high pressure (UHP) washing use large amounts of water at high pressure to scour paint and biological material from the hulls of ships.

Dust Suppression Units

Dust Suppression Units are used to mitigate the escape of dust from sandblasting operations in the drydock.

Water Quality

The water distribution system at the EGD was originally designed as a fire suppression system; therefore, the water in certain areas of the system may not be considered potable.

- Potable water is not available throughout the facility (*this includes intake to vessels moored alongside or in the drydock*).
- Users of the facility are responsible for ensuring that the water they use meets the guidelines for the purpose intended.
- Users must use backflow prevention when accessing the water distribution system.

The EGD maintains the fresh water distribution system.

- Flushing of the entire system is conducted on an annual basis.
- Collection and analysis of water, in comparison to drinking water quality guidelines, is conducted on an annual basis.

Metered Water Use at the Esquimalt Graving Dock

- Users of the facility must ensure that water is accessed from a metered line when connecting to the water distribution system.
- Portable meters are to be used when required.
- The EGD Pumphouse must be contacted for proper access to the water distribution system.

EBMP #11: Energy Conservation

The Esquimalt Graving Dock (*EGD*), as an industrial facility, is a major consumer of energy. Inefficient energy use may result in negative economic and environmental impacts. Economic impacts are associated with inefficient electrical usage (e.g. cost), while environmental impacts include those associated with the consumption of fuel (*e.g. air emissions*).

Energy consumption also results in the production and release of greenhouse gas emissions through the combustion of fossil fuels. Every aspect of work at the EGD results in the release of greenhouse gases, whether it is operating the cranes or printing a report. It is important to minimize energy consumption wherever possible to reduce the release of harmful greenhouse gases and conserve energy.

Electrical Consumption

There are a number of opportunities to increase the efficiency of electrical usage at the EGD:

- Turn off lights and equipment when not in use (*e.g. flood lights, office buildings*).
- Install energy efficient devices in buildings (*e.g. sensor switches, efficient light bulbs*).
- Use energy efficient equipment whenever possible and consider energy efficient options when purchasing new equipment.
- Stagger equipment start-up to decrease load on electrical system.

Fuel Consumption and Emissions

Opportunities to decrease the amount of fuel consumed by day to day activities include:

- Using energy efficient vehicles.
- Using alternative fuels where possible (*e.g. Biofuels*).
- Using alternative energy sources where possible (*e.g. LED, solar, rechargeable*).
- Avoid idling vehicles (*e.g. delivery vehicles*).
- Use shore power where possible.
- Encourage staff to try alternative means for commuting to work (*e.g. carpool, public transit, cycling*).

Be aware of the potential impacts of emmissions on neighours near the EGD.

Idling Vehicles

- Do not idle vehicles near building doorways or air intakes
- Vehicles must be turned off if idling for more than 3 minutes in a 60-minute period.

Idling vehicles produce unnecessary air emissions and noise.

Shore Power

For vessels moored alongside at the North Landing Wharf and in the drydock it is important that they utilize shore power when possible. With shore power, the auxiliary generator can be turned off, thereby saving fuel and preventing the release of harmful air pollutants.

Did You Know?

Shore Power may be accessed at the EGD:

- 208V and 480V available on the North Landing Wharf and drydock.

EBMP #12:
Nuisance Pollution (Noise/Odour/Light)

The daily operations of the Esquimalt Graving Dock (*EGD*) Users have the potential to negatively impact neighbouring residents and businesses, as well as the immediate work area. Nuisance pollution is often created by noise, odour and light.

Noise

- Noise pollution can be generated and recognized in decibel levels, pitch, oscillation and duration.
- The main sources of noise at the EGD include sandblasting, drilling, hammering, compressors, generators and the crane warning bell. Even general shop repair activities generate large amounts of noise.
- Sound carries. Operational noise, vehicle noise and loud voices can be heard in nearby areas. Site Users must be aware of the potential impacts of all activities taking place at EGD and be respectful of neighbours.
- Schedule noisy activities for daytime hours 0700 hrs to 2300 hrs on weekdays, weekends and holidays. Through worker education and good practice the generation of high-level intermittent or non-continuous noises can be minimized.
- Personal vehicles, including motorcycles, can disturb neighbouring residents. Your vigilance is appreciated especially during quiet hours. Warning signs are posted at parking areas to remind personnel to be respectful of neighbours when arriving and departing the EGD.
- The EGD recognizes applicable municipal laws and regulations. Operations will consider the requirements of the *Municipality of Esquimalt Bylaw 2826 Maintenance of Property, Unsightly Properties and Nuisance Bylaw Part III Nuisances Noise Contro*l.

The EGD is located in close proximity to residential areas.

Personal vehicles with loud engines can disturb neighbouring residents.

Warning signs in parking areas act as a reminder to minimize noise at EGD.

Responses to nuisance pollution complaints will be taken on a concern-by-concern basis.

To submit a nuisance complaint contact the Esquimalt Graving Dock Information Line at (250) 363-0227.

Environmental Best Management Practices

Odour

- Daily dock operations often create strong and unpleasant odours whether from the release of VOCs, H2S, organic materials, or chemicals. An offensive smell can reduce the quality of the work environment for neighbouring tenants and residents. Biological material removed from bilges, sea chests and hulls must be contained, covered and disposed of appropriately. Be proactive in planning for timely transport and proper disposal of material; a permit may be required for disposal.
- Material must be stored away from direct sunlight/heat and disposed of in a timely manner, to avoid nuisance odour pollution.
- Odour mitigating measures may be required, if odours are negatively affecting neighbouring properties or onsite personnel.
- The EGD recognizes applicable municipal laws and regulations. Operations will consider the requirements of the *Municipality of Esquimalt Bylaw 2826 Maintenance of Property, Unsightly Properties and Nuisance Bylaw Part III Odour and Disturbances*.

ADEQUATE containment of odorous waste.

INADEQUATE containment of odorous waste.

Light

- Night time dock operations require spotlights to provide a safe work environment. Be aware that strong spotlights can be a significant intrusion for residential neighbours.
- Only utilize spotlights when absolutely necessary. This will help prevent disturbing the neighbours, as well as to ensure a more energy efficient work environment.
- Changing the direction of stationary and portable lights in the workplace may reduce the effect they have on the neighbours.
- Turn off any unnecessary lights.
- The EGD recognizes applicable municipal laws and regulations. Operations will consider the requirements of the *Municipality of Esquimalt Bylaw 2826 Maintenance of Property, Unsightly Properties and Nuisance Bylaw Part III Odour and Disturbances.*

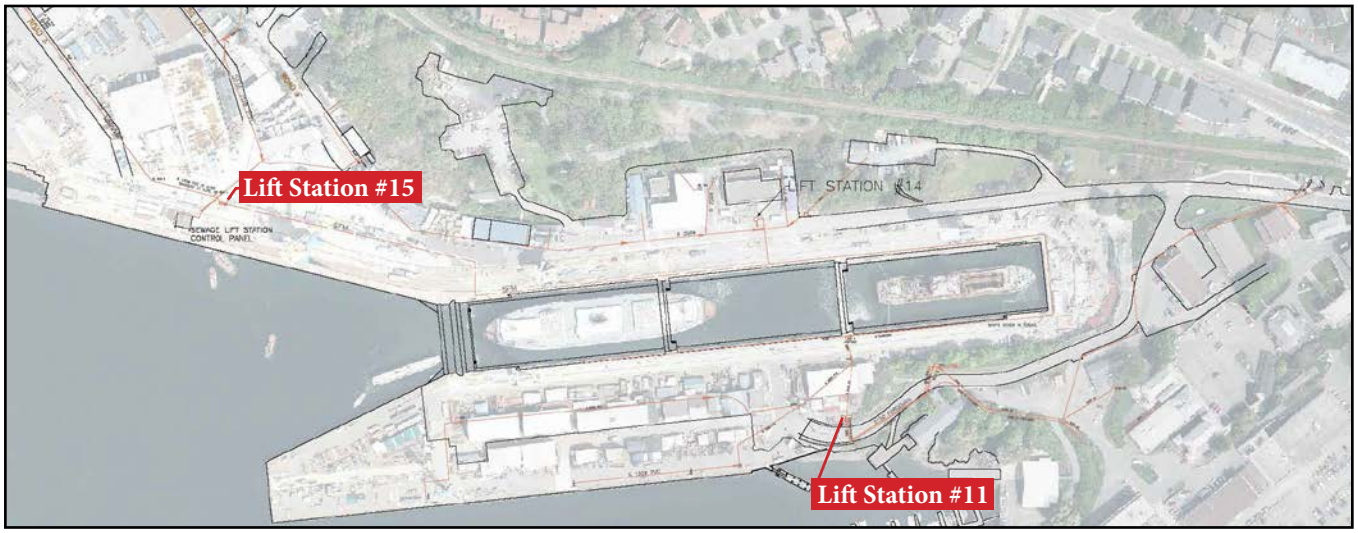
Only utilize spotlights when necessary.

Changing the direction of spotlights can reduce light impact on neighbours.

EBMP #13:
Sanitary Waste Management and Sewer Use

The Esquimalt Graving Dock (*EGD*) is authorized by the Capital Regional District (*CRD*) as a ship and boat waste disposal facility. The authorization allows for the proper discharge of sanitary waste, grey water and superchlorinated water at designated locations at the EGD, and stipulates the requirements that must be met prior to discharge.

Discharge to the sanitary sewer at any location other than at LS#15, LS#11 or at vessel connections located in the services tunnels of the drydock is prohibited.



Lift Station #11.

Lift Station Maintenance.

The EGD is authorized to discharge to the sanitary sewer at:

- Lift Station #15 (*LS#15*),
- Lift Station #11 (*LS#11*), and
- Vessel connections in the drydock.

Permitted wastes include:

- Sanitary waste, *
- Grey water, and
- Treated superchlorinated water.**

Sanitary Waste: *must contain <50,000 ppm total solids.*

***Superchlorinated Water:** must not be discharged to the sanitary sewer unless it has been de-chlorinated to less than 5 ppm chlorine.*

Prohibited wastes include:

- Bilge and ballast water,
- Wastewater sludge, and
- Fuel and oil, paint, paint thinner, solvents, and products containing toxic chemicals.

Other Wastes

Other wastes may be considered for discharge to the sanitary sewer on a case-by-case basis; approval *must be* requested from EGD Management prior to discharge.

Discharge to the sanitary sewer at locations other than those authorized may be considered on a case-by-case basis; approval *must be* requested from EGD Management prior to discharge.

Waste Discharge Notification

Envirosystems Inc. will, as a standard operating procedure, notify the EGD Pumphouse prior to large volume discharges to the sewer system (*e.g. any "batch discharge" in excess of 20,000 litres*). Coordination of discharge may be required depending on usage of the sanitary sewer system at the time.

Envirosystems Inc. will contact the Pumphouse on a regular work day if Envirosystems Inc. is planning to discharge large volumes during times other than Monday to Friday, day shift (*0730 hrs to 1600 hrs*) or on statutory holidays.

Envirosystems Inc. must contact EGD Management if there is a change in normal discharge operations (*e.g. increase in daily volume*).

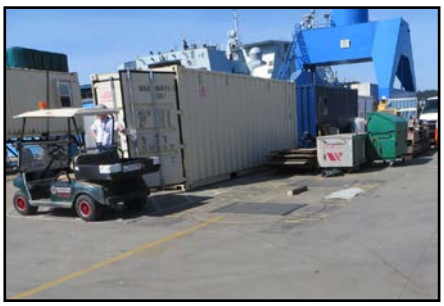
Access to the Sanitary Sewer

- Users must notify the Pumphouse before conducting any discharges to the sanitary sewer. Typical methods of discharge include: large (*direct connection and discharge from a vessel*), and small (*portable discharges from totes and tanks*).
- Users must complete a ***Sanitary Sewage Discharge Form*** and provide it to the Pumphouse prior to discharging to the sanitary sewer.
    - Pumphouse Operators will ensure that sanitary sewer discharges are in accordance with applicable regulations and authorizations.
    - Pumphouse Operators will provide all completed ***Sanitary Sewer Discharge Forms*** to EGD Environmental Services.
- Users must ensure a sample collection point is accessible at the point of discharge.
- Users must request approval from EGD Management to connect directly to the sanitary sewer for regular domestic waste (*e.g. washrooms, sinks, toilets*). Any other waste is prohibited from being discharged of through these lines.

Lift Station Maintenance

- Commissionaires will contact the Pumphouse on radio Channel 4 when DND sewer maintenance personnel enter the facility.
- Pumphouse staff will supervise DND personnel work on the lift stations where required.

AUTHORIZED Sanitary Sewer Discharge point, Lift Station #11.



AUTHORIZED Sanitary Sewer Discharge point, Lift Station #15.

UNAUTHORIZED Sanitary Sewer Discharge point (i.e. storm drain).

UNAUTHORIZED Sanitary Sewer Discharge point (i.e. trench drains).

UNAUTHORIZED Sanitary Sewer Discharge point (i.e. sewer manhole).

EBMP #14: Spill Preparedness and Response

The Esquimalt Graving Dock (*EGD*) is committed to the protection of human health and the environment. Safety and environmental management programs have been implemented at the EGD to reduce the potential for accidents and spills. Emphasis is placed on the prevention of spills, and although the potential for spills can be reduced through these programs, spills do still happen.

All Users operating at the EGD must have the capability to effectively manage spills resulting from their activities and operations.

- User employees must have adequate training in spill response.
- User employees must have access to spill response equipment and materials appropriate to the work they are performing.
- Users must have plans and procedures in place to respond to spills.

For spills which are beyond the capability of the User or are not being effectively responded to by the User, the EGD will provide assistance. The EGD has additional resources available, including:

- Spill kits and response materials for land and water based spills.
- Containment boom, deployment reels and boat.
- Pneumatic skimmer with drum and brush recovery modules, deployment and retrieval services.
- Staff trained to deal with land and water based spills.

For spills beyond the capability of the facility to manage, contact *Emergency Management* (EM*BC*). Additional resources will be coordinated for response to land and water based spills.

ALL Spills at the Facility
MUST BE REPORTED to EGD Management.
Details are to be provided in an *Incident or Spill Report*.

Spill response training at EGD.

Spill response training at EGD.

Spill response equipment: Skimmer.

Spill response equipment: Spill Kit.

Assess the situation.

Stop product flow.

Secure the area.

Steps to Spill Response

Assess the Situation

- Never rush in. Warn others in the immediate area.
- Stay upwind of the spill and avoid low lying areas.
- Quickly and accurately gather details that may need to be communicated to spill response personnel and the authorities including:
    - What equipment or work activity is involved?
    - What hazards are associated with the spilled product?
    - How large is the spill?
    - Is the situation under control or is it escalating?
    - What areas are or could be affected?
    - Proposed strategy to contain/control the spill.
    - Notify others in the area of the spill.

Stop Product Flow

- Act quickly to stop product flow, ONLY IF SAFE TO DO SO.
- Activate emergency shutdowns (*if applicable*).
- Close delivery truck manifold valves, etc. (*if applicable*).

Secure the Area

- Clear the area of public and untrained personnel.
- Ensure those onsite are wearing appropriate PPE.
- If spill is indoors, ensure the building is evacuated.
- Isolate large spills in all directions.
- Limit or prevent access to the site.
- Enforce safety procedures.

Contain the Spill

- Approach the spill from an upwind direction and avoid low lying areas.
- Use appropriate PPE (*e.g. gloves, eye protection, respirator*).
- Follow safe work procedures.
- Block drains, culverts, and ditches to prevent entry into waterways, sewers or confined areas.
- Contain spill with absorbent materials (*from spill kits*), earth, sand, or other non-combustible materials.

Notify the Authorities

- Contact your Supervisor immediately.
- Report the spill to EGD Management.
- For spills greater than 100L on land, or any spill of any size that enters the marine environment, contact: Emergency Management (*EMBC*) Reporting Line: 1-800-663-3456.
- Additional reporting requirements may be required depending on the spilled material.

Recovery and Clean Up

- Use appropriate materials to recover spilled product (*e.g. loose absorbent, pads, booms, socks*).
- Place waste in labelled 6mm plastic bags or leak proof containers.
- Store waste in secure, dry, well-ventilated location, away from heat and ignition sources.
- Consult with authorities before removing waste from site.
- Arrange for waste disposal at an approved facility by a qualified contractor.

Investigation & Reporting

- Investigate the spill or incident and complete and submit required reports to the authority having jurisdiction.

Contain the spill.

Environmental Emergency Contacts (24 Hours):

EGD Commissionaires
250-363-3784

Emergency Management (*BC*) Reporting Line
1-800-663-3456

DND QHM
250-363-2160
or
VHF Channel 10

Recovery and clean up.

EBMP #15:
In-Water Hull Cleaning and Maintenance

The cleaning, maintenance and repair of the underwater hull and associated appendages in water has the potential to release harmful contaminants into the marine environment.

In-water Hull Cleaning

- In-water hull cleaning of vessel hulls, that are coated with antifouling paint, is **prohibited** at the Esquimalt Graving Dock.
- In-water hull cleaning of vessels coated in non-biocide containing paints (*such as silicone based*), **may be considered** on a case-by-case basis and must be approved by EGD Management prior to the commencement of work. This applies to in-water hull cleaning to remove organic growth only, NOT to coating removal.

In-water Maintenance

- In-water maintenance may be considered on a case by case basis and must be approved by EGD Management prior to the commencement of work. In-water maintenance may include but is not limited to:
    - Cleaning of anodes, inlets, props, and transducers for operational and inspection purposes only.

All vessels approved for in-water hull cleaning or maintenance must have a containment boom in place prior to work starting.

Additional requirements may be required on a case by case basis depending on the scope of work involved.

NOTE: Cleaning of the above water hull while berthed alongside the dock is PROHIBITED.

Did You Know?

Antifouling paints and their residues contain heavy metals, such as copper, which are toxic to aquatic organisms, including salmon and shellfish.

Wash water and solid residues from the washing, scraping, sanding and blasting of antifouling paints from boat hulls are considered "*deleterious substances*" under the *Fisheries Act*. Releasing these wastes to fish bearing waters is a violation of the Act.

Environmental Best Management Practices

EBMP #16: Housekeeping

An organized, clean facility provides an environment that reduces the potential for pollutants to enter surface and ground water through spills and accidents. General cleanliness will lead to more organized and consistent handling of hazardous materials and waste products. Good housekeeping programs will identify and assign responsibilities for shift clean up, day-to-day cleanup, proper waste disposal, removal of unused material, and regular inspection.

Clean-Up

- Clean debris from work areas immediately after any maintenance activity. Dispose of collected material appropriately.
- Ensure garbage and recycling containers are available in all leased areas and are emptied regularly.
- Do not use running water to clean the work areas where potentially contaminated water could enter the stormwater system.
- Ensure trench and storm drains within designated leased areas are kept clean and free of debris.
- Sweep and/or clean active working areas on a regular basis.

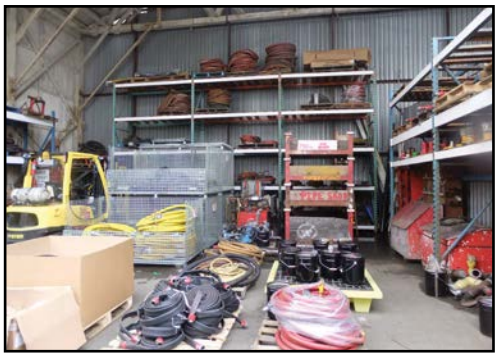
Storage

- Do not store materials or equipment outside of leased areas.
- Regularly inspect lease areas for unidentified or improperly stored materials.
- Ensure all stored products and wastes are clearly labelled and identifiable.
- Place a drip pan underneath vehicles and equipment when performing maintenance. Promptly transfer used fluids to the proper waste or recycling drums.
- Ensure all containers (*e.g. drums, totes, pails*) are in good condition and have a clean exterior at all times. Ensure containers are not left open; secure lids or cover containers when not in use.

INADEQUATE: Keep work areas neat & orderly.

INADEQUATE:
Keep trench and storm drains free of debris.

INADEQUATE:
Ensure storage containers are not left open.



ADEQUATE: Keep work spaces organized and clear of debris to prevent accidents.

EBMP #17: Stormwater Management

Stormwater has been identified as one of the primary pathways of contaminant loading to the local harbour associated with Esquimalt Graving Dock (*EGD*) operations. Common contaminants found in stormwater samples include metals, extractable petroleum hydrocarbons (*LEPH/HEPH)*, and total suspended solids (*TSS*). Five upland stormwater catchment areas terminate into the Esquimalt Harbour from the EGD property. The drydock floor tunnel drainage system leads directly to the Esquimalt Harbour. Any material entering the tunnel drainage system, either through tunnel grate drains or open sump well valves, will end up in the harbour. Deleterious materials must not be allowed to enter the storm or tunnel drain system.

Uplands Stormwater Management

- Store hazardous materials away from storm drains and trenches on the dock floor and in upland areas.
- Ensure totes, drums, pails and skips containing hazardous materials are protected from the weather (*e.g. lids secure, tarps in place*).
- Place filter cloth over storm and trench drains when working with deleterious substances that are in close proximity to, and that could pose a hazard to the marine environment.
- Divert and contain stormwater runoff containing contaminants and sediment with proper materials and filtration, prior to entering the drains (*e.g. use filter cloth, hay bales, sand bags*).
- During heavy stormwater events, ensure storm drains and trenches are kept clear of debris to prevent flooding.
- Conduct regular inspections of storm and trench drains in lease areas to ensure they are kept clear of debris.
- When using trench drains for secondary containment, ensure the containment system is monitored and removed in a stormwater event. A blocked trench drain may cause flooding of the area.

Prevent deleterious substances entering marine environment by placing filter cloth in the trench drains.

Sand bags used on dock bottom to divert and filter excess water.

Do not allow trench drains to build up with debris. This helps to prevent flooding during heavy stormwater events.

Drydock Floor Stormwater Management

- Stormwater has the potential to mix with washwater and other contaminants on the drydock floor during normal operations. Users of the drydock must plan in advance for stormwater management during their work period.
- To reduce the amount of washwater requiring treatment, stop power washing operations until stormwater can be controlled.
- To prevent contamination of stormwater with washwater, waste sandblast grit and other hazardous materials and wastes, cleanup work areas as soon as possible.
- Sump well valves may be opened to allow stormwater to drain into the tunnel drains when the trench drains, sump wells and dock floor area is clear of contaminants and debris. In the case where washwater collection is completed, but the trench drains, sump wells and dock floor have not been cleaned, a filter cloth may be secured over an open sump well valve to allow stormwater flow. This procedure prevents contaminants and debris from entering the drainage system. This method requires dedicated personnel management of the process and regular filter cloth replacement. Do not poke holes in the filter cloth.
- Tunnel grate drains on the drydock floor in Section 2 and 3 may be uncovered enough to allow stormwater to flow into the drains. Ensure the area is clear of contaminants and debris.
- Sump well valves must be closed in sumps containing visibly contaminated material. Sump wells must be pumped out and cleaned prior to opening the valves.
- Ensure there is capacity in the trench drain/sump well collection system to manage expected stormwater volume. This will allow for continued collection and will prevent flooding of the dock floor.
- Prior to flooding and dewatering of the drydock, ensure all sump well valves are open.

Uplands storm drain with filter cloth. Avoid storing hazardous materials near storm drains, which are directly linked to the marine environment.

Filter cloth secured over sump well valve to allow stormwater flow.

EBMP #18:
Property and Infrastructure Maintenance, Modifications and Construction

Significant environmental issues and potential impacts are known to be related to the management of Esquimalt Graving Dock (*EGD*) property and infrastructure. Any new property and infrastructure construction or modification projects at the EGD must consider environmental issues in project planning and implementation. Common environmental aspects that require consideration and management when planning and implementing projects include: dust emissions, hazardous materials and wastes, storm water runoff, noise, and prevention and response to accidental spills and releases. Requirements for the operational aspects are identified in specific sections of the EGD EBMPs.

Infrastructure Maintenance & Repair

Maintenance and repair of existing facility property and infrastructure often results in waste generation and other environmental aspect considerations to be addressed.

Minor Concrete Work

- Contain dust emissions from cutting and drilling.
- Prevent concrete slurry runoff from entering storm drains.
- Prevent debris from mixing concrete from entering storm drains or the marine environment.
- Prevent concrete slurry runoff from entering the trench and tunnel drains and the "moonpool" on the drydock floor.

Use of Preserved Wood

- Avoid use of creosote preserved wood products where possible.
- Follow applicable guideline for use of preserved wood products.
- Creosote wood waste may be considered a hazardous, restricted or controlled waste, and must be handled and disposed of accordingly.

Demolition/Renovation

- Ensure structures are assessed for the presence of hazardous materials prior to demolition or renovation (*e.g. asbestos, lead based paint, PCB and mercury containing ballasts, mould*).
- Hazardous materials and waste must be handled and disposed of according to applicable regulatory requirements.
- Halocarbon containing equipment must be managed in accordance with the Federal Halocarbon Regulations.

Land Use Application

The EGD Land Use Application (*EGD LUA*) contains sections specific to potential environmental aspects related to the project. These sections must be completed with all relevant information.

EGD Management will respond with additional environmental protection and mitigation measures if required.

Infrastructure Modification & Construction

All modification and construction projects at the EGD must be assessed for environmental impacts, and plans put in place to mitigate the identified impacts. Projects managed by the EGD will be completed in accordance with the national project management system and site specific requirements.

For projects managed by Users:

- Any changes to infrastructure, changes to an existing lease or application for a new lease, must be approved by EGD Management.
- Prior to the approval of a property or infrastructure project, the EGD Land Use Application must be completed in full and submitted to EGD Management for review.

Green Space and Vegetation

The EGD property includes areas of vegetation that provides many benefits, including important habitat for wildlife and sensitive native plant species, and act as a buffer between the industrial operations of the facility and the neighbouring residential area.

All projects which have the potential to impact green space, vegetation and wildlife habitat must be reviewed and approved by EGD Management.

Tree and Vegetation Compensation Policy

To facilitate the EGD wildlife management plan and reduce the likelihood of habitat loss at the facility, property and infrastructure projects that require the removal of vegetation must provide compensation in the form of appropriate vegetation replacement. Additional supplies are also required when compensation vegetation is purchased to ensure that new plantings will be successful (*e.g. soil, mulch, tree protection, and water bags*). Consult with EGD Management prior to work to determine what compensation is required.

Soil Management

The EGD has undergone significant capital and operation and maintenance projects in recent years. Extensive investigations into the soil conditions (*e.g. contamination and structure*), utility mapping and identification of archaeological conditions have taken place. The industrial history of the facility has resulted in known contamination of the soil and in-fill material used on site. The primary contaminants commonly found at levels exceeding industrial soil standards include: arsenic, cadmium, copper, lead, mercury, zinc, and polycyclic aromatic hydrocarbons (*PAH*).

Requirements for Excavation

Planning Excavation

1. Consult with EGD Management prior to excavation to identify:

- Project area and excavation boundaries.
- Known utilities, structures, and historical information regarding the proposed excavation area.
- Known contaminated soil locations and the nature and level of contaminants potentially in the soils to be excavated.
- Archaeologically significant areas, requirements for mitigation of archaeological impacts, and dealing with unanticipated archaeological finds.

2. Prepare a plan for soil management: stockpiling and sampling of soils to be excavated. Key issues to be considered include:

- Turnaround times for sample results may take up to 2 weeks.
- Parameters to be sampled may vary depending on the area of excavation. Common parameters include total metals, leachable metals, PAHs, and hydrocarbons (*LEPH, HEPH*).
- EGD Management must approve stockpile areas.
- Soils which exceed the CCME Industrial Levels or BC CSR Industrial Levels: must be disposed of off site at an approved disposal facility.
- Soils which are below industrial standards: may remain on site if geotechnically suitable, if there is an identified use for the soil, and when approved by EGD Management.

3. Ensure contractors and employees are aware of the health and environmental risks associated with the suspected contaminated soils and have procedures in place to mitigate the risks. This includes adequate Personal Protective Equipment (PPE) and hygiene practices (e.g. no smoking, wear gloves).

ADEQUATE soil stockpile management. Soils placed on poly and covered.

INADEQUATE stockpile of contaminated soil. Soil should be covered to prevent exposure to elements, runoff and people.

Conducting Excavation

- Ensure appropriate PPE and hygienic precautions are in place to prevent exposure to contaminants in the soils.
- Monitor all excavations for visible soil contamination or archaeologically significant material.
- Ensure soil is stockpiled, sampled and analyzed in accordance with the Environmental Management Act and Contaminated Sites Regulation, and BC Ministry of Environment Technical Guidance Document 1, Site Characterization BC Government Technical Guidance on Contaminated Sites (*January 2009*).
- Ensure soils suspected of contamination are stockpiled on an impervious surface (*e.g. 6 mil PVC or plastic poly liner*) and adequately covered to prevent exposure to wind, storm water runoff or people. Stockpiles must not exceed 50m^3 in size.
- Imported fill material used for surfacing, backfilling or any other use must meet CCME Residential/Parkland (*RL/PL)* Land Usage Soil Quality Guidelines. Fill material information must be provided to and approved by EGD Management before being used on site.

After Excavation

- Ensure all soil is disposed of at a facility that is permitted to accept that material.
- Obtain all disposal records, including: waste manifests, weigh bills and disposal certificates from the receiver.
- Report the volume, analysis results, excavation details and dimensions and disposal records to EGD Management.
- Provide all as-builts and project drawings to EGD Management in the format compatible with the EGD drawing standards.

Archaeological Considerations

The EGD property and surrounding area has a rich First Nations history. There are Provincially Registered Archaeological Sites listed within the property boundaries of the EGD.

- All excavation projects must be reviewed and approved by EGD Management prior to work beginning.
- Depending on the scope of the project a detailed Archaeological Impact Assessment may be required.
- All Users, including contractors and employees working on excavation projects, must be made aware of the potential for archaeological chance finds. In the case where suspect archaeological material is discovered during excavation, work must stop in that area and EGD Management must be notified immediately.

Archaeological Overview Assessment

An Archaeological Overview Assessment was conducted for the EGD which outlines the archaeologically sensitive areas on the property and identifies areas of high archaeological potential.

Archaeological significant materials found during excavation projects at the facility include shell midden, artifacts, faunal and human remains.

Many archaeologically sensitive areas exist on the EGD Property.

First Nations archaeologists examine materials unearthed during excavations at EGD.

SLR

global environmental solutions

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APPENDIX E
Preliminary Hazard Assessment Form

Esquimalt Graving Dock Parcel IM-901 Remediation
825 Admirals Road, Esquimalt, BC
SLR Project No.: 205.03877.00001

PRELIMINARY HAZARD ASSESSMENT FORM

Project Number:	**R.018399.004**
Location:	**Esquimalt Graving Dock, Esquimalt, BC**
Date:	December 21, 2018
Name of Departmental Representative:	William Govenlock
Name of Client:	
Name of Client Project Co-ordinator	PH: ( )- -

Site Specific Orientation Provided at Project Location **Yes** ☑ **No** ☐

Notice of Project Required **Yes** ☑ **No** ☐

NOTE:
PWGSC requires "**A Notice of Project"** for all construction work related activities.

NOTE:
OHS law is made up of many municipal, provincial, and federal acts, regulations, bylaws and codes. There are also many other pieces of legislation in British Columbia that impose OHS obligations.

Important Notice: This hazard assessment has been prepared by PWGSC for its own project planning process, and to inform the service provider of actual and potential hazards that may be encountered in performance of the work. PWGSC does not warrant the completeness or adequacy of this hazard assessment for the project and the paramount responsibility for project hazard assessment rests with the service provider.

TYPES OF HAZARDS TO CONSIDER	Potential Risk for:				COMMENTS
Examples: Chemical, Biological, Natural, Physical, and Ergonomic Listed below are common construction related hazards. Your project may include pre-existing hazards that are not listed. Contact the Regional Construction Safety Coordinator for assistance should this issue arise.	PWGSC, OGD's, or tenants		General Public or other contractors		Note: When thinking about this pre-construction hazard assessment, remember a **hazard** is anything that may cause harm, such as chemicals, electricity, working from heights, etc; the **risk** is the chance, high or low, that somebody could be harmed by these and other hazards, together with an indication of how serious the harm could be.
	Yes	**No**	**Yes**	**No**	
Typical Construction Hazards					
Concealed/Buried Services (electrical, gas, water, sewer etc)	✓		✓		
Slip Hazards or Unsound Footing	✓		✓		
Working at Heights		✓		✓	
Working Over or Around Water		✓		✓	
Heavy overhead lifting operations, mobile cranes etc.	✓		✓		
Marine and/or Vehicular Traffic (site vehicles, public vehicles, etc.	✓		✓		

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Fire and Explosion Hazards	✓		✓		
High Noise Levels	✓		✓		
Excavations	✓		✓		
Blasting		✓		✓	
Construction Equipment	✓		✓		
Pedestrian Traffic (site personnel, tenants, visitors, public)	✓		✓		
Multiple Employer Worksite	✓		✓		Example : Contractor working in a occupied Federal Employee space.

Electrical Hazards					**Comments**
Contact With Overhead Wires	✓		✓		
Live Electrical Systems or Equipment	✓		✓		
Other:					
Physical Hazards					
Equipment Slippage Due To Slopes/Ground Conditions	✓		✓		
Earthquake	✓		✓		
Tsunami	✓		✓		
Avalanche		✓		✓	
Forest Fires		✓		✓	
Fire and Explosion Hazards	✓		✓		
Working in Isolation		✓		✓	
Working Alone		✓		✓	
Violence in the Workplace	✓		✓		
High Noise Levels	✓		✓		
Inclement weather	✓		✓		
High Pressure Systems	✓		✓		
Other:					
Hazardous Work Environments					
Confined Spaces / Restricted Spaces		✓		✓	Review and provide confined space assessment(s) from PWGSC or client confined space inventories. Refer to PWGSC Standard on Entry into Confined Spaces. Contact the Regional Construction Safety Coordinator.
Suspended / Mobile Work Platforms		✓		✓	
Other:					
Biological Hazards					
Mould Proliferations		✓		✓	
Accumulation of Bird or Bat Guano		✓		✓	
Bacteria / Legionella in Cooling Towers / Process Water		✓		✓	
Rodent / Insect Infestation	✓		✓		
Poisonous Plants		✓		✓	
Sharp or Potentially Infectious Objects in Wastes	✓		✓		

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Wildlife	✓		✓		
Chemical Hazards					
Asbestos Materials on Site		✓		✓	If "yes" a pre-project asbestos survey report is required. Provide Contractor with DP – 057 ELF Form 16 "Contractor Notification and Acknowledgement"
Designated Substance Present		✓		✓	If "yes" a pre-project designated substance survey report is required.
Chemicals Used in work		✓		✓	
Lead in paint		✓		✓	If "yes" a pre-project lead survey report is required.
Mercury in Thermostats or Switches		✓		✓	If "yes" a pre-project mercury survey report is required.
Application of Chemicals or Pesticides		✓		✓	
PCB Liquids in Electrical Equipment		✓		✓	Soils tested for PCB. Below detection limit or applicable standard.
Radioactive Materials in Equipment		✓		✓	
Other:					
Contaminated Sites Hazards					
Hazardous Waste		✓		✓	
Hydrocarbons	✓		✓		
Metals	✓		✓		
Other:					

Security Hazards					**Comments**
Risk of Assault		✓		✓	
Other:					
Other Hazards					

Other Compliance and Permit Requirements[1]	**YES**	**NO**	**Notes / Comments**[2]
Is a Building Permit required?		✓	
Is a Electrical permit required?			
Is a Plumbing Permit required?			
Is a Sewage Permit required?			
Is a Dumping Permit required?			
Is a Hot Work Permit required?			
Is a Permit to Work required?			Mandatory for ALL AFD managed work sites.
Is a Confined Space Entry Permit required?		✓	Mandatory
Is a Confined Space Entry Log required?		✓	Mandatory for all Confined Spaces
Discharge Approval for treated water required?	✓		Offsite treatment facility only

Notes:

(1) Does not relieve Service Provider from complying with all applicable federal, provincial, and municipal laws and regulations.

(2) TBD means To Be Determined by Service Provider.

Service Provider Acknowledgement: We confirm receipt and review of this Pre-Project Hazard Assessment and acknowledge our responsibility for conducting our own assessment of project hazards, and taking all necessary protective measures (which may exceed those cited herein) for performance of the work.			
Service Provider Name			
Signatory for Service Provider		**Date Signed**	
RETURN EXECUTED DOCUMENT TO PWGSC DEPARTMENTAL REPRESENTATIVE PRIOR TO ANY WORK COMMENCING			