Public Works and Government Services Canada

Requisition No.: EZ897-212565

Buy and Sell ID No.: _____

Specifications for

Title: Soil Treatment Facilities Operation (5 Sites)

Location: Multiple Locations, Alaska Highway, BC and YT

Project No. R.018391.014.015 Date: 2021 February 19

APPROVED BY:

Birk, Raman
Digitally signed by: Birk, Raman
DN: CN = Birk, Raman C = CA O = GC OU = PWGSC-TPSGC
Date: 2021.02.22 08:59:10 -08'00'

Regional Manager ES Date

Chris Patterson
Digitally signed by Chris Patterson
Date: 2021.02.22 05:27:41 -08'00'

Construction Safety Coordinator Date

TENDER:

Moizumi, Amy
Digitally signed by: Moizumi, Amy
DN: CN = Moizumi, Amy C = CA
O = GC OU = PWGSC-TPSGC
Date: 2021.02.22 05:14:04 -08'00'

22-FEB-2021

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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2021 Feb 19
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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: security clearances are not required to access the sites, but the Soil Treatment Facilities (STFs) are fenced in and the gates are locked.

1.4.1.2. Neighbouring or sensitive sites restrictions are as follows: avoid discharging, releasing and spilling of waste and/or hazardous waste materials outside of the STF.

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

1.4.1.3.1. Hazardous Waste Quality

1.4.1.3.2. Waste Quality

1.4.1.3.3. Non-Contaminated 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 Onsite. Contractor responsible for discharge permits.

1.4.1.6. Treatment of Contaminated Water Offsite. Contractor responsible for transport and treatment. Contractor takes ownership of all material leaving site.

1.4.1.7. Transportation of Contaminated Soil to facilities. Contractor takes ownership of all material leaving site

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. Operation of a STF under the control of PSPC. After bioremediation soil will be tested insitu. After testing confirms soil is compliant, soil will be stockpiled within 500 m of STF. Non-compliant soil to remain in STF for further bioremediation.

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 Material. 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 Material. Complete list of anticipated contaminants and concentration levels on the Site available separately in Annexes and/or Drawings.

1.6.3. Existing condition on the Site identified according to Drawings. Annexes provided for reference purposes only.

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.

1.7.3. Further contracts may be awarded while the Contract is in progress.

1.7.4. Cooperate with other contractors in carrying out their respective works and carry out directions from Departmental Representative.

1.7.5. Coordinate Work with that of other contractors. If any part of Work under the Contract depends for its proper execution or result upon Work of another contractor, report promptly to Departmental Representative, in writing, any defects which can interfere with proper execution of this Work.

1.8. Contractor's Use of Site

1.8.1. Use of Site:

1.8.1.1. For the sole benefit of Canada.

1.8.1.2. Exclusive and only for completion of the execution of Work.

1.8.1.3. Assume responsibility 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 and Authorizations are included in the Annexes:
1.9.1.1. Iron Creek: Yukon Environment, Land Treatment Facility Permit 24-032.
1.9.2. Contractor assumes responsibility for relevant portions of existing permits.
1.9.3. Changes to existing permits must be accepted by Departmental Representative. Changes to existing permits responsibility of Contractor, including resubmission to regulators as determined by the Contractor's Qualified Professional. Contractor assumes all responsibility for changed permits.
1.9.4. Permits required other than the existing permits responsibility of Contractor.

1.10. Schedule Requirements

1.10.1. Work to be initiated: as soon as practical.
1.10.2. Pre-Mobilization Submittals: at least 10 Working Days prior to mobilization to Site, submit all documents required for mobilization, including at a minimum the Contractor's site-specific project Health and Safety Plan and emergency procedures.
1.10.3. Site Works: Final Completion no later than 2021 September 24.
1.10.4. Completion of the Work: no later than 2022 February 28. 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 for Iron Creek Maintenance Camp, Km 713 Gravel Pit, Stringer, Sikanni and JJJ Gravel Pit are 07:00 to 19:00.
1.11.2. Work outside of Working Days and Working Hours is at Department Representative's sole discretion and must be accepted in writing by Departmental Representative by Submission.
1.11.3. Be responsible for Site outside of Working Days and Working Hours and have a continuous presence on Site as required, in accordance with the Contract, or as directed by the Departmental Representative, to ensure:
1.11.3.1. Protection of health and safety for potentially hazardous activities (eg deep open excavations).
1.11.3.2. Site security for Sites in urban environments.
1.11.3.3. Maintenance of environmental monitoring and protection measures for Sites in urban environments or with sensitive neighbouring properties.

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. Advisory: notices, instructions, or directions issued by the Departmental Representative to the Contractor.

1.2.2. Certificate of Completion: see General Conditions.

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

1.2.4. 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.

1.2.5. 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.

1.2.6. Contaminated Material: 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 Soil, Sediment, Water, Debris, and Organic Matter. 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:

1.2.6.1. For all Sites: 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*.

1.2.6.2. For Sites in BC: BC *Hazardous Waste Regulation*, BC *Contaminated Sites Regulation*, and BC *Approved Water Quality Guidelines*. May also include risk-based site-specific target levels for remediation objectives (i.e., CCME Tier 3).

1.2.6.3. For Sites in Yukon: Yukon *Special Waste Regulation*, Yukon *Contaminated Sites Regulation*. May also include risk-based site-specific target levels for remediation objectives (i.e., CCME Tier 3).

1.2.7. 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, including contaminants and concentrations, on Drawings are

approximate and may vary based on field observations or Confirmation Samples.

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

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

1.2.10. Contract: see General Conditions.

1.2.11. Contract Amount: see General Conditions.

1.2.12. Contractor: see General Conditions.

1.2.13. Departmental Representative: see General Conditions.

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

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

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

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

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

1.2.19. 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.

1.2.20. Excavation Extents: lateral and vertical extents of Soil to be excavated to meet Contaminated Soil Extents, as determined by Contractor's Qualified

Professional. Includes Overburden. Extents on Drawings are approximate and may vary based on field observations or Confirmation Samples.

1.2.21. Extension of Time: see General Conditions.

1.2.22. Extension of Time on Contracts: PWGSC form requesting an Extension of Time.

1.2.23. Facility Authority:

1.2.23.1. For facilities within provincial or territorial jurisdiction: the relevant provincial or territorial ministry.

1.2.23.2. For facilities on First Nation reserve land in Canada not subject to the First Nation Land Management regime: Indigenous and Northern Affairs Canada.

1.2.23.3. For facilities on First Nations land in Canada subject to the First Nation Land Management Act regime: the relevant First Nation Council. Documentation must be provided that the facility is on land subject to the First Nation Land Management Act regime.

1.2.23.4. For facilities in the United States of America: either or both of the Environmental Protection Agency and the relevant State, as appropriate.

1.2.24. Final Completion: see General Conditions.

1.2.25. Final Excavation Limits: lateral and vertical extents of excavation as determined by Contractor's Qualified Professional Surveyor. Includes Contaminated Soil, Topsoil, Overburden, or other Non-Contaminated Quality Soil excavated incidentally including Temporary Sloping and Shoring.

1.2.26. Hazardous Waste Quality: Contaminated material which meets the applicable Regulatory definition of Hazardous Waste.

1.2.27. Land Treatment Facility (LTF): equivalent of Soil Treatment Facility (STF).

1.2.28. Landfill Facility: an offsite facility specifically used to introduce Non-Contaminated Quality Material into the environment for the purpose of final burial.

1.2.29. Master Plan: baseline schedule determined by Contractor compliant with Schedule Requirements. Duration for any portion of the Work based on Master Plan.

1.2.30. Material: Soil, Sediment, Water, Debris, and Organic Matter. Includes Topsoil, Overburden, Oversize Debris, cleared and grubbed vegetation, other vegetation, litter, rubbish, cobbles, boulders, excess construction material, lumber, steel, plastic, concrete, asphalt and other waste material.

1.2.31. 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.

1.2.32. National Master Specifications: the Specifications are subdivided in accordance with the current 6 digit National Master Specifications System; the first 2 digits are the Division, the last 4 digits are the Section. A Division may consist of the Work of more than 1 Subcontractor; responsibility for determining which Subcontractor provides the labour, material, equipment and services required to complete the Work rests solely with the Contractor.

1.2.33. Non-Contaminated Quality Material: material that does not exceed applicable Environmental Quality Criteria. Includes Soil, Sediment, Water, Debris, and Organic Matter.

1.2.34. 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.

1.2.35. Overburden: Non-Contaminated Quality Soil excavated incidentally as required above or adjacent to Contaminated Soil. Includes Topsoil.

1.2.36. 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.

1.2.37. Prime Contractor: see General Conditions “Contractor”, BC Occupational Health and Safety Regulations “Prime Contractor”, and Yukon Occupational Health and Safety Act “Constructor”.

1.2.38. Progress Payment: see General Conditions.

1.2.39. 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.

1.2.40. PWGSC: Public Works and Government Services Canada (also known as PSPC: Public Services and Procurement Canada). Representative of Canada with control of the Site.

1.2.41. Qualified Professional: a person who is registered in relevant jurisdiction 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. Only full membership will be considered to be a Qualified Professional (ie no "in training" designations). Includes:

1.2.41.1. Association of the Chemical Profession of British Columbia.

1.2.41.2. British Columbia College of Applied Biology.

1.2.41.3. British Columbia Institute of Agrologists.

1.2.41.4. Engineers and Geoscientists British Columbia.

1.2.41.5. Engineers Yukon.

1.2.42. Qualified Professional Surveyor: a person who is registered in relevant jurisdiction 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. Only full membership will be considered to be a Qualified Professional (ie no "in training" designations). Includes:

1.2.42.1. Association of British Columbia Land Surveyors.
1.2.42.2. Association of Canada Lands Surveyors.
1.2.42.3. Applied Science Technologists & Technicians of British Columbia registered in Site Improvements Surveys.
1.2.42.4. Engineers and Geoscientists British Columbia.
1.2.43. Quote: Quotation for Design Change or Additional Work. Contractor's cost proposal issued to the Departmental Representative as per the relevant Contemplated Change Notice. May be either a Lump Sum Arrangement or a Unit Price Arrangement.
1.2.44. Remediation by Excavation: complete excavation of Contaminated Soil and incidental Non-Contaminated Quality Soil to the Site boundaries for the purpose of remediating the Site to meet numerical standards. Includes full treatment and disposal. Does not include risk assessment or risk management of material onsite. Does not include encapsulation or solidification in place.
1.2.45. Request For Information: notice or other communication issued by the Contractor to the Departmental Representative.
1.2.46. 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.
1.2.47. Site: work area available to Contractor according to Drawings. Does not include shared or public areas, including common roads.
1.2.48. Soil: unconsolidated mineral or organic material, rock, fill, and sediment deposited on land, and other solid material excavated incidentally. Includes Topsoil and Overburden. Includes cobbles and boulders.
1.2.49. Soil Treatment Facility (STF): facility for bioremediating contaminated soil. Includes Treatment Cells, Staging Cells, and ancillary Access Roads.
1.2.50. Special Waste: equivalent of Hazardous Waste.
1.2.51. Subcontractor: see General Conditions.
1.2.52. 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.
1.2.53. Substantial Performance: see General Conditions.
1.2.54. Superintendent: see General Conditions
1.2.55. Supplier: see General Conditions.
1.2.56. Topsoil: Overburden excavated incidentally above Contaminated Soil Extents that is a surface organic layer to facilitate vegetation growth.
1.2.57. Transfer/Interim Storage Facility: an offsite facility specifically used to transfer or short term storage Contaminated Soil during offsite transport.
1.2.58. Treat: handling or processing of Contaminated Material in such a manner as to change the physical, chemical or biological character or composition of Contaminated Material such that it becomes Non-Contaminated Quality and is

suitable for final Discharge or Disposal. Treatment includes filtering, bioremediation, thermal desorption, and incineration. Treatment does not include blending, mixing, or dilution. Material sent to a Treatment Facility must be Treated as follows:

1.2.58.1. Water must be Treated to meet requirements of a valid and subsisting Discharge Approval held by the Treatment Facility.

1.2.58.2. Soil must be Treated to meet (i) less than Waste Quality and (ii) requirements of the subsequent Disposal Facility.

1.2.59. 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 must be considered Contaminated Material until final Discharge or Disposal.

1.2.60. Waste Quality: material that exceeds applicable Environmental Quality Criteria but is not Hazardous Waste.

1.2.61. Wastewater: Non-Contaminated Quality Water that is not Sewage.

1.2.62. 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 onsite or offsite weigh scale used during excavation, transportation, treatment or disposal.
1.3.8. Weigh Scale Slips: within 10 Working Days of measurement, Submit all onsite and offsite weigh scale slips for material.

1.4. 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. 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. Provide 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. Advisory: Contractual correspondence from the Departmental Representative to the Contractor. Does not include Change Documents. To be sequentially numbered. Include cross references to applicable Request For Information. The status of the Contractor, including the function of Prime Contractor, must not change by reason of any Advisory.
1.11.2. Request For Information: Contractual correspondence from Contractor to the Departmental Representative. Includes Submittals. Does not include Change Documents. Must be sequentially numbered. Include cross references to applicable Advisory. Status of the Contractor, including the function of Prime Contractor, must not change by reason of any Request For Information.
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 methods, means and sequences.
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: There may be a change to the completion of the Work by reason of an Extension of Time on Contracts. No increase to the Contract Amount by reason of any 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 or applicable law.

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. If, upon examination such work is found not in accordance with Contract, 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 as required: Protection of Features, Site Clearing, and Exiting Utilities. Does not include offsite Transport and Disposal of any incidental or generated material.

1.1.4. Standby Time will be paid in accordance with unit rate price established for time when construction Work is unable to proceed and that is directly attributable to any neglect or delay that occurs after the date of the Contract on the part of the Departmental Representative in providing any information or in doing any act that the Contract expressly requires the Departmental Representative. Measurement as recorded time by Departmental Representative. Includes machinery and labour standby costs. Does not include items covered by Site Facilities Operation. Standby Time may be pro-rated based on hours of work. Make all efforts to minimize impacts due to delays caused by the Departmental Representative, including re-sequencing Work. Provide documentation of a sufficient description of the facts and circumstances of the occurrence to enable the Departmental Representative to determine whether or not the Standby Time is justified. Standby Time must be pre-approved by Departmental Representative prior to being invoiced. No Standby Time charges or increases to Contract Amount or Extension of Time for completion of the Work for reviews, sampling, or other work conducted by the Departmental Representative that have time allowances in accordance with the Contract.

1.1.5. 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.

1.1.6. 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.

1.1.7. 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 by Contractor's Qualified Professional Surveyor documenting preconstruction condition of Site and adjacent sites.

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. Postconstruction Condition Survey: within 10 days of completing site Work, Submit a report by Contractor's Qualified Professional Surveyor documenting preconstruction condition of Site and adjacent sites.

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

1.4. Examination

1.4.1. Determine condition of existing Site and requirements to make the Site suitable for Work.

1.4.2. Preconstruction Condition Survey to be completed by Contractor's Qualified Professional Surveyor prior to commencing any other Work.

1.4.3. Postconstruction Condition Survey to be completed by Contractor's Qualified Professional Surveyor after completing all other Work.

1.4.4. Condition Surveys to include: property lines, site grades (surface elevations) and condition of buildings, utilities, roadways, pathways, landscaping, significant vegetation, and other features (including infrastructure) both onsite and adjacent sites that may be potentially impacted by the Work.

1.5. Mobilization and Demobilization

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

1.6. Protection of Features

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

1.6.2. Protect natural and man-made features required to remain undisturbed. Protect existing trees and other prominent natural features from damage unless otherwise required or located in an area to be occupied by new construction. Protect existing structures, including roads, walls, and buildings.
1.6.3. Protect above ground and buried utilities that are required to remain undisturbed or in continuous operation during the Work.
1.6.4. Protect features from surface water damage by temporary structures to divert flow as appropriate.
1.6.5. Protection of Monitoring Wells
1.6.5.1. Protect all monitoring wells unless specifically confirmed by Departmental Representative.
1.6.5.2. Protect all monitoring wells outside area of surface disturbance, including Contaminated Soil Extents.
1.6.5.3. Protect monitoring wells within area of surface disturbance, including Contaminated Soil Extents, as identified in Contract.
1.6.5.4. Replace protected monitoring wells damaged by Work using methods, means, and sequences as directed by the Departmental Representative at Contractor's expense.
1.6.5.5. Decommission monitoring wells within area of surface disturbance, including Contaminated Soil Extents, or as otherwise agreed to by Departmental Representative. Decommission in accordance with methods in BC Groundwater Protection Regulation or the Yukon Environment Protocol 7: Groundwater Monitoring Well Installation, Sampling and Decommissioning, as appropriate.
1.6.6. Security and Safety:
1.6.6.1. Provide safety measures to ensure worker and public safety.
1.6.6.2. 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.
1.6.6.3. Site including all construction areas should be secured with locked fencing, temporary hoarding and security personnel as required.

1.7. Site Clearing

1.7.1. Prepare site as required to complete Work.
1.7.2. Clearing and grubbing of the Site to allow access for Work.
1.7.2.1. Clearing consists of removing Non-Contaminated Quality vegetation above existing ground surface to facilitate Work. Includes: cutting off trees and brush vegetative growth, felled trees, previously uprooted trees and stumps. Clear invasive species in accordance with the Contract or as directed by the Departmental Representative. Dispose of Non-Contaminated Quality Material at a Landfill.
1.7.2.2. 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 Material at a Landfill.

1.7.3. Divert water and associated infrastructure and equipment as required to facilitate Work in the dry.

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

1.7.5. Demolish or temporary remove existing infrastructure in accordance with the Contract or as required to facilitate Work. Notify Departmental Representative at least 5 Working Days in advance of demolition.

1.8. Existing Utility Services

1.8.1. Size, depth and location of existing utilities and structures as provided in Contract are for guidance only. Completeness and accuracy are not guaranteed.

1.8.2. Establish location and extent of service lines in area of Work and notify Departmental Representative prior to commencing any other Work. All utilities entering Site must be confirmed prior to subsurface disturbance (ie do not rely on as-built documents). As appropriate, confirm locations of buried utilities by independent utility locator and using hand test excavations or hydrovac methods.

1.8.3. Remove abandoned service lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

1.8.4. Maintain and protect from damage all utilities and structures encountered, unless Work involves temporarily breaking, rerouting, or connecting existing utilities.

1.8.5. Where Work requires temporarily breaking, rerouting, or connecting into existing utilities, obtain permission from both users and utility companies of intended interruption of services, and carry out Work at times determined by the authorities having jurisdiction.

1.8.6. Submit schedule to and obtain approval for any shutdown or closure of active service. Adhere to schedule accepted by Departmental Representative and provide notice to affected parties.

1.8.7. Provide temporary services as required to maintain critical systems.

1.8.8. Where unknown utilities are encountered, immediately verbally notify Departmental Representative and confirm findings in writing.

1.9. Site Restoration

1.9.1. Site Restoration includes re-establishment of pre-existing infrastructure, final grading, topsoil reuse or provide and placement, revegetation, and deconstructing and removal from Site all temporary facilities and removal of any incidental or generated material.

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

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

1.9.4. Re-establish topsoil reusing existing stripped topsoil. If insufficient existing topsoil, import additional topsoil as required. Imported topsoil must, at a minimum, contain: between 50% and 70% sand, less than 25% silt and clay, and

between 4% and 15% organic matter (dry weight basis) unless otherwise identified according to Drawings.

1.9.5. 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.

1.9.6. Upon Final Completion of Work, remove Non-Contaminated Quality Soil and Debris, trim slopes, and correct defects as directed by the Departmental Representative.

1.9.7. 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.

1.9.8. Reinstate pre-existing utilities and other infrastructure to original location and condition, meeting current standards, codes, and other requirements, unless otherwise identified according to Drawings or as directed by the Departmental Representative.

1.9.9. Reinstate surface to pre-existing conditions, including surface material (eg vegetation, gravel, pavement), unless otherwise identified according to Drawings or as directed by the Departmental Representative.

1.9.10. Seeding, to be consistent with *Canadian Landscape Standards* for lawns or current version of BC Ministry of Transportation and Infrastructure *Standard Specifications for Highway Construction* unless otherwise identified according to Annexes and Drawings.

1.10. As-Built Documents

1.10.1. 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.

1.10.2. Postconstruction Condition Survey to be completed by Contractor's Qualified Professional Surveyor.

1.10.3. 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.

1.10.4. Drawings and Shop Drawings: legibly mark each item to record actual construction, including:

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

1.10.4.2. Field changes of dimension and detail.

1.10.4.3. Changes made by change orders.

1.10.4.4. Details not on original Drawings.

1.10.4.5. References to related Shop Drawings and modifications.

1.10.5. Contract Specifications: legibly mark each item to record actual workmanship of construction, including:

1.10.5.1. Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

1.10.5.2. Changes made by addenda and change orders.
1.10.6. As-built information:
1.10.6.1. Record changes in red ink.
1.10.6.2. 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.
1.10.6.3. Submit 1 set in editable AutoCAD file format with all as-built information.
1.10.6.4. Submit all sets as directed by the Departmental Representative.
1.10.7. As required, surveying to be completed by Contractor's Qualified Professional Surveyor for as-built documents.

1.11. Completion Documents
1.11.1. Submit as directed by the Departmental Representative, a written certificate that the following have been performed:
1.11.1.1. Work has been completed, and inspected and accepted by the Departmental Representative, in accordance with the Contract.
1.11.1.2. Treatment and Disposal of treatable soils have been completed and Disposal of all other soils has been completed.
1.11.1.3. 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.
1.11.1.4. Contractor's Qualified Professional report documenting backfilling has met all requirements of the Contract.
1.11.2. Defective products will be rejected, regardless of previous inspections. Replace defective products.
1.11.3. 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 (Kickoff) 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 including Master Plan.
1.5.4.3. Schedule of Submittals including premobilization Submittals including Insurance, Contract Security, Health and Safety Plan, and Environmental Protection Plan.
1.5.4.4. Requirements for temporary facilities.
1.5.4.5. Site security, Health and Safety, Environmental Protection, coordination with other Site users including consultants and other contractors.
1.5.4.6. Change orders, procedures, approvals required, administrative requirements.
1.5.4.7. Monthly Progress Payments, administrative procedures, hold backs.
1.5.4.8. Appointment of inspection and testing agencies or firms.
1.5.4.9. List of Subcontractor(s).

1.6. Progress Meetings

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

period. Include review of progress with respect to previously established dates for starting and stopping various stages of Work.

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

1.7. Toolbox Meetings

1.7.1. During the course of the Work, schedule daily toolbox (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.

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 are compliant with Schedule Requirements.

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 as updates to 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 accepted 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. Required Action and Information Submittals are identified in each Section under Subsection 1.3. Other Submittals may be required as determined by Departmental Representative.

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

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

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

1.4.5. 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.

1.4.6. Make any changes in Submittals which Departmental Representative requires to be in accordance with the Contract and resubmit.

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

1.4.8. Do not proceed with Work until relevant Submittals are finalized and accepted.

1.4.9. 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.

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

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

1.4.12. 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.

1.4.13. 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. No Standby Time charges or increases to Contract Amount or Extension of Time for Departmental Representative's review.

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.

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 conducted solely to sump on staging pad. Leachate is Contaminated Water.

1.5.3. Storage of solid or liquid waste: 200 L steel drums meeting Transportation of 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 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 Material incidental to the Work or as directed by the Departmental Representative.

1.11.2. Material and Water will be Classified by the Departmental Representative based on insitu results, field observations, field measurements, and/or exsitu characterization. Departmental Representative responsible for Classification. Contractor cannot re-Classify material.

1.11.3. 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. Do not blend, or mix and dilute, different material Classifications.

1.11.4. Contractor responsible for Transportation, Treatment, and Disposal based on Classification by Departmental Representative. Contractor responsible for material blended, or mixed and diluted, based on re-Classification by Departmental Representative. No increases to Contract Amount or Extension of Time due to material blended, or mixed and diluted.

1.11.5. Material characterization (eg sampling and testing) of parameters additional to information provided in Contract as required by the Contractor (eg for Transportation, Treatment Facility or Disposal Facility purposes) responsibility of Contractor.

1.11.6. 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. Store excavated Non-Contaminated Quality Soil only on Non-Contaminated Quality surface areas. Ensure no contact between Non-Contaminated Quality Soil and Contaminated Soil.

1.12.4. Pre-existing stockpile preparation:

1.12.4.1. Remove vegetation that could potentially damage liner, including roots.
1.12.4.2. Inspect berms. Grade or place material to maintain height and integrity of berms.
1.12.4.3. Inspect granular base protective layer of liner. Grade base layer to allow uniform slope to sump. Notify Departmental Representative if less than 0.5m thick at any location.
1.12.4.4. Inspect visually liner for damage, including both the base and the berms. Excavate protective base layer in suspect areas (eg depressions that may be due to piping through a liner hole or areas where previous excavations may have led to a liner tear) to inspect liner for damage. Notify Departmental Representative of any significant damage.
1.12.4.5. Make good repairs of any pre-existing damage to liner, including berms, base and cover. Be prepared to repair a minimum of 10 square meters of liner or as shown on Drawings.
1.12.4.6. Pump any collected or sump water from pre-existing stockpile or Onsite STF. Treat or otherwise discharge water as required according to Contract or as directed by Departmental Representative.
1.12.4.7. Grade surface of soil to allow stockpiling or bioremediation activities.
1.12.5. New temporary stockpile construction:
1.12.5.1. Prepare surface material as required to maintain liner integrity and stockpile integrity. Clear and grub stockpile area, ensure no sharp protrusions. Compact surface soil as required to prevent settlement. Grade bottom of stockpile area to prevent leachate from migrating outside of stockpile area.
1.12.5.2. Install impermeable liner (eg asphalt or minimum 20 mil (0.5mm) polyethylene) below proposed stockpile locations to prevent contact between stockpile material and ground.
1.12.5.3. Construct adequate berms around stockpile to ensure material remains within stockpile area and that surface water does flow into stockpile area.
1.12.6. Temporary stockpile operation:
1.12.6.1. Segregate Contaminated Soil into separate Classifications, and segregate Contaminated Soil from Non-Contaminated Quality Soil, into separate stockpiles to prevent cross-contamination. Segregate different suspect material in discrete stockpiles to facilitate exsitu characterization for Classification as directed by the Departmental Representative.
1.12.6.2. Cover stockpiled material when not being worked or sampled to prevent release of airborne dust, vapours, or odours, and to prevent saturation and leachate generation from material. Securely fasten covers over stockpiled material until material is loaded for transport. Cover to be impermeable (eg minimum 5 mil polyethylene) and securely fashioned to prevent blowing off.
1.12.6.3. Prevent Non-Contaminated Quality Water, including surface runoff water, from coming into contact with Contaminated Soil stockpiles.
1.12.6.4. Assist Departmental Representative in collection of stockpile samples for exsitu characterization. Exsitu characterization may take up to 10 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 10 Working Days, not counting the day the sample is collected.

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

1.13. Stockpile or Onsite STF Loading

1.13.1. Place Contaminated Soil in Stockpiles or Onsite STF 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 or Onsite STF when there is a minimum of 1m of soil present or as directed by the Departmental Representative. 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 or Onsite STF when there is a minimum of 0.5m of soil present or as directed by the Departmental Representative.

1.13.6. Be responsible for, and make good repairs of, any damage to Stockpiles or Onsite STF 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

PSPC Update on Asbestos Use
Effective April 1, 2016, all Public Services and Procurement Canada (PSPC) contracts for new construction and major rehabilitation will prohibit the use of asbestos-containing materials.

COVID 19
All contractors shall follow Canadian Construction Association COVID-19 - Standardized Protocols for All Canadian Construction Sites, Provincial Regulations, and Federal Site Specific COVID 19 Procedures.

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. Site Specific Health and Safety Plan: within 7 Working Days after Contract award and prior to mobilization to Site, Submit a health and safety plan. Include:
1.3.3.1. Results of site-specific safety hazard assessment.
1.3.3.2. Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
1.3.4. Submit digital copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative.
1.3.5. Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
1.3.6. Submit copies of incident and accident reports.
1.3.7. Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 10 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 10 days after receipt of comments from Departmental Representative.
1.3.8. Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
1.3.9. 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.

1.3.10. On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
1.3.11. Submit:
1.3.11.1. Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
1.3.11.2. Emergency Procedures.
1.3.11.3. Notice of 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. The Canadian Electric Code (as amended).
1.4.4. Canadian Standards Association (CSA) as amended:
1.4.4.1. CSA Z797-2009 Code of Practice for Access Scaffold.
1.4.4.2. CSA S269.1-1975 (R2003) Falsework for Construction Purposes.
1.4.4.3. CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures.
1.4.4.4. CSA Z1006-10 Management of Work in Confined Spaces
1.4.4.5. CSA Z462 Workplace Electrical Safety Standard.
1.4.5. National Fire Code of Canada 2010 (as amended):
1.4.5.1. Part 5 – Hazardous Processes and Operations and Division B as applicable and required.
1.4.5.2. FCC No. 302, Standard for Welding and Cutting.
1.4.6. American National Standards Institute (ANSI):
1.4.6.1. ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
1.4.7. Health Canada/Workplace Hazardous Materials Information System (WHMIS)
1.4.7.1. Material Safety Data Sheets (MSDS).
1.4.8. Canadian Construction Association
1.4.8.1. COVID-19 Standardized Protocols for All Canadian Construction Sites
1.4.9. Province of British Columbia (as appropriate):
1.4.9.1. Workers Compensation Act Part 3-Occupational Health and Safety.
1.4.9.2. Occupational Health and Safety Regulation.
1.4.10. Yukon Territory (as appropriate):
1.4.10.1. Occupational Health and Safety Act.
1.4.10.2. Workers' Compensation Act.
1.4.10.3. Occupational Health and Safety Regulation

1.5. Worker's Compensation Board Coverage

1.5.1. 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.

1.5.2. 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.

1.6. Compliance with Regulations

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

1.6.2. Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:

1.6.2.1. Primary requirements:

1.6.2.1.1. Contractor's safety policy.

1.6.2.1.2. Identification of applicable compliance obligations.

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

1.6.2.1.4. General safety rules for project including COVID 19 protocols.

1.6.2.1.5. Job-specific safe work procedures.

1.6.2.1.6. Inspection policy and procedures.

1.6.2.1.7. Incident reporting and investigation policy and procedures.

1.6.2.1.8. Occupational Health & Safety Committee / Representative procedures.

1.6.2.1.9. Occupational Health & Safety meetings.

1.6.2.1.10. Occupational Health & Safety communications and record keeping procedures.

1.6.2.2. 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 site work.

1.6.2.3. List hazardous materials to be brought on site as required by work.

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

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

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

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

1.6.3. 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.

1.6.4. Revise and update Health and Safety Plan as required and re-submit to the Departmental Representatives.

1.6.5. Departmental Representative's review: the review of Site-Specific Health & Safety Plan by Public Services and Procurement Canada (PSPC) shall not

relieve the Contractor of responsibility for errors or omissions in final Site Specific Health and Safety Plan or of responsibility for meeting all requirements of construction and contract documents.

1.7. General Requirements – Site Specific Safety Plan (SSSP/HASP)

1.7.1. Develop written site Specific Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

1.7.2. Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.8. Filing of Notice

1.8.1. The Prime Contractor must complete and submit a Notice of Project as required by Provincial or Territorial authorities.

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

1.9. Safety Assessment

1.9.1. Perform site specific safety hazard assessment related to project.

1.10. Meetings

1.10.1. Attend health and safety pre-construction meetings and all subsequent meetings call by the Departmental Representative.

1.11. Regulatory Requirements

1.11.1. Do Work in accordance with Regulatory Requirements.

1.12. Responsibility

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

1.12.2. 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.

1.12.3. Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.13. Compliance Requirements

1.13.1. Comply with the CCA COVID-19 – Standardized Protocols for All Canadian Construction Sites.

1.13.2. Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations

1.13.3. Comply with the B.C. Workers Compensation Act and Worksafe B.C. Occupational Health and Safety Regulations.

1.13.4. The most stringent will apply.

1.14. Unforeseen Hazards

1.14.1. When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Safety Officer and follow procedures in accordance with Acts and Regulations of Territory having jurisdiction and advise Departmental Representative verbally and in writing.

1.15. Health and Safety Coordinator

1.15.1. The Health and Safety Coordinator must:

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

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

1.15.1.3. Be on site during execution of work.

1.16. Posting of Documents

1.16.1. Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Territory having jurisdiction, and in consultation with Departmental Representative.

1.17. Correction of Non-Compliance

1.17.1. Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

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

1.17.3. Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.18. Work Stoppage

1.18.1. Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

1.19. Powder Actuated Devices

1.19.1. Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.20. General Conditions

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

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

1.20.2.1. Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
1.20.2.2. Secure site at nighttime or provide security guard as deemed necessary to protect site against entry.

1.21. Project/Site Conditions
1.21.1. Work at site will involve contact with:
1.21.1.1. Multi-employer work site.
1.21.1.2. Federal employees and general public.
1.21.1.3. Energized electrical services.
1.21.1.4. Working from heights.
1.21.1.5. Working in open exposed to unpredictable weather.
1.21.1.6. High volumes of vehicular and pedestrian traffic.
1.21.1.7. Contaminants identified in Contract Documents and environmental reports.

1.22. Utility Clearances
1.22.1. The Contractor is solely responsible for all utility detection and clearances prior to starting the Work.
1.22.2. The Contractor will not rely solely upon the Reference Drawings or other information provided for utility locations.

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

1.24. Work Permits
1.24.1. Obtain specialty permit(s) related to project before start of work.

1.25. Emergency Procedures
1.25.1. 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:
1.25.1.1. Designated personnel from own company.
1.25.1.2. Regulatory agencies applicable to work and as per legislated regulations.
1.25.1.3. Local emergency resources.
1.25.1.4. Departmental Representatives.
1.25.2. Include the following provisions in the emergency procedures:
1.25.2.1. Notify workers and the first-aid attendant, of the nature and location of the emergency.
1.25.2.2. Evacuate all workers safely.

1.25.2.3. Check and confirm the safe evacuation of all workers.
1.25.2.4. Notify the fire department or other emergency responders.
1.25.2.5. Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
1.25.2.6. Notify Departmental Representatives.
1.25.3. Provide written rescue / evacuation procedures as required for, but not limited to:
1.25.3.1. Work at high angles.
1.25.3.2. Work in confined spaces or where there is a risk of entrapment.
1.25.3.3. Work with hazardous substances.
1.25.3.4. Underground work.
1.25.3.5. Work on, over, under, and adjacent to water.
1.25.3.6. Workplaces where there are persons who required physical assistance to be moved.
1.25.4. Design and mark emergency exit routes to provide quick and unimpeded exit.

1.26. Hazardous Products

1.26.1. 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 Representatives and in accordance with the Canada Labour Code.
1.26.2. Where use of hazardous and toxic products cannot be avoided:
1.26.2.1. Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per Section 01 33 00.
1.26.2.2. In conjunction with Departmental Representative, schedule to carry out work during “off hours” when tenants have left the building.
1.26.2.3. Provide adequate means of ventilation in accordance with Section 01 51 00.
1.26.2.4. The contractor shall ensure that the product is applied as per manufacturers recommendations.
1.26.2.5. The contractor shall ensure that only pre-approved products are brought onto the work site in an adequate quantity to complete the work.

1.27. Asbestos Hazard

1.27.1. Carry out any activities involving asbestos in accordance with applicable Provincial Regulations.
1.27.2. Removal and handling of asbestos will be performed as indicated on the PSPC website.

1.28. PCB Removals

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

1.28.2. Removal, handle, transport, and dispose of as indicated on the PSPC website.

1.29. Removal of Lead Containing Paint

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

1.29.2. Carry out demolition activities involving lead-containing paints in accordance with applicable Provincials Regulations.

1.30. Electrical Safety Requirements

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

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

1.30.1.2. 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.

1.31. Electrical Lockout

1.31.1. 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.

1.31.2. 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 for review upon request by the Departmental Representatives.

1.31.3. Keep the documents and lockout tags at the site in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representatives or by any authorized safety representative.

1.32. Overloading

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

1.33. Falsework

1.33.1. Design and construction falsework in accordance with CSA S269.1-1975 (R2003).

1.34. Scaffolding

1.34.1. Design, construct, and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2009 and BC Occupational Health and Safety Regulations.

1.35. Confined Spaces

1.35.1. Carry out with confined spaces in compliance with Provincial and Territorial Regulations.

1.36. Powder Actuated Devices

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

1.37. Fire Safety and Hot Work

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

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

1.38. Fire Safety Requirements

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

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

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

1.39. Fire Protection and Alarm System

1.39.1. Fire protection and alarm shall not be:

1.39.1.1. Obstructed.

1.39.1.2. Shut off.

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

1.39.2. Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.

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

1.40. Unforeseen Hazards

1.40.1. 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.

1.41. Posted Documents

1.41.1. Post legible versions of the following documents on site:
1.41.1.1. Site Specific Health and Safety Plan
1.41.1.2. Sequence of work
1.41.1.3. Emergency procedures
1.41.1.4. Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
1.41.1.5. Notice of Project
1.41.1.6. Floor plans or site plans
1.41.1.7. 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.
1.41.1.8. Workplace Hazardous Materials Information System (WHMIS) documents.
1.41.1.9. Material Safety Data Sheets (MSDS)
1.41.1.10. List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
1.41.2. 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.
1.41.3. 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.

1.42. Meetings

1.42.1. Attend health and safety preconstruction meeting and all subsequent meetings called by the Departmental Representative.
1.42.2. Ensure all site personnel attend a health and safety toolbox meeting at the beginning of each shift, which must include:
1.42.2.1. Sign-in of all attendees.
1.42.2.2. Planned Work activities and environmental considerations for that shift.
1.42.2.3. Hazards associated with these Work activities, including environmental hazards (eg potential for hypothermia, heat exhaustion, heat stroke).
1.42.2.4. Appropriate job-specific safe work procedures.
1.42.2.5. Required personal protective equipment (PPE).
1.42.2.6. Appropriate emergency procedures.
1.42.2.7. Review recent accidents on Site, including near misses.
1.42.3. 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.

1.43. Hazardous Occurrence Investigation, Recording and Reporting (HOIRR)

1.43.1. Hazard includes:

1.43.1.1. 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.

1.43.2. Hazardous Occurrence includes:

1.43.2.1. 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.

1.43.3. Hazardous Occurrence Investigation and Reporting Procedures:

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

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

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

1.43.3.4. Requires the appointment of a qualified investigator.

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

1.43.4. Fatal or Serious Accidents Procedures:

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

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

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

1.43.4.4. 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.

1.44. Personal Protective Equipment Program

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

1.44.1.1. Donning and doffing procedures.

1.44.1.2. PPE selection based upon Site hazards.

1.44.1.3. PPE use and limitations of equipment.

1.44.1.4. Work mission duration, PPE maintenance and storage.

1.44.1.5. PPE decontamination and disposal.

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

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

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

1.44.1.9. 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.

1.44.1.10. 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.

1.44.1.11. Decontamination procedures for both personnel and equipment.

1.44.1.12. 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.

1.44.1.13. Written respiratory protection program for project activities.

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

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

1.45. Offsite Contingency and Emergency Response Plan

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

1.45.2. 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.

1.46. Personnel Health, Safety, and Hygiene

1.46.1. Training: ensure personnel entering Site are trained in accordance with specified personnel training requirements. Training session must be completed by Health and Safety Officer.

1.46.2. Levels of Protection: establish levels of protection for each Work area based on planned activity and location of activity.

1.46.3. Personal Protective Equipment:

1.46.3.1. Ensure all site personnel are furnished with appropriate PPE.

1.46.3.2. Unless identified otherwise in site-specific health and safety plan, minimum PPE to include: industrial protective headwear, high-visibility safety apparel, and protective footwear.

1.46.3.3. Ensure that safety equipment and protective clothing is kept clean and maintained.

1.46.4. Develop protective equipment usage procedures and ensure that procedures are strictly followed by site personnel; include following procedures as minimum:

1.46.4.1. Ensure industrial protective headwear is of appropriate CSA Standard and meets other appropriate standards.

1.46.4.2. Ensure high-visibility safety apparel is of appropriate CSA Standard and meets other appropriate standards.

1.46.4.3. Ensure protective footwear is of appropriate CSA Standard and meets other appropriate standards.

1.46.4.4. Dispose of or decontaminate PPE worn onsite at end of each workday.

1.46.4.5. Decontaminate reusable PPE before reissuing.

1.46.4.6. Ensure site personnel have passed respirator fit test prior to entering potentially volatile contaminated work areas, as appropriate.

1.46.4.7. Ensure facial hair does not interfere with proper respirator fit.

1.46.5. Respiratory Protection:

1.46.5.1. 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.

1.46.5.2. Develop, implement, and maintain respirator program.

1.46.5.3. Monitor, evaluate, and provide respiratory protection for site personnel.

1.46.5.4. Ensure levels of protection as listed have been chosen consistent with site-specific potential airborne hazards associated with major contaminants identified onsite.

1.46.5.5. In absence of additional air monitoring information or substance identification, retain an industrial hygiene specialist to determine minimum levels of respiratory protection required.

1.46.5.6. Immediately notify Departmental Representative when level of respiratory protection required increases.

1.46.5.7. 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.

1.46.6. Heat Stress/Cold Stress: implement heat stress or cold stress monitoring program as applicable and include in site-specific Health and Safety Plan.
1.46.7. Personnel Hygiene and Personnel Decontamination Procedures. Provide minimum as follows:
1.46.7.1. Suitable containers for storage and disposal of used disposable PPE.
1.46.7.2. Potable water and suitable sanitation facility.
1.46.8. Emergency and First-Aid Equipment:
1.46.8.1. 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.
1.46.9. Site Communications:
1.46.9.1. Identify, provide and implement appropriate dedicated communication devices for Site and post emergency numbers near dedicated devices.
1.46.9.2. Ensure personnel use of "buddy" system and develop hand signal system appropriate for site activities.
1.46.9.3. Provide employee alarm system to notify employees of site emergency situations or to stop Work activities if necessary.
1.46.9.4. Furnish selected personnel with 2-way radios.
1.46.9.5. Safety Meetings: conduct mandatory daily safety meetings for personnel, and additionally as required by special or Work-related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Hold additional safety meetings on as-needed basis.

2. PART 2 - PRODUCTS

2.1. Not Used
2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Not Used
3.1.1. Not Used.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

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

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

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

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

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

1.3.1.3. 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 identifying methods, means, and sequences for preventing, monitoring, and controlling protection of historical, archaeological, cultural resources, biological resources and valued habitat. Include procedures if previously unknown historical, archaeological, cultural,

and biological resources are discovered during Work. Includes Species At Risk.

1.3.1.7. 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. Copy of permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the disposal of relevant Non-Contaminated Soil.

1.3.1.9. Traffic Management Plan including signage and traffic control personnel for Site ingress and egress. Traffic Management Plan, 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; in accordance with the Contract; in accordance with recommendations from the Contractor's Qualified Professional. 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 onsite surface water, 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. Include measures for protection of fish and wildlife during Work in or Adjacent to Waterways including isolation and dewatering of work zones and monitoring. Include coordination with owner's Environmental Consultant for fish and wildlife salvage prior to Work in or Adjacent to Waterways.

1.3.1.16. Monitoring requirements for general compliance with Environmental Protection Plan.

1.3.1.17. Environmental Protection Plan must be signed and sealed by Contractor's Qualified Professional, as required by potential impact to environment by Contractor's methods, means and sequences.

1.3.2. Submit amended Environmental Protection Plan if there are 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. Contractor's Qualified Professional

1.4.1. Perform design, construction, monitoring, reporting, and other required tasks under the supervision of the Contractor's Qualified Professional applicable to the performance of the Work.

1.5. Cleaning

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

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

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

1.6. Site Clearing and Plant Protection

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

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

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

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

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

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

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

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

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

1.7. Archaeological

1.7.1. Attend archaeological awareness training provided by Departmental Representative.

1.7.2. Abide by Chance Find Procedures developed by Departmental Representative, as appropriate.

1.8. Species At Risk

1.8.1. Protect all Species At Risk, including meeting all federal, provincial, and municipal laws and regulations.

1.8.2. Modify Work procedures, including stopping Work, as instructed by Contractor's Qualified Professional or Departmental Representative to protect Species At Risk.

1.9. Non-Contaminated Quality Soil and Water Management

1.9.1. Solid waste

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

1.9.1.2. Remove surplus materials and temporary facilities from Site.

1.9.1.3. Do not burn or bury any waste onsite.

1.9.1.4. Do not discharge wastes into streams or waterways.

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

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

1.9.2. Sewage

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

1.9.2.2. Provide, operate, and maintain Sewage storage tanks to store Sewage.

1.9.2.3. 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.

1.9.2.4. 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.

1.9.3. Wastewater

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

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

1.9.3.3. Direct surface waters that have not contacted potentially Contaminated Material to surface drainage systems.

1.9.3.4. 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.

1.9.3.5. 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.

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

1.9.3.7. 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.

1.9.3.8. Obtain permits to discharge Wastewater to environment or municipal system (sewer, ditches).
1.9.3.9. 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.

1.10. Non-Contaminated Quality Soil Transport and Disposal

1.10.1. 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.
1.10.2. Transport material as soon as practical; do not unreasonably stockpile onsite.
1.10.3. Cover material while being transported to prevent release of airborne dust, vapours, or odours, and to prevent saturation and leachate generation from material.
1.10.4. Excess water in material must not be allowed to flow out of vehicle or vessel during transport.
1.10.5. Stabilize material as necessary.
1.10.6. All vehicles, vessels and operators must be appropriately licensed and equipped to transport Non-Contaminated Quality Soil.
1.10.7. Barges must be inspected by an independent Marine Surveyor for stability and safety.
1.10.8. Non-Contaminated Quality Soil Disposal: dispose all Non-Contaminated Quality Soil, at Landfill Facility provided by Contractor and accepted by the Departmental Representative.
1.10.9. Landfill Facility must:
1.10.9.1. Be an existing offsite facility located in Canada or the United States.
1.10.9.2. 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.
1.10.9.3. 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.
1.10.9.4. Comply with requirements of acts, regulations, bylaws, and other requirements, in force or appropriately adopted as guidelines, including the BC Environmental Management Act and BC Landfill Criteria for Municipal Solid Waste, or Yukon Environment Act and Yukon Solid Waste Regulations, municipal zoning bylaws, or equivalent.
1.10.10. 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.
1.10.11. Material sent to a Landfill Facility must be permanently stored at that facility.
1.10.12. If proposed Landfill Facility is not acceptable to Departmental Representative, provide an alternate Landfill Facility that is acceptable.

1.11. Public Traffic Management

1.11.1. Where applicable, traffic to include pedestrian traffic.

1.11.2. Ensure pedestrians have safe and unencumbered access in public areas. Provide traffic control personnel wherever Contractor's activities (including vehicle crossings) impedes sidewalks, pathways, bike paths, roadways, or other public routes, or elsewhere as required or as directed by Departmental Representative.

1.11.3. Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.

1.11.4. 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.

1.11.5. Comply with current version of WorkSafeBC Occupational Health and Safety Regulation *Part 18 Traffic Control* or Yukon Workers' Compensation Health and Safety Board Occupational Health and Safety Act and Regulations *Public Way 1.46 and 1.47*, as appropriate.

1.11.6. Comply with current version of BC Ministry of Transportation and Infrastructure *2015 Interim Traffic Management Manual for Work on Roadways*.

1.11.7. Obtain all necessary permits or other authorizations regarding traffic control, including access and road usage.

1.11.8. 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.

1.11.9. Prevent tracking or spilling of debris or material onto private and public roads.

1.11.10. Immediately sweep or scrape up debris or material on private and public roads.

1.11.11. Clean public roads within a minimum 200 m radius of the Site entrance or as required at least once per shift, or as directed by Departmental Representative.

1.11.12. Departmental Representative can stop relevant Work at any time when Contractor's Work procedures are inadequate, when reasonable use of neighbouring properties are impacted, or when monitoring indicates that levels equal or exceed regulated levels in accordance with the Contract. Do not proceed with stopped Work until corrections accepted by Departmental Representative.

1.12. Noise, Vibration, Vapours, and Dust Control

1.12.1. Maintain acceptable levels not injurious or objectionable to worker safety, public health, the environment, and equipment and infrastructure.

1.12.2. Comply with applicable municipal bylaws and other applicable requirements; Contractor's Qualified Professional may determine lower acceptable levels.

1.12.3. Maximum levels allowed at site boundaries to prevent nuisance, unless otherwise accepted by Departmental Representative:

1.12.3.1. Noise: 55 dBa.

1.12.3.2. Vibration: 0.315 m/s^2 (based on ISO 2631-1).
1.12.3.3. Dust PM_{10}: 50 $\mu g/m^3$.
1.12.4. Departmental Representative can stop relevant Work at any time when Contractor's Work procedures are inadequate, when reasonable use of neighbouring properties are impacted, or when monitoring indicates that levels equal or exceed regulated levels, or levels in accordance with the Contract. Do not proceed with stopped Work until corrections accepted by Departmental Representative.
1.12.5. Specific procedures to prevent dust:
1.12.5.1. Cover or wet down relevant Work to prevent vapours and blowing dust and debris, including temporary roads, excavations, and stockpiles. In urban environments or if sensitive neighbouring properties (eg residences, parklands, protected areas) provide full time coverage or wetting down.
1.12.5.2. Covers to be impermeable (eg minimum 5 mil polyethylene) and securely fashioned to prevent blowing off. Use fresh (non-saline) water for dust and particulate control.
1.12.5.3. 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.
1.12.5.4. In urban environments or if sensitive neighbouring properties (eg residences, parklands, protected areas) provide privacy screening on security fence.

1.13. Spill Control

1.13.1. 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.
1.13.2. Prevent spills or releases.
1.13.2.1. Maintain temporary erosion and pollution control features.
1.13.2.2. Do not store fuel onsite other than tanks forming part of the equipment.
1.13.2.3. 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.
1.13.2.4. Control emissions from equipment and plant to meet applicable authorities' emission requirements.
1.13.2.5. Contractor to regularly inspect all machinery on the Site to ensure it is in good repair and free of leaks.
1.13.3. Be prepared to intercept, cleanup, and dispose of spills or other releases that can occur whether on land or water.
1.13.4. Spill kits and containment are to be maintained onsite and ready for deployment in the event of spills or other releases.
1.13.4.1. Spill kits are to include sufficient quantities of absorbent material, containers, booms, shovels and other tools, and personal protective equipment.

1.13.4.2. Spill response materials must be compatible with type of equipment being used or type of material being handled.
1.13.4.3. Spill kits are to be in close proximity to machinery.
1.13.4.4. During the Work there are to be trained and qualified personnel available that are ready to deploy spill kits when necessary.
1.13.5. Take immediate action using available resources to contain and mitigate effects on environment and persons from spill or release.
1.13.6. Promptly report spills and releases potentially causing damage to environment to:
1.13.6.1. Authority having jurisdiction or interest in spill or other release including conservation authority, water supply authorities, drainage authority, road authority, and fire department.
1.13.6.2. Contractor emergency response team including Superintendent.
1.13.6.3. Departmental Representative and other contractor(s) and individuals as directed by the Departmental Representative.
1.13.7. 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.
1.13.8. Remediation of soil, sediment or water contaminated by Contractor's activities.
1.13.8.1. Remediate all soil, sediment or water contaminated by Contractor's activities associated with the Work onsite and offsite.
1.13.8.2. 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.
1.13.8.3. Submit procedures for remediating soil, sediment or water contaminated by Contractor's activities.
1.13.8.4. Remediate as directed by the Departmental Representative.
1.13.8.5. Contractor is responsible for any additional investigation, testing, and assessments required as acceptable to the Departmental Representative.
1.13.9. Departmental Representative can stop relevant Work at any time when Contractor's Work procedures are inadequate, when reasonable use of neighbouring properties are impacted, or when monitoring indicates that levels equal or exceed regulated levels, or levels in accordance with the Contract. Do not proceed with stopped Work until corrections accepted by Departmental Representative.

1.14. Erosion and Sediment Control

1.14.1. 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.

1.14.2. Install effective erosion and sediment control measures before starting work to prevent sediment from entering the water body.
1.14.3. 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.
1.14.4. 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).
1.14.5. 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.
1.14.6. Regular inspection and maintenance of erosion and sediment control measures and structures during the course of construction.
1.14.7. Repair erosion and sediment control measures and structures if damage occurs.
1.14.8. Remove non-biodegradable erosion and sediment control materials once site is stabilized.
1.14.9. Departmental Representative can stop relevant Work at any time when Contractor's Work procedures are inadequate, when reasonable use of neighbouring properties are impacted, or when monitoring indicates that levels equal or exceed regulated levels, or levels in accordance with the Contract. Do not proceed with stopped Work until corrections accepted by Departmental Representative.

1.15. Work In or Adjacent to Waterways

1.15.1. Approvals and Practices:
1.15.1.1. As required, comply with Fisheries Act Approval and other relevant authorizations, permits and approvals and in accordance with the Contract. Obtain amendments as required by Contractor's methods, means, and sequences only if recommended by Contractor's Qualified Professional and accepted by Departmental Representative.
1.15.1.2. Restrict Work as described in, and follow requirements in, Contract including Environmental Effects Determination, Environmental Management Plan, Aquatic Effects Assessment, Environmental Mitigation Strategy, or similar documents. Variations allowed only if recommended by Contractor's Qualified Professional and accepted by Departmental Representative.
1.15.1.3. Follow practices described in *Land Development Guidelines for the Protection of Aquatic Habitat* (Fisheries and Oceans Canada/Ministry of Environment, Lands and Parks, 1993 September) and *Measures to avoid causing harm to fish and fish habitat including aquatic species at risk* (Fisheries and Oceans Canada, 2018 December 14).
1.15.1.4. Follow practices described in *Standards and Best Practices for Instream Works* (BC Ministry of Environment, 2004 March).

1.15.2. Timing

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

1.15.2.2. Minimize duration of in-water work.

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

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

1.15.3. Site Selection

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

1.15.3.2. Design and construct approaches to wetland and waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation. Design a Site Access Plan detailing areas of access and egress to Waterways and including equipment types and methods to limit riparian vegetation clearing for approval by the Departmental Representative.

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

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

1.15.4. Shoreline/bank Re-vegetation and Stabilization

1.15.4.1. Clearing of riparian vegetation should be kept to a minimum: use existing trails, roads or cut lines wherever possible to avoid disturbance to the riparian vegetation and prevent soil compaction. When practicable, prune or top the vegetation instead of grubbing/uprooting. Coordinate with Departmental Representative for fish and wildlife salvage prior to conducting Work within or Adjacent to waterbodies

1.15.4.2. 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. Coordinate with Departmental Representative to conduct pre-clearing nesting bird surveys prior to vegetation clearing

1.15.4.3. 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.

1.15.4.4. 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.

1.15.4.5. 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.
1.15.4.6. Remove all construction materials from site upon project completion.
1.15.4.7. Do not remove riparian vegetation if the riparian area is identified as part of critical habitat of an aquatic listed Species At Risk.
1.15.5. Aquatic Life Protection
1.15.5.1. Ensure that all in-water activities, or associated in-water structures, do not interfere with aquatic life passage, constrict the channel width, or reduce flows, or result in the stranding or death of aquatic life.
1.15.5.2. Contractor's Qualified Professional to ensure applicable permits for relocating fish are obtained and to capture any fish trapped within an isolated/enclosed area at the work site and safely relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the site.
1.15.5.3. Any capture and relocation of an endangered or threatened aquatic Species At Risk will require approval from Department of Fisheries and Oceans.
1.15.6. Water Intake or Outlet Pipe Screening:
1.15.6.1. Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish. Entrainment occurs when a fish is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself.
1.15.6.2. Screens should be located in areas and depths of water with low concentrations of fish throughout the year.
1.15.6.3. Screens should be located away from natural or artificial structures that may attract fish that are migrating, spawning, or in rearing habitat.
1.15.6.4. The screen face should be oriented in the same direction as the flow.
1.15.6.5. Ensure openings in the guides and seals are less than the opening criteria to make "fish tight".
1.15.6.6. Screens should be located a minimum of 300 mm (12 in.) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the bottom area.
1.15.6.7. Structural support should be provided to the screen panels to prevent sagging and collapse of the screen.
1.15.6.8. Large cylindrical and box-type screens should have a manifold installed in them to ensure even water velocity distribution across the screen surface. The ends of the structure should be made out of solid materials and the end of the manifold capped.
1.15.6.9. Heavier cages or trash racks can be fabricated out of bar or grating to protect the finer fish screen, especially where there is debris loading (woody material, leaves, algae mats, etc.). A 150 mm (6 in.) spacing between bars is typical.

1.15.6.10. Provision should be made for the removal, inspection, and cleaning of screens.
1.15.6.11. Ensure regular maintenance and repair of cleaning apparatus, seals, and screens is carried out to prevent debris-fouling and impingement of fish.
1.15.6.12. Pumps should be shut down when fish screens are removed for inspection and cleaning.
1.15.7. Explosives:
1.15.7.1. Avoid using explosives in or near water. Use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs. Blasting vibrations may also kill or damage fish eggs or larvae.
1.15.7.2. Do not use explosives where SARA-listed aquatic species, their residences or critical habitat occur, without review by Department of Fisheries and Oceans.
1.15.8. Operation of Machinery
1.15.8.1. Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.
1.15.8.2. Whenever possible, operate machinery on land above the high water mark, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody.
1.15.8.3. Limit machinery fording of the watercourse to a one-time event (ie over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure.
1.15.8.4. Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (eg dominated by organic materials and silts) banks and beds. For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (eg swamp mats, pads) if minor rutting is likely to occur during fording.
1.15.8.5. Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.
1.15.8.6. Do not ford, place crossing materials or operate machinery on the bed of a waterbody where SARA-listed shellfish occur, or critical habitat or residences of freshwater SARA-listed aquatic species occur.

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 utility services.

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. Also includes ongoing services including administration, overhead, project management, security, surveying, noise monitoring, vibration monitoring, utility services, 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. Lump sum may be pro-rated based on duration in Master Plan for Extension of Time.

1.1.3. Site Facilities - Provision and Operation for Consultants will be paid in accordance with lump sum price for individual onsite accommodations for four consultants that meets the approval of the Departmental Representative. Includes a minimum of a lockable access door, four floor to ceiling walls, bed, washroom facilities including hot showers, access to and supply of potable water, kitchen facilities equipped to store perishable foods and prepare hot meals/drinks, heating/cooling system capable of maintaining room temperatures up to 22 degrees Celsius, interior and exterior lighting, access to electricity and satellite Wi-fi communications. Contractor is responsible for sewage and grey water pump out and offsite disposal. Lump sum may be pro-rated based on duration in Master Plan for Extension of Time.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

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

1.3.1.1. Equipment and personnel decontamination areas.

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

1.3.1.3. Equipment and material staging areas.
1.3.1.4. Stockpile areas and construction details, including base preparation and water control features.
1.3.1.5. Exclusion areas, contaminant handling areas, and other areas identified in Contractor's site-specific Health and Safety Plan and Environmental Protection Plan.
1.3.1.6. Grading, including contours, required to construct temporary facilities.
1.3.1.7. Location of all temporary facilities including: Onsite Contaminated Water Treatment Plant, truck wash and decontamination units, office trailers, modular camp structures, parking, storage, environmental monitoring stations, above ground and underground utilities, roads, and other temporary facilities.
1.3.2. Signs: at least 5 Working Days prior to posting, Submit any signs viewable by public.

1.4. Utility Services

1.4.1. Utility Services (including electrical power, potable water, sewers, and telecommunications) 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. Sanitary Facilities

1.5.1. Provide sanitary facilities for work force (including Contractor, Subcontractors, Departmental Representative, and Consultants) in accordance with governing regulations and ordinances.
1.5.2. Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.6. Fire Protection

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

1.7. Access and Delivery

1.7.1. Only the designated entrance in accordance with the Contract can be used for access to Site.
1.7.1.1. Maintain for duration of Contract.
1.7.1.2. Make good damage resulting from Contractor’s use.
1.7.2. Use of the Site will be granted to the Contractor through the Departmental Representative.

1.8. Installation and Removal

1.8.1. 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.

1.8.2. Identify areas which have to be graveled or otherwise treated to prevent tracking of mud.
1.8.3. Indicate use of supplemental or other staging area.
1.8.4. Provide construction facilities in order to execute work expeditiously.
1.8.5. Provide temporary utilities in order to execute Work expeditiously.
1.8.6. Remove from Site all such Work after use.

1.9. Site Storage/Loading

1.9.1. Confine work and operations of employees in accordance with the Contract. Do not unreasonably encumber premises with products.
1.9.2. Storage space must be limited to the Site.
1.9.3. Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.10. Construction Parking

1.10.1. Parking of private vehicles will not be permitted on Site, unless otherwise agreed to by Departmental Representative.
1.10.2. Provide and maintain adequate access to project site.

1.11. Security

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

1.12. Departmental Representative and Consultant Offices

1.12.1. Provide office facilities for the exclusive use of the Departmental Representative and their consultants with the following minimum intent, modified as per the Contract, or as directed by the Departmental Representative:
1.12.1.1. Two work stations within factory fabricated modular units.
1.12.1.2. Work stations must include; 1 desk (minimum size 120 cm x 50 cm, minimum height 70 cm), 1 swivel desk chair (minimum load requirement 100 kg), 1 bookshelf (minimum 3 shelves with a minimum shelf height of 32 cm), 1 locking filing cabinet (minimum dimensions 50 cm x 39 cm x 60 cm), 1 garbage can, and 1 recycling bin.
1.12.1.3. Building envelope: watertight construction.
1.12.1.4. Completed building: exterior to interior minimum sound attenuation of STC 30.
1.12.1.5. Building interior environment: heated and cooled to maintain temperature of 20 degrees C minimum to 25 degrees C maximum with relative humidity of 35% to 60%.
1.12.1.6. Provide ventilation and outdoor air as per ASHRAE 62.1 – 2010 Standard.

1.12.1.7. Building lighting: maintain measured lighting level of 200 lx at 1500 mm above finished floor, after building finishes and painting complete.
1.12.1.8. Thermal performance of window units: Maximum heat transfer rate (U-value) not to exceed 2.0 W/m2K.
1.12.1.9. Regularly collect refuse and recyclables and keep the office clean and properly maintained with heat and light.
1.12.1.10. Provide private washroom facilities in offices in accordance with the Contract, complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.
1.12.1.11. The work stations and contents must be for the sole use of the Departmental Representative and their consultant(s) for the duration of the Work and may, if necessary, be used concurrently with other inspection agencies.
1.12.2. Installation:
1.12.2.1. Install level and plumb.
1.12.2.2. Install stairs.
1.12.2.3. Adjust doors and windows for smooth operation.
1.12.3. Provide a minimum of 2 parking spaces for Departmental Representative and their consultants adjacent to offices.

1.13. Equipment, Tools and Materials Storage

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

1.14. Construction Signage

1.14.1. 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.
1.14.2. Contractor signage must be accepted by Departmental Representative.
1.14.3. Contractor signage must include at a minimum:
1.14.3.1. Name of Contractor.
1.14.3.2. Emergency contact number.
1.14.3.3. Personal Protective Equipment requirements.
1.14.3.4. Other pertinent safety warnings (eg “open excavation”).
1.14.4. Maintain accepted signs and notices in good condition for duration of project, and dispose of offsite on completion of project or earlier if directed by Departmental Representative.

1.15. Onsite Traffic Management

1.15.1. Where applicable, traffic to include pedestrian traffic.

1.15.2. Provide access and temporary relocated roads as necessary to maintain traffic.
1.15.3. Maintain and protect traffic on affected roads during construction period.
1.15.4. 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.
1.15.5. Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
1.15.6. Verify adequacy of existing roads and allowable load limit on these roads. Contractor responsible for repair of damage to roads caused by construction operations.

1.16. Onsite Roads

1.16.1. Where applicable, traffic to include pedestrian traffic.
1.16.2. Construct, operate and maintain the onsite access roads as required.
1.16.3. Design of temporary onsite access roads to be signed and sealed by Contractor's Qualified Professional where location of road causes stability concerns, or as required by Departmental Representative.
1.16.4. Location, alignment, design and construction of all detour, access and haul roads subject to the acceptance of the Departmental Representative.
1.16.5. Employ suitable measures to maintain quality, visibility, and safe conditions in the use of access, detour and haul roads associated with the Work.
1.16.6. Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
1.16.7. Maintain and clean roads for duration of Work, keep dry and free of mud. Control dust to ensure safe operation at all times.
1.16.8. Provide snow removal during period of Work.
1.16.9. Remove, upon completion of work, haul roads designated by Departmental Representative.

1.17. Truck Wash and Decontamination Units

1.17.1. Provide, install and operate truck wash, including the installation of a water supply, or as directed by the Departmental Representative:
1.17.1.1. No vehicles which have come in contact with Contaminated Material must leave the Site without passing through the truck wash.
1.17.1.2. 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.
1.17.1.3. 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.
1.17.1.4. Recycle or treat as Contaminated Water truck wash water.
1.17.2. Alternatives to a truck wash, including isolating truck traffic from contact with Contaminated Material, may be accepted 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.

1.17.3. Provide 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 Material. Provide decontamination units for work force.
1.17.3.1. At least one personnel decontamination unit must have overhead shower capability.
1.17.3.2. The personnel decontamination units to be available to Departmental Representative and their consultants.
1.17.3.3. The personnel decontamination units are subject to acceptance of Departmental Representative.
1.17.4. The truck wash and personnel decontamination units must be maintained in good working order during onsite Work.
1.17.5. The truck wash and personnel decontamination units must be removed from the Site during Site Decommissioning.

1.18. Clean-Up
1.18.1. Remove construction debris, waste materials, packaging material from work site daily.
1.18.2. Clean dirt or mud tracked onto paved or surfaced roadways.
1.18.3. Store materials resulting from demolition activities that are salvageable.
1.18.4. Stack stored new or salvaged material not in construction facilities.

1.19. Storage Tanks
1.19.1. 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.
1.19.2. Temporary storage tanks subject to the regulations must be registered with Environment Canada.
1.19.3. Mobile tanks subject to the regulations must be certified to be mobile.
1.19.4. Storage tanks to meet the following minimum requirements:
1.19.4.1. Corrosion protection.
1.19.4.2. Secondary containment.
1.19.4.3. Containment sumps, if applicable.
1.19.4.4. Overfill protection.
1.19.5. All components of tank system must bear certification marks indicating that they conform to the standards set out in the regulations.
1.19.6. Product transfer area must be designed to contain spills.
1.19.7. Prepare an emergency plan.
1.19.8. Prior to first filling, storage tanks must:
1.19.8.1. Be registered.
1.19.8.2. Be certified and marked.
1.19.8.3. Transfer area be constructed.
1.19.8.4. 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. Contaminated Water Treatment Onsite-Provision will be paid in accordance with lump sum price established to design, temporarily provide for duration of Work, and erect all onsite ancillary tanks, storage containers, equipment and piping to collect, store, and sample contaminated or potentially Contaminated Water. Includes provision for dewatering of Contaminated Water from excavation or STF. Includes provision of Onsite Contaminated Water Treatment Plant.

1.1.2. Contaminated Water Treatment Onsite-Operation will be paid in accordance with the lump sum price established to process Contaminated Water onsite. Includes all onsite ancillary tanks, storage containers, equipment and piping to collect, store, and sample Contaminated or potentially Contaminated Water. Includes operation of dewatering of Contaminated Water from excavation or STF. Includes treating Non-Aqueous Phase Liquids. Includes operation of Onsite Contaminated Water Treatment Plant and discharge piping. Includes analytical testing to demonstrate compliance with Contract. Lump sum may be pro-rated based on duration in Master Plan for Extension of Time.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Contaminated Water Treatment Provision Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit methods, means, and sequences for Contaminated Water Treatment Plant Provision 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. Includes onsite infrastructure. Must be signed by Contractor's Qualified Professional.

1.3.2. Provide copies of all correspondence with Discharge Approval authority, including:

1.3.2.1. Copy of Discharge Approval including: approval from authority having jurisdiction, discharge criteria, and sampling requirements (including substances and other parameters, and frequency).

1.3.2.2. Copy of test results forwarded to Discharge Approval authority.

1.3.2.3. Copy of changes to Discharge Approval, including orders to cease discharge.

1.3.3. Onsite Contaminated Water Treatment Plant Testing:

1.3.3.1. Within 5 Working Days of conducting initial operations testing, and prior to operating or discharge, Submit results of initial operations test.

1.3.3.2. Within 5 Working Days of sampling Submit sampling results of operational (recurrent) testing.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Contaminated Water Transport

3.1.1. Assume ownership of, and be responsible for Contaminated Water once it enters the Onsite Contaminated Water Treatment Plant

3.2. Contaminated Water Treatment Onsite

3.2.1. Design and Discharge Requirements:

3.2.1.1. Design and Operating Criteria: design Contaminated Water Treatment Plant capable of treating Contaminated Water generated from dewatering excavations and Work areas to meet Discharge Approval requirements, capable of removing oil, suspended solids, particulates, and asbestos fibers, and filter water through 5-micron particulate filter prior to discharge.

3.2.1.2. Discharge to environment only in compliance with the Discharge Approval and requirements by the Discharge Approval authority. Discharge to environment only as determined by Contractor’s Qualified Professional and as accepted by Departmental Representative.

3.2.2. Initial Testing: determine performance of Contaminated Water Treatment Plant provided by Contractor as follows prior to commencing excavation:

3.2.2.1. Test run with potable water to ensure operation, no leaks are occurring, and no contaminants are introduced into treated water.

3.2.2.2. Performance verification (contaminant removal) with Contaminated Water test batch to ensure treatment is effective. Treat, store, test, and assess samples by Contractor's Qualified Professional.

3.2.2.3. Provide access for independent collection of treated stored water samples by the Departmental Representative.

3.2.3. Operational Testing:

3.2.3.1. Operate Contaminated Water Treatment Plant using experienced, qualified personnel and in accordance with manufacturer's instructions and procedures as Submittals by Contractor.

3.2.3.2. Collect, analyze, and assess samples as required by Contractor's Qualified Professional, and at a minimum of every 72 hours of operation.

3.2.3.3. Provide access for independent collection of samples by the Departmental Representative.

3.2.3.4. On basis of analytical results by Contractor or Departmental Representative obtained from samples collected at the discharge point, cease discharge and make Plant modifications required for effluent to satisfy effluent criteria as directed by the Departmental Representative or Discharge Approval authority. Perform Initial Testing after Plant modifications.

3.2.4. Decommissioning/Dismantling:

3.2.4.1. Decontaminate and remove salvageable components of Contaminated Water Treatment Plant including treatment system, pumps, piping, and electrical equipment.

3.2.4.2. Dispose of non-salvageable equipment and materials at Disposal Facility accepted by the Departmental Representative. Decontaminate salvageable equipment as required prior to demobilization from Site.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Contaminated Water Treatment Offsite-Provision will be paid in accordance with lump sum price established to design, temporarily provide for duration of Work, and erect all onsite ancillary tanks, storage containers, equipment and piping to collect, store, and sample contaminated or potentially Contaminated Water. Includes dewatering of Contaminated Water from excavation or STF and during STF decommissioning at Iron Creek Maintenance Camp. Includes provision of bulk storage tanks and loading facilities for Offsite Water Treatment Facility.

1.1.2. Contaminated Water Treatment Offsite-Operation will be paid in accordance with the lump sum price established to process Contaminated Water offsite. Includes all onsite ancillary tanks, storage containers, equipment and piping to collect, store, and sample Contaminated or potentially Contaminated Water. Includes operation of dewatering of Contaminated Water from excavation or STF and during STF decommissioning at Iron Creek Maintenance Camp. Includes treating Non-Aqueous Phase Liquids. Includes Transport and Treatment at Offsite Contaminated Water Treatment Facility. Includes analytical testing to demonstrate compliance with Contract. Lump sum may be pro-rated based on duration in Master Plan for Extension of Time.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Contaminated Water Treatment Provision Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit methods, means, and sequences for Contaminated Water Treatment Plant Provision 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. Includes onsite infrastructure.

1.3.2. Offsite Contaminated Water Treatment Facility Plan: at least 10 days prior to transporting material to a Treatment Facility, Submit documentation describing Treatment Facility. Include for each Treatment Facility:

1.3.2.1. Copy of permit, certificate, approval, license, or other required form of authorization issued by a Facility Authority for the Treatment of relevant Contaminated Water.

1.3.2.2. Letter from Contractor's Qualified Professional that the Treatment Facility is appropriate for the nature, type, concentration, and quantity of Contaminated Water to be Treated in accordance with any authorization and complies with appropriate government requirements of a general nature (eg BC Landfill Criteria).

1.3.2.3. Letter from Treatment Facility that they can accept within the schedule in Contract the nature, type, concentration, and quantity of Contaminated Water to be Treated at the Facility, signed by an authorized representative of the Facility.

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

1.3.3.1. Issued by the Treatment Facility.

1.3.3.2. On company letterhead.

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

1.3.3.4. Date and weight for each shipment received and total weight received at the offsite facility.

1.3.3.5. Date and weight for each treatment event and total weight treated at the offsite facility.

1.3.3.6. Treatment methodology.

1.3.3.7. Laboratory certificates demonstrating Treatment objectives were met.

1.3.3.8. Disposition of treated material.

1.3.3.9. Signed by identified authorized treatment company representative.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Contaminated Water Transport

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

3.2. Contaminated Water Treatment Offsite

3.2.1. Assume ownership of, and be responsible for, Contaminated Water treated offsite.

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

3.2.3. Offsite Treatment Facility must:

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

3.2.3.2. Be designed, constructed and operated for the handling or processing of Contaminated Water for the purposes of Treatment.

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

3.2.3.4. Comply with requirements of acts, regulations, bylaws, and other requirements, in force or appropriately adopted as guidelines, including the BC Environmental Management Act and BC Landfill Criteria for Municipal Solid Waste, or Yukon Environment Act and Yukon Solid Waste Regulations, municipal zoning bylaws, or equivalent.

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

3.2.5. Water sent to an offsite Treatment Facility must subsequently be discharged in compliance with a Discharge Approval.

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/amending, loading, hauling, unloading, transfer, interim storage, and transport to and from intermediate locations and final placement location. Stabilization/amending includes all measures required to prepare material for Transport, Treatment, and Disposal; includes provision and application of stabilizers or other amendments. 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. 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.

1.3.1.2. Letter from Contractor's Qualified Professional that the Transfer/Interim Storage Facility is appropriate for the nature, type, concentration, and quantity of Contaminated Soil to be Transferred/Interim Stored in accordance with any authorization and complies with appropriate government requirements of a general nature (eg BC Landfill Criteria).

1.3.1.3. Letter from Transfer/Interim Storage Facility that they can accept within the schedule in Contract the nature, type, concentration, and quantity of Contaminated Soil to be Transferred/Interim Stored at the Facility, signed by an authorized representative of the Facility.

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 for transport 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 certified by an independent Marine Surveyor for stability.
3.1.8. Manifest and correlate quantities of all Contaminated Soil transported from Site documenting nature, type, concentration, and quantity 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 requirements of acts, regulations, bylaws, and other requirements, in force or appropriately adopted as guidelines, including the BC Environmental Management Act and BC Landfill Criteria for Municipal

Solid Waste, or Yukon Environment Act and Yukon Solid Waste Regulations, municipal zoning bylaws, or equivalent.

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 Contractor's Qualified Professional that the Disposal Facility is: appropriate for the nature, type, concentration, and quantity of Contaminated Soil to be Disposed in accordance with any authorization; complies with appropriate government requirements of a general nature (eg BC Landfill Criteria); and meets the Disposal Facility Minimum Criteria.

1.3.1.2. Letter from Disposal Facility that they can accept within the schedule in Contract the nature, type, concentration, and quantity of Contaminated Soil to be Disposed at the Facility, signed by an authorized representative of the Facility.

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

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

1.3.2.1. Issued by the Disposal Facility.

1.3.2.2. On company letterhead.

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

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

1.3.2.5. Identification of acceptance of final ownership of material.

1.3.2.6. Signed by identified authorized disposal company representative.

2. PART 2 - PRODUCTS

2.1. Not Used

2.1.1. Not Used.

3. PART 3 - EXECUTION

3.1. Contaminated Soil Disposal

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

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

3.1.3. Disposal Facility must:

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

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

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

3.1.3.4. Comply with requirements of acts, regulations, bylaws, and other requirements, in force or appropriately adopted as guidelines, including the BC Environmental Management Act and BC Landfill Criteria for Municipal Solid Waste, or Yukon Environment Act and Yukon Solid Waste Regulations, municipal zoning bylaws, or equivalent.

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.

3.2. Disposal Facility Minimum Criteria

3.2.1. Designed, inspected, and monitored by a Qualified Professional.

3.2.2. Closure Plan prepared by a Qualified Professional.

END OF SECTION

1. PART 1 - GENERAL

1.1. Measurement Procedures

1.1.1. Soil Turning will be paid in accordance with unit rate price established for time of excavator to access the Treatment Cells and flip the soil as directed by Department Representative. Includes during the Iron Creek Maintenance Camp STF decommissioning. Measurement as recorded time by Departmental Representative.

1.1.2. Fertilizer Provision and Application will be paid in accordance with unit rate price established for weight of fertilizer supplied and applied to the Treatment Cells to assist with bioremediation. Includes all associated costs to provide, store and apply the high nitrogen water soluble fertilizer at the location identified by the Departmental Representative.

1.1.3. Water Application will be paid in accordance with unit rate price established for volume of water supplied and applied to the Treatment Cells to assist with bioremediation. Include all costs associated with dispersing the sump water during treatment of contaminated soil. Measurement as recorded volume by Departmental Representative.

1.1.4. Aerator Operation will be paid in accordance with unit rate price established for time of tractor or excavator to aerate soil within Treatment Cells to depth and degree as directed by Departmental Representative. Includes removal of Debris. Measurement as recorded time by Departmental Representative.

1.1.5. Bioremediated Soil Relocation will be paid in accordance with unit rate price established for volume of soil moved from the Treatment Cells to the Bioremediated Soil Staging Cells. Also includes movement of bioremediated soil from Bioremediated Soil Staging Cells back to Treatment Cells as directed by Departmental Representative. Includes grading and sediment control measures at the Staging Cells. Measurement as recorded exsitu volume using Progress Survey.

1.1.6. Soil Sampling Assistance will be paid in accordance with unit rate price established for time of backhoe or excavator to access the Bioremediated Soil Staging Cells to excavate soil sampling locations as directed by Department Representative. Includes during the Iron Creek Maintenance Camp STF decommissioning. Measurement as recorded time by Departmental Representative.

1.1.7. Compliant Soil Relocation will be paid in accordance with unit rate price established for volume of soil moved from the STF or Bioremediated Soil Staging Cells to the Compliant Soil Stockpile Area. Includes stockpiling, grading and sediment control measures at the Compliant Soil Stockpile Area and stockpiling and grading in the STF. Includes during the Iron Creek Maintenance Camp STF decommissioning. Measurement as recorded exsitu volume using Progress Survey.

1.1.8. STF Decommissioning will be paid in accordance with the lump sum price established to decommission the Iron Creek STF according to Annexes. Includes decommissioning of STF perimeter wells and disposal of generated material, disposal of plywood cover, STF liner, cover and hold downs, final grading inside of the STF fenced area, hydroseeding and removal of any incidental or generated material.

1.1.9. Fertilizer Application will be paid in accordance with unit rate price established for weight of PSPC supplied fertilizer applied to the Treatment Cells to assist with bioremediation. Includes all associated costs to store and apply the high nitrogen water soluble fertilizer at the location identified by the Departmental Representative.

1.2. Definitions

1.2.1. See 01 11 55.

1.3. Action and Informational Submittals

1.3.1. Contaminated Sites Onsite STF Operation Plan: within 10 Working Days after Contract award and prior to mobilization to Site, Submit methods, means, and sequences for Contaminated Sites Onsite STF Operation 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. Repair material.

1.3.1.2. Procedures for repair.

1.3.1.3. Monitoring and inspection requirements.

2. PART 2 - PRODUCTS

2.1. Fertilizer

2.1.1. Fertilizer to have N:P:K ratio of 10:1:1 or higher for Nitrogen (eg 30:3:3 or 40:4:4). Fertilizer to be in weatherproof container suitable for unprotected storage onsite for at least 1 year.

2.2. Equipment

2.2.1. Aerator to be one or more tractor and/ or excavator:

2.2.1.1. Tractor to be four wheel drive or track mounted with cultivator (including disks or tines, or combination) as appropriate for site conditions to complete Work within Schedule.

2.2.1.2. Excavator to be a tracked excavator with a suitable attachment (including allu bucket, mixer, tiller, auger, screener, raker, or combination) as appropriate for site conditions to complete Work within Schedule.

3. PART 3 - EXECUTION

3.1. Soil Treatment Onsite Facility Preparation

3.1.1. Remove cover and hold downs.
3.1.2. Remove vegetation that could potentially damage liner, including roots.
3.1.3. Inspect berms. Grade or place material to maintain height and integrity of berms.
3.1.4. Inspect granular base protective layer of liner. Grade base layer to allow uniform slope to sump. Notify Departmental Representative if less than 0.5m thick at any location.
3.1.5. Inspect visually liner for damage, including both the base and the berms. Excavate protective base layer in suspect areas (eg depressions that may be due to piping through a liner hole or areas where previous excavations may have led to a liner tear) to inspect liner for damage. Notify Departmental Representative of any significant damage.
3.1.6. Make good repairs of any pre-existing damage to liner, including berms, base and cover. Be prepared to repair a minimum of 10 square meters of liner or as shown on Drawings.
3.1.7. Pump any collected or sump water from pre-existing stockpile or Onsite STF. Treat or otherwise discharge water as required according to Contract or as directed by Departmental Representative.
3.1.8. Grade surface of soil to allow stockpiling or bioremediation activities.

3.2. Soil Treatment Onsite

3.2.1. Remove debris from the Treatment Cells. Debris is Non-Contaminated Quality Material that will interfere with tilling of soil within the Land Treatment Facility at a Landfill. Debris includes: rocks, concrete, brick, metal, wood.
3.2.2. Turn soil in the Treatment Cells using an excavator or tractor as directed by Department Representative. Bucket of the excavator must be marked and it must not come in contact with the geotextile separator marker layer.
3.2.3. Provide and apply fertilizer to soils in Treatment Cells as directed by Department Representative. This includes all associated costs to transport and store the nitrate fertilizer at the location specified by the Departmental Representative.
3.2.4. Provide and apply water (as needed) to soils in Treatment Cells as required based on field observations at application rates and methodology as accepted by Departmental Representative.
3.2.5. Aerate the upper 400 mm of the contaminated soil within to soils in Treatment Cells with Aerator based on field observations by Departmental Representative. This process will be repeated for additional lifts as the upper layer is deemed bioremediated by the Departmental Representative.
3.2.6. Move bioremediated soil from to soils in Treatment Cells to the Bioremediated Soil Staging Cells adjacent the Treatment Cells. Bioremediated soil to be windrowed as directed by the Departmental Representative to allow exsitu

sampling by the Departmental Representative. Fertilizer may be applied as directed by the Departmental Representative.

3.2.7. Facilitate soil confirmation sampling in the Bioremediated Soil Staging Cells using a backhoe or excavator as directed by Department Representative. Departmental Representative responsible for confirmation sample collection, analysis and assessment.

3.2.8. Once confirmation sample has been collected by the Department Representative it may take up to 10 Working Days to complete analysis and assessment. No Standby Time charges or increases to Contract Amount or Extension of Time for completion of the Work can be incurred for Confirmation Sampling results provided within 10 Working Days, not including day of sample collection.

3.2.9. Once the bioremediated soil is confirmed compliant by the Departmental Representative, move compliant soil to the Compliant Soil Stockpile Area within 500 m of the Bioremediated Soil Staging Cells. The compliant soil in the storage area will be required to be stockpiled as directed by the Departmental Representative. Fertilizer may be applied as directed by the Departmental Representative. Move non-compliant soil back into Treatment Cells for additional bioremediation as directed by Departmental Representative.

3.2.10. Trucks are only to operate on Onsite STF when there is a minimum of 1m of soil present.

3.2.11. Tracked equipment is only to operate on Onsite STF when there is a minimum of 0.5m of soil present

3.3. Onsite STF Closure

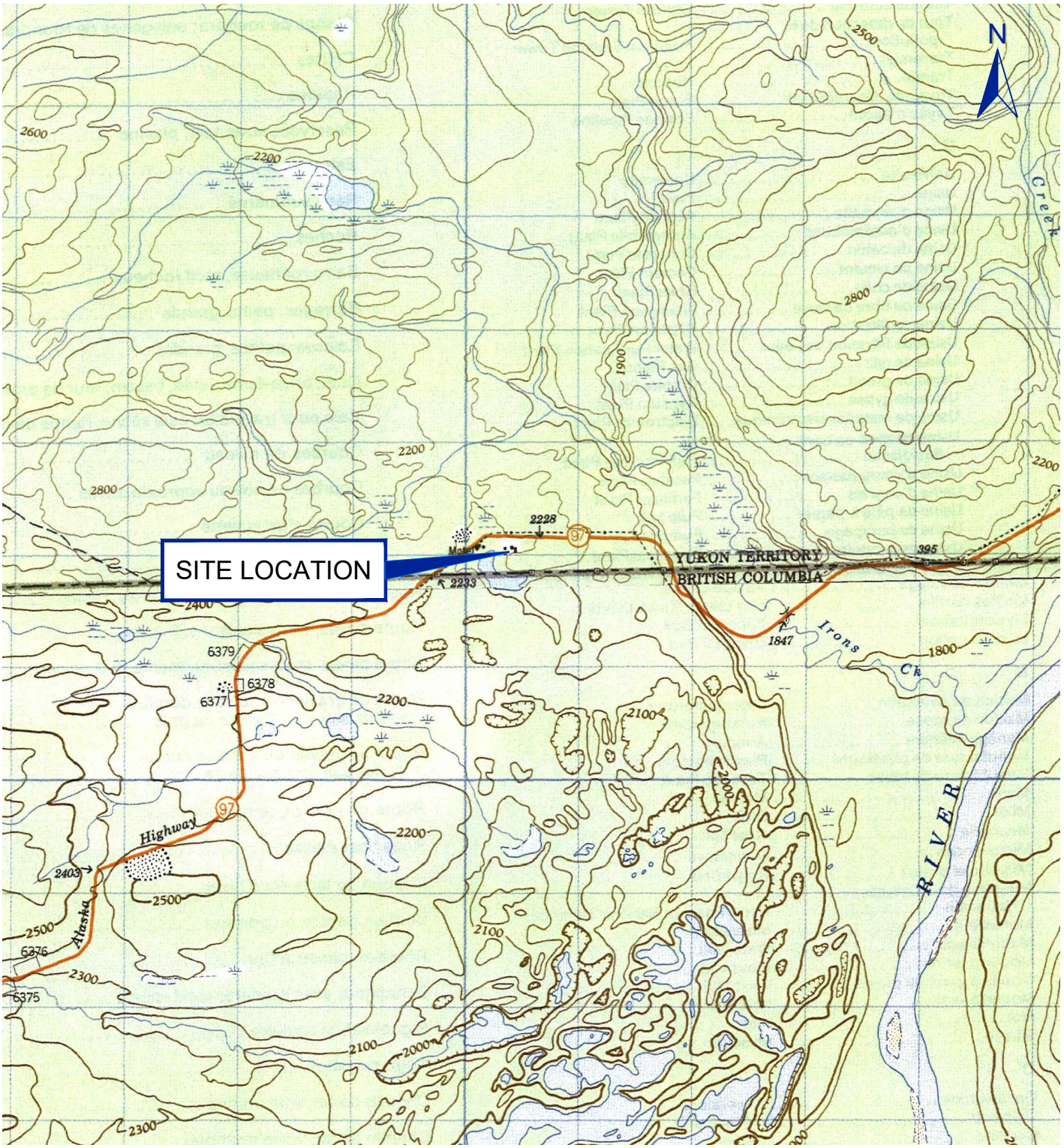
3.3.1. At completion of transport and placement of material to Onsite STF:

3.3.1.1. Grade soil for drainage to prevent ponding within STF.

3.3.1.2. Cover soil and secure cover with hold downs after grading soil for drainage.

END OF SECTION

Drawing No.	Drawing Title
Iron Creek Maintenance Camp	
1	Site Location Map
2	Site Plan
8	SW Isometric View of Biocell with Cross-Section A-A’



REFERENCED FROM : ETOPO MAP SYSTEM NTS MAP 94 D/04 AND 94 M/13

PUBLIC WORKS AND GOVERNMENT SERVICES
IRON CREEK MAINTENANCE CAMP
km 922 ALASKA HIGHWAY
YUKON TERRITORY

SOIL TREATMENT FACILITY OPERATION

SITE LOCATION MAP

0 0.5 1 2 3 km

SCALE 1:50,000
WHEN PLOTTED CORRECTLY ON A 8.5 x 11 PAGE LAYOUT
NAD 1983 UTM Zone 9 V

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

SLR global environmental solutions

Date: December 2, 2019	Drawing No. 1
Project No. 205.03986.00000	

Cadfile name: S_205-03986-00000-A1.dwg

Y.T. HIGHWAY NO. 1 (ALASKA HWY)

N

LOT 4 GROUP 758

PLAN 90461 CLSR
2005-0105 LTO

LOT 1001 QUAD 95
D/4 PLAN 74906
CLSR

SLOPE DOWN

EDGE OF TREES

WELL HOUSE

SLOPE DOWN

YARD

SALT SHED

MW14-01-S
MW14-05
MW14-06
MW14-01-D

MW14-02

RESIDENTIAL TRAILERS

MW14-03

MW14-04

NEW MAINTENANCE GARAGE LOCATION

NEW AST FUELING PAD LOCATION

LOT 3
GROUP 758 PLAN
50934 CLSR

MW10-22D
MW11-32
MW10-22

MW11-33
MW10-23

SLOPE FOR DRAINAGE

MW10-26

MW10-25

EDGE OF TREES

MW11-31
MW11-30

MW10-27

MW10-24

POSITIVE DRAINAGE DITCHES

NOTES:
REFERENCED FROM: YUKON HIGHWAYS AND PUBLIC WORKS GEOYUKON ONLINE MAPPING APPLICATION, SLR CONSULTING DRAWINGS ACADD10-87.DWG AND ACADD11-249.DWG AND SITE RECONNAISSANCE INFORMATION.

LEGAL DESCRIPTION:
LOT 3 GROUP 758 PLAN 50934 CLSR
YUKON TERRITORY

LEGEND:

- PROPERTY BOUNDARY
- SITE BOUNDARY
- LTF FACILITY AREA
- FENCE
- TOP OF BERM
- TOE OF BERM
- TOP OF CRUSH
- TOE OF CRUSH
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL

0 10 20 40 60 m

SCALE 1:1,000
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 9 V

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

PUBLIC WORKS AND GOVERNMENT SERVICES
IRON CREEK MAINTENANCE CAMP
km 922 ALASKA HIGHWAY
YUKON TERRITORY

SOIL TREATMENT FACILITY OPERATION

SITE PLAN

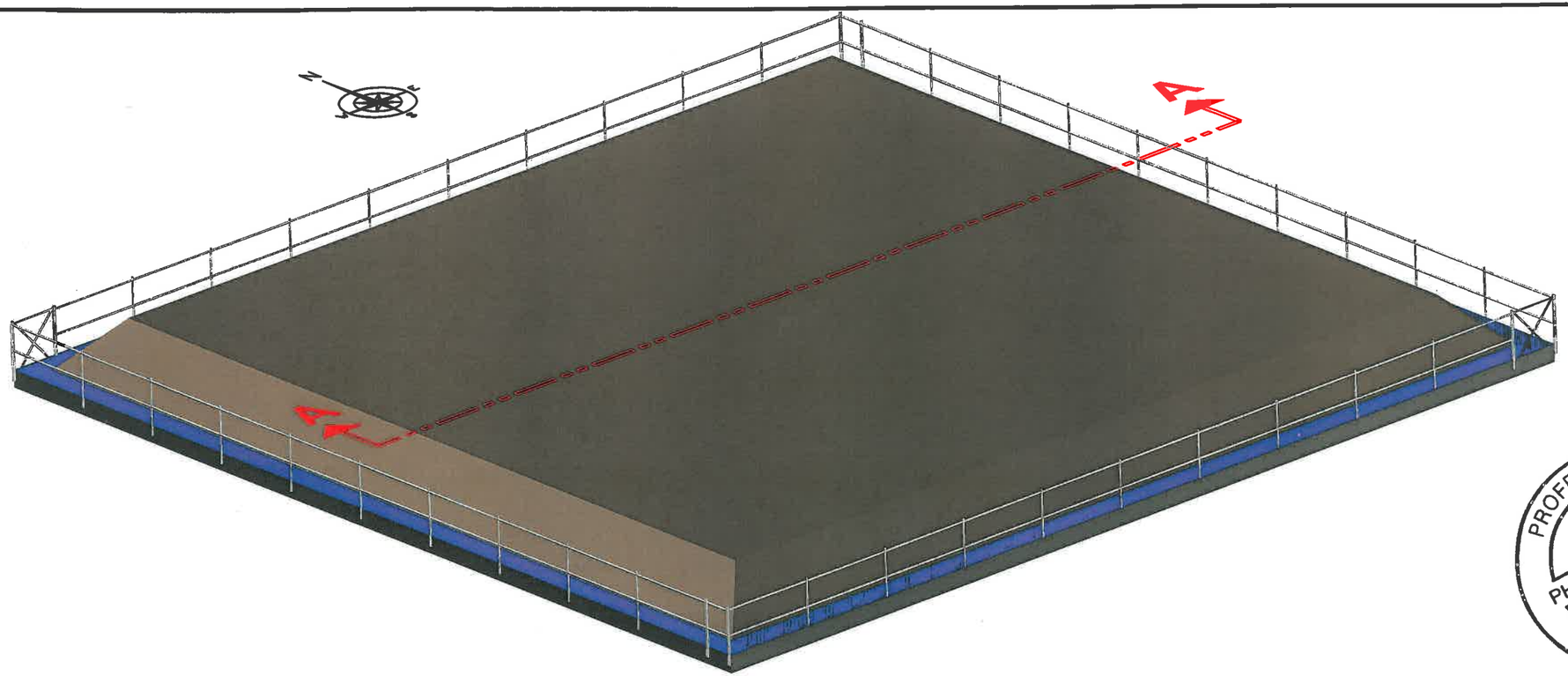
Date: December 2, 2019

Project No. 205.03986.00000

Drawing No. 2

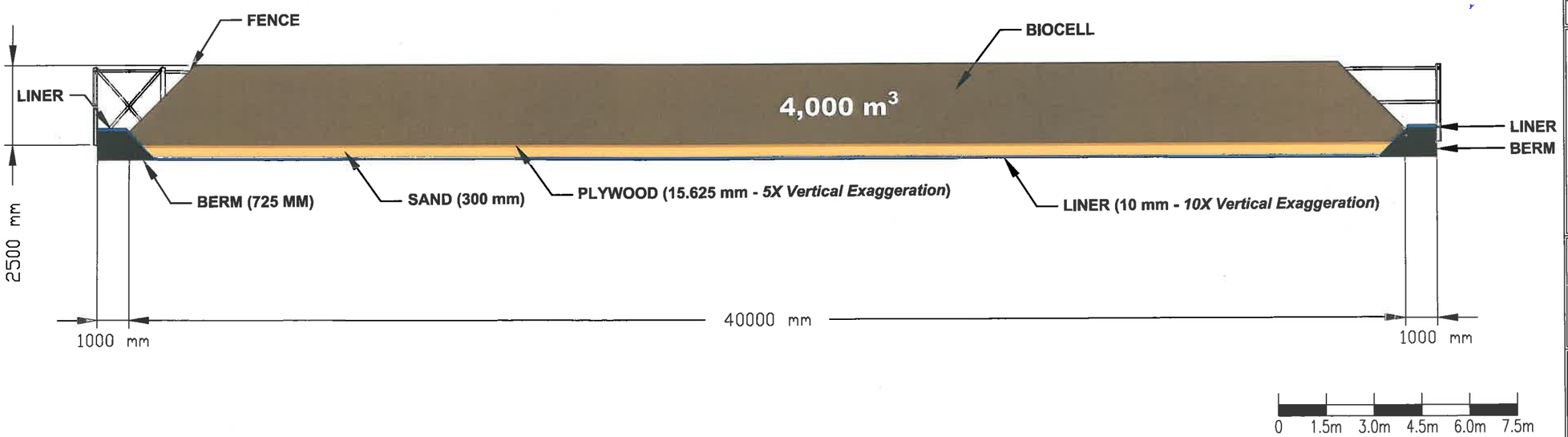
SLR global environmental solutions

Cadfile name: S_205-03986-00000-A1.dwg



PROFESSIONAL ENGINEER
YUKON TERRITORY
PHILIPPE GINGRAS
13.12.05

SECTION AA
Scale 1:150



NO.	VERSION	DATE	BY	VERIF.	APPR.
B	AS BUILT	2013-11-29	D.W.	S.A.	P.G.
A	AS BUILT	2013-11-14	D.W.	S.A.	P.G.

Public Works and Government Services Canada

KILOMETRE 922 ALASKA HIGHWAY, YUKON TERRITORY

SW ISOMETRIC VIEW OF BIOCELL WITH CROSS-SECTION A-A

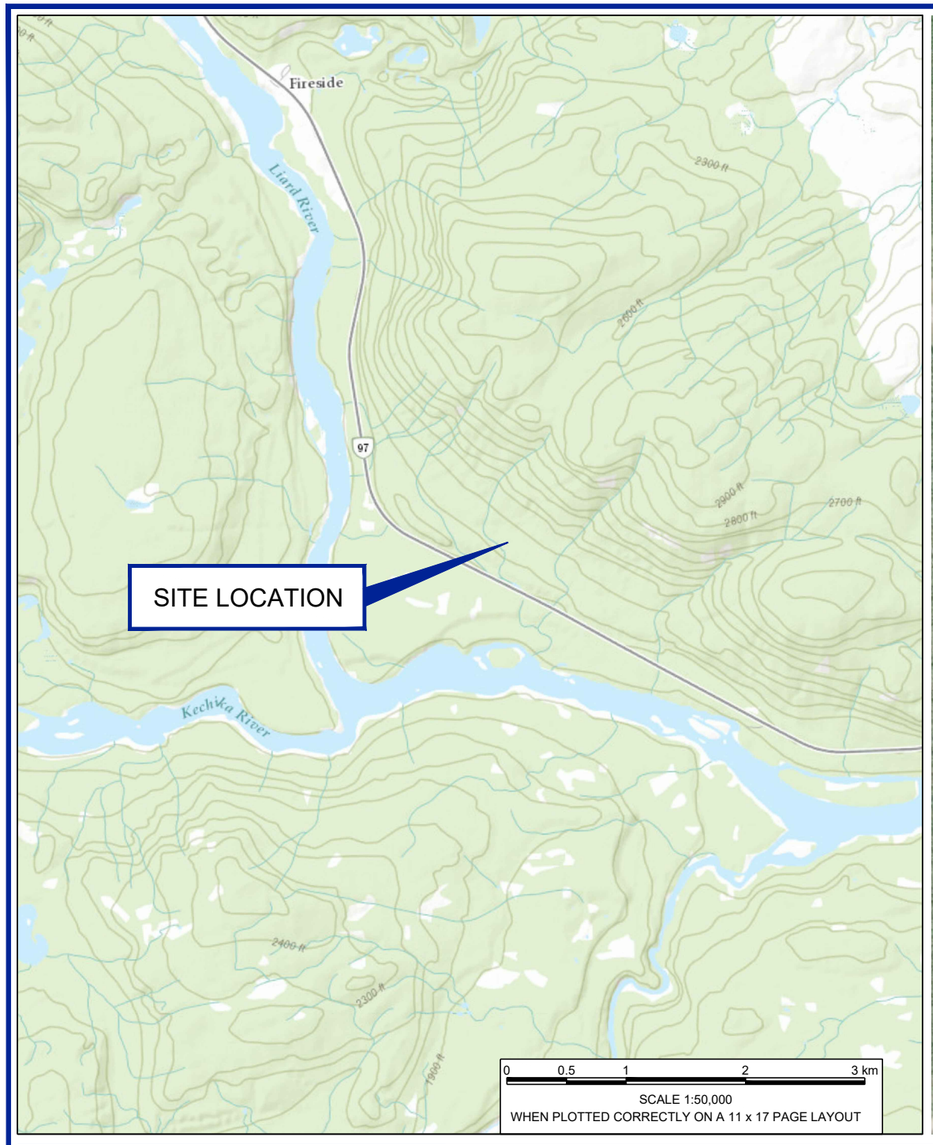
SITE REMEDIATION SOLUTIONS

Biogenie, a division of EnGlobe Corp.
#136, 2301 Premier Way
Sherwood Park, Alberta, T8H 2K8, Canada
Phone: (780) 416-0414 Fax: (780) 416-0417

MEASUREMENT UNIT:	SCALE:	DATE (month-year):
MILLIMETRE	AS SHOWN	DECEMBER 2013
DRAWN BY: D. WILSON	VERIFIED BY: S. ALIMOHAMED	APPROVED BY: P. GINGRAS
PROJECT NO: TP3562_200_203	DRAWING NO: TP3562_200_203-BIOCELL3D-B	PAGE NAME: CS

FIGURE 8

Drawing No.	Drawing Title
JJJ (Triple J) Gravel Pit	
1	Site Location and Surrounding Land Use
2	Site Plan



NOTES:
NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION.

Ref for topo: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

ArcGIS Imagery: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (IMAGE DATE: 2018)

LEGEND:

SITE BOUNDARY

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

PUBLIC WORKS AND PROCUREMENT CANADA
JJJ
KM 839, ALASKA HWY
FIRESIDE, BC

2020 STF BIOREMEDIATION MONITORING PROGRAM

SITE LOCATION AND SURROUNDING LAND USE

Date: February 8, 2021

Project No. 205.04023.00001

Drawing No. 1

SLR

Cadfile name: N:\Vancouver\CAD\Project Drawings\205\205.04023\205.04023.00001\S_205-04023-00001-A3.dwg

NOTES:
NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION.

REFERENCED FROM: ARCADIS, PROJECT NUMBER 30000987 FIGURE 3A, DATE JANUARY 2020.

ArcGIS Imagery: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (IMAGE DATE: 2018)

LEGEND:

FENCE

BERM

0 25 50 100 150 m

SCALE 1:3,000
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 9 V

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

PUBLIC WORKS AND PROCUREMENT CANADA
JJJ
KM 839, ALASKA HWY
FIRESIDE, BC

2020 STF BIOREMEDIATION MONITORING PROGRAM

SITE PLAN

Date: February 8, 2021

Project No. 205.04023.00001

Drawing No. 2

SLR

Cadfile name: N:\Vancouver\CAD\Project Drawings\205\205.04023\205.04023.00001\S_205-04023-00001-A3.dwg

Drawing No.	Drawing Title
Km 713 Gravel Pit	
1	Site Location
2	Site Plan

NOTES:
NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION.

ArcGIS Imagery: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND:

SITE BOUNDARY

PUBLIC SERVICES AND PROCUREMENT CANADA
KM 713 GRAVEL PIT
ALASKA HIGHWAY
MUNCHO LAKE, BC

2020 STF MONITORING PROGRAM

SITE LOCATION

Date: February 12, 2021

Project No. 205.04023.00001

Drawing No. 1

SLR

Cadfile name: N:\Vancouver\CAD\Project Drawings\205\205.04023205.04023.00001S_205-04023-00001-A4.dwg

NOTES:
NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION.

REFERENCED FROM: ARCADIS, PROJECT NUMBER 30000987, FIGURE 2, DATE JANUARY 2020

ArcGIS Imagery: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND:

FENCE

BERM

SUMP

0 10 20 40 60 m

SCALE 1:1,000
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10 V

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

PUBLIC SERVICES AND PROCUREMENT CANADA
KM 713 GRAVEL PIT
ALASKA HIGHWAY
MUNCHO LAKE, BC

2020 STF MONITORING PROGRAM

SITE PLAN

Date: February 12, 2021

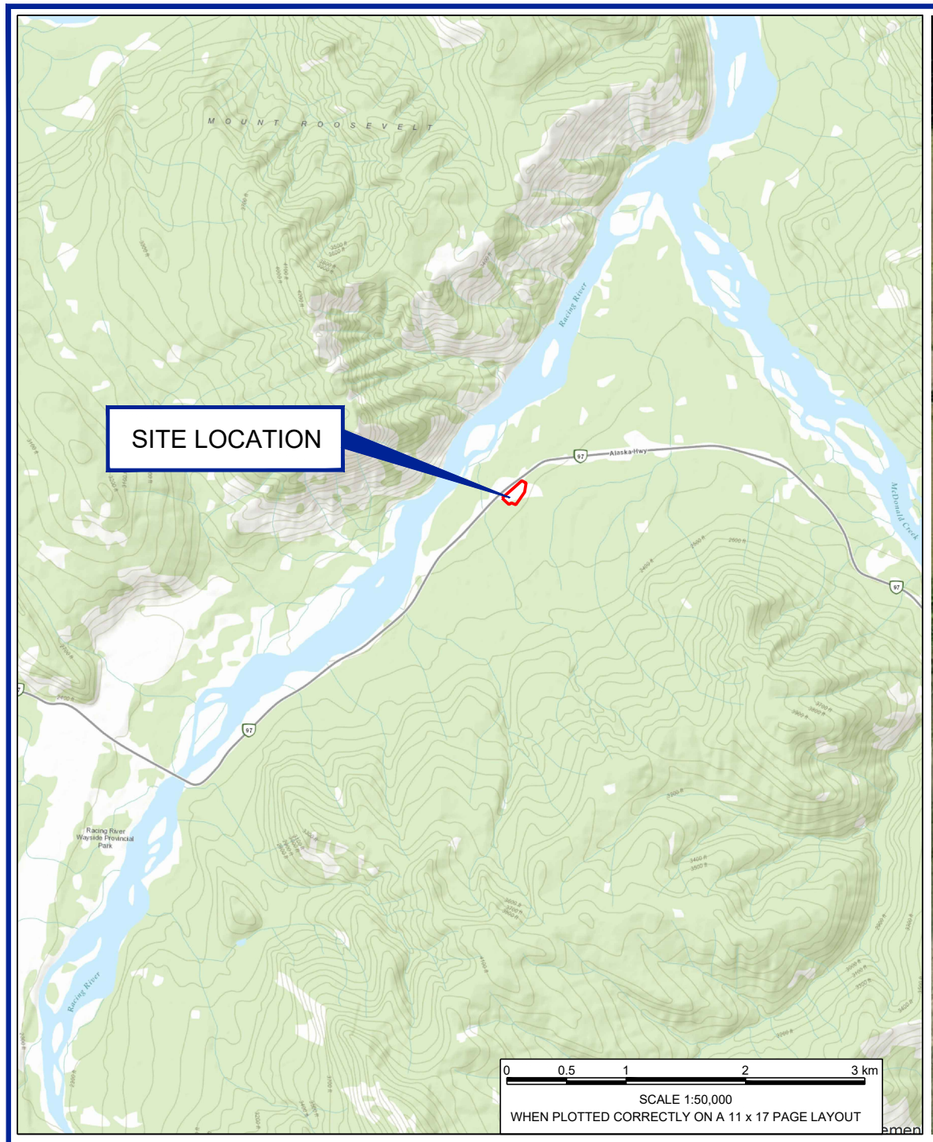
Project No. 205.04023.00001

Drawing No. 2

SLR

Cadfile name: N:\Vancouver\CAD\Project Drawings\205\205.04023\205.04023.00001\S_205-04023-00001-A4.dwg

Drawing No.	Drawing Title
Toad River Maintenance Camp (Stringer)	
1	Site Location and Surrounding Land Use
2	Site Plan



NOTES:
NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION.

ArcGIS Imagery: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND:

SITE BOUNDARY

0 50 100 200 300 400 m

SCALE 1:7,500
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10 V

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

PUBLIC SERVICES AND PROCUREMENT CANADA
STRINGER
KM 639 ALASKA HIGHWAY
TOAD RIVER, BC

2020 STF BIOREMEDIATION MONITORING PROGRAM

SITE LOCATION AND SURROUNDING LAND USE

Date: December 17, 2020

Project No. 205.04023.00001

Drawing No. 1

SLR

Cadfile name: N:\Vancouver\CAD\Project Drawings\205\205.04023\205.04023.00001\S_205-04023-00001-A6.dwg

NOTES:
NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION.

REFERENCED FROM: ARCADIS, PROJECT NUMBER 30000987, FIGURE 2, DATE JANUARY 2020

ArcGIS Imagery: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND:

- PROPERTY BOUNDARY
- FENCE
- BERM
- (S) SUMP

0 10 20 40 60 m

SCALE 1:1,000
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10 V

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PUBLIC SERVICES AND PROCUREMENT CANADA
STRINGER
KM 639 ALASKA HIGHWAY
TOAD RIVER, BC

2020 STF BIOREMEDIATION MONITORING PROGRAM

SITE PLAN

Date: December 17, 2020
Project No. 205.04023.00001

Drawing No. 2

SLR

Cadfile name: N:\Vancouver\CAD\Project Drawings\205\205.04023\205.04023.00001\S_205-04023-00001-A6.dwg

Drawing No.	Drawing Title
Sikanni Maintenance Camp	
1	Site Location Map
2	Site Plan
n/a	Cut/Fill Summary (2020)

N

SITE LOCATION

Sikanni Chief

Sikanni Chief River

97 Highway North

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

- Contour (20m)
- Watercourse
- Wetlands
- Wooded Area
- Expressway / Highway

0 0.5 1 2 3 km

SCALE 1:50,000
WHEN PLOTTED CORRECTLY ON A 8.5 x 11 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.

SLR global environmental solutions

PUBLIC WORKS AND GOVERNMENT SERVICES
SIKANNI MAINTENANCE CAMP
KILOMETER 254 OF THE ALASKA HIGHWAY
SIKANNI CHIEF, BC

STF OPERATIONS

SITE LOCATION MAP

Date: December 8, 2017

Project No. 205.03902.00000

Drawing No. 1

Cadfile name: S_205-03902-00000-A1.dwg

NOTES:
REFERENCED FROM HEMMERA DRAWING *PROPERTY PLAN* (MARCH, 2013), PUBLIC WORKS AND GOVERNMENT SERVICES CANADA DRAWING *SK#5345.00* (JULY 2011), SITE RECONNAISSANCE. IMAGERY: © 2017 DIGITALGLOBE ©CNES (2017) DISTRIBUTION AIRBUS DS © 2017 MICROSOFT CORPORATION.

LEGEND:

FEDERAL LEASE PROPERTY BOUNDARY

0 50 100 200 300 400 m

SCALE 1:7,500
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 WORKS AND GOVERNMENT SERVICES
SIKANNI MAINTENANCE CAMP
KILOMETER 254 OF THE ALASKA HIGHWAY
SIKANNI CHIEF, BC

STF OPERATIONS

SITE PLAN

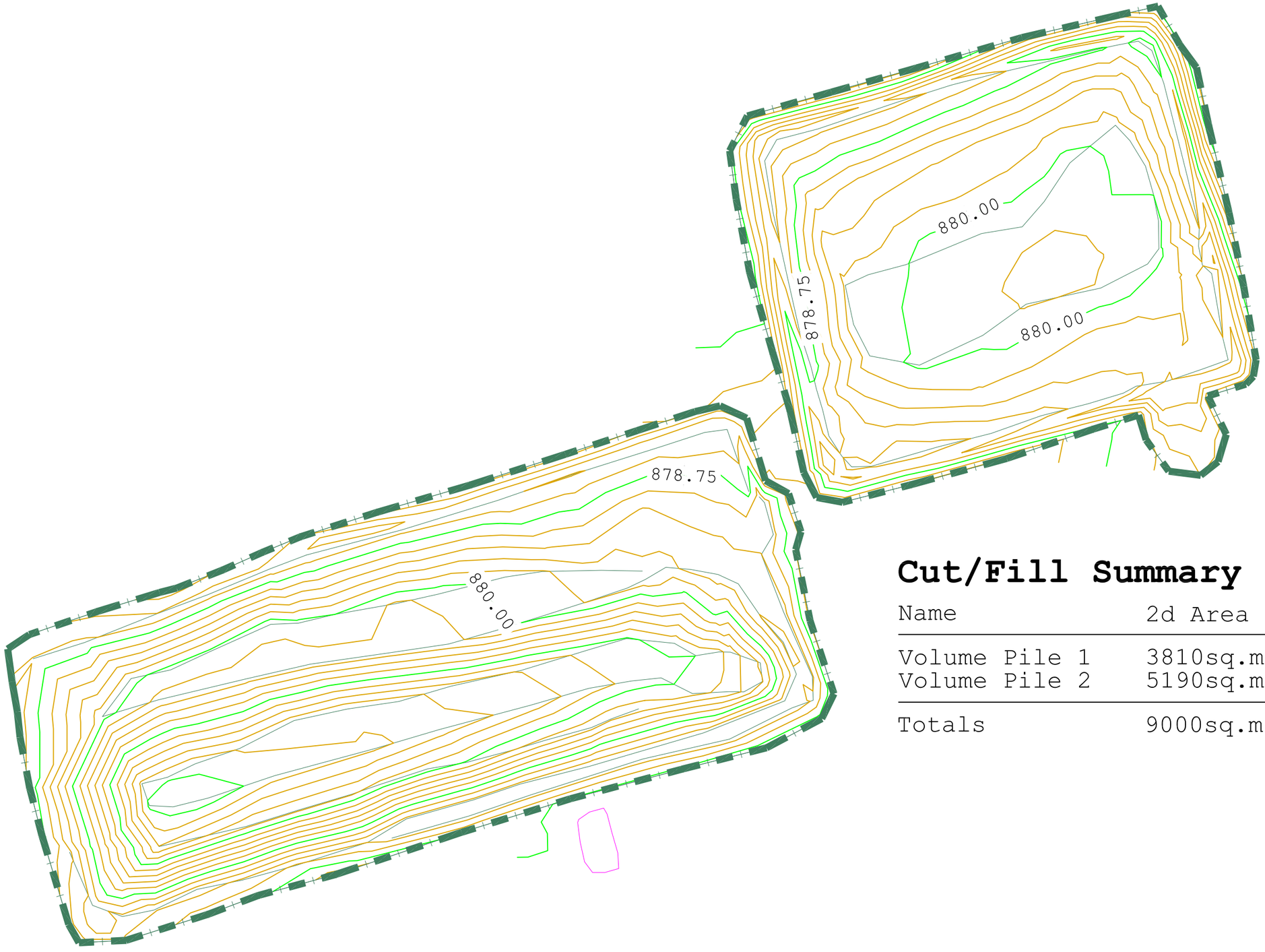
Date: December 8, 2017

Drawing No. 2

Project No. 205.03902.00000

SLR global environmental solutions

Cadfile name: S_205-03902-00000-A1.dwg



Cut/Fill Summary

Name	2d Area	Fill
Volume Pile 1	3810sq.m	5550 Cu. M.
Volume Pile 2	5190sq.m	8800 Cu. M.
Totals	9000sq.m	14350 Cu. M.

P:\FtStJohn\2020\20200756\Field Data\TBC Processing\2020-10-21 SFL\20200756_20201021_SFL\20200756_20201021_SFL_3d.dxf

Annex No.	Annex Title
A	FY 2020/2021 Soil Treatment Facility Site Photographs

Photo 1: Iron Creek Maintenance Camp (ICMC) -located at km 922, Iron Creek, TY.
Aerial view of soil treatment facility (STF) and adjacent highway maintenance camp.

Photo 2: ICMC STF.

SLR	FY 2020/2021 Soil Treatment Facility Site Photographs R.018391.014.015 STF Operation, Alaska Highway (5 sites)
SITE PHOTOGRAPHS	Project No: 206.03927.19001

Photo 3: JJJ ("Triple J") Gravel Pit – Located at km 835, approximately 4 km south of Fireside, BC. Aerial view of four STFs.

Photo 4: Triple J STFs.

Photo 5: Km 713 Gravel Pit – located at km 713, approximately 15 km north of Muncho Lake, BC. Aerial view of two STFs and adjacent gravel pit.

Photo 6: Km 713 STFs.

Photo 7: Toad River Maintenance Camp (Stringer) – located at km 639, Toad River, BC.
Aerial view of STF and adjacent gravel pit.

Photo 8: Stringer STF.

Photo 9: Sikanni Maintenance Camp (Sikanni) – located at km 254, Sikanni, BC.
Photo of STF.

Photo 10: Sikanni STFs, taken post 2020 work program.

Annex No.	Annex Title
B	FY 2021/2022 Soil Treatment Facility Data and Proposed Sequencing of Operations

SLR Consulting (Canada) Ltd.
303-3960 Quadra Street, Victoria, BC V8X 4A3

Victoria Office Number: 250 475 9595
Victoria Office Fax Number: 250 475 9596

Memorandum

To:	Amy Moizumi	**From:**	Ellen Clara, Chelsea Webb, Aaron Haegele
Company:	Public Services and Procurement		
cc:		**Date:**	January 21, 2021
Subject:	FY 2021/2022 SOIL TREATMENT FACILITY DATA AND PROPOSED SEQUENCING OF OPERATIONS		

SLR Consulting (Canada) Ltd. (SLR) is pleased to provide the following Soil Treatment Facility (STF) data summary and proposed sequencing of tilling operations for treatment of soil at the following locations along the Alaska Highway, in order from north to south:

- Iron Creek Maintenance Camp (ICMC) – located at km 922, Iron Creek, YT;
- JJJ ("Triple J") Gravel Pit – located at km 835, approximately 4 km south of Fireside, BC;
- Km 713 Gravel Pit – located at km 713, approximately 15 km north of Muncho Lake, BC;
- Toad River Maintenance Camp (Stringer) – located at km 639, Toad River, BC; and
- Sikanni Maintenance Camp (Sikanni) – located at km 254, Sikanni, BC.

1.0 DATA SUMMARY

1.1 SOIL TREATMENT FACILITY DETAILS

Details of the STFs at the locations listed above, including the inside dimensions, current approximate volume and the estimated number of lifts to treat, are summarized in Table 1. For planning purposes, each lift has been assumed to be approximately 400 millimetres (mm) thick, but may vary depending on equipment used, variability in cell thickness, and other factors. The location plans, site plans and STF details are included within the STF specifications drawing set.

Table 1: Summary of STF Details

STF Location	Maintenance Camp	STF Inside Dimensions (Approximate L x W)	Current Approximate STF Volume (m^3)	Estimated No. of Lifts (400 mm) to Treat	Estimated Sump Water Volume (L)
ICMC (Km 922)	Iron Creek (Km 922)	STF #1 = 25 m x 35 m	STF #1 = 600 [1]	STF #1 = 1 lift [2]	50,000
Triple J Gravel Pit (Km 835)	Fireside (Km 839)	STF #1 = 67 m x 48 m STF #2 = 70 m x 51 m STF #3 = 62 m x 46 m STF #4 = 65 m x 58 m	STF #1 = 5,921 STF #2 = 1,645 STF #3 = 5,356 STF #4 = 7,922	STF #1 = 5 lifts STF #2 = 1 lift STF #3 = 4 lifts STF #4 = 6 lifts	150,000

STF Location	Maintenance Camp	STF Inside Dimensions (Approximate L x W)	Current Approximate STF Volume (m^3)	Estimated No. of Lifts (400 mm) to Treat	Estimated Sump Water Volume (L)
Km 713 Gravel Pit (Km 713)	Muncho Lake (Km 698)	STF #1 = 83 m x 42 m STF #2 = 38 m x 30 m	STF #1 = 1,400 STF #2 = 2,800	STF #1 = 1 lift STF #2 = 7 lifts	150,000
Stringer (Km 639)	Toad River (Km 649)	STF #1 = 48 m x 46 m	STF #1 = 3,500	STF #1 = 4 lifts	50,000
Sikanni (Km 254)	Sikanni (Km 254)	STF #1 = 100 x 40 m STF #2 = 55 x 45 m	STF #1 = 8,800 STF #2 = 5,550	STF #1 = 4 lifts STF #2 = 4 lifts	150,000

Notes:

1 – includes final lift (400 m^3) and sand layer (200 m^3)
2 – sand layer not counted as a lift

1.2 CONTAMINANTS OF CONCERN

1.2.1 Soil

The primary contaminants of concern (COCs) in soil are petroleum hydrocarbons, which include, but are not limited to benzene, toluene, ethylbenzene and xylenes (BTEX), methyl tert-butyl ether (MTBE), volatile petroleum hydrocarbons (VPHs), petroleum hydrocarbon (PHC) fractions F1-F4, light and heavy extractable petroleum hydrocarbons (LEPH/HEPH, respectively), and polycyclic aromatic hydrocarbons (PAHs).

Secondary COCs not being remediated within this scope of work include road salts (i.e., sodium and chloride) and metals.

1.2.2 Sump Water

Laboratory analysis and characterization may be required prior to the disposal of sump water. If required, laboratory analysis may include, but is not limited to, BTEX, VPHs, PHC, LEPH/HEPH, PAHs and/or total metals. Copies of the FY 2019/2020 sump water analytical results, where available, are provided in the STF specification Annex D for informational purposes.

2.0 PROPOSED SEQUENCING OF TREATMENT OPERATIONS

The proposed sequencing of treatment operations at each of the five locations are detailed below. The application of high-nitrogen fertilizer may occur prior to the soil tilling of each lift to best facilitate mixing into the soil and bioremediation during the tilling/aeration process. The application of fertilizer will be at the discretion of the Department Representative (i.e., Consultant).

The final stockpile location for soil deemed appropriate to be removed from the STF as directed by the Department Representative will be at the discretion of the Owner. For purposes of planning, the stockpile location is expected to be within 500 m of the STF from which the soil originated.

2.1 ICMC

The proposed sequence of operations at ICMC are as follows:

- Contractor to remove the hold downs and cover liner from STF #1. Preserve the hold downs and liner for future use;
- Contractor to till the final lift at STF #1 while adding fertilizer and water at the discretion of the Department Representative. Once tilling has been completed, the Department Representative to

conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis;

- While waiting for the analytical results, the Contractor to continue tilling the final lift at STF #1. Estimated wait time for soil analytical results, including shipping, analysis, data management and review, is per the Specification Section No. 02 61 00.08 (Contaminated Sites Onsite STF Operation);
- The analytical results will be reviewed by the Department Representative upon receipt. If the soil meets the remedial objectives, the Department Representative will approve the removal of the soil from the STF. Contractor to load the approved soil into trucks and transport to the final stockpile location, within 500 m of the STF, as designated by the Department Representative. Contractor to begin tilling the next lift at STF #1:
    - If the analytical results do not meet the remedial objectives, the Departmental Representative to re-sample the soil with assistance from the Contractor since it has been continuously tilled since the initial sampling event. Departmental Representative to submit the samples for laboratory analysis.
- As required, the Contractor to purge excess water from the STF sump, collect water samples and submit the samples for laboratory analysis. Contractor to load the water onto a leak-free truck designed to carry water and dispose of the water at an offsite permitted facility;
- Continue to repeat the process above as time permits or until all remaining soil in STF #1 meets the remedial objectives and is transported to the final stockpile location, within 500 m of the STF; and
- Contractor to decommission the STF upon removal of all soil. Section 3.0 ICMC Decommissioning provides further details.

2.2 TRIPLE J GRAVEL PIT

The proposed sequence of operations at Triple J are as follows:

- Contractor to remove the hold downs and cover liner from STF #1, STF #2, STF #3 and STF #4. Preserve the hold downs and liner for future use;
- Contractor to till the first lift at STF #1 while adding fertilizer and water at the discretion of the Department Representative. Once tilling has been completed, the Departmental Representative to conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis;
- Contractor to move to STF #4 and till the first lift while adding fertilizer and water at the discretion of the Department Representative. Once tilling has been completed, the Departmental Representative to conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis;
- Contractor to move to STF #2 and till the first lift while adding fertilizer and water at the discretion of the Department Representative. Once tilling has been completed, the Departmental Representative to conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis;
- Contractor to move to STF #3 and till the first lift while adding fertilizer and water at the discretion of the Department Representative. Once tilling has been completed, the Departmental Representative to conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis;
- Contractor to move back to STF #1. It is anticipated that the analytical results will be available for review by the Department Representative. If the soil meets the remedial objectives, the Department Representative will approve the removal of the soil from the STF. Contractor to load

the approved soils into trucks and transport to the final stockpile location, within 500 m of the STF, as designated by the Department Representative. Contractor to begin tilling the next lift:
    - If the analytical results do not meet the remedial objectives, Contractor to continue tilling the existing lift. Once completed, the Departmental Representative to resample the soil with assistance from the Contractor and submit the samples for laboratory analysis; and
    - Estimated wait time for soil analytical results, including shipping, analysis, data management and review, is per the Specification Section No. 02 61 00.08 (Contaminated Sites Onsite STF Operation).
- Contractor to move to STF #4, STF #2 and STF # 3 sequentially and continue to repeat the process above as time permits or until all remaining soil in STF #1 to STF #4 meet the remedial objectives and is transported to the final stockpile location, within 500 m of the STF;
- As required, Contractor to purge excess water from the STF sump; collect water samples and submit the samples for laboratory analysis. Contractor to load the water onto a leak-free truck designed to carry water and dispose of the water at an offsite permitted facility; and
- Contractor to place the cover liner and hold downs back onto STF #1, STF #2, STF #3 and STF #4.

2.3 KM 713 GRAVEL PIT

The proposed sequence of operations at Km 713 are as follows:

- Contractor to remove the hold downs and cover liner from STF #1 and STF #2. Preserve the hold downs and liner for future use;
- Contractor to till the first lift at STF #2 while adding fertilizer and water at the discretion of the Department Representative. Once tilling has been completed, the Departmental Representative to conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis;
- Contractor to move to STF #1 and till the first lift while adding fertilizer and water at the discretion of the Department Representative. Once tilling has been completed, the Departmental Representative to conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis;
- Contractor to move back to STF #2. It is anticipated that the analytical results will be available for review by the Department Representative. If the soil meets the remedial objectives, the Department Representative will approve the removal of the soil from the STF. Contractor to load the approved soils into trucks and transport to the final stockpile location, within 500 m of the STF, as designated by the Department Representative. Contractor to begin tilling the next lift:
    - If the analytical results do not meet the remedial objectives, Contractor to continue tilling the existing lift. Once completed, the Departmental Representative to resample the soil with assistance from the Contractor and submit the samples for laboratory analysis; and
    - Estimated wait time for soil analytical results, including shipping, analysis, data management and review, is per the Specification Section No. 02 61 00.08 (Contaminated Sites Onsite STF Operation).
- Contractor to move to STF #1 and continue to repeat the process above as time permits or until all remaining soil in STF #1 and STF #2 meet the remedial objectives and is transported to the final stockpile location, within 500 m of the STF;
- As required, the Contractor to purge excess water from the STF sump, collect water samples and submit the samples for laboratory analysis. Contractor to load the water onto a leak-free truck designed to carry water and dispose of the water at an offsite permitted facility; and
- Contractor to place the cover liner and hold downs back onto STF #1 and STF #2.

2.4 STRINGER

The proposed sequence of operations at Stinger are as follows:

- Contractor to remove the hold downs and cover liner from STF #1. Preserve the hold downs and liner for future use;
- Contractor to till the first lift at STF #1 while adding fertilizer and water at the discretion of the Department Representative. Once tilling has been completed, Department Representative conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis;
- While waiting for the analytical results, Contractor to continue tilling the first lift at STF #1. Estimated wait time for analytical results, including shipping, analysis, data management and review, is per the Specification Section No. 02 61 00.08 (Contaminated Sites Onsite STF Operation);
- The analytical results will be reviewed by the Department Representative upon receipt. If the soil meets the remedial objectives, the Department Representative will approve the removal of the soil from the STF. Contractor to load the approved soils into trucks and transport to the final stockpile location, within 500 m of the STF, as designated by the Department Representative. Contractor to begin tilling the next lift at STF #1:
    - If the analytical results do not meet the remedial objectives, the Department Representative to re-sample the soil with the assistance of the Contractor since it has been continuously tilled since the initial sampling event. Department Representative to submit the samples for laboratory analysis.
- As required, the Contractor to purge excess water from the STF sump, collect water samples and submit the samples for laboratory analysis. Contractor to load the water onto a leak-free truck designed to carry water and dispose of the water at an offsite permitted facility;
- Continue to repeat process above as time permits or until all remaining soil in STF #1 meets the remedial objectives and is transported to the final stockpile location, within 500 m of the STF; and
- Contractor to place the cover liner and hold downs back onto STF #1.

2.5 SIKANNI

The proposed sequence of operations at Sikanni are as follows:

- Contractor to remove the hold downs and cover liner from STF #1 and STF #2. Preserve the hold downs and liner for future use;
- Contractor to till the first lift at STF #1 while adding fertilizer and water at the discretion of the Department Representative. Once tilling has been completed, the Departmental Representative to conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis;
- Contractor to move to STF #2 and till the first lift while adding fertilizer and water at the discretion of the Department Representative. Once tilling has been completed, the Departmental Representative to conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis;
- Contractor to move back to STF #1. It is anticipated that the analytical results will be available for review by the Department Representative. If the soil meets the remedial objectives, the Department Representative will approve the removal of the soil from the STF. Contractor to load the approved soils into trucks and transport to the final stockpile location, within 500 m of the STF, as designated by the Department Representative. Contractor to begin tilling the next lift;

- If the analytical results do not meet the remedial objectives, Contractor to continue tilling the existing lift. Once completed, the Departmental Representative to resample the soil with assistance from the Contractor and submit the samples for laboratory analysis:
    - Estimated wait time for soil analytical results, including shipping, analysis, data management and review, is per the Specification Section No. 02 61 00.08 (Contaminated Sites Onsite STF Operation).
- Contractor to move to STF #2 and continue to repeat the process above as time permits or until all remaining soil in STF #1 and STF #2 meet the remedial objectives and is transported to the final stockpile location, within 500 m of the STF;
- As required, the Contractor to purge excess water from the STF sump, collect water samples and submit the samples for laboratory analysis. Contractor to load the water onto a leak-free truck designed to carry water and dispose of the water at an offsite permitted facility; and
- Contractor to place the cover liner and hold downs back onto STF #1 and STF #2.

3.0 ICMC DECOMMISSIONING

After the final lift has met the remedial objectives, the proposed sequence of operations for the decommissioning of the STF at ICMC are as follows:

- Contractor to dispose of the STF cover liner and hold downs at a permitted facility;
- Contractor to remove the STF plywood cover and dispose of at a permitted facility;
- To assess the sand layer exposed after removal of the plywood cover, the Departmental Representative to conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis.
- While waiting for the analytical results, the Contractor to till the sand layer. Estimated wait time for soil analytical results, including shipping, analysis, data management and review, is per the Specification Section No. 02 61 00.08 (Contaminated Sites Onsite STF Operation);
- The analytical results will be reviewed by the Department Representative upon receipt. If the sand layer meets the remedial objectives, the Department Representative will approve the removal of the sand from the STF. Contractor to load the approved sand into trucks and transport to the final stockpile location, within 500 m of the STF, as designated by the Department Representative:
    - If the analytical results do not meet the remedial objectives, the Departmental Representative to re-sample the soil with assistance from the Contractor since it has been continuously tilled since the initial sampling event. Departmental Representative to submit the samples for laboratory analysis.
- As required, the Contractor to purge excess water from the STF sump, collect water samples and submit the samples for laboratory analysis. Contractor to load the water onto a leak-free truck designed to carry water and dispose of the water at an offsite permitted facility;
- Continue to repeat the process above as time permits or until the sand layer meets the remedial objectives and is transported to the final stockpile location, within 500 m of the STF;
- Contractor to remove the STF High Density Polyethylene (HDPE) liner and STF outside berm covers and dispose of at a permitted facility;
- To assess the STF berm material and material at the base of the STF cell under the HDPE liner, Departmental Representative to conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis. Estimated wait time for soil analytical results, including shipping, analysis, data management and review, is per the Specification Section No. 02 61 00.08 (Contaminated Sites Onsite STF Operation);

- The analytical results will be reviewed by the Department Representative upon receipt. If the berm and base material meets the remedial objectives, the Department Representative will approve grading of the interior of the STF (inside the fenced area) level and sloped for drainage as directed by the Departmental Representative:
    - If the analytical results do not meet the remedial objectives, Contractor to transport the material to a permitted facility for disposal as directed by the Departmental Representative. Contractor to assume material is Waste quality (greater than the Canadian Council of Ministers of the Environment Industrial guidelines and Yukon Contaminated Sites Regulation Industrial standards) and quality to be determined after sample results are reviewed by the Departmental Representative;
    - Once material has been removed for disposal, Departmental Representative to conduct an insitu soil sampling program with the assistance of the Contractor and submit the samples for laboratory analysis. Estimated wait time for soil analytical results, including shipping, analysis, data management and review, is per the Specification Section No. 02 61 00.08 (Contaminated Sites Onsite STF Operation); and
    - Continue to repeat the process above as time permits or until all berm and base material meets the remedial objectives.
- Contractor to decommission the eleven perimeter STF groundwater monitoring wells in accordance with methods in Yukon Environment Protocol 7: Groundwater Monitoring Well Installation, Sampling and Decommissioning. The groundwater monitoring well locations are shown on the STF specifications drawing set. The well completion depths, polyvinyl chloride (PVC) well diameter and surface protection details are summarized in Table 1, attached. The well details are provided in the borehole logs, attached. The proposed sequence of operations to decommission the wells are as follows:
    - Groundwater monitoring wells are to be sealed by injecting grout (100% pure bentonite grout) into the well under pressure, with the intent of injecting grout through the well screen and into the surrounding filter pack per Yukon Environment Protocol 7: Groundwater Monitoring Well Installation, Sampling and Decommissioning method 2.b);
    - Surface protection (stick up monument) to be removed and recycled/disposed of at a permitted facility. Recycling/disposal includes steel stick up monuments and associated concrete;
    - PVC well pipe to be cut off below surface, approximately 20 centimetres below grade, and a PVC slip cap installed. The depression in the area of the well to be backfilled with Public Services and Procurement Canada supplied sand from within 500 m of the STF, and the ground surface in the area of the well to be graded approximately 10 centimetres above surrounding grade so that the surface grade slopes away from the decommissioned well; and
    - Excess well materials to be disposed of at a permitted facility.
- Contractor to hydroseed the STF area as directed by the Departmental Representative. Contractor to assume hydroseeding a 1,500 square metre area is required. Hydroseed mix to contain the following species and accepted by the Departmental Representative: 25% creeping red fescue, 20% slender wheat grass, 15% smooth brome grass, 10% alsike clover, 10% Canada blue grass, 10% timothy, 5% sheep fescue and 5% red top or brown top.

Enc Table 1 – Iron Creek Groundwater Monitoring Well Decommissioning Summary

Iron Creek Maintenance Camp Borehole Logs

TABLE 1 - Iron Creek Groundwater Monitoring Well Decommissioning Summary			
Monitoring well ID	**Well Completion Depth (mbg)**	**PVC Well Diameter (mm)**	**Surface Protection**
MW10-22	22.3	51	stick up monument
MW10-22D	27.4	51	stick up monument
MW10-23	27.1	51	stick up monument
MW10-24	21.0	51	stick up monument
MW10-25	25.3	51	stick up monument
MW10-26	24.4	51	stick up monument
MW10-27	21.6	51	stick up monument
MW11-30	27.7	51	stick up monument
MW11-31	24.4	51	stick up monument
MW11-32	29.0	51	stick up monument
MW11-33	27.4	51	stick up monument

Notes:

mbg - metres below grade

mm - millimetres

PVC - polyvinyl chloride

SLR CONSULTING (CANADA) LTD.

CLIENT: **Public Works and Government Services**
PROJECT: **Iron Creek**
ADDRESS: **KM 922 Alaska Highway, Yukon**
SLR JOB NO: **205.03504.00000**

MONITORING WELL LOG

MONITORING WELL NO: MW10-22
SURFACE ELEVATION: 683.09 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
				Ground Surface				well completed as a stickup	
0				**SILT (Till)** light brown, moist				cement silica sand	683
1									682
2									681
3									680
4				**sandy SILT (Till)** some subangular gravel, light brown, moist					679
5									678
6				**silty SAND (Till)** some subrounded gravel, loose, light brown, moist					677
7									676
8									675
9									674
10								bentonite seal	673
11									672
12									671
13				**SILT (Till)** some fine sand, some subrounded gravel, soft, dark brown, moist					670
14									669
15									668
16									667
17									666
18									665
19				**silty SAND (Till)** some subrounded gravel, some cobble, light brown					664
20									663
21								silica sand	662
22				moist at 22.25 m					661
23									660
24									659
				End of monitoring well at 24.4 m Well Completion Details: Screened interval from 19.2 m to 22.3 m below surface Elevation at top of casing (TOC) = 684.130 m EOH at 6.10 m on August 3, 2010 due to broken shoe. Continued with solid stem auger 1.5 m to west on August 4, 2010. Lost .11 m of casing from 21.34 m - 22.86 m				

BOREHOLE METHOD: ODEX Air Rotary Drilling

BOREHOLE DATE: August 3, 2010 LOGGED BY: Ray Holberger

Notes:

SLR CONSULTING (CANADA) LTD.

CLIENT: **Public Works and Government Services**
PROJECT: **Iron Creek**
ADDRESS: **KM 922 Alaska Highway, Yukon**
SLR JOB NO: **205.03504.00000**

MONITORING WELL LOG

MONITORING WELL NO: MW10-22d
SURFACE ELEVATION: 682.88 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
0				Ground Surface				well completed as a stickup	683
0				**SAND and GRAVEL (Till)** with silt, grey-brown				bentonite seal	683
1									682
2									681
3									680
4									679
5									678
6									677
7									676
8									675
9									674
9				**silty SAND and GRAVEL (Till)** coarse grained, unconsolidated, grey-brown					674
10									673
11									672
12								grout	671
13									670
14				**silty SAND (Till)** with gravel, medium to fine grained, becomes less consolidated with increasing depth, brown, increasing moisture with depth, no water to 27.43 m					669
15									668
16									667
17									666
18									665
19									664
20									663
21									662
22									661
23									660
24								bentonite seal	659
25									658
26									657
27								50mm 010 slot PVC pipe / silica sand	656
				End of monitoring well at 27.4 m Well Completion Details: Screened interval from 24.4 m to 27.4 m below surface Elevation at top of casing (TOC) = 683.900 m					

BOREHOLE METHOD: ODEX Air Rotary Drilling

BOREHOLE DATE: August 17, 2010 LOGGED BY: Holly Keech

Notes:

SLR CONSULTING (CANADA) LTD.

CLIENT: **Public Works and Government Services**
PROJECT: **Iron Creek**
ADDRESS: **KM 922 Alaska Highway, Yukon**
SLR JOB NO: **205.03504.00000**

MONITORING WELL LOG

MONITORING WELL NO: MW10-23
SURFACE ELEVATION: 681.65 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
				Ground Surface				well completed as a stickup	682
0				**SAND and GRAVEL (Till)** silty, medium - coarse grained, grey-brown				bentonite seal	682
1									681
2									680
3									679
4									678
5									677
6									676
7				**SILT (Till)** brown					675
8				**silty SAND (Till)** fine grained, brown					674
9				**silty SAND and GRAVEL (Till)** silt content decreases with depth, increased grain size (gravel)					673
10									672
11									671
12								grout backfill	670
13									669
14									668
15									667
16									666
17				**silty SAND (Till)** with gravel, decreasing grain size with depth, increasing silt content, grey-brown					665
18									664
19									663
20									662
21				moisture content increases below 21.34 m					661
22									660
23								bentonite seal	659
24								silica sand	658
25									657
26									656
27									655
				End of monitoring well at 27.1 m Well Completion Details: Screened interval from 24.1 m to 27.1 m below surface Elevation at top of casing (TOC) = 682.660 m					

BOREHOLE METHOD: ODEX Air Rotary Drilling

BOREHOLE DATE: August 15, 2010 LOGGED BY: Holly Keech

Notes:

SLR CONSULTING (CANADA) LTD.

CLIENT: **Public Works and Government Services**
PROJECT: **Iron Creek**
ADDRESS: **KM 922 Alaska Highway, Yukon**
SLR JOB NO: **205.03504.00000**

MONITORING WELL LOG

MONITORING WELL NO: MW10-24
SURFACE ELEVATION: 679.50 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
				Ground Surface				well completed as a stickup	680
0				**SAND and GRAVEL (Till)** clayey, poorly sorted, dense, consolidated, brown				bentonite seal	679
1									678
2									677
3									676
4									675
5									674
6									673
7									672
8									671
9								grout backfill	670
10									669
11									668
12									667
13									666
14									665
15									664
16									663
17								bentonite seal	662
18				**SAND (Till)** medium - coarse grained, grey-brown, moist				silica sand	661
19									660
20				sand became wet below 19.51 m					659
21									
				End of monitoring well at 21.3 m Well Completion Details: Screened interval from 18.0 m to 21.0 m below surface Elevation at top of casing (TOC) = 680.500 m					

BOREHOLE METHOD: ODEX Air Rotary Drilling

BOREHOLE DATE: August 10, 2010 LOGGED BY: Holly Keech

Notes:

SLR CONSULTING (CANADA) LTD.

CLIENT: **Public Works and Government Services**
PROJECT: **Iron Creek**
ADDRESS: **KM 922 Alaska Highway, Yukon**
SLR JOB NO: **205.03504.00000**

MONITORING WELL LOG

MONITORING WELL NO: MW10-25
SURFACE ELEVATION: 682.51 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
				Ground Surface				well completed as a stickup	683
0				**SAND and GRAVEL (Till)** clayey				bentonite seal	682
1									681
2									680
3									679
4									678
5									677
6				auger hole was crooked or slouged in to 6.10 m					676
7									675
8									674
9									673
10									672
11								grout backfill	671
12									670
13									669
14									668
15									667
16									666
17									665
18									664
19									663
20									662
21								bentonite seal	661
22									660
23				**SAND (Till)** medium - coarse grained, unconsolidated, grey-brown moist below 23.16 m					659
24									658
25								silica sand	657
26				heaved from 25.30 m - 27.44 m wet below 25.91 m				heave	656
27									
				End of monitoring well at 27.4 m Well Completion Details: Screened interval from 22.3 m to 25.3 m below surface Elevation at top of casing (TOC) = 683.510 m					

BOREHOLE METHOD: ODEX Air Rotary Drilling

BOREHOLE DATE: August 11, 2010 LOGGED BY: Holly Keech

Notes:

SLR CONSULTING (CANADA) LTD.

CLIENT: **Public Works and Government Services**
PROJECT: **Iron Creek**
ADDRESS: **KM 922 Alaska Highway, Yukon**
SLR JOB NO: **205.03504.00000**

MONITORING WELL LOG

MONITORING WELL NO: MW10-26
SURFACE ELEVATION: 683.69 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
				Ground Surface				well completed as a stickup	684
0				**SAND and GRAVEL (Till)** clayey, dense, consolidated, poorly sorted, grey-brown				bentonite seal	
1									683
2									682
3									681
4									680
5									679
6									678
7									677
8									676
9									675
10									674
11								grout backfill	673
12									672
13									671
14									670
15									669
16									668
17									667
18				**SILT (Till)** wet					666
19				**SAND and GRAVEL (Till)** clayey, dense, consolidated, poorly graded, grey-brown					665
20									664
21								bentonite seal	663
22								silica sand	662
23				**SAND (Till)** medium - coarse grained, grey-brown, moist					661
24									660
25									659
26				wet below 25.91 m				heave	658
27									657
				End of monitoring well at 27.4 m Well Completion Details: Screened interval from 21.0 m to 24.4 m below surface Elevation at top of casing (TOC) = 684.740 m					

BOREHOLE METHOD: ODEX Air Rotary Drilling

BOREHOLE DATE: August 12, 2010 LOGGED BY: Holly Keech

Notes:

SLR CONSULTING (CANADA) LTD.

CLIENT: **Public Works and Government Services**
PROJECT: **Iron Creek**
ADDRESS: **KM 922 Alaska Highway, Yukon**
SLR JOB NO: **205.03504.00000**

MONITORING WELL LOG

MONITORING WELL NO: MW10-27
SURFACE ELEVATION: 679.19 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
				Ground Surface				well completed as a stickup	680
0				**SAND and GRAVEL (Till)** clayey, poorly sorted, dense, consolidated, grey-brown				bentonite seal	679
1									678
2									677
3									676
4									675
5									674
6									673
7									672
8									671
9								grout	670
10									669
11									668
12									667
13									666
14									665
15									664
16									663
17								bentonite seal	662
18									661
19									660
20				**silty SAND (Till)** fine grained, brown, moist					659
21				**SAND and GRAVEL (Till)** becomes less consolidated with increasing depth, dry				silica sand	658
22									657
23									656
24									655
25									654
26									653
27									652
				End of monitoring well at 27.4 m Well Completion Details: Screened interval from 18.6 m to 21.6 m below surface Elevation at top of casing (TOC) = 680.190 m					

BOREHOLE METHOD: ODEX Air Rotary Drilling

BOREHOLE DATE: August 14, 2010 LOGGED BY: Holly Keech

Notes:

SLR CONSULTING (CANADA) LTD.

CLIENT: **PWGSC**
PROJECT: **Iron Creek Maintenance Camp**
ADDRESS: **KM 922 Alaska Highway, Yukon**
SLR JOB NO: **205.03504.00000**

BOREHOLE LOG

BOREHOLE NO: BH11-30
SURFACE ELEVATION: 680.03 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
0				Ground Surface				stickup, jplug	680
0				**CLAY and SAND (Till)** trace gravel, brown, moist				bentonite seal	680
1				**SAND and GRAVEL (Till)** brown, dry					679
2				**SAND (Till)** fine grained, brown, moist					678
3				**SAND and GRAVEL (Till)** trace silt, brown, dry					677
4									676
5									675
6									674
7									673
8									672
9									671
10									670
11									669
12								grout	668
13									667
14				**CLAY (Till)** hard, light brown, moist					666
15				**SAND and GRAVEL (Till)** trace silt, brown, dry					665
16				**CLAY (Till)** soft, light brown, wet					664
17				**SAND and GRAVEL (Till)** trace silt, brown, dry					663
18				**CLAY (Till)** soft, light brown, wet					662
19				**SAND and GRAVEL (Till)** trace silt, brown, dry					661
20				**SILT and CLAY (Till)** some sand, grey, wet					660
21				**SAND and GRAVEL (Till)** trace silt, dark brown, dry					659
22									658
23									657
24								bentonite seal silica sand	656
25									655
26								50 mm 010 slot PVC pipe	654
27				**CLAY (Till)** soft, brown, wet					653
28				**SAND and GRAVEL (Till)** trace silt, dark brown, dry				silica sand bentonite seal	652
29									651
30				**CLAY (Till)** soft, light brown, moist					650
31				**SILT (Till)** trace fine sand, light brown/white, dry				backfilled with drill cuttings	649
32				**SAND (Till)** some gravel, trace silt, orange-brown more silty, light brown at 31.31 m					648
				End of borehole at 32.6 m					

Well Completion Details:
Screened interval from 24.7 m to 27.7 m below surface
Elevation at top of casing (TOC) = 680.910 m

BOREHOLE METHOD: ODEX Air Rotary Drilling

BOREHOLE DATE: November 10, 2011 LOGGED BY: CK

Notes:

SLR CONSULTING (CANADA) LTD.

CLIENT: **PWGSC**
PROJECT: **Iron Creek Maintenance Camp**
ADDRESS: **KM 922 Alaska Highway, Yukon**
SLR JOB NO: **205.03504.00000**

BOREHOLE LOG

BOREHOLE NO: BH11-31
SURFACE ELEVATION: 680.04 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
				Ground Surface				stickup, jplug	
0				**CLAY and SAND (Till)**				bentonite seal	680
1				trace gravel, brown, moist					679
2				**SAND and GRAVEL (Till)** brown, dry					678
3				**SAND (Till)** fine grained, brown, moist					677
4				**SAND and GRAVEL (Till)** brown, dry					676
5									675
6									674
7									673
8									672
9									671
10								slough	670
11									669
12									668
13									667
14									666
15									665
16									664
17									663
18									662
19									661
20								bentonite seal	660
21				**CLAY (Till)** some fine sand, brown, moist				silica sand	659
22									658
23				**SAND and GRAVEL (Till)** brown, dry				50 mm 010 slot PVC pipe	657
24				**CLAY (Till)** some fine sand, brown, moist					656
25				**SAND and GRAVEL (Till)** brown, dry				silica sand	655
				End of borehole at 25.1 m					

Well Completion Details:
Screened interval from 21.3 m to 24.4 m below surface
Elevation at top of casing (TOC) = 681.020 m

BOREHOLE METHOD: ODEX Air Rotary Drilling

BOREHOLE DATE: November 14, 2011 LOGGED BY: CK

Notes:

SLR CONSULTING (CANADA) LTD.

CLIENT: **PWGSC**
PROJECT: **Iron Creek Maintenance Camp**
ADDRESS: **KM 922 Alaska Highway, Yukon**
SLR JOB NO: **205.03504.00000**

BOREHOLE LOG

BOREHOLE NO: BH11-32
SURFACE ELEVATION: 681.48 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
				Ground Surface				stickup, jplug	
0				**SAND and GRAVEL (Till)** trace silt and clay, brown, dry				bentonite seal	681
1									680
2									679
3									678
4									677
5				**SAND (Till)** some gravel, brown, moist					676
6				**SAND and GRAVEL (Till)** trace silt and clay, brown, dry				grout	675
7									674
8									673
9				at 8.5 m becomes very gravelly					672
10									671
11									670
12									669
13									668
14									667
15									666
16									665
17				at 16.8 m becomes silty sand					664
18								slough	663
19									662
20									661
21				at 21.0 m becomes fine sand					660
22									659
23									658
24									657
25								bentonite seal	656
26								silica sand	655
27								50 mm 010 slot PVC pipe	654
28									653
29				at 28.4 m becomes moist				silica sand backfilled with drill cuttings	652
30				End of borehole at 30.0 m					

Well Completion Details:
Screened interval from 25.9 m to 29.0 m below surface
Elevation at top of casing (TOC) = 682.340 m

BOREHOLE METHOD: ODEX Air Rotary Drilling

BOREHOLE DATE: November 15, 2011 LOGGED BY: CK

Notes:

SLR CONSULTING (CANADA) LTD.

CLIENT: **PWGSC**
PROJECT: **Iron Creek Maintenance Camp**
ADDRESS: **KM 922 Alaska Highway, Yukon**
SLR JOB NO: **205.03504.00000**

BOREHOLE LOG

BOREHOLE NO: BH11-33
SURFACE ELEVATION: 681.06 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
0–6				**SAND and GRAVEL (Till)** trace silt and clay, brown, dry				roadbox, jplug, cement bentonite seal	680–675
6–7				**Silty SAND (Till)** fine grained sand, brown, moist to wet					675–674
7–15				**SAND and GRAVEL (Till)** trace silt and clay, brown, dry				grout	674–666
15–16				**SILT (Till)** moist					666–665
16–21				**SAND and GRAVEL (Till)** trace silt and clay, brown, dry					665–660
21–22				at 20.9 m becomes silty sand, some gravel, greyish brown, moist					660–659
22–24				at 23.8 m becomes dry				bentonite seal silica sand	659–657
24–26								50 mm 010 slot PVC pipe	657–655
26–28				at 26.2 m contains more sand				silica sand	655–653
28–29				at 28.7 m contains more gravel, light brown, dry				backfilled with drill cuttings	653–652
29–30				End of borehole at 30.0 m Well Completion Details: Screened interval from 24.4 m to 27.4 m below surface Elevation at top of casing (TOC) = 681.790 m					652

BOREHOLE METHOD: ODEX Air Rotary Drilling

BOREHOLE DATE: November 16, 2011 LOGGED BY: CK

Notes:

Annex No.	Annex Title
C	Iron Creek: Yukon Environment, Land Treatment Facility Permit 24-032

Permit No: 24-032

LAND TREATMENT FACILITY PERMIT

Issued pursuant to the *Environment Act*, and the *Contaminated Sites Regulation*

Permittee:	**SLR Consulting (Canada) Ltd.**
Mailing Address:	**303 – 3960 Quadra Street, Victoria, BC V8X 4A3**
Site Location:	**Iron Creek Maintenance Camp, Km 922 Alaska Highway Lot 3, Group 758, YT**
Site Location Coordinates:	**60.00194 -127.91667**
Authorized Representative:	**Aaron Haegele**
Phone:	**(250) 475-9595**
Email:	**ahaegele@slrconsulting.com**
Effective Date:	**Date of Director's signature**
Expiry Date:	**December 31, 2024**

This permit replaces Land Treatment Facility permit #24-032 issued on March 6, 2015

Scope of Authorization: In accordance with your application and supporting documents, **SLR Consulting (Canada) Ltd.** is hereby permitted to operate a Private Land Treatment Facility (the "facility") at the above site location for the acceptance, storage and treatment of soil contaminated with petroleum hydrocarbons, including soil also containing contaminants other than petroleum hydrocarbons below the standards in the *Contaminated Sites Regulation* for those contaminants for Industrial Land Use, as set out in the terms and conditions of this permit.

Dated this 17th day of January, 2020

_____

Director, Environmental Programs Branch
Environment Yukon

PART 1. DEFINITIONS

1. In this permit,

"Act" means the *Environment Act*, R.S.Y. 2002, c.76;

"approved plan" means a plan that is submitted by the permittee and approved by an environmental protection analyst under this permit and includes any terms and conditions specified by the environmental protection analyst in the approval;

"associated personnel" means all employees, contractors, subcontractors, agents and volunteers involved in the activities conducted in relation to permit;

"berm" means an earthen raised barrier which completely encloses a treatment cell

"Branch" means the following sections within the Environmental Programs Branch, Environment Yukon: Standards & Approvals; the Enforcement Compliance & Inspections Section; and/or the Directorate;

"contaminant of concern" means any contaminant that is known or suspected to be present at concentrations above applicable CSR standards;

"contaminated material" means any soil, snow, sediment, or water that has one or more parameters in excess of applicable standards in the *Contaminated Sites Regulation*, O.I.C. 2002/171;

"CSR" means the *Contaminated Sites Regulation*, O.I.C. 2002/171;

"facility" means the entire area of the Land Treatment Facility authorized by this permit, including the staging cells, treatment cells, and all access roads;

"freeboard" means the distance between the liquid level within the cell and the top of the berm(s);

"highly contaminated material" means highly contaminated water, highly contaminated soil, or a mixture of both;

"highly contaminated soil" means:

i. soil or sediment with a total petroleum hydrocarbon concentration of 30,000 ppm or greater; and
ii. soil or sediment contaminated with a nonaqueous phase liquid.

"highly contaminated water" means:

i. water or snow with a total concentration of volatile hydrocarbons of 15,000 µg/L or greater;
ii. water or snow with a total concentration of light extractable hydrocarbons of 5,000 µg/L or greater; and
iii. water or snow contaminated with a nonaqueous phase liquid.

"nonaqueous phase liquid" means an immiscible liquid composed of organic compounds (which may be lighter or denser than water) at any apparent thickness;

"non-biodegradable contaminants" are contaminants, including metals, that are not amenable to treatment by bioremediation in a land treatment facility;

"ppm" means parts per million;

"private land treatment facility" means a facility which is authorized to accept contaminated material generated from the permittee's operations only;

"protocols" are those protocols created under section 21(1) of the CSR and which are currently in force;

"Regulations" means the *Contaminated Sites Regulation*, O.I.C. 2002/17 and the *Spills Regulations*, O.I.C. 1996/193, as applicable;

"seasonal high water table" means the shallowest depth to free water on an annual basis;

"supporting documents" means documents, correspondence or other material submitted in conjunction with the permit application;

"treatment cell" means a fully enclosed, bermed area into which contaminated material is placed for treatment;

"treatment" includes but is not limited to tilling/turning the material, mixing it with other materials, or adding moisture or nutrients.

2. Any term not defined in this permit that is defined in the Act or the Regulations has the same meaning as in the Act or the Regulations.

PART 2. GENERAL CONDITIONS

1. No condition of this permit limits the applicability of any other law.

2. The permittee shall only conduct activities authorized by this permit on land that the permittee has the right to enter upon and use for that purpose.

3. The permittee shall only collect, store, handle, or treat contaminated material generated by the permittee's own activities at the facility.

4. The permittee shall only allow associated personnel to take part in activities in relation to this permit if they:
   a) have access to a copy of this permit;

b) are knowledgeable of the terms and conditions of this permit; and
c) receive the appropriate training for the purposes of carrying out the requirements of this permit.

5. The permittee shall provide notice in writing to an environmental protection analyst prior to any significant change of circumstances, including without limitation:
   a) closure of the facility;
   b) a change in the ownership of the facility; or
   c) a change in the mailing address, site location or phone number of the permittee.

6. If an inspection reveals that the facility is in any way not compliant with this permit or approved plans, the permittee shall take actions as required to comply with this permit as soon as practicable.

7. The permittee shall have all sampling conducted in accordance with all applicable protocols pursuant to the CSR that pertain to sampling and analysis. The permittee shall have all sample collection carried out by trained personnel using appropriate equipment and procedures.

8. If an environmental protection analyst or environmental protection officer directs in writing that a submitted plan, including plans submitted under previous permits for the facility, be amended, the permittee shall prepare the required amendment by the date specified.

9. Where conflicts exist between this permit, the permit application, or elements of any plan pertaining to any activity conducted by the permittee and regulated under the Act, this permit shall prevail.

10. If this permit expires or is cancelled by the Minister pursuant to section 91(1) of the Act, the permittee shall decommission the facility as directed by an environmental protection officer.

11. For clarity, the obligations of the permittee survive the expiry of the permit and remain in effect until they are fulfilled to the satisfaction of an environmental protection officer.

PART 3. FACILITY SPECIFICATIONS

1. The permittee shall not operate a facility on any portion of land where:
   a) the slope is greater than 6%;

b) the seasonal high water table is less than 3 metres below the surface;
c) the facility would be within 100 metres of a surface water body;
d) the land is within a 25 year floodplain; or
e) residential property boundaries or residential buildings are less than 60 metres away.

2. The permittee shall install and maintain a UV-resistant, impermeable liner of a minimum 30 mil (30 thousandths of an inch) thickness beneath all treatment cells in accordance with the manufacturer's specifications to remain firmly anchored in the berms on all sides of each cell.

3. The permittee shall have qualified personnel install, weld and repair all impermeable liners.

4. The permittee shall take all reasonable measures to maintain the integrity of the liner and shall undertake all necessary maintenance, repairs, upgrades or other actions to remedy any failures in the integrity of the liner.

5. In accordance with the permit application and supporting documents and approved plans:
   a) the facility shall consist of one treatment cell, with maximum interior dimensions of 52 metres by 52 metres;
   b) the maximum volume of contaminated material within the facility shall be 2,475 m^3 cubic metres; and
   c) the facility shall be contained within the boundaries of the site location.
   d) The permittee shall not exceed these maximum thresholds.

6. The permittee shall maintain berms around all treatment cells to prevent the escape of contaminated material, runoff or leachate from the cells. The permittee shall maintain berms at sufficient height and lateral extent to contain all contaminated material, runoff, and leachate in the cells, as determined by an environmental protection officer.

7. The permittee shall prevent berms surrounding treatment cells from being removed or breached except as approved by an environmental protection analyst in writing or as instructed by an environmental protection officer.

8. The permittee shall maintain ramps to allow equipment to access the cells without damaging or degrading the berms or the liner.

9. If any berms become damaged or degraded, the permittee shall repair the berms as soon as practicable.

10. The permittee shall construct and maintain diversion berms and/or ditches as required to ensure that runoff cannot enter the cells.

11. The permittee shall keep the facility secured at all times to prevent vehicle access by unauthorized persons.

12. The permittee shall post a sign at the entrance to the facility identifying that the facility contains contaminated material and shall maintain the sign at all times of the facility's operation.

PART 4. FACILITY MAINTENANCE

1. The permittee shall:
   a) properly maintain and repair the berms, ditches, tanks, fencing, signage, and all other facility components at all times; and
   b) inspect the facility for compliance with this permit every two weeks from April 1 to October 31 of each year.

2. If an inspection under condition 4.1 reveals that the facility is in any way not in compliance with this permit or approved plans, the permittee shall take actions as required to comply with this permit as soon as practicable.

3. The permittee shall take all reasonable measures to prevent wildlife, including waterfowl, from being attracted to the site. These measures may include, but need not be limited to, fencing, the use of bird scare devices, removal of suitable habitat (e.g. standing water and vegetation), and the installation of netting over the cells.

PART 5. INTAKE OF CONTAMINATED MATERIAL

1. The permittee may accept soil contaminated with petroleum hydrocarbons, including soil also containing contaminants other than petroleum hydrocarbons below the standards in the *Contaminated Sites Regulation* for those contaminants for Industrial Land Use.

2. The permittee shall obtain the relocation permit number under which incoming material is transported prior to acceptance of the material into the facility, unless

otherwise directed by an environmental protection analyst or environmental protection officer.

3. The permittee shall have samples as per applicable protocols of incoming contaminated material from each source analyzed for petroleum hydrocarbons and any other contaminants of concern within 60 days of acceptance of the material.

4. If the permittee has reasonable grounds to believe that incoming contaminated material may contain contaminants other than petroleum hydrocarbons, the permittee shall contact an environmental protection analyst prior to accepting the contaminated material and shall follow the direction provided by an environmental protection analyst in respect of that contaminated material.

5. Should analysis of incoming contaminated material show that it contains contaminants other than petroleum hydrocarbons above the standards for those contaminants in the CSR for Industrial Land Use , the permittee shall contact an environmental protection analyst for direction on the disposal of the material within 5 days of receipt of the analytical results, and shall remove the material from the facility within 30 days of receipt of the analytical results or as directed by an environmental protection analyst.

6. The permittee shall not initiate treatment of incoming material, including but not limited to tilling or applying water or other soil conditioners or amendments, until analytical results are received, establishing the type and level of contaminants in that material.

7. If any results of analysis of incoming contaminated material demonstrates that the material is highly contaminated material, the permittee shall inform an environmental protection analyst within 5 days of receipt of the analytical results. Within 30 days of the receipt of the results, the permittee shall remove the material represented by the relevant sample.

PART 6. SOIL HANDLING AND STOCKPILING

1. The permittee shall ensure that contaminated material from different sources or containing different types of contamination is handled, stored and treated separately except as authorized by this permit or as directed by an environmental protection analyst.

2. Following the receipt of analytical results for samples from each stockpile, the permittee may consolidate stockpiles of soil from different sources into a single stockpile with a maximum volume of 500 m^3, provided that each original stockpile:
   a) contains only petroleum hydrocarbon-contaminated material; and
   b) does not contain highly contaminated material.

3. The permittee shall prevent contaminated material from being mixed with highly contaminated material, treated material or non-contaminated material, except as authorized by this permit or as directed by an environmental protection analyst.

4. The permittee shall take all reasonable measures to prevent the release of contaminated material into the environment.

5. The permittee shall place all contaminated material within a cell a sufficient distance from all berms to prevent contaminated material, runoff or leachate from escaping the cell, as determined by an environmental protection officer.

6. The permittee shall sufficiently separate piles or windrows of contaminated material to allow equipment to access each pile or windrow, and to prevent inadvertent mixing of piles or windrows of contaminated material from different sources or containing different levels or types of contamination.

7. The permittee prevent contaminated material from being placed on the ramp(s) into the cells, the berms surrounding the cells or on access road(s) into or within the facility.

8. The permittee shall document the location of stockpiles within the facility by relocation permit number under which the material was transported to the facility or another identifier consistent with the figure and records required under condition 11.2, below.

PART 7. MONITORING

1. The permittee shall develop and implement a sampling and monitoring program for all contaminated material being treated at the facility, in accordance with all guidelines and protocols pursuant to the CSR that pertain to the sampling, analysis and monitoring of contaminated material within a land treatment facility.

PART 8. REMOVAL OF REMEDIATED SOIL

1. The permittee shall not remove any material from the facility without first:

a) submitting a written request to an environmental protection analyst to remove a specific volume of material;
b) providing information on the land use at the receiving site;
c) providing analytical results demonstrating that the material to be removed is suitable for use at the receiving site, based on the applicable CSR land use standards, for all contaminants of concern;
d) providing a description of sampling methodology applied;
e) demonstrating, to the satisfaction of an environmental protection analyst, that if the material removed from the facility is contaminated above CSR standards for all land uses, that the material will be transported, in accordance with applicable transport laws, to a facility permitted to receive the contaminated material;
f) providing the date on which the soil was last tilled;
g) receiving the written approval of an environmental protection analyst for the removal; and
h) obtaining a relocation permit for the relocation of the remediated material, if the concentration of any contaminant in the material is above the applicable standards in the CSR for the receiving site.

2. Within 14 days prior to collecting confirmatory samples from a stockpile in support of a request to remove the soil from the facility, the permittee shall thoroughly till or turn all of the material in the stockpile at least once using appropriate equipment.

3. Prior to removal of stockpiles that have been consolidated in accordance with condition 6.2 above, the permittee shall ensure that confirmatory samples are analyzed for all contaminants of concern from each individual stockpile or source.

PART 9. MANAGEMENT OF LIQUID CONTAMINATED MATERIAL

1. Liquid contaminated material, other than runoff from soil in the facility, may not be collected, stored, or treated at the facility.

2. The permittee shall ensure that all runoff within cells, including rain water, snow and ice melt, is either contained within the berms of each cell while still leaving a minimum of 30 cm freeboard or is removed from the cells and is contained within the facility in aboveground storage tanks of sufficient volume.

3. Prior to releasing or removing any liquid from the facility, including runoff from soil in the facility and liquid that has been treated or filtered, the permittee shall collect a representative sample of the liquid proposed for release and provide analytical results,

and information regarding the amount of liquid to be released, to an environmental protection analyst with the Environmental Programs Branch.

4. When the permittee has provided the analytical results, the permittee shall:
    a) If the analytical results demonstrates that hydrocarbons and any other contaminants of concern are identified as being below the detection limit, the permittee may release the liquids.
    b) If the analytical results demonstrates that hydrocarbons and any other contaminants of concern are detected in the sample but are below applicable CSR standards, the permittee shall provide 10 days written notice to an environmental protection analyst with the Environmental Programs Branch, before releasing the liquids. However, the liquids shall not be released if an Environmental Protection Officer determines that a release would cause an adverse effect.
    c) If the analytical results demonstrates that hydrocarbons and any other contaminants of concern are in excess of the applicable CSR standards, the permittee shall not release the liquids.

5. The permittee may remove snow from the facility and discharge it to the environment without sampling, provided that the snow is from an area of the facility where no contaminated soil is present and that the snow has not come into contact with contaminants or contaminated material.

6. The permittee shall have a sample of the liquid contaminated material referred to in 9.3 above collected and analyzed prior to adding any additional material to the storage tank or treatment cell in order to not change the composition of the liquid that was sampled.

7. The permittee shall not apply any liquid highly contaminated material onto soil in the facility. The permittee shall dispose of such liquid in accordance with all applicable regulations.

PART 10. SPILLS

1. The permittee shall store or handle all substances are so as to prevent spills, leakage, leaching or other discharges or releases of the substances from their storage containers, equipment, or other sources.

2. The permittee shall contact either an environmental protection officer or the 24-hour Yukon Spill Report Centre (867-667-7244), as soon as possible under the circumstances, in the event of a release, spill, unauthorized emission, discharge or escape of any material as defined in the Act or Regulations.

3. The permittee shall ensure that appropriate clean-up equipment (such as sorbent, shovel, broom, bucket, gloves, boots, etc.) is readily available on site.

4. The permittee make emergency spill procedures are available in a written format to all personnel when working on-site and shall familiarize all associated personnel with those procedures.

PART 11. REPORTING AND RECORD KEEPING

1. The permittee shall maintain current records detailing:
   a) the origin of all contaminated material being stored and treated;
   b) the volume of contaminated material accepted from each source;
   c) a figure(s) showing the entire facility including the location within the facility of contaminated material from each source;
   d) for soil combined in accordance with condition 6.2, the original source and volume of each component stockpile;
   e) the total volume of contaminated material in the facility;
   f) soil analysis results for samples from any contaminated material accepted for treatment or removed from the facility;
   g) soil analysis results for any interim samples taken in order to assess remediation progress;
   h) results of any water analyses conducted on runoff from the facility;
   i) details of any nutrients added (including type, dates, quantity and location of application);
   j) soil analysis results for any confirmatory samples taken for the purpose of determining if the soil was remediated;
   k) details of any handling of highly contaminated material (including volumes accepted and/or removed from the facility);
   l) the volume of material removed from the facility, the location and applicable land use(s) of the receiving site(s), and the written approval of an environmental protection analyst for removal of the material;
   m) summaries of all inspections carried out under part 4.1 of this permit (including the name of the person conducting the inspection, the date of each inspection, any

observations recorded during the inspection, actions taken as a result of those observations, and the date each action was taken);

n) notes concerning any spills or leaks occurring at the site, including substance involved, estimated quantity, date of observation of the spill or leak, spill reports made, and clean-up procedures implemented; and
o) any and all deficiencies observed and remedied in accordance with condition 4.2, and details describing how and when they were remedied.

2. The permittee shall submit an annual report to an environmental protection analyst on or before March 31 of each year, including the March 31 following the expiry of this permit, which includes but need not be limited to:
   a) a description of all activities undertaken at the facility in the previous calendar year;
   b) all records required to be maintained under condition 11.1 as they pertain to the previous calendar year and reflective of conditions as of the end of that year, including original laboratory reports for all sample results reported;
   c) a figure showing the entire facility, including the location of contaminated material from each source within the facility;
   d) a sampling and monitoring plan for the current calendar year, pursuant to condition 7.1 of this permit; and
   e) a workplan for the entire facility for the current calendar year.

3. Notwithstanding the reporting requirements listed in condition 11.2, analytical results for samples from contaminated or remediated material accepted for treatment or removed from the facility need not be included in the annual report where these results have previously been submitted to the Branch. Additionally, authorizations received from an environmental protection analyst (such as for the removal of treated soil) need not be included in the annual report. The permittee shall still include all other applicable information pertaining to this material (e.g. volumes, sources, etc.) in the report.

4. The permittee include in the annual report described in condition 11.2 an explanation of any case where a requirement of condition 11.1 does not apply (for example, if no nutrients were added in the previous calendar year). The permittee shall submit the annual report described in condition 11.2 even if no activity was undertaken in the previous calendar year.

5. The permittee shall keep all records required under this permit in a format acceptable to an environmental protection officer for a minimum of three years and make them available for inspection by an environmental protection officer upon request.

PART 12. DECOMMISSIONING

1. At least three months prior to the intended closure of the facility or any individual cells, the permittee shall submit a detailed decommissioning plan to an environmental protection analyst for approval which includes:
   a) a schedule for decommissioning the facility or cell(s);
   b) the results of sampling demonstrating the levels of contaminants in all soil in the facility or cell(s);
   c) details of the intended use and receiving location of all soil in the facility or cell(s);
   d) a description of the methods to be used to restore the site, or portion thereof, or to prepare the site location or portion thereof for its future uses; and
   e) any other information required by the Branch.

2. If the permittee does not anticipate closure of the facility but closure is required, the permittee shall submit the information listed in 12.1 as soon as practicable.

3. The permittee shall obtain written approval of the decommissioning plan from an environmental protection analyst prior to the commencement of any work to decommission the facility or any individual cells.

4. The permittee shall obtain approval from an environmental protection analyst for all amendments to the decommissioning plan.

5. Following submission of the decommissioning plan as in condition 12.1, the permittee shall ensure that no additional contaminated material is accepted into the facility or individual cells to be closed.

6. The permittee shall conduct all work to decommission the facility or any individual cells in accordance with the decommissioning plan approved by an environmental protection analyst, including any conditions applicable to the approval.

7. The permittee shall commence decommissioning the cell(s) or facility within six months of receiving approval from an environmental protection analyst or as directed by an environmental protect analyst.

8. During decommissioning of the facility, the permittee shall have confirmatory samples collected from the bases of all cells in the facility, the berm material and any other area(s) of the site location that may have been impacted due to the operation of the facility. The permittee shall have these samples collected and analyzed for all

contaminants of concern in accordance with *Protocol 11: Sampling Procedures for Land Treatment Facilities* as updated from time to time.

9. The permittee shall relocate any contaminated material excavated during implementation of the decommissioning plan to another cell, in the case of the closure of one or more cells, or another facility permitted to accept the material in accordance with the CSR, in the case of closure of the facility.

10. Within 120 days of implementation of the decommissioning plan, the permittee shall submit a report to an environmental protection analyst describing the effectiveness of the implementation of the approved decommissioning plan, including confirmatory sampling results which demonstrate that contaminant concentrations at the former cell or at the land treatment facility site location are below applicable CSR standards.

Annex No.	Annex Title
D	FY 2019/2020 Sump Water Analytical Results

TABLE 11: SUMP WATER CHEMISTRY RESULTS - PETROLEUM HYDROCARBONS (FIGWQG)

			Petroleum Hydrocarbons														
			benzene	toluene	ethylbenzene	total xylenes	styrene	VHs6-10	VPHs	EPHs10-19	LEPHs	EPHs19-32	HEPHs	F1 (C6-C10 less BTEX)	F2 (C10-C16)	F3 (C16-C34)	F4 (C34-C50)
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
FIGWQG Tier 1 RL/PL, Coarse Soil			140	83	11000	3900	72	ng	ng	ng	ng	ng	ng	810	1300	ng	ng
FIGWQG Tier 1 RL/PL, Fine Soil			2800	82000	42000	21000	72	ng	ng	ng	ng	ng	ng	6500	1800	ng	ng
Sample Location	**Sample Date (yyyy-mmm-dd)**	**Sample ID**															
SS19-Sump01	2019-Sep-20	SS19-Sump01	<0.5	<0.5	<0.5	<1	<0.5	<100	<100	480	480	210	210	<100	220	490	<200
		DUP19-06	<0.5	<0.5	<0.5	<1	<0.5	<100	<100	420	420	<200	<200	<100	210	420	<200
SS19-Sump02	2019-Sep-27	SS19-Sump02	<0.5	<0.5	<0.5	<1	<0.5	<100	<100	910	900	560	560	<100	500	1000	<200
RPD (%)																	
SS19-Sump01/ DUP19-06	2019-Sep-20	-	NC	NC	NC	NC	NC	NC	NC	13.3	13.3	NC	NC	NC	4.7	15.4	NC

Notes:

µg/L - micrograms per litre

< - less than reported detection limit

ng - no guideline listed

BTEX - benzene, toluene, ethylbenzene, xylenes

VHs - volatile hydrocarbons

VPHs - volatile petroleum hydrocarbons

EPHs - extractable petroleum hydrocarbons

LEPHs - light extractable petroleum hydrocarbons

HEPHs - heavy extractable petroleum hydrocarbons

F1 (C6-C10) - petroleum hydrocarbon fraction 1 (C_6-C_{10})

F2 (C10-C16) - petroleum hydrocarbon fraction 2 (C_{10}-C_{16})

F3 (C16-C32) - petroleum hydrocarbon fraction 3 (C_{16}-C_{32})

F4 (C32-C50) - petroleum hydrocarbon fraction 4 (C_{32}-C_{50})

FIGWQG - Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites

RPD - relative percent difference

NC - not calculated due to duplicate values that were either less than the minimum detection limit (MDL) or less than 5 x MDL

- formatting of cells indicates exceedances of like-formatted standards
- where many exceedance formats are used, highlighted results reflect the least stringent standard/guideline exceeded
- samples collected at the same location and date are blind field duplicate / parent pairs
- RPD acceptance limits for water are as follows: volatile organics and other organic parameters (45%), inorganics and metals (30%)

Environmental Guidelines Descriptions:

- FIGWQG Tier 1 RL/PL, Coarse Soil:Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, Tier 1, Residential and Park Land Use, Coarse Soil (June 2016)
- FIGWQG Tier 1 RL/PL, Fine Soil:Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, Tier 1, Residential and Park Land Use, Fine Soil (June 2016)

TABLE 12: SUMP WATER CHEMISTRY RESULTS - POLYCYCLIC AROMATIC HYDROCARBONS (FIGWQG)

Sample Location	Sample Date (yyyy-mmm-dd)	Sample ID	PAHs																					
			acenaphthylene	acenaphthene	acridine	anthracene	benz(a)anthracene	benzo(b)fluoranthene	benzo(b+j)fluoranthenes	benzo(g,h,i)perylene	benzo(j)fluoranthene	benzo(k)fluoranthene	benzo(a)pyrene	chrysene	dibenz(a,h)anthracene	fluoranthene	fluorene	indeno(1,2,3-cd)pyrene	methylnaphthalene, 1-	methylnaphthalene, 2-	naphthalene	phenanthrene	pyrene	quinoline
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
FIGWQG Tier 1 RL/PL, Coarse Soil			46	5.8	0.05	0.012	0.018[#1]	ng	0.48[#1]	0.17[#1]	ng	0.48[#1]	0.01[#1]	0.1[#1]	0.26[#1]	0.04	3	0.21[#1]	ng	ng	1.1	0.4	0.025	3.4
FIGWQG Tier 1 RL/PL, Fine Soil			46	5.8	0.05	0.012	0.018[#1]	ng	0.48[#1]	0.21[#1]	ng	0.48[#1]	0.01[#1]	0.1[#1]	0.28[#1]	0.04	3	0.23[#1]	ng	ng	1.1	0.4	0.025	3.4
SS19-Sump01	2019-Sep-20	SS19-Sump01	<0.02	0.02	<0.05	<0.01	<0.01	<0.01	0.01	0.01	0.01	0.01	0.01	<0.01	0.01	0.02	<0.02	0.01	<0.05	<0.05	<0.05	<0.04	0.02	<0.05
		DUP19-06	<0.02	0.02	<0.05	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.02	<0.01	<0.05	<0.05	<0.05	0.05	<0.02	<0.05
SS19-Sump02	2019-Sep-27	SS19-Sump02	<0.02	0.08	<0.05	0.09	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.19	0.09	<0.01	0.37	0.17	0.06	0.47	0.21	<0.05

Notes:

µg/L - micrograms per litre

< - less than reported detection limit

ng - no guideline listed

PAH - polycyclic aromatic hydrocarbons

FIGWQG - Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites

• formatting of cells indicates exceedances of like-formatted standards

• where many exceedance formats are used, highlighted results reflect the least stringent standard/guideline exceeded

• samples collected at the same location and date are blind field duplicate / parent pairs

*relative percent difference was not calculated due to values that were either less than the minimum detection limit (MDL) or less than 5 x MDL

Environmental Guidelines Comments:

#1:For ecological receptors only.

Environmental Guidelines Descriptions:

• FIGWQG Tier 1 RL/PL, Coarse Soil:Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, Tier 1, Residential and Park Land Use, Coarse Soil (June 2016)

• FIGWQG Tier 1 RL/PL, Fine Soil:Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, Tier 1, Residential and Park Land Use, Fine Soil (June 2016)

TABLE 13: SUMP WATER CHEMISTRY RESULTS - TOTAL AND DISSOLVED METALS (FIGWQG)

Metals - Total and Dissolved (Filtered)

Sample ID	Sample Date (yyyy-mmm-dd)	Sample Location	hardness as CaCO3	hardness as CaCO3 (Filtered)	aluminum	aluminum (Filtered)	antimony	antimony (Filtered)	arsenic	arsenic (Filtered)	barium	barium (Filtered)	beryllium	beryllium (Filtered)	bismuth	bismuth (Filtered)	boron	boron (Filtered)	cadmium	cadmium (Filtered)	calcium	calcium (Filtered)
			mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L
FIGWQG Tier 1 RL/PL, Coarse Soil			ng	ng	5	5	2000	2000	5	5	500	500	5.3	5.3	ng	ng	5000	5000	0.09	0.09	ng	ng
FIGWQG Tier 1 RL/PL, Fine Soil			ng	ng	5	5	2000	2000	5	5	500	500	5.3	5.3	ng	ng	5000	5000	0.09	0.09	ng	ng
SS19-Sump02	2019-Sep-27	SS19-Sump02	508	454	5700	25	2.2	1.5	9	2.3	737	680	0.25	0.01	0.11	<0.05	47	55	0.67	0.19	143	128

Sample ID	chromium (III+VI)	chromium (III+VI) (Filtered)	cobalt	cobalt (Filtered)	copper	copper (Filtered)	iron	iron (Filtered)	lead	lead (Filtered)	lithium	lithium (Filtered)	magnesium	magnesium (Filtered)	manganese	manganese (Filtered)	mercury	mercury (Filtered)	molybdenum	molybdenum (Filtered)	nickel	nickel (Filtered)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
FIGWQG Tier 1 RL/PL, Coarse Soil	8.9	8.9	ng	ng	2	2	300	300	1	1	ng	ng	ng	ng	ng	ng	0.016	0.016	73	73	25	25
FIGWQG Tier 1 RL/PL, Fine Soil	8.9	8.9	ng	ng	2	2	300	300	1	1	ng	ng	ng	ng	ng	ng	0.016	0.016	73	73	25	25
SS19-Sump02	9.9	0.7	13.1	5.71	34.6	21.6	12,600	115	8.39	0.08	3.8	0.9	36.6	32.6	1940	1500	0.1	0.01	15.2	13.2	32.3	15.4

Sample ID	potassium	potassium (Filtered)	selenium	selenium (Filtered)	silver	silver (Filtered)	sodium	sodium (Filtered)	strontium	strontium (Filtered)	thallium	thallium (Filtered)	tin	tin (Filtered)	titanium	titanium (Filtered)	uranium	uranium (Filtered)	vanadium	vanadium (Filtered)	zinc	zinc (Filtered)	zirconium	zirconium (Filtered)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
FIGWQG Tier 1 RL/PL, Coarse Soil	ng	ng	1	1	0.25	0.25	ng	ng	ng	ng	0.8	0.8	ng	ng	100	100	15	15	ng	ng	10	10	ng	ng
FIGWQG Tier 1 RL/PL, Fine Soil	ng	ng	1	1	0.25	0.25	ng	ng	ng	ng	0.8	0.8	ng	ng	100	100	15	15	ng	ng	10	10	ng	ng
SS19-Sump02	34,200	29,800	3.6	2.6	0.18	<0.02	1130	1090	619	520	0.27	0.17	1.57	6.38	157	5.3	7.18	6.99	22	1.2	69	5	9.2	4.9

Notes:
mg/L - milligrams per litre
µg/L - micrograms per litre
< - less than reported detection limit
'-' - sample not analyzed for parameter indicated
ng - no guideline listed
FIGWQG - Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites
• formatting of cells indicates exceedances of like-formatted standards
• where many exceedance formats are used, highlighted results reflect the least stringent standard/guideline exceeded

Environmental Guidelines Descriptions:
• FIGWQG Tier 1 RL/PL, Coarse Soil:Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, Tier 1, Residential and Park Land Use, Coarse Soil (June 2016)
• FIGWQG Tier 1 RL/PL, Fine Soil:Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, Tier 1, Residential and Park Land Use, Fine Soil (June 2016)

Table 5A: Triple J Sump Water - Analytical Results - FISQG and Health Canada CDWQG MAC/AO Guidelines

Field label	FIGQG Tier 1 RL/PL & Tier 2 - Coarse GS	FIGQG Tier 1 CL/IL & Tier 2 - Coarse GS	HC CDWQG MAC/AO	SUMP#1	DUP#1	RPD	SUMP#2	SUMP#3	SUMP#4
Duplicate ID				DUP#1	SUMP#1				
Date				13/Sep/19	13/Sep/19		13/Sep/19	13/Sep/19	13/Sep/19
Lab report ID				19Y519702	19Y519702		19Y519702	19Y519702	19Y519702
Monocyclic Aromatic Hydrocarbons									
Benzene	140	88	5	<0.5	<0.5	-	<0.5	<0.5	<0.5
Ethylbenzene	11000	3200	140/1.6	<0.5	<0.5	-	<0.5	<0.5	<0.5
Toluene	83	83	60/24	0.6	0.6	-	1.5	<0.5	<0.5
MTBE	340	340	15	<1	<1	-	3	<1	<1
Styrene	72	72	-	<0.5	<0.5	-	<0.5	<0.5	<0.5
m+p-Xylene	-	-	-	0.8	0.8	-	2.9	0.5	<0.5
o-Xylene	-	-	-	<0.5	<0.5	-	1.7	<0.5	<0.5
Xylenes (total)	3900	3900	90/20	<1	<1	-	5	<1	<1
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	5.8	5.8	-	<0.02	<0.02	-	1.09	<0.02	<0.02
Acenaphthylene	46	46	-	<0.02	<0.02	-	<0.02	<0.02	<0.02
Acridine	0.05	0.05	-	<0.05	<0.05	-	<0.05	<0.05	<0.05
Anthracene	0.012	0.012	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[a]anthracene	0.018	0.018	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[a]pyrene	0.01	0.01	0.04	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[b]fluoranthene	-	-	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[b+j]fluoranthene	0.48	0.48	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[ghi]perylene	0.17	0.17	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[j]fluoranthene	-	-	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[k]fluoranthene	0.48	0.48	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Chrysene	1.4	1.4	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Dibenzo[a,h]anthracene	0.26	0.26	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	-	<0.02	<0.02	-	**0.08**	<0.02	<0.02
Fluorene	3	3	-	0.18	0.28	*43%*	0.32	<0.02	<0.02
Indeno[1,2,3-cd]pyrene	0.21	0.21	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
1-Methylnaphthalene	180	180	-	1.13	1.17	3%	0.51	<0.05	<0.05
2-Methylnaphthalene	180	180	-	0.57	0.71	*22%*	0.24	<0.05	<0.05
Naphthalene	1.1	1.1	-	0.39	0.30	*26%*	0.39	<0.05	<0.05
Phenanthrene	0.4	0.4	-	0.11	0.15	*31%*	**0.49**	0.07	<0.04
Pyrene	0.025	0.025	-	<0.02	<0.02	-	**0.07**	0.02	<0.02
Quinoline	3.4	3.4	-	<0.05	<0.05	-	<0.05	<0.05	<0.05
Petroleum Hydrocarbons									
F1 (C6-C10)	810	810	-	<100	<100	-	<100	<100	<100
F1 (C6-C10) minus BTEX	-	-	-	<100	<100	-	<100	<100	<100
F2 (C10-C16)	1300	1300	-	**1330**	**1670**	*23%*	**1810**	260	<200
F3 (C16-C34)	-	-	-	910	1180	*26%*	2140	220	<200
F4 (C34-C50)	-	-	-	<200	<200	-	1070	<200	<200

Notes

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Red cells indicates parameter exceeds FIGQG Tier 1 for RL/PL coarse soils and Tier 2 for inhalation, soil organism direct contact, and FW coarse soils, whichever is more stringent. (Current as of 4-January-2020)

Bold indicates parameter exceeds FIGQG Tier 1 for CL/IL coarse soils and Tier 2 for inhalation, soil organism direct contact, and FW coarse soils, whichever is more stringent. (Current as of 4-January-2020)

Underline indicates parameter exceeds Health Canada Canadian Drinking Water Quality Guidelines, Maximum Allowable Concentration (MAC) or Aesthetic Objective (AO), whichever is more stringent. (Current as of 4-January-2020)

"RPD" is Relative Percentage Difference. (RPD = 2*(A-B)/(A+B)*100%. BC MOE 2013; Field Sampling Manual)

Yellow cells indicate that RPD value is >20%. *Orange* cells indicate that RPD value is >50%.

Table 5B: Triple J Sump Water - Analytical Results - CSR AW and DW Standards

Field label	BC CSR AW	BC CSR DW	SUMP#1	DUP#1	RPD	SUMP#2	SUMP#3	SUMP#4
Duplicate ID			DUP#1	SUMP#1				
Date			13/Sep/19	13/Sep/19		13/Sep/19	13/Sep/19	13/Sep/19
Lab report ID			19Y519702	19Y519702		19Y519702	19Y519702	19Y519702
Monocyclic Aromatic Hydrocarbons								
Benzene	400	5	<0.5	<0.5	-	<0.5	<0.5	<0.5
Ethylbenzene	2000	140	<0.5	<0.5	-	<0.5	<0.5	<0.5
Toluene	5	60	0.6	0.6	-	1.5	<0.5	<0.5
MTBE	34000	95	<1	<1	-	3	<1	<1
Styrene	720	800	<0.5	<0.5	-	<0.5	<0.5	<0.5
m+p-Xylene	-	-	0.8	0.8	-	2.9	0.5	<0.5
o-Xylene	-	-	<0.5	<0.5	-	1.7	<0.5	<0.5
Xylenes (total)	300	90	<1	<1	-	5	<1	<1
Polycyclic Aromatic Hydrocarbons								
Acenaphthene	60	250	<0.02	<0.02	-	1.09	<0.02	<0.02
Acenaphthylene	-	-	<0.02	<0.02	-	<0.02	<0.02	<0.02
Acridine	0.5	-	<0.05	<0.05	-	<0.05	<0.05	<0.05
Anthracene	1	1000	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[a]anthracene	1	0.07	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[a]pyrene	0.1	0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[b]fluoranthene	-	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[b+j]fluoranthene	-	0.07	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[ghi]perylene	-	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[j]fluoranthene	-	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Benzo[k]fluoranthene	-	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
Chrysene	1	7	<0.01	<0.01	-	<0.01	<0.01	<0.01
Dibenzo[a,h]anthracene	-	0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01
Fluoranthene	2	150	<0.02	<0.02	-	0.08	<0.02	<0.02
Fluorene	120	150	0.18	0.28	*43%*	0.32	<0.02	<0.02
Indeno[1,2,3-cd]pyrene	-	-	<0.01	<0.01	-	<0.01	<0.01	<0.01
1-Methylnaphthalene	-	5.5	1.13	1.17	3%	0.51	<0.05	<0.05
2-Methylnaphthalene	-	15	0.57	0.71	*22%*	0.24	<0.05	<0.05
Naphthalene	10	80	0.39	0.30	*26%*	0.39	<0.05	<0.05
Phenanthrene	3	-	0.11	0.15	*31%*	0.49	0.07	<0.04
Pyrene	0.2	100	<0.02	<0.02	-	0.07	0.02	<0.02
Quinoline	34	0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05
Petroleum Hydrocarbons								
EPH (C10-C19)	5000	5000	1810	2290	*23%*	2430	320	<200
EPH (C19-C32)	-	-	370	490	*28%*	1280	<200	<200
HEPH	-	-	370	490	*28%*	1280	<200	<200
LEPH	500	-	1810	2290	*23%*	2430	320	<200
VH C6-C10	15000	15000	<100	<100	-	<100	<100	<100
VPH (VH6-10) minus BTEX	1500	-	<100	<100	-	<100	<100	<100

Notes

All units in ug/L, unless otherwise noted.

"-" indicates that there is no applicable standard or analyses were not performed.

Red cells indicates parameter exceeds BC CSR AW . (Current as of 4-January-2020)

Bold indicates parameter exceeds BC CSR DW. (Current as of 4-January-2020)

"RPD" is Relative Percentage Difference. (RPD = 2*(A-B)/(A+B)*100%. BC MOE 2013; Field Sampling Manual)

Yellow cells indicate that RPD value is >20%. *Orange* cells indicate that RPD value is >50%.

Table 3A: Km 713 Sump Water - Analytical Results - FISQG and HC CDWQG MAC/AO Guidelines

Field label	FIGQG Tier 1 RL/PL & Tier 2 - Coarse GS	FIGQG Tier 1 CL/IL & Tier 2 - Coarse GS	HC CDWQG MAC/AO	713-STF1-SUMP	DUP-1	RPD	713-STF2-SUMP
Duplicate ID				DUP-1	713-STF1-SUMP		
Date				10/Sep/19	10/Sep/19		10/Sep/19
Lab report ID				19Y517136	19Y517136		19Y517136
Monocyclic Aromatic Hydrocarbons							
Benzene	140	88	5	<0.5	<0.5	-	<0.5
Ethylbenzene	11000	3200	140/1.6	<0.5	<0.5	-	<0.5
Methyl tert-butyl ether	340	340	15	<1	<1	-	<1
Styrene	72	72	-	<0.5	<0.5	-	<0.5
Toluene	83	83	60/24	<0.5	<0.5	-	<0.5
m+p-Xylene	-	-	-	<0.5	<0.5	-	<0.5
o-Xylene	-	-	-	<0.5	<0.5	-	<0.5
Xylenes (total)	3900	3900	90/20	<1	<1	-	<1
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	5.8	5.8	-	<0.02	<0.02	-	<0.02
Acenaphthylene	46	46	-	<0.02	<0.02	-	<0.02
Acridine	0.05	0.05	-	<0.05	<0.05	-	<0.05
Anthracene	0.012	0.012	-	<0.01	<0.01	-	<0.01
Benzo[a]anthracene	0.018	0.018	-	<0.01	<0.01	-	<0.01
Benzo[a]pyrene	0.01	0.01	0.04	<0.01	<0.01	-	<0.01
Benzo[b]fluoranthene	-	-	-	<0.01	<0.01	-	<0.01
Benzo[b+j]fluoranthene	0.48	0.48	-	<0.01	<0.01	-	<0.01
Benzo[ghi]perylene	0.17	0.17	-	<0.01	<0.01	-	<0.01
Benzo[j]fluoranthene	-	-	-	<0.01	<0.01	-	<0.01
Benzo[k]fluoranthene	0.48	0.48	-	<0.01	<0.01	-	<0.01
Chrysene	0.1	0.1	-	<0.01	<0.01	-	<0.01
Dibenzo[a,h]anthracene	0.26	0.26	-	<0.01	<0.01	-	<0.01
Fluoranthene	0.04	0.04	-	0.02	0.02	-	0.03
Fluorene	3	3	-	<0.02	<0.02	-	0.02
Indeno[1,2,3-cd]pyrene	0.21	0.21	-	<0.01	<0.01	-	<0.01
1-Methylnaphthalene	180	180	-	<0.05	<0.05	-	0.54
2-Methylnaphthalene	180	180	-	<0.05	<0.05	-	0.18
Naphthalene	1.1	1.1	-	<0.05	<0.05	-	<0.05
Phenanthrene	0.4	0.4	-	0.08	0.09	12%	0.13
Pyrene	0.025	0.025	-	0.02	0.02	-	**0.03**
Quinoline	3.4	3.4	-	<0.05	<0.05	-	<0.05
Petroleum Hydrocarbons							
F1 (C6-C10)	810	810	-	<100	<100	-	<100
F1 (C6-C10) minus BTEX	-	-	-	<100	<100	-	<100
F2 (C10-C16)	1300	1300	-	220	250	13%	440
F3 (C16-C34)	-	-	-	280	280	0%	340
F4 (C34-C50)	-	-	-	<200	<200	-	<200

Notes

All units in ug/L, unless otherwise noted.

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Red cells indicates parameter exceeds FIGQG Tier 1 for RL/PL coarse soils and Tier 2 for inhalation, soil organism direct contact, and FW coarse soils, whichever is more stringent. (Current as of 4-January-2020)

Bold indicates parameter exceeds FIGQG Tier 1 for CL/IL coarse soils and Tier 2 for inhalation, soil organism direct contact, and FW coarse soils, whichever is more stringent. (Current as of 4-January-2020)

Underline indicates parameter exceeds Health Canada Canadian Drinking Water Quality Guidelines, Maximum Allowable Concentration (MAC) or Aesthetic Objective (AO), whichever is more stringent. (Current as of 4-January-2020)

"RPD" is Relative Percentage Difference. (RPD = 2*(A-B)/(A+B)*100%. BC MoE 2013; Field Sampling Manual)

Yellow cells indicate that RPD value is >20%. *Orange* cells indicate that RPD value is >50%.

Table 3B: Km 713 Sump Water - Analytical Results - CSR AW and DW Standards

Field label	BC CSR AW	BC CSR DW	713-STF1-SUMP	DUP-1	RPD	713-STF2-SUMP
Duplicate ID			DUP-1	713-STF1-SUMP		
Date			10/Sep/19	10/Sep/19		10/Sep/19
Lab report ID			19Y517136	19Y517136		19Y517136
Monocyclic Aromatic Hydrocarbons						
Benzene	400	5	<0.5	<0.5	-	<0.5
Ethylbenzene	2,000	140	<0.5	<0.5	-	<0.5
Methyl tert-butyl ether	34,000	95	<1	<1	-	<1
Styrene	720	800	<0.5	<0.5	-	<0.5
Toluene	5	60	<0.5	<0.5	-	<0.5
m+p-Xylene	-	-	<0.5	<0.5	-	<0.5
o-Xylene	-	-	<0.5	<0.5	-	<0.5
Xylenes (total)	300	90	<1	<1	-	<1
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	60	250	<0.02	<0.02	-	<0.02
Acenaphthylene	-	-	<0.02	<0.02	-	<0.02
Acridine	0.5	-	<0.05	<0.05	-	<0.05
Anthracene	1	1000	<0.01	<0.01	-	<0.01
Benzo[a]anthracene	1	0.07	<0.01	<0.01	-	<0.01
Benzo[a]pyrene	0.1	0.01	<0.01	<0.01	-	<0.01
Benzo[b]fluoranthene	-	-	<0.01	<0.01	-	<0.01
Benzo[b+j]fluoranthene	-	0.07	<0.01	<0.01	-	<0.01
Benzo[ghi]perylene	-	-	<0.01	<0.01	-	<0.01
Benzo[j]fluoranthene	-	-	<0.01	<0.01	-	<0.01
Benzo[k]fluoranthene	-	-	<0.01	<0.01	-	<0.01
Chrysene	1	7	<0.01	<0.01	-	<0.01
Dibenzo[a,h]anthracene	-	0.01	<0.01	<0.01	-	<0.01
Fluoranthene	2	150	0.02	0.02	-	0.03
Fluorene	120	150	<0.02	<0.02	-	0.02
Indeno[1,2,3-cd]pyrene	-	-	<0.01	<0.01	-	<0.01
1-Methylnaphthalene	-	5.5	<0.05	<0.05	-	0.54
2-Methylnaphthalene	-	15	<0.05	<0.05	-	0.18
Naphthalene	10	80	<0.05	<0.05	-	<0.05
Phenanthrene	3	-	0.08	0.09	12%	0.13
Pyrene	0.2	100	0.02	0.02	-	0.03
Quinoline	34	0.05	<0.05	<0.05	-	<0.05
Petroleum Hydrocarbons						
EPH (C10-C19)	5,000	5,000	320	350	9%	610
EPH (C19-C32)	-	-	<200	<200	-	<200
HEPH	-	-	<200	<200	-	<200
LEPH	500	-	320	350	9%	610
VH C6-C10	15,000	15,000	<100	<100	-	<100
VPH (VH6-10) minus BTEX	1,500	-	<100	<100	-	<100

Notes

All units in ug/L, unless otherwise noted.

"-" indicates that there is no applicable standard or analyses were not performed.

Red cells indicates parameter exceeds BC CSR AW . (Current as of 4-January-2020)

Bold indicates parameter exceeds BC CSR DW. (Current as of 4-January-2020)

"RPD" is Relative Percentage Difference. (RPD = 2*(A-B)/(A+B)*100%. BC MOE 2013; Field Sampling Manual)

Yellow cells indicate that RPD value is >20%. *Orange* cells indicate that RPD value is >50%.

TABLE 5: Summary of Analytical Results for Sump - Hydrocarbons - Stringer Creek

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Monocyclic Aromatic Hydrocarbons				Gross Parameters					PHC			
			Benzene µg/L	Ethyl-benzene µg/L	Toluene µg/L	Xylenes µg/L	VH (C6-C10) µg/L	VPH (C6-C10) µg/L	EPH (C10-C19) µg/L	LEPH (C10-C19) µg/L	EPH (C19-C32) µg/L	F1-BTEX µg/L	F2 (>C10-C16) µg/L	F3 (>C16-C34) µg/L	F4 (>C34-C50) µg/L
SUMP	SUMP-1-190822	2019 08 22	< 0.5	< 0.5	< 0.5	< 1	< 100	< 100	< 200	< 200	< 200	< 100	< 200	< 200	< 200
Federal Guideline															
Canadian Drinking Water Quality Guidelines (CDWQG)			5	1.6	24	20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
FGQG Tier 2 Residential Land Use (RL)[a,b]			140	16,000	83	3,900	n/a	n/a	n/a	n/a	n/a	810	1,300	n/a	n/a
BC Standard															
CSR Drinking Water (DW)			5	140	60	90	15,000[c]	n/a	5,000[c]	n/a	n/a	n/a	n/a	n/a	n/a
CSR Aquatic Life (AW)[a]			400	2,000	5	300	15,000[c]	1,500	5,000[c]	500	n/a	n/a	n/a	n/a	n/a

Associated AGAT file(s): 19V509811.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

RPD Denotes relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

SHADED Concentration greater than Canadian Drinking Water Quality Guidelines (CDWQG) Guideline

BOLD Concentration greater than FGQG Tier 2 Residential Land Use (RL) Guideline

OUTLINE Concentration greater than CSR Drinking Water (DW) standard

SHADOW Concentration greater than CSR Aquatic Life (AW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline for coarse grained soil.

[c] Applicable at all sites irrespective of water use.

TABLE 6: Summary of Analytical Results for Sump - Polycyclic Aromatic Hydrocarbons - Stringer Creek

Sample Location		SUMP	Federal Guideline		BC Standard	
Sample ID		SUMP-1-190822	Canadian Drinking Water Quality Guidelines (CDWQG)	FGQG Tier 2 Residential Land Use (RL)[a,b]	CSR Drinking Water (DW)	CSR Aquatic Life (AW)[a]
Sample Date (yyyy mm dd)		2019 08 22				
Parameter	**Units**	**Analytical Results**				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	µg/L	< 0.05	n/a	1.1	80	10
Methylnaphthalene, 1-	µg/L	< 0.05	n/a	180	5.5	n/a
Methylnaphthalene, 2-	µg/L	< 0.05	n/a	n/a	15	n/a
Acenaphthylene	µg/L	< 0.02	n/a	46	n/a	n/a
Acenaphthene	µg/L	< 0.02	n/a	5.8	250	60
Fluorene	µg/L	< 0.02	n/a	3	150	120
Phenanthrene	µg/L	< 0.04	n/a	0.4	n/a	3
Anthracene	µg/L	< 0.01	n/a	0.012	1,000	1
Acridine	µg/L	< 0.05	n/a	0.05	n/a	0.5
Fluoranthene	µg/L	< 0.02	n/a	0.04	150	2
Pyrene	µg/L	< 0.02	n/a	0.025	100	0.2
Benz(a)anthracene	µg/L	0.01	n/a	0.018	0.07	1
Chrysene	µg/L	0.01	n/a	1.4	7	1
Benzo(b)fluoranthene	µg/L	0.01	n/a	0.48	0.07	n/a
Benzo(j)fluoranthene	µg/L	0.01	n/a	0.48	0.07	n/a
Benzo(b+j)fluoranthene	µg/L	0.02	n/a	0.48	0.07	n/a
Benzo(k)fluoranthene	µg/L	0.01	n/a	0.48	n/a	n/a
Benzo(a)pyrene	µg/L	0.01	0.04	0.015	0.01	0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.01	n/a	0.21	n/a	n/a
Dibenz(a,h)anthracene	µg/L	0.01	n/a	0.26	0.01	n/a
Benzo(g,h,i)perylene	µg/L	0.01	n/a	0.17	n/a	n/a
Quinoline	µg/L	< 0.05	n/a	3.4	0.05	34

Associated AGAT file(s): 19V509811.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

RPD Denotes relative percent difference.

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

SHADED	Concentration greater than Canadian Drinking Water Quality Guidelines (CDWQG) Guideline
BOLD	Concentration greater than FGQG Tier 2 Residential Land Use (RL) Guideline
OUTLINE	Concentration greater than CSR Drinking Water (DW) standard
SHADOW	Concentration greater than CSR Aquatic Life (AW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline for coarse grained soil.

TABLE 7: Summary of Analytical Results for Sump - Total Metals - Stringer Creek

Sample Location		SUMP	Federal Guideline		BC Standard	
Sample ID		SUMP-1-190822	Canadian Drinking Water Quality Guidelines	FGQG Tier 2 Residential Land Use	CSR Drinking Water (DW)	CSR Aquatic Life (AW)[a]
Sample Date (yyyy mm dd)		2019 08 22				
Parameter	**Units**	**Analytical Results**	**(CDWQG)**	**(RL)[a,b]**		
Physical Parameters						
pH (field)	pH	8.5	7.0 - 10.5	6.5 - 9	n/a	n/a
Hardness	mg/L	122	n/a	n/a	n/a	n/a
Total Metals						
Aluminum	µg/L	***940***	100	100[d]	9,500	n/a
Antimony	µg/L	0.6	6	2,000	6	90
Arsenic	µg/L	0.8	10	5	10	50
Barium	µg/L	163	1,000	2,900	1,000	10,000
Beryllium	µg/L	0.07	n/a	5.3	8	1.5
Bismuth	µg/L	< 0.05	n/a	n/a	n/a	n/a
Boron	µg/L	14	5,000	1,500	5,000	12,000
Cadmium	µg/L	0.04	5	0.19[e]	5	2.5[e]
Calcium	µg/L	36,900	n/a	n/a	n/a	n/a
Chromium	µg/L	2.0	50	8.9	50[e]	10[e]
Cobalt	µg/L	0.79	n/a	n/a	20[c]	40
Copper	µg/L	***5.5***	1,000	2.8[e]	1,500	50[e]
Iron	µg/L	***1,520***	300	300	6,500[g]	n/a
Lead	µg/L	1.19	5	4.1[e]	10	60[e]
Lithium	µg/L	2.9	n/a	n/a	8	n/a
Magnesium	µg/L	7,360	n/a	n/a	n/a	n/a
Manganese	µg/L	**25**	20	n/a	1,500[g]	n/a
Mercury	µg/L	***0.04***	1	0.026	1	0.25
Molybdenum	µg/L	13.1	n/a	73	250	10,000
Nickel	µg/L	3.3	n/a	111[e]	80	1,100[e]
Potassium	µg/L	1,470	n/a	n/a	n/a	n/a
Selenium	µg/L	1.0	50	1	10	20
Silicon	µg/L	3,080	n/a	n/a	n/a	n/a
Silver	µg/L	< 0.02	n/a	0.25	20	15[e]
Sodium	µg/L	57,000	200,000	n/a	200,000	n/a
Strontium	µg/L	69.0	n/a	n/a	2,500	n/a
Sulphur	µg/L	1,750	n/a	n/a	n/a	n/a
Thallium	µg/L	0.06	n/a	0.8	n/a	3
Tin	µg/L	2.22	n/a	n/a	2,500	n/a
Titanium	µg/L	13.5	n/a	100	n/a	1,000
Uranium	µg/L	0.747	20	15	20	85
Vanadium	µg/L	4	n/a	n/a	20	n/a
Zinc[d]	µg/L	22	5,000	30	3,000	900[e]
Zirconium	µg/L	0.9	n/a	n/a	n/a	n/a

Associated AGAT file(s): 19V509811.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

QA/QC RPD Denotes quality assurance/quality control relative percent difference

* RPDs are not calculated where one or more concentrations are less than five times RDL.

RDL Denotes reported detection limit.

SHADED	Concentration greater than Canadian Drinking Water Quality Guidelines (CDWQG) Guideline
BOLD	Concentration greater than FIGWQG Tier 2 Residential Land Use (RL) Guideline
OUTLINE	Concentration greater than CSR Drinking Water (DW) standard
SHADOW	Concentration greater than CSR Aquatic Life (AW) standard

[a] Standard to protect freshwater aquatic life.

[b] Guideline for coarse grained soil.

[c] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).

[d] Guideline is pH dependent.

[e] Guideline is hardness dependent.

Table 2A - Analytical Results
Dissolved / Total Metals and Inorganics in Water - Sikanni Soil Treatment Facility
(Federal Guidelines)

Location	RDL	Reporting Units	Canadian Drinking Water MAC	Fed Intrm GW Tier 2 FW Coarse CL IL	Fed Intrm GW Tier 2 Inhalation Coarse CL IL	Fed Intrm GW Tier 2 Organism Contact Coarse CL IL	TS-2	TS-3		RPD
Sample Date							2020-08-06	2020-08-08	2020-08-08	
Sample ID							TS-2	TS-3	TS-300	
Inorganics										
Hardness (as CaCO3)	100	mg/L	-	-	-	-	894	1,080	1,060	2%
Nitrate (as N)	0.5	mg/L	10	13	-	-	149	174	175	1%
Nitrite (as N)	0.05	mg/L	1	0.06	-	-	2.06	3.61	4.26	17%
Total Kjedhal Nitrogen	0.05	mg/L	-	-	-	-	18.9	22.4	15.7	35%
Ortho-Phosphate	0.001	mg/L	-	-	-	-	-	<0.001	<0.001	NC
Phosphate	0.001	mg/L	-	-	-	-	<0.001	-	-	-
Dissolved Metals										
Aluminum	2	µg/L	100	5 - 100	-	-	3	3	3	NC
Antimony	0.2	µg/L	6	2,000	-	-	0.2	0.2	0.2	NC
Arsenic	0.1	µg/L	10	5	-	-	0.4	0.5	0.6	18%
Barium	0.2	µg/L	1,000	2,900	-	-	115	103	105	2%
Beryllium	0.01	µg/L	-	5.3	-	-	<0.01	<0.01	<0.01	NC
Bismuth	0.05	µg/L	-	-	-	-	<0.05	<0.05	<0.05	NC
Boron	2	µg/L	5,000	1,500	-	-	48	54	62	14%
Cadmium	0.01	µg/L	5	0.017	-	-	0.02	0.07	0.09	25%
Calcium	50	µg/L	-	-	-	-	203,000	253,000	255,000	1%
Chromium	0.5	µg/L	50	8.9	-	-	<0.5	<0.5	<0.5	NC
Cobalt	0.05	µg/L	-	-	-	-	0.17	0.62	0.49	23%
Copper	0.2	µg/L	-	2 - 4	-	-	1.7	6.2	6.2	0%
Iron	10	µg/L	-	300	-	-	40	<10	<10	NC
Lead	0.05	µg/L	5	1 - 7	-	-	0.08	<0.05	<0.05	NC
Lithium	0.5	µg/L	-	-	-	-	11.9	13.1	13.1	0%
Magnesium	50	µg/L	-	-	-	-	51,400	58,200	58,400	0%
Manganese	1	µg/L	120	-	-	-	108	372	373	0%
Mercury	0.01	µg/L	1	0.026	-	-	<0.01	<0.01	<0.01	NC
Molybdenum	0.05	µg/L	-	73	-	-	0.84	1.15	1.12	3%
Nickel	0.2	µg/L	-	25	-	-	5.1	6.2	8.9	36%
Potassium	50	µg/L	-	-	-	-	7,020	8,300	8,160	2%
Selenium	0.5	µg/L	50	1	-	-	2.7	6.5	6.5	0%
Silicon	50	µg/L	-	-	-	-	640	1,060	1,060	0%
Silver	0.02	µg/L	-	0.25	-	-	0.03	0.03	0.03	NC
Sodium	50	µg/L	-	-	-	-	192,000	210,000	209,000	0%
Strontium	0.1	µg/L	7,000	-	-	-	583	659	712	8%
Sulphur	500	µg/L	-	-	-	-	75,000	85,800	86,000	0%
Thallium	0.01	µg/L	-	0.8	-	-	0.2	0.21	0.24	13%
Tin	0.05	µg/L	-	-	-	-	<0.05	<0.05	<0.05	NC
Titanium	0.5	µg/L	-	100	-	-	0.5	0.7	1.1	NC
Uranium	0.01	µg/L	20	15	-	-	4.68	6.08	6.14	1%
Vanadium	0.5	µg/L	-	-	-	-	<0.5	<0.5	<0.5	NC
Zinc	2	µg/L	-	30	-	-	29	61	30	68%
Zirconium	0.1	µg/L	-	-	-	-	0.4	0.2	<0.1	NC
Total Metals										
Aluminum	5	µg/L	100	5 - 100	-	-	374	629	662	5%
Antimony	0.5	µg/L	6	2,000	-	-	<0.5	<0.5	<0.5	NC
Arsenic	0.1	µg/L	10	5	-	-	0.9	1.3	1.3	0%
Barium	0.2	µg/L	1,000	2,900	-	-	153	157	179	13%
Beryllium	0.05	µg/L	-	5.3	-	-	<0.05	0.07	0.11	NC
Bismuth	0.05	µg/L	-	-	-	-	<0.05	<0.05	<0.05	NC
Boron	5	µg/L	5,000	1,500	-	-	56	55	68	21%
Cadmium	0.01	µg/L	5	0.017	-	-	0.03	0.1	0.12	18%
Calcium	50	µg/L	-	-	-	-	253,000	311,000	306,000	2%
Chromium	0.5	µg/L	50	8.9	-	-	1	1.8	1.3	NC
Cobalt	0.05	µg/L	-	-	-	-	0.45	1.28	1.35	5%
Copper	0.5	µg/L	-	2 - 4	-	-	8.3	11	12.1	10%
Iron	10	µg/L	-	300	-	-	1,420	1,770	1,980	11%
Lead	0.05	µg/L	5	1	-	-	2.84	1.5	1.85	21%
Lithium	0.5	µg/L	-	-	-	-	13.3	14.4	15.7	9%
Magnesium	50	µg/L	-	-	-	-	63,700	73,400	71,800	2%
Manganese	1	µg/L	120	-	-	-	199	607	609	0%
Mercury	0.01	µg/L	1	0.026	-	-	0.01	<0.01	0.01	NC
Molybdenum	0.1	µg/L	-	73	-	-	1	1.3	1.6	21%
Nickel	0.5	µg/L	-	25	-	-	5.8	10	11	10%
Potassium	100	µg/L	-	-	-	-	7,750	9,120	9,160	0%
Selenium	0.5	µg/L	50	1	-	-	2.7	6.6	6.4	3%
Silicon	50	µg/L	-	-	-	-	1,600	2,660	2,930	10%
Silver	0.02	µg/L	-	0.25	-	-	<0.02	0.03	0.04	NC
Sodium	100	µg/L	-	-	-	-	211,000	233,000	231,000	1%
Strontium	0.1	µg/L	7,000	-	-	-	643	709	746	5%
Sulphur	500	µg/L	-	-	-	-	94,400	110,000	109,000	1%
Thallium	0.02	µg/L	-	0.8	-	-	0.25	0.24	0.28	15%
Tin	0.05	µg/L	-	-	-	-	0.13	0.09	0.1	NC
Titanium	0.5	µg/L	-	100	-	-	11	5.8	9.4	47%
Uranium	0.01	µg/L	20	15	-	-	5.45	6.33	6.89	8%
Vanadium	1	µg/L	-	-	-	-	2	2	3	NC
Zinc	5	µg/L	-	30	-	-	38	69	50	32%
Zirconium	0.5	µg/L	-	-	-	-	0.6	<0.5	<0.5	NC

Notes:

XX%	Exceeds allowable RPD value
	Exceeds most stringent applicable guideline
CL	Commercial Land Use
IL	Industrial Land Use
GW	Groundwater
HEPHw	Heavy Extractable Petroleum Hydrocarbons
LEPHw	Light Extractable Petroleum Hydrocarbons
MAC	Maximum Allowable Concentration
MW	Freshwater Aquatic Life
NC	Not calculated as concentration is less than 5 times the detection limit
RDL	Reported Detection Limit
RPD	Relative Percent Difference

Table 2B - Analytical Results
Hydrocarbons in Water - Sikanni Soil Treatment Facility
(Federal Guidelines)

Location	RDL	Reporting Units	Canadian Drinking Water MAC	Fed Interim GW Tier 2 FW Coarse CL IL	Fed Interim GW Tier 2 Inhal Coarse CL IL	Fed Intrm GW Tier 2 Organism Contact Coarse CL IL	TS-2	TS-3		RPD
Sample Date							2020-08-06	2020-08-08	2020-08-08	
Sample ID							TS-2	TS-3	TS-300	
Volatile Hydrocarbons										
Benzene	0.5	µg/L	5	690	1,800	350,000	<0.5	<0.5	<0.5	NC
Ethylbenzene	0.5	µg/L	140	41,000	-	110,000	<0.5	<0.5	<0.5	NC
F1	100	µg/L	-	9,800	9,100	11,000	<100	<100	<100	NC
F1-BTEX	100	µg/L	-	-	-	-	<100	<100	<100	NC
Methyl tert-butyl ether (MTBE)	1	µg/L	-	10,000	4,300	-	<1	<1	<1	NC
Styrene	0.5	µg/L	-	72	51,000	-	-	<0.5	<0.5	NC
Toluene	0.5	µg/L	60	83	-	200,000	<0.5	0.7	0.7	NC
Volatile Hydrocarbons (VHw)	100	µg/L	-	-	-	-	-	<100	<100	NC
Volatile Petroleum Hydrocarbons (VPHw)	100	µg/L	-	-	-	-	<100	<100	<100	NC
Xylene (m & p)	0.5	µg/L	-	-	-	-	<0.5	1.6	1.5	NC
Xylene (o)	0.5	µg/L	-	-	-	-	<0.5	0.7	0.7	NC
Xylene (Total)	1	µg/L	90	18,000	48,000	120,000	<1	2.3	2.2	NC
Extractable Hydrocarbons										
EPHw C10-C19	200	µg/L	-	-	-	-	240	610	610	NC
EPHw C19-C32	200	µg/L	-	-	-	-	460	1,040	1,090	5%
F2	200	µg/L	-	1,300	17,000	3,100	<200	220	<200	NC
F3	200	µg/L	-	-	-	-	560	1,270	1,330	5%
F4	200	µg/L	-	-	-	-	250	430	440	NC
HEPHw	200	µg/L	-	-	-	-	460	1,040	1,090	5%
LEPHw	200	µg/L	-	-	-	-	240	609	609	NC
Polycyclic Aromatic Hydrocarbons (PAHs)										
Acenaphthene	0.02	µg/L	-	5.8	-	-	<0.02	<0.02	<0.02	NC
Acenaphthylene	0.02	µg/L	-	46	-	-	<0.02	<0.02	<0.02	NC
Acridine	0.05	µg/L	-	0.05	-	-	<0.05	<0.05	<0.05	NC
Anthracene	0.01	µg/L	-	0.012	-	320	<0.01	<0.01	<0.01	NC
Benz(a)anthracene	0.01	µg/L	-	0.018	-	-	<0.01	<0.01	<0.01	NC
Benzo(a)pyrene	0.01	µg/L	0.04	0.015	-	6.6	<0.01	<0.01	<0.01	NC
Benzo(b)fluoranthene	0.01	µg/L	-	0.48	-	-	<0.01	<0.01	<0.01	NC
Benzo(b+j)fluoranthenes	0.01	µg/L	-	0.48	-	-	<0.01	<0.01	<0.01	NC
Benzo(g,h,i)perylene	0.01	µg/L	-	0.17	-	-	<0.01	<0.01	<0.01	NC
Benzo(j)fluoranthene	0.01	µg/L	-	-	-	-	<0.01	<0.01	<0.01	NC
Benzo(k)fluoranthene	0.01	µg/L	-	0.48	-	-	<0.01	<0.01	<0.01	NC
Chrysene	0.01	µg/L	-	1.4	-	-	<0.01	<0.01	<0.01	NC
Dibenz(a,h)anthracene	0.01	µg/L	-	0.26	-	-	<0.01	<0.01	<0.01	NC
Fluoranthene	0.02	µg/L	-	0.04	-	860	0.04	0.04	0.04	NC
Fluorene	0.02	µg/L	-	3	-	-	0.03	0.05	0.06	NC
Indeno(1,2,3-cd)pyrene	0.01	µg/L	-	0.21	-	-	<0.01	<0.01	<0.01	NC
Methylnaphthalene, 1-	0.05	µg/L	-	180	38,000	-	0.11	0.87	0.89	2%
Methylnaphthalene, 2-	0.05	µg/L	-	180	38,000	-	0.12	1.14	1.15	1%
Naphthalene	0.05	µg/L	-	1.1	7,000	-	0.11	0.58	0.57	2%
Phenanthrene	0.04	µg/L	-	0.4	-	-	0.09	0.18	0.17	NC
Pyrene	0.02	µg/L	-	0.025	-	-	0.03	0.04	0.04	NC
Quinoline	0.05	µg/L	-	3.4	-	-	<0.05	<0.05	<0.05	NC

Notes:

	= Exceeds most stringent applicable guideline
CL	Commercial Land Use
IL	Industrial Land Use
GW	Groundwater
HEPHw	Heavy Extractable Petroleum Hydrocarbons
LEPHw	Light Extractable Petroleum Hydrocarbons
MAC	Maximum Allowable Concentration
MW	Freshwater Aquatic Life
NC	Not calculated as concentration is less than 5 times the detection limit
RDL	Reported Detection Limit
RPD	Relative Percent Difference

Table 2C
Dissolved Metals and Inorganics in Water - Sikanni Soil Treatment Facility
BC CSR Standards and BC Water Quality Guidelines

Location	Reporting Units	RDL	BC CSR Sch 3.2 Freshwater Aquatic Life	BC CSR Sch 3.2 Drinking Water	BCWQG Freshwater Aquatic Life Long-Term	BCWQG Freshwater Aquatic Life Short-Term Max	TS-2	TS-3		RPD
Sample Date							2020-08-06	2020-08-08	2020-08-08	
Sample ID							TS-2	TS-3	TS-300	
Inorganics										
Hardness (as CaCO3)	mg/L	0.1	-	-	-	-	894	1,080	1,060	2%
Nitrate	mg/L	0.5	-	-	3	-	149	-	-	-
Nitrate (as N)	mg/L	0.5	400	10	3	32.8	-	174	175	1%
Nitrite (as N)	mg/L	0.05	0.2 - 2	1	-	-	2.06	3.61	4.26	17%
Nitrogen (Total Oxidised)	mg/L	0.05	-	-	-	-	18.9	22.4	15.7	35%
Ortho-Phosphate	mg/L	0.001	-	-	-	-	-	<0.001	<0.001	NC
Phosphate	mg/L	0.001	-	-	-	-	<0.001	-	-	-
Dissolved Metals										
Aluminum	µg/L	5	-	9,500	1 - 50	10 - 100	3	3	3	NC
Antimony	µg/L	0.5	90	6	9	-	0.2	0.2	0.2	NC
Arsenic	µg/L	0.1	50	10	-	5	0.4	0.5	0.6	18%
Barium	µg/L	0.2	10,000	1,000	1,000	-	115	103	105	2%
Beryllium	µg/L	0.05	1.5	8	0.13	-	<0.01	<0.01	<0.01	NC
Bismuth	µg/L	0.05	-	-	-	-	<0.05	<0.05	<0.05	NC
Boron	µg/L	5	12,000	5,000	1,200	-	48	54	62	14%
Cadmium	µg/L	0.01	0.5 - 4	5	0.04 - 0.37	0.1	0.02	0.07	0.09	25%
Calcium	µg/L	100	-	-	-	-	203,000	253,000	255,000	1%
Chromium	µg/L	0.5	10	50	1	-	<0.5	<0.5	<0.5	NC
Cobalt	µg/L	0.05	40	1	4	110	0.17	0.62	0.49	23%
Copper	µg/L	0.5	20 - 90	1,500	2 - 2	2 - 2	1.7	6.2	6.2	0%
Iron	µg/L	10	-	6,500	-	350	40	<10	<10	NC
Lead	µg/L	0.05	40 - 160	10	3	3	0.08	<0.05	<0.05	NC
Lithium	µg/L	0.5	-	8	-	-	11.9	13.1	13.1	0%
Magnesium	µg/L	50	-	-	-	-	51,400	58,200	58,400	0%
Manganese	µg/L	1	-	1,500	600	540	108	372	373	0%
Mercury	µg/L	0.01	0.25	1	0.01	-	<0.01	<0.01	<0.01	NC
Molybdenum	µg/L	0.1	10,000	250	1,000	2,000	0.84	1.15	1.12	3%
Nickel	µg/L	0.5	250 - 1500	80	25 - 150	-	5.1	6.2	8.9	36%
Potassium	µg/L	100	-	-	-	-	7,020	8,300	8,160	2%
Selenium	µg/L	0.5	20	10	2	-	2.7	6.5	6.5	0%
Silicon	µg/L	50	-	-	-	-	640	1,060	1,060	0%
Silver	µg/L	0.02	0.5 - 15	20	0.05 - 1.5	0.1 - 3	0.03	0.03	0.03	NC
Sodium	µg/L	100	-	200,000	-	-	192,000	210,000	209,000	0%
Strontium	µg/L	0.1	-	2,500	-	-	583	659	712	8%
Sulphur	µg/L	500	-	-	-	-	75,000	85,800	86,000	0%
Thallium	µg/L	0.02	3	-	0.8	-	0.2	0.21	0.24	13%
Tin	µg/L	0.05	-	2,500	-	-	<0.05	<0.05	<0.05	NC
Titanium	µg/L	0.5	1,000	-	-	-	0.5	0.7	1.1	NC
Uranium	µg/L	0.01	85	20	8.5	-	4.68	6.08	6.14	1%
Vanadium	µg/L	1	-	20	-	-	<0.5	<0.5	<0.5	NC
Zinc	µg/L	5	75 - 2400	3,000	190	340	29	61	30	68%
Zirconium	µg/L	0.5	-	-	-	-	0.4	0.2	<0.1	NC
Total Metals										
Aluminum	µg/L	2	-	9,500	1 - 50	10 - 100	374	629	662	5%
Antimony	µg/L	0.2	90	6	9	-	<0.5	<0.5	<0.5	NC
Arsenic	µg/L	0.1	50	10	-	5	0.9	1.3	1.3	0%
Barium	µg/L	0.2	10,000	1,000	1,000	-	153	157	179	13%
Beryllium	µg/L	0.01	1.5	8	0.13	-	<0.05	0.07	0.11	44%
Bismuth	µg/L	0.05	-	-	-	-	<0.05	<0.05	<0.05	NC
Boron	µg/L	2	12,000	5,000	1,200	-	56	55	68	21%
Cadmium	µg/L	0.01	0.5 - 4	5	0.04 - 0.37	0.1	0.03	0.1	0.12	18%
Calcium	µg/L	50	-	-	-	-	253,000	311,000	306,000	2%
Chromium	µg/L	0.5	10	50	1	-	1	1.8	1.3	NC
Cobalt	µg/L	0.05	40	1	4	110	0.45	1.28	1.35	5%
Copper	µg/L	0.2	20 - 90	1,500	2 - 2	2 - 2	8.3	11	12.1	10%
Iron	µg/L	10	-	6,500	-	350	1,420	1,770	1,980	11%
Lead	µg/L	0.05	40 - 160	10	3	3	2.84	1.5	1.85	21%
Lithium	µg/L	0.5	-	8	-	-	13.3	14.4	15.7	9%
Magnesium	µg/L	50	-	-	-	-	63,700	73,400	71,800	2%
Manganese	µg/L	1	-	1,500	600	540	199	607	609	0%
Mercury	µg/L	0.01	0.25	1	0.01	-	0.01	<0.01	0.01	NC
Molybdenum	µg/L	0.05	10,000	250	1,000	2,000	1	1.3	1.6	21%
Nickel	µg/L	0.2	250 - 1500	80	25 - 150	-	5.8	10	11	10%
Potassium	µg/L	50	-	-	-	-	7,750	9,120	9,160	0%
Selenium	µg/L	0.5	20	10	2	-	2.7	6.6	6.4	3%
Silicon	µg/L	50	-	-	-	-	1,600	2,660	2,930	10%
Silver	µg/L	0.02	0.5 - 15	20	0.05 - 1.5	0.1 - 3	<0.02	0.03	0.04	NC
Sodium	µg/L	50	-	200,000	-	-	211,000	233,000	231,000	1%
Strontium	µg/L	0.1	-	2,500	-	-	643	709	746	5%
Sulphur	µg/L	500	-	-	-	-	94,400	110,000	109,000	1%
Thallium	µg/L	0.01	3	-	0.8	-	0.25	0.24	0.28	15%
Tin	µg/L	0.05	-	2,500	-	-	0.13	0.09	0.1	NC
Titanium	µg/L	0.5	1,000	-	-	-	11	5.8	9.4	47%
Uranium	µg/L	0.01	85	20	8.5	-	5.45	6.33	6.89	8%
Vanadium	µg/L	0.5	-	20	-	-	2	2	3	NC
Zinc	µg/L	2	75 - 2400	3,000	190	340	38	69	50	32%
Zirconium	µg/L	0.1	-	-	-	-	0.6	<0.5	<0.5	NC

Notes:

	Exceeds applicable most stringent applicable BCWQG
	Exceeds most stringent applicable BC CSR standard
XX%	Exceeds acceptable RPD limit
BC CSR	British Columbia Contaminated Sites Regulation
BCWQG	British Columbia Water Quality Guidelines
RDL	Reported Detection Limit
RPD	Relative Percent Difference

Table 2D
Hydrocarbons in Water - Sikanni Soil Treatment Facility
BC CSR Standards and BC Water Quality Guidelines

Location	Reporting Units	RDL	BC CSR Sch 3.2 Freshwater Aquatic Life	BC CSR Sch 3.2 Drinking Water	BCWQG Freshwater Aquatic Life Long-Term	BCWQG Freshwater Aquatic Life Short-Term Max	TS-2	TS-3		RPD
Sample Date							2020-08-06	2020-08-08	2020-08-08	
Sample ID							TS-2	TS-3	TS-300	
Volatile Hydrocarbons										
Benzene	µg/L	0.5	400	5	40	-	<0.5	<0.5	<0.5	NC
Ethylbenzene	µg/L	0.5	2,000	140	200	-	<0.5	<0.5	<0.5	NC
F1	µg/L	100	-	-	-	-	<100	<100	<100	NC
F1-BTEX	µg/L	100	-	-	-	-	<100	<100	<100	NC
Methyl tert-butyl ether (MTBE)	µg/L	1	34,000	95	-	3,400	<1	<1	<1	NC
Styrene	µg/L	0.5	720	800	72	-	-	<0.5	<0.5	NC
Toluene	µg/L	0.5	5	60	0.5	-	<0.5	0.7	0.7	0%
Volatile Hydrocarbons (VHw)	µg/L	100	15,000	-	-	-	-	<100	<100	NC
Volatile Petroleum Hydrocarbons (VPHw)	µg/L	100	1,500	-	-	-	<100	<100	<100	NC
Xylene (m & p)	µg/L	0.5	-	-	-	-	<0.5	1.6	1.5	6%
Xylene (o)	µg/L	0.5	-	-	-	-	<0.5	0.7	0.7	0%
Xylene (Total)	µg/L	0.7	300	90	0.03	-	<1	2.3	2.2	NC
Extractable Hydrocarbons										
EPHw C10-C19	µg/L	200	5,000	-	-	-	240	610	610	NC
EPHw C19-C32	µg/L	200	-	-	-	-	460	1,040	1,090	5%
F2	µg/L	200	-	-	-	-	<200	220	<200	NC
F3	µg/L	200	-	-	-	-	560	1,270	1,330	5%
F4	µg/L	200	-	-	-	-	250	430	440	NC
HEPHw	µg/L	200	-	-	-	-	460	1,040	1,090	5%
LEPHw	µg/L	200	500	-	-	-	240	609	609	NC
Polycyclic Aromatic Hydrocarbons (PAHs)										
Acenaphthene	µg/L	0.02	60	250	6	-	<0.02	<0.02	<0.02	NC
Acenaphthylene	µg/L	0.02	-	-	-	-	<0.02	<0.02	<0.02	NC
Acridine	µg/L	0.05	0.5	-	3	-	<0.05	<0.05	<0.05	NC
Anthracene	µg/L	0.01	1	1,000	4	-	<0.01	<0.01	<0.01	NC
Benz(a)anthracene	µg/L	0.01	1	0.07	0.1	-	<0.01	<0.01	<0.01	NC
Benzo(a)pyrene	µg/L	0.01	0.1	0.01	0.01	-	<0.01	<0.01	<0.01	NC
Benzo(b)fluoranthene	µg/L	0.01	-	0.07	-	-	<0.01	<0.01	<0.01	NC
Benzo(b+j)fluoranthenes	µg/L	0.01	-	0.07	-	-	<0.01	<0.01	<0.01	NC
Benzo(g,h,i)perylene	µg/L	0.01	-	-	-	-	<0.01	<0.01	<0.01	NC
Benzo(j)fluoranthene	µg/L	0.01	-	0.07	-	-	<0.01	<0.01	<0.01	NC
Benzo(k)fluoranthene	µg/L	0.01	-	-	-	-	<0.01	<0.01	<0.01	NC
Chrysene	µg/L	0.01	1	7	-	-	<0.01	<0.01	<0.01	NC
Dibenz(a,h)anthracene	µg/L	0.01	-	0.01	-	-	<0.01	<0.01	<0.01	NC
Fluoranthene	µg/L	0.02	2	150	4	-	0.04	0.04	0.04	NC
Fluorene	µg/L	0.02	120	150	12	-	0.03	0.05	0.06	NC
Indeno(1,2,3-cd)pyrene	µg/L	0.01	-	-	-	-	<0.01	<0.01	<0.01	NC
Methylnaphthalene, 1-	µg/L	0.05	-	5.5	-	-	0.11	0.87	0.89	2%
Methylnaphthalene, 2-	µg/L	0.05	-	15	-	-	0.12	1.14	1.15	1%
Naphthalene	µg/L	0.05	10	80	1	1	0.11	0.58	0.57	2%
Phenanthrene	µg/L	0.04	3	-	0.3	-	0.09	0.18	0.17	NC
Pyrene	µg/L	0.02	0.2	100	-	-	0.03	0.04	0.04	NC
Quinoline	µg/L	0.05	34	0.05	3.4	-	<0.05	<0.05	<0.05	NC

Notes:

	Exceeds applicable most stringent applicable BCWQG
	Exceeds most stringent applicable BC CSR standard
XX%	Exceeds acceptable RPD limit
BC CSR	British Columbia Contaminated Sites Regulation
BCWQG	British Columbia Water Quality Guidelines
EPHw	Extractable Petroleum Hydrocarbons
LEPHw	Light Extractable Petroleum Hydrocarbons
HEPHw	Heavy Extractable Petroleum Hydrocarbons
RDL	Reported Detection Limit
RPD	Relative Percent Difference