Public Services and Procurement Canada

Requisition No: EZ899-220429/A

DRAWINGS & SPECIFICATIONS

For:

Inga Lake Intersection Improvements, Alaska Highway, BC

Project No. R.115570.001 March 2021

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DIVISION 31 – EARTHWORKS

DIVISION 32 – EXTERIOR IMPROVEMENTS

DIVISION 33 – SPECIALTY

APPENDICES

REFERENCE DOCUMENTATION

Standards and Best Practices for Instream Works, British Columbia Ministry of Land and Air Protection Ecosystem Standards and Planning Biodiversity Branch – March 2004.
Available online at:
http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf

Land Development Guidelines for the Protection of Aquatic Habitat, Fisheries and Oceans – September 1993.
Available online at:
http://www.dfo-mpo.gc.ca/Library/165353.pdf

Manual of Standard Traffic Signs & Pavement Markings, BC Ministry of Transportation and Highways – September 2000
Available online at:
https://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/engineering-standards-and-guidelines/traffic-engineering-and-safety/traffic-engineering/traffic-signs-and-pavement-markings/manual_signs_pavement_marking.pdf

BC Ministry of Transportation and Infrastructure, Traffic Management Manual for Work on Roadways (Office Edition) – 2020 Edition and applicable Amendments available at time of tender closing.
Available online at:
https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/traffic-engineering-safety/trafficmanagementmanual

2020 Standard Specifications for Highway Construction, BC Ministry of Transportation and Infrastructure – November 1, 2020 – Volume 1 and 2 and applicable Amendments available at time of tender closing.
Available online at:
http://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/standard-specifications-for-highway-construction

BC Ministry of Transportation and Infrastructure, Recognized Product List.
Available online at:
http://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/recognized-products-list

Public Services and Procurement Canada – Acquisition Forms
Available online at:
http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/formulaires-forms-eng.html

Alberta Transportation, Paving Guidelines and Segregation Rating Manual (2002)
Available online at:
http://www.transportation.alberta.ca/Content/docType233/Production/pavsegman.pdf

Canadian Construction Association, COVID-19 – Standardized Protocols for All Canadian Construction Sites, Version 5, May 26, 2020
Available online at:
https://www.cca-acc.com/wp-content/uploads/2020/06/CCA-COVID-19-Standardized-Protocols-for-All-Canadian-Construction-Sites-05-26-20.pdf

WorkSafeBC Construction and COVID-19 Safety
Available online at:
https://www.worksafebc.com/en/about-us/covid-19-updates/covid-19-industry-information/construction

LIST OF CONTRACT DRAWINGS

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Order of Precedence.

1.2 Work Covered by Contract Documents.

1.3 Codes.

1.4 Contractor's Use of Site.

PART 2 – PRODUCTS:

2.1 Products.

PART 3 – EXECUTION:

3.1 Site Inspection.

3.2 Work Completion.

3.3 Special Precautions.

3.4 Survey.

3.5 Contract Drawings.

3.6 Electronic Contract Drawings.

3.7 Contract Submittals.

3.8 Supervisory Personnel.

3.9 Special Requirements.

3.10 Work by Others.

3.11 Departmental Representative's Office Trailer.

PART 1 – GENERAL

1.1 Order of Precedence

.1 In the event of any discrepancy or conflict, order of precedence shall be in accordance with GC 1.2.2 – Order of Precedence and as follows:

.1 The Division 1 Sections of these Specifications take precedence over the other sections of the Specifications.

.2 In the event that two or more plans show conflicting information, the information on the most recently dated plan shall govern.

.3 If conflict arises between an item in the main body of these Specifications (Division 1 – Division 33) and an item found in one of the Appendices (Reference Documents), the main body of the Specifications (Division 1 – Division 33) shall govern.

.4 Any technical and manufacturer's standard, Government Act, Regulation or Code of practice referred to in the Contract documents shall be the version current at the time of tender closing.

1.2 Work Covered by Contract Documents

.1 Overall, the project includes the following but not limited to:

.1 Widening of the Alaska Highway and intersection improvements through the Inga Lake Road area per Contract Drawings.

.2 Construction of the realigned crossroad to the north side of the highway opposite to the Inga Lake Road and tie-in to existing road.

.3 The site is located at Km 145.8 of the Alaska Highway between Fort St John and Fort Nelson, BC. For reference Dawson Creek is at Km 0.0, Fort St John is at approximately Km 75 and Fort Nelson is at approximately Km 455 of the Alaska Highway.

.2 The work under this contract generally comprises of the following but is not limited to:

.1 Completion and submission of accepted submittals listed for review and acceptance by the Departmental Representative prior to the undertaking the work effected by the submittal.

.2 Clearing, removal, disposal of trees, brush and other vegetation including chipping within the designated construction footprint.

.3 Grubbing of stumps and organic materials and disposal including chipping within the designated construction footprint.

.4 Stripping of organic material, temporary stockpile, and reuse as topsoil.

.5 Development of construction access to facilitate construction. Restoration of the disturbed areas following the construction.

.6 Supply, transport, place, and compact material for roadway embankment.

.7 Remove and dispose of existing drainage culverts at existing access locations and replace with ditches.

.8 Accommodate the relocation of utilities by others as shown on the Contract Drawings and as per the specifications of this Contract. The Contractor is responsible for all coordination with the utility owners or their contractors regardless of whether the utility works are included in this contract.

.9 Supply, manufacture, transport, place, and compact crushed sub-base course crushed base gravels and crushed surfacing gravels.

.10 Saw cutting and removal of existing asphalt concrete pavement as indicated on Contract Drawings. Transport and dispose of asphalt concrete material offsite.

.11 Supply, manufacture, transport, and placement of Asphalt Prime, Asphalt Tack Coat, and Hot Mix Asphalt Concrete Pavement.

.12 Transport, placement (using a purpose-built shouldering machine if necessary), grading, and compaction of Gravel Shouldering.

.13 Supply and install drainage infrastructure including aluminized CSP culverts.

.14 Remove, stockpile for re-use by others (if in good conditions) or dispose the existing traffic signage and posts if indicated as sign removal on Contract Drawings.

.15 Supply and install permanent traffic signage, line painting and markings.

.16 Restoration to pre-construction conditions and Hydroseeding of disturbed areas.

.17 Construction layout surveys, quantity surveys, and as-built surveys.

.18 Environmental protection and monitoring.

.19 Traffic management including maintaining safe and efficient public traffic flow through the limits of the work via the implementation of the Contractor’s traffic management plans and construction staging plan if needed with the details of all required temporary lanes, traffic control, signage, and detours for the duration of the works.

.20 Dust control.

.21 Quality management and quality control.

.22 Work complete by Change Order (if required).

1.3 Codes

.1 Meet or exceed requirements of:

.1 Contract Documents.

.2 Specified standards, applicable legislation, codes, and referenced documents.

.3 Other codes of Local, Provincial, or Federal application (in the case of conflict or discrepancy, the more stringent requirements shall apply).

.2 Perform all instream work and riparian work in accordance with the Ministry of Forests, Lands, Natural Resource Operations, and Rural Development (FLNRORD) Section 11 Approval for Instream Work (to be provided to the Contractor prior to the start of construction), the Contractor's accepted Environmental Protection Plan (EPP), the Environmental Overview Assessment (Appendix K), and the Contract requirements.

1.4 Contractor's Use of Site

.1 Restrict work to within the construction footprint shown on the Contract Drawings and as agreed to by the Departmental Representative.

.2 Any additional areas required by the Contractor outside the lands owned by the Departmental Representative and designated for use on this project, shall be the Contractor's responsibility to organize. Any costs associated with the use of these additional lands shall be the Contractor's responsibility.

.3 Assume full responsibility for protection and safekeeping of products under this contract.

PART 2 – PRODUCTS

2.1 Products

.1 Not used.

PART 3 – EXECUTION

3.1 Site Inspection

.1 Preparation of required submittals to commence immediately upon receipt of notice to proceed and to be completed prior to commencement of work (unless specified otherwise).

3.2 Work Completion

.1 Preparation of required submittals to commence immediately after receipt of notice to proceed and be completed in sufficient time as to not delay the work.

.2 Achieve Substantial Performance by September 23, 2021.

.3 Achieve Completion by September 30, 2021.

.4 The instream construction on this project shall be completed within the dates indicated on the FLNRORD Section 11 Approval for Instream Work (to be provided to the Contractor prior to the start of construction) and the Environmental Overview Assessment (Appendix K).

.5 Works may need to be temporally shut down during heavy rain events, or adverse weather conditions. The works may be stopped by the following processes:

.1 The Contractor with approval from the Departmental Representative shall suspend works should the adverse weather conditions adversely affect the Contractors ability to achieve the contract specifications for quality of work.

.2 The Contractor's Environmental Monitor with approval from the Departmental Representative may suspend work should they feel it is not be possible to achieve the environmental requirements due to the adverse weather conditions.

.3 The Departmental Representative in conjunction with British Columbia Ministry of Environment and Climate Change Strategy (MoE) may suspend the work should they feel that it is not possible to achieve the environmental requirements or the contract specifications for quality of work due to the adverse weather conditions.

.6 Regardless of who suspends the work, the Contractor will be responsible for maintaining the site and protecting the works throughout the suspension period to ensure the site is in an acceptable condition safe to the public.

.7 The Contractor shall account for the possibility of not being able to complete work due to adverse weather conditions in the construction schedule and in the unit prices. No payment for temporary work stoppages due to adverse weather conditions will be made.

.8 The Contractor shall account for possible impacts of COVID-19 in the construction schedule and the unit prices. The Contractor shall always keep informed with the latest Federal and Provincial recommendations and protocols regarding COVID-19 during construction and shall modify their construction approach accordingly to ensure adherence to these recommendations and protocols.

.9 If Federal and/or Provincial recommendations require that the project work be stopped, the Contractor shall consult with the Departmental Representative and the Departmental Representative will advise as to the course of action the contractor shall take. Any monetary impact to the Contractor from the work being stopped due to Federal and/or Provincial recommendations will be addressed in accordance with the contract general conditions.

3.3 Special Precautions

.1 The Contractor's attention is drawn to the possibility of impacting abandoned and live utilities within the limits of work. The Contractor shall confirm the locations of all such utilities before construction starts. All costs for utility locate shall be incidental to the work. The Contractor shall notify the Departmental Representative should utilities be located in areas other than those shown on the Contract Drawings or if any conflicts with constructability, and await instructions from the Departmental Representative before proceeding with work in the vicinity of such encountered services and utilities. See Section 01 14 00 – Work Restrictions, Access Development, Construction Staging, and Restoration for more details.

.2 Existing structures, signs, utilities, power poles and anchors, asphalt, culverts, and all other structures, services, piping, or equipment within the limits of work shall be properly protected from any injury or damage, direct or indirect. Any damage that is caused because of the operations of the Contractor shall be repaired and made good at the Contractor's expense to the satisfaction of the Departmental Representative.

3.4 Survey

.1 The Contractor shall be responsible for all layout surveys to complete the work per the design lines and grades, survey of construction for measurement for payment (see Section 01 29 00 – Payment Procedures), and as-built surveys (see Section 01 78 00 – Closeout Submittals). All surveys shall achieve the following:

.1 Be collected to an accuracy of +/-0.02 m horizontal and +/-0.02 m vertical or better and shall be referenced / tie into the PSPC's monument / coordinate system as shown on the Contract Drawings.

.2 Use industry standards, methods, equipment, and the survey requirements of Item 1.3 – Survey of Section 01 29 00 – Payment Procedures, and other approaches (if necessary) as pre-approved by the Departmental Representative.

.2 Unless specified otherwise in the Contract Specifications, all layout surveys and quantity surveys shall be considered incidental to the work and not measured for payment.

.3 All layout surveys, quantity surveys, monitoring surveys, and quantity calculations for the purposes of progress payments shall be completed by a Professional Engineer, an Applied Science Technologist or Certified Engineering Technician, or other qualified surveyor, with the knowledge, skills and abilities acceptable to the Departmental Representative. The surveyor or person(s) used for these tasks shall have a minimum of 5 years' experience working on projects of similar size, scope, and cost. A resume detailing this experience shall be provided to the Departmental Representative for review and acceptance if requested.

.4 Prior to starting on-site construction work, complete a check of the survey control monument coordinates and elevations provided by the Departmental Representative via a static survey of each monument. Provide results to the Departmental Representative for review and acceptance. If deemed necessary by the Departmental Representative, design adjustments may be made by the Departmental Representative to suit the findings of the monument survey checks.

.5 Prior to starting affected work, complete a check of the survey control monument coordinates and elevations for any discrepancies relative to the design and existing conditions. Provide results to the Departmental Representative for review and acceptance as soon as they are discovered. Should a discrepancy be found, await written approval from the Departmental Representative prior to proceeding. If deemed necessary by the Departmental Representative, design adjustments may be made by the Departmental Representative to suit the findings of the survey checks undertaken.

.6 Establish working control points based on survey control monuments provided (other monuments not listed shall not be used). Report to the Departmental Representative when a working control point is lost or destroyed because of necessary work. Replace working control points from the project survey control monuments.

.7 Establish / layout the proposed alignment(s) and grades using paint lines and survey stakes based on working control points and survey control monuments provided.

.8 The Departmental Representative may elect to verify surveys. Verification of the survey by the Departmental Representative does not abdicate the Contractor's responsibility for the correctness and accuracy of the survey.

.9 Maintain a complete, accurate log of control and survey work as it progresses. On request of the Departmental Representative, submit documentation to verify the accuracy of the field engineering work.

.10 The Contractor shall regularly monitor the condition of the Work Site and of property on and adjoining the Work Site throughout the construction period and shall immediately notify the Owner if any deterioration in condition is detected. Such monitoring shall cover all pertinent features and property including, but not limited to, buildings, structures, roads, walls, fences, slopes, sewers, culverts, and landscaped areas.

.11 The Departmental Representative may, but shall not be obligated to, survey and record the condition of the Work Site and of property on or adjoining the Work Site prior to the commencement of construction by the Contractor. If a survey is undertaken and if requested by the Contractor, the Departmental Representative will provide a copy of the survey records to the Contractor for reference.

.12 Whenever supplied with survey records, the Contractor shall satisfy itself as to the accuracy and completeness of the survey records provided by the Departmental Representative for any area before commencing construction in that area. Commencement of construction in any area shall be interpreted to signify that the Contractor has accepted such survey records as being a true record of the existing conditions prior to construction.

.13 The provision of the records of a survey of existing conditions by the Departmental Representative shall in no way limit or restrict the Contractors responsibility to exercise proper care to prevent damage to all property within or adjacent to the Work Site, whether all such property is covered by the survey or not.

3.5 Contract Drawings

.1 Upon award of the project, PSPC will at the request of the successful Contractor provide the successful Contractor with up to four (4) sets of 609.6 mm x 914.4 mm (24” x 36”) and six (6) sets of 279.4 mm x 431.8 mm (11” x 17”) “Issued for Construction” or “Issued for Tender” hardcopy Contract Drawing sets. Preparation and plotting of the hardcopy drawing sets may take up to 14 days to prepare (excluding shipping).

.2 Upon award of the project, PSPC will provide the successful Contractor with a digital PDF version of the “Issued for Construction” or “Issued for Tender” Contract Drawings. Preparation of the PDF drawing file may take up to 14 days to prepare.

3.6 Electronic Contract Drawings

.1 If requested by the Contractor, the Departmental Representative will provide the Contractor with available Contract Drawings in electronic format for the Contractor to reference throughout the work.

.2 The format and software of the electronic Contract Drawings shall be at the Departmental Representatives discretion.

.3 The Departmental Representative accepts no responsibility for the accuracy or completeness of the electronic Contract Drawings. Should the Contractor choose to reference the electronic Contract Drawings, the Contractor shall satisfy itself as to the accuracy and completeness of the electronic Contract Drawings before commencing construction. Should a discrepancy between the electronic Contract Drawings and the hardcopy Contract Drawings be discovered (at any time during the work), the hardcopy Contract Drawings shall govern. The Contractor will be responsible for all costs associated with any corrections to ensure the work is in conformance with the hardcopy Contract Drawings. The Departmental Representative shall not be responsible for updating or correcting any discrepancies between the electronic Contract Drawings and the hardcopy Contract Drawings identified by the Contractor.

3.7 Contract Submittals

.1 Complete and submit for Departmental Representative review, all required contract submittals as detailed in the relevant sections of the contract specifications. Work affected by the submittals shall not proceed until the submittal is accepted by the Departmental Representative. Allow for submittal review periods as required for each submittal and as detailed in Section 01 33 00 – Submittal Procedures. Required submittals include but are not limited to the following:

.1 Construction Staging Drawings (see Section 01 14 00).

.2 Project Schedule (see Section 01 32 16).

.3 Traffic Management Plan (see 01 35 00)

.4 Project Specific Health and Safety Plan (see Section 01 35 33) including:

.1 Appendix 1: Preliminary Hazard Assessment Form.

.2 Appendix 2: Confirmation of Prime Contractor’s Main Responsibilities Under the WorkSafeBC Occupational Health and Safety

Regulations and Worker's Compensation Act Form.

.3 Appendix 3: Contractor's COVID-19 Safe Work Plan

.5 Environmental Protection Plan (see Section 01 35 43).

.6 Quality Management Plan (see Section 01 45 00).

.7 As-built Survey, As-built Drawing mark-ups, and Shop Drawing mark-ups (see Section 01 78 00).

.8 Shop Drawings (if applicable, including professional seal for design work required).

.9 Asphalt Mix Design (see Section 32 12 16).

.10 Asphalt Cement, Asphalt Prime, Asphalt Tack Coat samples and product data (see Section 32 12 10, Section 32 12 13.16, and Section 32 12 13.23).

.11 Aggregate materials quality and property test results.

3.8 Supervisory Personnel

.1 Within five Days after award notification, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract. At a minimum the following personnel shall be included on the list:

.1 Project Superintendent.

.2 Deputy Project Superintendent.

.3 Health and Safety Coordinator.

.4 Quality Control Manager.

.2 The above personnel shall perform the following duties:

.1 Project Superintendent: shall be employed full time and shall be present on the Work Site every workday that Work is being performed, from the commencement of work to Substantial Performance and Completion of the Work.

.2 Deputy Project Superintendent: shall have the authority of the Project Superintendent during the latter's absence for short periods of time.

.3 Health and Safety Coordinator: shall possess safety experience in general construction. Duties shall encompass all matters of safety activities from

commencement of work until Substantial Performance and Completion of the Work (see Section 01 35 33 – Health and Safety for further requirements).

.4 Quality Control Manager: shall be independent from the Contractor, experienced in Quality Management, and dedicated to quality matters from commencement of work until Substantial Performance and Completion of the Work (see Section 01 45 00 – Quality Management for further requirements).

3.9 Special Requirements

.1 The following special requirements for this project are emphasized for the Contractor's attention:

.1 Maintain two-way and two-lane traffic for the Alaska Highway except as otherwise noted in Section 01 35 00 – Traffic Management.

.2 Existing accesses maintained or other suitable accesses of the same width and convenience as existing to the highway and private properties.

3.10 Work by Others

.1 The contractor is advised that concurrent with this project there may be other Contractors working in nearby adjacent projects. Should other Contractors be working in nearby adjacent projects, the Contractor shall coordinate his operations with the other Contractors, including traffic management.

.2 The Contractor is advised that the utility relocation of the utilities will be undertaken by others before and after work on this project commences. The Contractor will need to coordinate his operations with the owner or its contractor of these utilities to ensure the utilities are not damaged. Refer to Subsection 1.3 in Section 01 14 00 – Work Restriction, Access Development, Construction Staging, and Restoration for further details.

3.11 Departmental Representative's Office Trailer

.1 Office Trailer: See Section 01 52 00 for requirements for the Departmental Representative's office trailer. Office trailer to be supplied and maintained by the Contractor.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Use of Work Site.

1.2 Work Conducted in and Adjacent to Waterways.

1.3 Utilities.

1.4 Protection of Persons and Property.

1.5 Use of Public Areas.

1.6 Construction Signage.

1.7 Access Development.

1.8 Construction Start-up.

1.9 Construction Staging.

1.10 Restoration.

PART 1 – GENERAL

1.1 Use of Work Site

.1 The Work Site will be specified by the Departmental Representative and shall only be used for the purposes of the Work. The Work Site will be made available to the Contractor for its exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.

.2 The Contractor's office trailer may be set up in the locations identified in Section 01 52 00 – Construction Facilities and Equipment. The Contractor's construction camp may be set up in the locations identified in Section 01 59 10.

.3 While the Work Site is under the Contractor's control, the Contractor shall be entirely responsible for the security of the Work Site and of the Work.

.4 The Contractor shall keep the Work Site clean and free from accumulation of waste materials and rubbish regardless of the source. Snow/ice shall be removed by the Contractor as necessary for the performance and inspection of the Work.

.5 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and the Environmental Procedures for this project. The Contractor shall post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.

.6 Any damage to the Work Site caused by the Contractor shall be repaired by the Contractor at its expense.

.7 The Contractor may work up to 12 hours per day from 7am to 7pm, seven days per week. The Contractor may work more than 12 hours per day with the following restrictions:

.1 Work more than 12 hrs per day shall require pre-approval from the Departmental Representative. At a minimum, pre-approval shall require a plan from the Contractor to ensure all necessary QC work per the contract requirements is completed during all times of work. The Departmental Representative may withdraw approval for the extended work hours at any time should the Contractor fail to achieve all necessary QC requirements or any other contractual requirement because of the extended work hours.

.2 Request for approval to work more than 12 hrs per day must be submitted in writing to the Departmental Representative a minimum of five (5) days in advance of the planned change in working hours.

.3 No hauling of material during inclement weather.

.4 Work during non-daylight hours requires suitable lighting.

1.2 Work Conducted in and Adjacent to Waterways

.1 All components of the work shall be conducted in accordance with Section 01 35 43 – Environmental Protection.

1.3 Utilities

.1 There are active utilities within the Highway Right of Way.

.2 The locations of Utilities shown are not necessarily exact nor is there any guarantee that all Utilities in existence within the limits of the Work Site have been shown on the Contract Drawings.

.3 If it is determined by the Departmental Representative that Utilities are affected by the permanent Work, the utilities will be relocated by Other Contractors. The Contractor shall cooperate and coordinate as required with Other Contractors engaged in Utility relocation operations on the Work Site.

.4 The existing underground fiber optic line will be relocated by NorthwesTel as shown on Contract Drawings and is not part of this Contract. The new fiber optic conduit may be within or near the Highway Right of Way. The Contractor will need to coordinate his operations with the owner or its contractor of the

fiber optic utility to ensure the fiber optic conduit is not damaged.

.5 Existing power poles and anchors along the south side of the highway shown on Contract Drawings will stay as is. The Contractor is responsible for ensuring the safety of all personnel (construction crew, PSPC personnel and the public) and that the power poles, anchors, and the power line are not damaged during the construction works.

.6 The Contractor shall notify the Departmental Representative and the Utility companies at least seven (7) days in advance of any activities which may interfere with the operation of such Utilities.

.7 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the Work, using hand labour as required.

.8 The Contractor shall assess the possible impact of its operation on all utilities and shall protect, divert, temporarily support, or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.

9 The Contractor shall immediately report any damage to Utilities to the Departmental Representative and to the Utility company or authority affected and shall promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

1.4 Protection of Persons and Property

.1 The Contractor shall comply with all applicable safety regulations of WorkSafeBC including, but not limited to, the Workers Compensation Act, Occupational Health and Safety Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations (see Section 01 35 33 – Health and Safety for additional requirements).

.2 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site.

.3 The Contractor shall promptly take such measures as are required to repair, replace, or compensate for any loss or damage caused by the Contractor to any property.

1.5 Use of Public Areas

.1 Off-road construction equipment (equipment when exceeds legal highway load limits or dimensions) will not be allowed on the Alaska Highway outside the limits of the work shown on the Contract Drawings except as designated in the Contractor's

Construction Staging / Traffic Management Plans accepted by the Departmental Representative. Steel tracked equipment with cleats will not be allowed on asphalt outside the limits of the work or asphalt designated for future use.

.2 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas. All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle. All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner which will prevent dropping of materials or debris on the roadways, and, where contents may otherwise be blown off during transit, such loads shall be covered by tarpaulins or other suitable covers. Spills of material, including rocks and debris from loaded trucks, shall be removed, or cleaned immediately by the Contractor at no cost to the Owner. All activities shall be in accordance with Section 01 35 43 – Environmental Protection and the Environmental Protection Plan prepared by the Contractor for the project. The traveled lanes of the Alaska Highway shall remain a Public Highway subject to the rules and laws of Public Highways in the Province of British Columbia. The Contractor is responsible for ensuring all equipment accessing the Highway meets all requirements for vehicles traveling on Public Highways in the Province.

1.6 Construction Signage

.1 No Signs or advertisements, other than regulatory or warning signs, PSPC supplied signage, and portable electrically illuminated message signs are permitted on site.

.2 Signs and notices for Safety and instruction shall be provided by the Contractor (see Section 01 35 00 – Traffic Management for additional details).

.3 Maintain approved signs and notices in good condition for duration of Project and dispose of off-site on completion of Project or earlier as directed by the Departmental Representative.

.4 Signage shall be coordinated with Other Contractors working in the area as needed.

1.7 Access Development

.1 The Contractor is required to develop access to the required work areas. The Contractor is fully responsible for the selection and implementation of all methods to accomplish this requirement. All construction access shall be completed in conformance with the requirements of Section 01 35 43 – Environmental Protection and the Contractor’s Environmental Protection Plan.

.2 The Contractor's attention is drawn to the possibility of impacting abandoned and live utilities within the limits of work. The Contractor shall confirm the locations of all such utilities before construction starts. All costs for utility locate shall be incidental to the work. The Contractor shall notify the Departmental Representative should utilities be located in areas other than those shown on the Contract Drawings or if any conflicts with constructability, and await instructions from the Departmental Representative before proceeding with work in the vicinity of such encountered services and utilities. See Section 01 14 00 – Work Restrictions, Access Development, Construction Staging, and Restoration for more details.

.3 Existing structures, signs, utilities, asphalt, culverts, and all other structures, services, piping, or equipment within the limits of work shall be properly protected from any injury or damage, direct or indirect. Any damage that is caused because of the operations of the Contractor shall be repaired and made good at the Contractor's expense to the satisfaction of the Departmental Representative.

1.8 Construction Start-up

.1 The Contractor or his Sub-contractors shall not perform any on site work until all necessary submittals have been provided, reviewed, and accepted by the Departmental Representative and the Contractor has received from the Departmental Representative a completed version of the "On-site Construction Start-up Form" (see Appendix D) which has been completed and signed by PSPC's the Departmental Representative. PSPC reserves the right to refuse payment for any on-site work performed prior to issuing the completed and signed "On-site Construction Start-up Form".

1.9 Construction Staging

.1 The Contractor shall stage the work ensuring that:

.1 All crossroads including Inga lake Road are open to traffic at all times.

.2 All design requirements as specified in the Contract Drawings, contractor prepared shop drawings, and contract specifications are achieved.

.3 All requirements of Section 01 35 00 – Traffic Management are achieved.

.4 All requirements of the Section 01 35 43 – Environmental Protection and the Contractor's Environmental Protection Plan are achieved.

The Contractor is fully responsible for the selection and implementation of all methods to accomplish this requirement.

1.10 Restoration

.1 Remove access points, roads, detours, laydown areas, pads, and all other works installed during access development and construction staging. Re-instate the worksite to a condition equal to or better than the site condition prior to construction by:

.1 Restoring organic soils (if removed during access development).

.2 Eliminating uneven areas and low spots.

.3 Restoring existing and proposed drainage patterns as shown on the Contract Drawings.

.4 Removal of all gravels, other materials, or structures placed to create access points, roads, detours, or pads. Dispose of gravels, other materials, or structures at an off-site disposal facility acceptable to the Departmental Representative.

.5 Hydroseeding all disturbed areas and areas designated for hydroseeding, per Section 32 93 21 – Hydraulic Seeding.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Definitions.

1.2 Measurement and Payment Procedures.

PART 1 – GENERAL

1.1 Definitions

.1 Mobilization and Demobilization: Consists of preparatory work and operations, including but not limited to:

.1 Preparation and acceptance of submittals (Construction Schedule, Traffic Management Plan, Quality Management Plan, Environmental Protection Plan, Construction Staging Plans, Health and Safety Plan, and any other submittals required prior to starting work).

.2 Work and costs incurred necessary for the movement of personnel, equipment, supplies and incidentals to/from the work site.

.3 Work and cost incurred in the establishment and operation of offices, camps, and other facilities necessary to undertake the work.

.4 Work and costs incurred in the completion of clean-up and project completion.

.5 All other work and costs incurred in the successful completion of mobilization and demobilization.

1.2 Measurement and Payment Procedures

.1 Payment for Mobilization and Demobilization will be made on the basis of the Price per Unit Bid for Mobilization and Demobilization in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs associated with the items of work listed in 1.1 Definitions above.

.2 Measurement for Payment for the completion of Mobilization and Demobilization will be made at the Lump Sum price and will be scheduled as follows:

.1 50% of the Lump Sum bid price to a maximum of 5% of the Total Tender price at the beginning of construction after the Contractor's required submittals (including Construction Schedule, Traffic Management Plan, Quality Management Plan, Environmental Protection Plan, Project Specific Health and Safety Plan, and any other submittals noted in the specifications as being required prior to starting work) have been submitted for review, accepted for the work

in its entirety, and work onsite has commenced to the satisfaction of the Departmental Representative. Should the Departmental Representative allow the work to start prior to submission or acceptance by the Departmental Representative of any of submittals listed above, the Departmental Representative may choose to hold back a minimum of 5% of the 50% Mobilization & Demobilization payment for each outstanding submittal until an acceptable submission is provided.

.2 50% once the project has achieved "Completion" and all equipment has been demobilized from the site, the site has been cleaned to the satisfaction of the Departmental Representative, remaining deficiencies identified during final inspection (Section 01 77 00 – Closeout Procedures) are corrected, and all closeout submittals are provided and accepted by the Departmental Representative.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Terms of Payment.

1.2 Basis of Payment.

1.3 Survey.

PART 1 – GENERAL

1.1 Terms of Payment

.1 The project's terms of payment shall be per General Conditions (GC) 5 – Terms of Payment. Progress payments shall be submitted by the Contractor monthly unless accepted otherwise by the Departmental Representative. The progress payment shall use PSPC's Request for Progress Payment – Construction Contracts form: PSPC-TPSGC 1792, found online (see link to Public Services and Procurement Canada – Acquisition Forms within the Reference Documentation section of the Table of Contents for link).

With each progress payment, provide to the Departmental Representative:

.1 Documentation required by General Conditions (GC) 5 – Terms of Payment including signed statutory declaration.

.2 Progress Payment Submittal Form (see Appendix E) completed and signed by the Contractor's representative. Upon receipt of this form and all other required, PSPC will commence review of the progress payment request in accordance with General Conditions (GC) 5 – Terms of Payment.

.3 WorkSafeBC Clearance Letter, indicating the Contractor is in active and good standing per the end date of the progress payment in accordance with Section 51 of the Workers Compensation Act (Departmental Representative may waive this requirement).

.4 Updated construction progress schedule (accepted project schedule shown as the baseline and actual start dates / completion dates / percent complete shown for each task, see Section 01 32 16 – Construction Progress Schedules – Bar (Gantt) Chart).

.5 All survey information (digital csv file with xyz data and breaklines in DXF file format) for each payment item claimed on the progress payment and measured by survey as defined in the Contract Specifications. For each payment item claimed on the progress payment and

measured by survey, provide a Measurement for Payment Survey Details Form (Appendix F).

1.2 Basis of Payment

.1 Basis of payment shall be per the Measurement and Payment Procedures in the applicable specification section. Where not specified, basis of payment for all work included in these specifications or Contract Drawings not specifically mentioned is considered incidental to other work and is part of the Total Contract Amount. No additional payment will be made for incidental work.

.2 Payment for work shall be made per the Price per Unit as shown in the Unit Price Table.

.3 For unit price items in the Bid and Acceptance Form, progress payments shall be made based on the quantities of work in place (prior to excavation or following placement and compaction), compacted (if required), surveyed, and accepted by the Departmental Representative in the field.

.4 For lump sum items in the Bid and Acceptance Form, progress payments shall be made based on the percent of work completed and accepted by the Departmental Representative at the time of the monthly progress payment (excluding Mobilization and Demobilization which is paid per Item 1.2 – Measurement and Payment Procedures of Section 01 25 20 – Mobilization and Demobilization). Survey may be required to verify the work is completed to the design requirements (thickness, length, grade, volume, area, etc.).

.5 The Contractor must support any claims for products purchased, manufactured, or delivered to the place of work but not yet incorporated into work. The support for such claims must include such evidence as may be required by the Departmental Representative to establish value and the percentage of the work completed. During or at the completion of the work any products purchased, manufactured, or delivered to the place of work but not incorporated into the work shall be removed from the site at the Contractor's cost and no payment (including adjustment to quantities on previous progress payments, see GC5.2 – Amount Payable) shall be made (excluding items resulting from changes to the work made by the Departmental Representative during the work and brought to the attention of the Departmental Representative by the Contractor at the time of the change).

.6 Any work called for in the specifications or shown on the Contract Drawings but not specifically mentioned as an item for which payment will be made, will be considered incidental to the items of work listed. No additional payment will be made for this incidental work.

.7 All equipment, materials, and labour necessary to complete any item of work shall be included in the cost of that work.

.8 Materials shall be excavated or placed within the specified tolerances of the design lines and grades shown on the Contract Drawings but not uniformly high or low. Materials excavated or placed outside the specified tolerances will not be measured for payment unless preapproved by the Departmental Representative.

.9 Measurement for Payment will be at the Departmental Representative's discretion using one or more of the following methods:

.1 Based upon the survey data collected by the Contractor – when the materials have been excavated or placed within the specified tolerances of the design lines and grades shown on the Contract Drawings but not uniformly high or low.

.2 Based upon the survey data collected by the Contractor – when the Contractor's or Departmental Representative's survey data indicates that less materials were excavated or placed than called for by the design lines and grades on the Contract Drawings.

.3 By the design grade / design drawing neat lines – when the Contractor's or Departmental Representative's survey data indicates that materials were excavated or placed outside / beyond the specified tolerances of the design lines and grades on the Contract Drawings.

.10 At any point throughout the project, the Departmental Representative may compile and review the survey data (individual surveys or multiple surveys of items of work) to reconcile the total quantities of items of work to date on the project. Adjustments to quantities on future progress payments may then be made per GC5.2 – Amount Payable.

1.3 Survey

.1 Surveys shall be undertaken by the Contractor to verify quantities for payment purposes, or in the case of lump sum items to verify that work has been completed to the design requirements. Survey shall be considered incidental to the work and not measured for payment.

.2 All quantity surveys, quantity calculations for the purposes of progress payments, and surveys to verify the work shall be completed to the design requirements by a Professional Engineer, an Applied Science Technologist or Certified Engineering Technician, or other qualified surveyor, with the

knowledge, skills and abilities acceptable to the Departmental Representative. The surveyor or person(s) used for this task shall have a minimum of 5 years' experience working on projects of similar size, scope, and cost. A resume detailing this experience shall be provided to the Departmental Representative for review and acceptance if requested.

.3 Survey data collected shall be of sufficient density to fully characterize the work. Survey methods and location of surveyed cross sections is subject to prior approval of the Departmental Representative. At a minimum the Contractor shall survey all features at 20 m station intervals (may be reduced to 5 m in locations with grade changes at the discretion of Departmental Representative) and the location of all treatment boundaries including changes in material type / placement, changes in surface treatment, and changes in the terrain.

.4 A survey of the existing ground surfaces and other topographic features shall be undertaken by the Contractor prior to initiation of construction, but in areas designated for Tree Clearing after the Tree Clearing has been completed to the satisfaction of the Departmental Representative. The survey shall be provided to the Departmental Representative for review and acceptance. During construction no material shall be placed unless the applicable surveys on the completed surfaces have been carried out and the data accepted by the Departmental Representative, and the completed surface has been inspected and accepted by the Departmental Representative. At the Departmental Representative's sole discretion, payment for work completed and measured by survey may not be made should the Contractor fail to complete necessary surveys, or the surveys be of insufficient quality or detail.

.5 Survey data shall be collected at an accuracy of +/-0.02 m horizontal and +/-0.02 m vertical or better and shall be referenced / tie into the PSPC's monument / coordinate system as shown on the Contract Drawings.

.6 Survey data for each payment line item in the unit price table and area of work shall be provided to the Departmental Representative as follows:

.1 Digital csv files with the xyz data and an appropriate descriptor code as to the type of material surface or feature being surveyed.

.2 Breaklines for all survey data in DXF file formation or another format pre-approved by the Departmental Representative.

.3 A list of all point descriptors used in the survey data.

.7 Whenever survey data is provided, provide to the Departmental Representative the completed Measurement for Payment Survey Details Form (Appendix F) for each payment line item in the unit price table and area of work.

.8 Where surveys of an item of work or location of work have been completed multiple times (ex. multiple progress payments), compile individual survey point files into one complete survey file free of overlapping points and other inconsistencies resulting from the completion of individual surveys.

.9 The Contractor shall complete detailed volume calculations using average end area determination or electronic surface to surface comparisons. Details of volume calculations shall be provided to the Departmental Representative for review upon request.

.10 Surveys may be subject to verification by the Departmental Representative. In case of discrepancy, the Departmental Representative's survey will govern.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Pre-Construction Meeting.

1.2 On-Site Documents.

1.3 Schedules.

1.4 Construction Progress Meetings.

1.5 Written Communication / Document Management.

1.6 Submittals.

1.7 Close-Out Procedures.

PART 1 – GENERAL

1.1 Pre-Construction Meeting

.1 Following tender closing and prior to the construction start, attend in person or via teleconference a pre-construction meeting organized by the Departmental Representative.

.2 Departmental Representatives and senior representatives of the Contractor, including but not necessarily limited to the Project Superintendent, Deputy Project Superintendent, Health and Safety Coordinator, Surveyor, Quality Control Manager, and Environmental Monitor, and major subcontractors shall attend in person or via teleconference.

.3 The Departmental Representative shall establish a time, location, and teleconference number for the meeting and notify the Contractor a minimum of three days prior to the meeting. The Contractor shall notify all concerned parties of the meeting.

.4 The agenda is to include but is not limited to the following:

.1 Appointment of the official representative of participants in the work and lines of communication.

.2 Project schedule.

.3 Contractor submissions (requirements and submissions schedule).

.4 Requirements for temporary facilities, site signage, offices, construction camp, storage sheds, utilities, and fences.

.5 Permitting and Environmental requirements.

.6 Site security in accordance with Section 01 52 00 – Construction Facilities and Equipment.

.7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.

.8 As-built drawings in accordance with Section 01 78 00 – Closeout Submittals.

.9 Take-over procedures, acceptance, and warranties in accordance with Section 01 77 00 – Closeout Procedures.

.10 Monthly progress claims, administrative procedures, photographs, and holdbacks.

.11 Contractor's Quality Management and Quality Assurance undertaken by the Departmental Representative.

.12 Insurances and transcript of policies.

.13 Contractor's Project Specific Health and Safety Plan.

.14 Maintenance in accordance with Section 01 78 00 – Closeout Submittals.

.15 Other business as required by the Departmental Representative or Contractor.

.5 Within fourteen (14) days of the pre-construction meeting, the Departmental Representative shall distribute meeting minutes to the Contractor. The Contractor shall review the meeting minutes and provide any comments within 5 working days.

1.2 On-Site Documents

.1 Maintain at job site, one copy each of the following:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Reviewed and accepted submittals.

.5 Change Orders.

.6 Other modifications to Contract.

.7 Field test reports.

.8. Copy of approved work schedule.

.9 Manufacturer's installation and application instructions (if applicable).

.10 All permits (as required for the project).

.11 Meeting minutes.

.12 Contractor's Project Specific Health and Safety Plan.

.13 Contractor's Environmental Protection Plan (EPP).

.14 Contractor's Traffic Management Plan.

.15 Current construction standards of workmanship listed in the contract specifications.

.16 One set of "Issued for Construction" Contract Drawings (or "Issued for Tender" if being used for construction), contract specifications, and Shop Drawings for as-built purposes.

1.3 Schedules

.1 Submit preliminary construction progress schedule in accordance with Section 01 32 16 – Construction Progress Schedules – Bar (Gantt) Chart to the Departmental Representative.

.2 After review by Departmental Representative, revise project schedule to comply with comments given.

.3 During progress of work, provide schedule with original tasks shown as the baseline and actual work progress updated with each submission (see Section 01 32 16 – Construction Progress Schedules – Bar (Gantt) Chart, Subsection 1.4).

1.4 Construction Progress Meetings

.1 During the course of work the Departmental Representative may schedule construction progress meetings approximately every week or every two (2) weeks.

.2 Departmental Representatives and senior representatives of the Contractor, including but not necessarily limited to the Project Superintendent and major subcontractors shall attend in person. Other contractor representatives including the Deputy Project Superintendent, Health and Safety Coordinator,

Quality Control Manager, Surveyor, and Environmental Monitor shall attend in person or via teleconference.

.3 The Departmental Representative shall establish a time, location, and teleconference number for the meeting and notify the Contractor a minimum of three days prior to the meeting. The Contractor shall notify all concerned parties of the meeting.

.4 The meetings may be held on site provided teleconference capabilities are available or at PSPC's office in Fort Nelson. If held on site, the Contractor shall provide physical space and plan for the meetings.

.5 Agenda to include the following:

.1 Review and approval of minutes of previous meeting.

.2 Health and Safety Incidents and Concerns.

.3 Review of work progress since previous meeting.

.4 Field observations, problems, conflicts.

.5 Problems which impede construction schedule.

.6 Review of off-site fabrication delivery schedules (if applicable).

.7 Corrective measures and procedures to regain projected schedule.

.8 Revision to construction schedule and project submittals.

.9 Progress schedule, during succeeding work period.

.10 Review submittal schedules: expedite as required.

.11 Maintenance of quality standards.

.12 Review proposed changes for effect on construction schedule and on completion date.

.13 Other business.

.6 Within fourteen days of the construction progress meeting, the Departmental Representative shall distribute meeting minutes to the Contractor. The Contractor shall review the meeting minutes and provide any comments within five (5) working

days.

1.5 Written Communication / Document Management

.1 Written communication and document management shall be completed per the Written Communication / Document Management Protocol prepared by the Departmental Representative following award of the contract. The Written Communication / Document Management Protocol will resemble the template provided in Appendix B.

1.6 Submittals

.1 Provide submittals, Shop Drawings, product data and samples in accordance with Section 01 33 00 – Submittal Procedures for review for compliance with Contract Documents, field dimensions and clearances, compatibility, and available space, and for relation to work of other contracts. If requested, after receipt of Departmental Representative comments, revise and resubmit.

.2 Submit requests for payment through the Departmental Representative via email or if requested by the Departmental Representative or if desired by the Contractor PSPC's cloud-based document filing system "CentralCollab". Support claims for payment with survey data and other evidence as required by the Departmental Representative.

.3 Submit Requests for Information (RFI) of Contract Documents and obtain instructions through Departmental Representative via PSPC's cloud-based document filing system "CentralCollab". If required by the Departmental Representative, provide supporting documents for proposed substitutions via PSPC's cloud-based document filing system "CentralCollab".

.4 Process substitutions through Departmental Representative. If required by the Departmental Representative, provide supporting documents for proposed substitutions via PSPC's cloud-based document filing system "CentralCollab".

.5 Process change orders through Departmental Representative via PSPC's cloud-based document filing system "CentralCollab".

.6 Deliver closeout submittals for review and preliminary inspections, for transmittal to Departmental Representative via PSPC's cloud-based document filing system "CentralCollab".

1.7 Close-Out Procedures

.1 Close-out procedures as per 01 77 00 – Closeout Procedures.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Project Schedule.

1.2 Schedule Format.

1.3 Submission of Schedules.

1.4 Project Schedule Reporting During the Work.

PART 1 – GENERAL

1.1 Project Schedule

.1 Develop detailed Project Schedule conforming to the project completion dates found in Section 01 11 10 – Summary of Work and the Construction Staging requirements outlined in Section 01 14 00 – Work Restrictions, Access Development, Construction Staging, and Restoration.

.2 Ensure detailed Project Schedule includes as a minimum all relevant milestone activity types as follows:

.1 Project Award.

.2 Receipt of Necessary Permits.

.3 Submittal Schedule:

.1 Pre-construction survey

.2 Environmental Protection Plan.

.3 Traffic Management Plan / Detour Plan.

.4 Construction Staging Plan / Site Access.

.5 Quality Management Plan.

.6 Project Specific Health and Safety Plan, including MSDS sheets.

.7 Hazardous Materials Management Plan.

.8 Shop Drawings and Product Samples (if applicable).

.9 As-built Survey and As-Built Drawing Mark-ups.

.10 Test results.

.4 Mobilization.

.5 Work activities and material purchases by segment / locations (unless accepted otherwise, at a minimum each line item of work identified in the unit price table shall be identified separately on the project schedule).

.6 Interim inspections.

.7 Site Clean-up / De-mobilization.

.8 Project Substantial Completion and Project Completion dates.

.3 Indicate dates for submitting, review time, resubmission time, and last date for meeting fabrication schedule.

.4 Include dates when reviewed submittals will be required from the Departmental Representative.

1.2 Schedule Format

.1 Prepare schedule in form of a horizontal Gantt bar chart.

.2 Provide a separate bar for each item of work identified on the unit price table or if acceptable to the Departmental Representative, each operation.

.3 Provide horizontal time scale identifying first workday of each week.

.4 Format for listings: the chronological order of start of each item of work.

.5 Include complete sequence of construction activities and identify critical path and critical path work items in identifying colour.

.6 Include dates for commencement and completion of each major element of construction.

.7 For submission during the work, split horizontally for projected and actual performance.

1.3 Submission of Schedules

.1 Submit initial format of schedules within fifteen (12) days after award of Contract but in all cases prior to starting onsite work.

.2 Submit schedules in electronic format via PSPC's cloud-based document filing system "CentralCollab" (login details to be provided by Departmental Representative at time of submission following contract award). Provide schedules as a single PDF file format document (multiple files will not be

accepted) and native file format (ex. Microsoft Projects format) if requested by the Departmental Representative.

.3 If requested submit two (2) hardcopies to be retained by the Departmental Representative.

.4 The Departmental Representative will review the schedule and return any comments within 10 days after receipt.

.5 Resubmit finalized schedule within seven (7) days after return of review copy. Once accepted by the Departmental Representative, the accepted schedule shall form a baseline which all schedule updates shall be compared against.

.6 Distribute copies of revised schedule to:

.1 The Contractor's team including Project Superintendent, Deputy Project Superintendent, and others as required.

.2 Subcontractors.

.3 Other concerned parties.

.7 Instruct recipients to report to Contractor within seven (7) days any problems anticipated by timetable shown in the schedule.

1.4 Project Schedule Reporting During the Work

.1 Update project schedule monthly or with each progress payment (whichever is more frequent) reflecting activity changes and completions, as well as activities in progress.

.2 Include as a baseline each line item and details from the initial project schedule accepted by the Departmental Representative at the start of the project. On an adjacent line indicate progress of each activity started and completed to the date of schedule submission by including an actual start date / end date / percent complete. See example Figure 01 32 16 – 01 (example in Microsoft Project) and Figure 01 32 16 – 02 (example in Microsoft Excel) for further details.

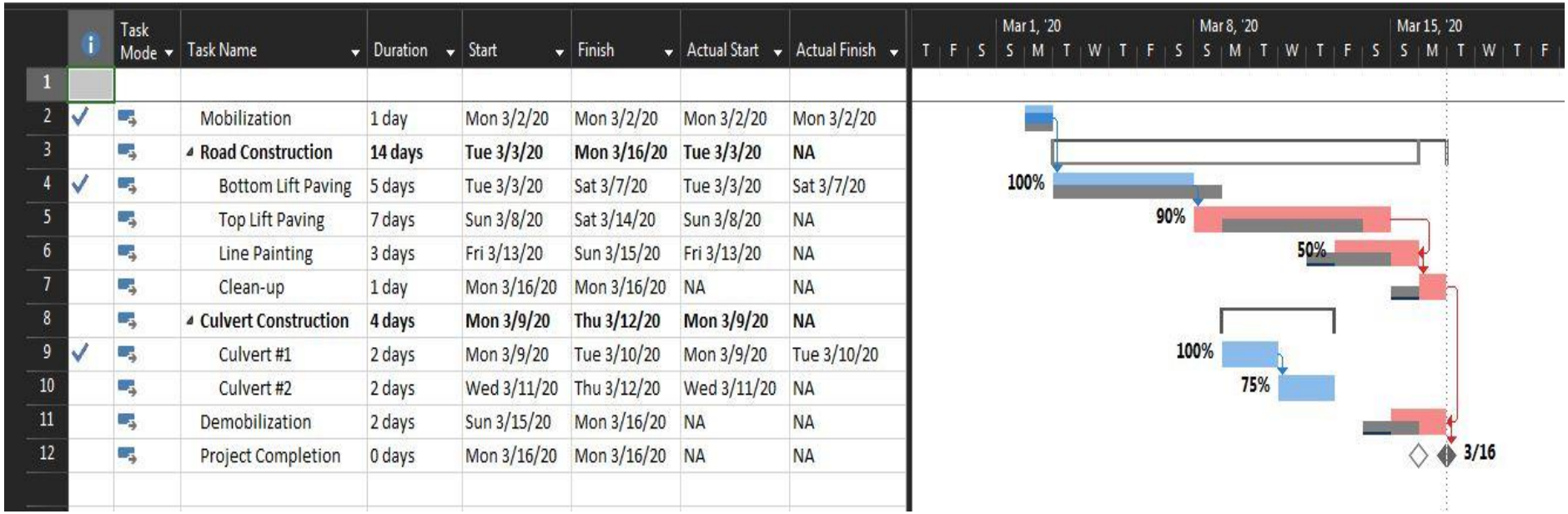


Figure 01 32 16 – 01: Example in Microsoft Project

ID	Task Name	Duration	Start	Finish	Actual Start	Actual Finish
1	Mobilization	1 day	3/2/2020	3/2/2020	3/2/2020	3/2/2020
2	**Road Construction**	**14 Days**	**3/3/2020**	**3/16/2020**	**3/3/2020**	**NA**
3	Bottom Lift Paving	5 Days	3/3/2020	3/8/2020	3/3/2020	3/7/2020
4	Top Lift Paving	7 Days	3/9/2020	3/14/2020	3/8/2020	NA
5	Line Painting	3 Days	3/13/2020	3/15/2020	3/12/2020	NA
6	Clean-up	1 Day	3/15/2020	3/16/2020	NA	NA
7	**Culvert Construction**	**4 Days**	**3/9/2020**	**3/12/2020**	**3/9/2020**	**NA**
8	Culvert #1	2 Days	3/9/2020	3/10/2020	3/9/2020	3/10/2020
9	Culvert #2	2 Days	3/11/2020	3/12/2020	3/11/2020	NA
10	Demobilization	3 Days	3/14/2020	3/16/2020	NA	NA
11	Project Completion	0 Days	3/16/2020	3/16/2020	NA	NA

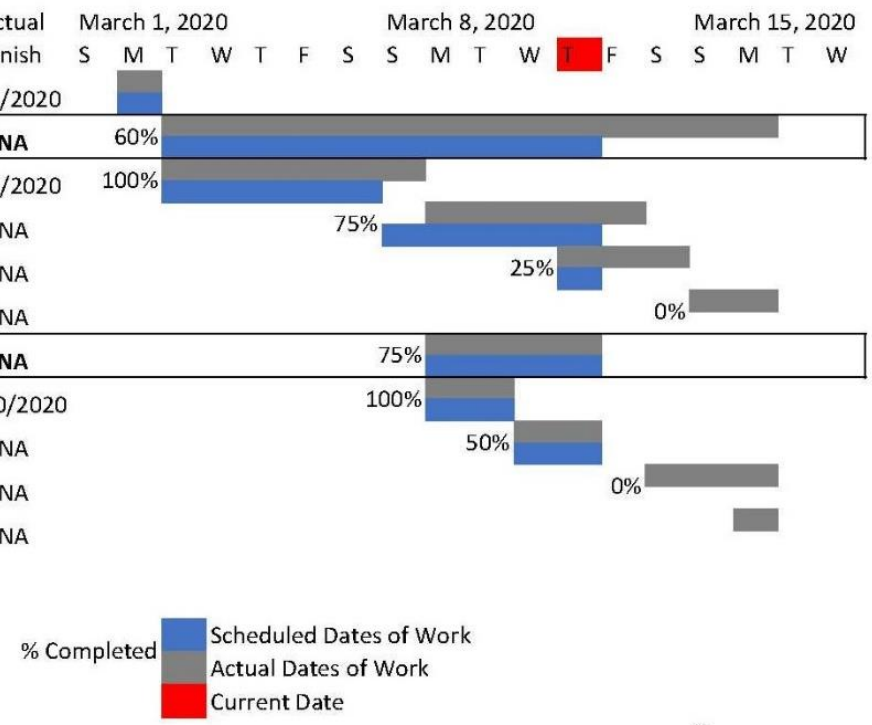


Figure 01 32 16 – 02: Example in Microsoft Excel

.3 Show changes occurring since previous submission of schedule:

.1 Major changes in scope.

.2 Activities modified since previous submission.

.3 Revised projections of progress and completion.

.4 Other identifiable changes.

.4 Provide a narrative report to define:

.1 Problem areas, anticipated delays, and impact on schedule.

.2 Corrective action recommended and its effect.

.3 Effect of changes on schedules of another Prime Contractor's.

.5 Discuss project schedule at Construction Progress Meetings, identify activities that are behind schedule and provide measures to regain slippage. If requested by the Departmental Representative, provide a schedule recovery plan with details of the approach, and changes the Contractor is planning on implementing to bring the project back on schedule.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 General Requirements.

1.2 Shop Drawings and Product Data.

1.3 Samples.

PART 1 – GENERAL

1.1 General Requirements

.1 Submit to the Departmental Representative submittals listed for review. Submit with reasonable promptness (per the timelines indicated, if applicable) and in an orderly sequence to not cause delay in work. Failure to submit in ample time is not considered sufficient reason for an extension of contract Substantial Completion Date, and no claim for extension by reason of such default will be allowed.

.2 Unless specified otherwise or requested by the Departmental Representative, submittals shall be submitted to the Departmental Representative in electronic format via PSPC's cloud-based document filing system "CentralCollab" (login details to be provided by Departmental Representative at time of submission following contract award). Submittals shall be named and filed on "CentralCollab" in accordance with the Written Communication / Document Management Protocol (see template Appendix B). Each submittal shall be compiled into a single PDF document (multiple files will not be accepted).

.3 The Departmental Representative will review the project submittals for accuracy against the appropriate project specifications and contract requirements, and endeavor to complete the reviews within the review time specified for each particular submittal. However, a longer review period may be required. If a longer review period is required, the Contractor will be notified prior to the passing of the specified review period. Upon completion of the submittal reviews by the Departmental Representative, comments and or acceptance of the submittals will be given. Upon review by the Departmental Representative, should comments be provided, the Contractor shall revise the submittal as required and re-submit the complete revised submittal back to the Departmental Representative for review within one week (or within a time preapproved by the Departmental Representative). The submittals will not be accepted until all comments from all reviews have been addressed to the satisfaction of the Departmental Representative. Despite acceptance of a particular submittal, the Departmental Representative reserves the right to provide additional comments to ensure the

correction of any deficiencies with particular submittals at any time during the project.

.4 Work affected by a submittal shall not proceed until the submittal is completed, reviewed, and accepted by the Departmental Representative.

.5 Present all necessary drawings, Shop Drawings, product data, samples, and mock-ups in SI Metric units.

.6 Where items or information is not produced in SI Metric units, converted values are acceptable.

.7 Review submittals prior to submission to the 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 the requirements of work and Contract Documents. Submittals not stamped, signed, dated, and identified as to a specific project will be returned without being examined and shall be considered rejected.

.8 Notify the Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents and stating reasons for deviations.

.9 Prior to any submission, verify field measurements and affected adjacent work included on the submission are coordinated.

.10 Contractor's responsibility for errors and omissions in submission is not relieved by the Departmental Representative's review of submittals.

.11 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.12 Keep one reviewed copy of each submission on site.

.13 Comments made from review of submittals are intended to ensure conformance with contract requirements and not intended to change contract price. If the Contractor feels the comments include requirements not required by the contract, the Contractor shall respond in writing to the Departmental Representative prior to undertaking the work.

1.2 Shop Drawings and Product Data

.1 The term "Shop Drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures, and

other data that are to be provided by the Contractor to illustrate details of a portion of work.

.2 Indicate materials, methods of construction, and attachment or anchorage, erection diagrams, connections, explanatory notes, and other information necessary for completion of work or as indicated elsewhere in the specifications. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of the section under which adjacent items will be supplied and installed. Indicate cross-references to design drawings and specifications.

.3 Adjustments made on Shop Drawings by the Departmental Representative are not intended to change the Contract Price. Should the Contractor feel that the adjustments affect the value of work and are outside the contract requirements, the Contractor shall state such in writing to the Departmental Representative prior to proceeding with work.

.4 Make changes in Shop Drawings as the Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify the Departmental Representative in writing of any revisions other than those requested.

.5 Accompany submissions with a transmittal letter, in duplicate, containing:

.1 Date.

.2 Project title and number.

.3 Contractor’s name and address.

.4 Identification and quantity of each Shop Drawing, product data, and sample.

.5 Other pertinent data.

.6 Submissions shall include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name and address of:

.1 Subcontractor.

.2 Supplier.

.3 Manufacturer.

.4 Contractor's stamp, signed by the Contractor's authorized representative certifying approval of submissions, verification of field measurements, and compliance with Contract Documents and requirements.

.5 Details of appropriate portions of work as applicable:

.1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions, and clearances.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Single line and schematic diagrams.

.9 Relationship to adjacent work.

.6 Professional seal and signature of the engineer certifying approval of the work (if required).

.7 After the Departmental Representative's review and acceptance, distribute copies.

.8 Submit an electronic copy of the Shop Drawing for each requested within the specification sections. Submit hardcopies as requested by the Departmental Representative.

.9 Submit electronic copies of product data sheets or brochures for requirements requested in specification sections and as requested by the Departmental Representative where Shop Drawings will not be prepared due to standardized manufacture of product.

.10 Delete information not applicable to project.

.11 Supplement standard information to provide details applicable to the project.

.12 If upon review by the Departmental Representative no errors or omissions are discovered or if only minor corrections are made, copies will be returned, and fabrication and installation of work may proceed. If Shop Drawings are rejected, noted copy will be returned. Resubmission of corrected Shop Drawings, through the same procedure as indicated above, must be performed before fabrication and installation of work may proceed.

.13 The review of Shop Drawings by the Departmental Representative is for the sole purpose of ascertaining conformance with general concept. This review shall not mean the Departmental Representative approves the detail design inherent in Shop Drawings. Responsibility for detail design of Shop Drawings shall remain with the Contractor, and as such, reviews by the Departmental Representative shall not relieve the Contractor of responsibility for errors or omissions in Shop Drawings, or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of work of all sub-trades.

.14 Work affected by Shop Drawing shall not proceed until the Shop Drawing is reviewed and accepted by the Departmental Representative.

1.3 Samples

.1 Submit for review samples in duplicate, as requested in respective specification sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's site office or to a location as directed by the Departmental Representative.

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If

adjustments affect value of work, state such in writing to Departmental Representative prior to proceeding with work.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.

.8 Work affected by the sample shall not proceed until the sample is reviewed and accepted by the Departmental Representative.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

1.3 General.

1.4 Definitions.

1.5 Submittals.

PART 2 - PRODUCTS:

2.1 Temporary Traffic Control Devices.

PART 3 – EXECUTION:

3.1 General.

3.2 Traffic Management.

3.3 Protection of Public Traffic.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for the cost of Traffic Management and Access Development will be made on the basis of the Price per Unit Bid for Traffic Management and Access Development in the Bid and Acceptance Form. The Price per Unit Bid shall include the completion of the Traffic Management Plan, construction signage, traffic flaggers, automated traffic control devices, pilot vehicles, temporary concrete barriers and privacy fence (if required), shadow and escort vehicles (per line painting requirements), temporary gravel surfacing and shouldering (if required), detours (if required), and all other items necessary for the successful completion of the task.

.2 Measurement for Payment for completion of the Traffic Management and Access Development will be made by Lump Sum based on the percentage of the work completed and accepted by the Departmental Representative.

1.2 References

.1 British Columbia Ministry of Transportation and Infrastructure.

.1 Traffic Management Manual for Work on Roadways – 2020 Office Edition.

.2 B.C. Supplement to TAC Geometric Design Guide for Canadian Roads (latest edition).

.2 Transportation Association Canada.

.1 Geometric Design Guide for Canadian Roads (latest edition).

1.3 General

.1 The traffic management standards and requirements included in these specifications shall be considered the minimum requirements which shall be achieved. The Contractor in conjunction with the Professional Engineer whom seals the Traffic Management Plan shall be responsible for ensuring the traffic management used on the project achieves these Traffic Management specifications, is appropriate for the project requirements, and achieves the requirements of WorkSafeBC OHS Regulation Part 18: Traffic Control.

1.4 Definitions

.1 Delay – The total amount of time vehicles is stopped by all flaggers or automated traffic control devices due to the Contractor's operations while driving through the limits of the work. The delay time includes the time for a vehicle to come to a stop position behind a queue of vehicles and then start moving again following a long queue of vehicles. The maximum allowable delay on this project is defined below in Subsection 3.2.1.8 – Traffic Management (15 minutes).

.2 Limits of Work – The limits of work for this project are defined as follows:

.1 Station 145+350 to station 146+300 for Alaska Highway including signage installation limits as shown on Contract Drawings.

.2 Station 20+085 to station 50+260 for Inga Lake Road as shown on Contract Drawings.

.3 Long-Duration Work: For Traffic Management purposes and applicable signage requirements, all work on the project shall be considered Long Duration as defined by the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition.

1.5 Submittals

.1 Traffic Management Plan

.1 Submit to the Departmental Representative for review and acceptance a Traffic Management Plan. The Traffic Management Plan shall function as a standalone document, be signed/sealed by a P.Eng. or PTOE and provide a complete and unambiguous plan

of the traffic accommodation strategies proposed for use during the work and incorporate the following requirements.

.1 Fully integrated with the Contactor's plan, schedule, and the accepted construction staging drawings for carrying out the work.

.2 Shall provide a complete and unambiguous plan for the traffic accommodation strategies proposed for use during the work using the allowed products, strategies, layouts, and management techniques as described in Part 2 – Products and Part 3 – Execution of this specification.

.3 Shall be in accordance with Section 3: Traffic Management Plans of the BC Ministry of Transportation and Infrastructure's Traffic Management Manual for Work on Roadways – 2020 Office Edition, excluding Sections 3.4.1 and 3.4.2.

.4 Developed and conform to the standards for Category 3 Traffic Management Plans as defined in Section 3: Traffic Management Plans of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition. As defined by Section 3.4.3, the Category 3 Traffic Management Plan shall be signed and sealed by a Professional Engineer who is licensed in British Columbia and qualified and experienced in traffic management. The customized drawings shall further include the sign size used for each individual sign (see Item 2.1 – Temporary Traffic Control Devices, subsection .2 of this specification), the sign support used (see Item 2.1 – Temporary Traffic Control Devices, subsection .1.4 of this specification), and the use of flags (if applicable, see Item 2.1 – Temporary Traffic Control Devices, subsection .1.5 of this specification).

.5 Shall at a minimum include all headings, sub-headings details, and presentation format as provided in the Template for Category 3 Traffic Management Plans found in Appendix C: Templates for Traffic Management Plan in

the BC Ministry of Transportation and Infrastructure's Traffic Management Manual for Work on Roadways – 2020 Office Edition. PSPC has the right to reject the Traffic Management Plan if the correct headings from this document are not used by the Contractor.

.6 Shall include procedures for the review and analysis of work zone incidents and near misses per the requirements of Section 3.6 – Analysis of Work Zone Incidents and Near Misses and for the documentation of traffic control records per the requirements of Section 3.7 – Traffic Control Records as provided in the BC Ministry of Transportation and Infrastructure's Traffic Management Manual for Work on Roadways – 2020 Office Edition.

.7 Shall include traffic signage to be used on side access roads within the limits of the work.

.8 If DMS message signs are required or used by the Contractor, include in an appendix or in the body of the plan a list of DMS messages which will be displayed on the DMS throughout the project. Messages used on the DMS shall be per Section 4 – Temporary Traffic Control Devices (Table 4.5 and Table 4.2) of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition plus other messages required or anticipated to be required on the project.

.9 Shall include details of the procedures, processes, and sequencing used to determine the layout of the signs in the field and the order of installation and order of removal of the signs in the field. Refer to Section 6: Traffic Control Layouts – General Instructions of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition for further details. At a minimum the text and figures included in Item 6.7.4 – Two-Lane, Two-Way Roadways shall be included within the Contractor's Traffic Management Plan for reference during the work (in main body of

the plan or in Appendices of the plan with reference to applicable Appendix in main body of the plan). The Contractor shall customize the details of the steps for the project as required.

.10 Shall include a table or list of each element of work on the project and the applicable traffic accommodation strategies and layout drawing(s) which will be used during that element of work throughout all project locations. Example elements of work are to include but are not limited to unloading of equipment, paving, line painting, rumble strip installation, excavation on highway, excavation off highway, culvert installation, etc. The table or list of each element of work on the project shall also include the applicable traffic accommodation strategies and layout drawing(s) to be used during non-work hours.

.11 If using Traffic Control Persons (TCPs) after sunset, shall include details of the overhead lighting which will be used at each TCP location. Details to include the location, direction, height, brightness, and use of shields on the lights to suitably illuminate the TCP but not obstruct the visibility of drivers approaching the TCP.

.12 Shall include graphical representation of the sign supports planned for use on the projects; Post Mounted Supports found in Figure 01 35 00 – 01 and/or the Wind Resistant Sign Stand found in Figure 01 35 00 – 02.

.13 Shall include a copy of the "Daily Sign Check Form" as found in the appendices of the Traffic Management Plan template (Appendix C of the specifications).

.2 The Contractor's Traffic Management Plan shall be submitted to the Departmental Representative as a single PDF document (multiple files will not be accepted) for review and acceptance in accordance with the procedures outlined in Section 01 33 00 – Submittal Procedures. The Departmental Representative will review the plan (first submission and if required all subsequent re-submissions) within 14 days of submission. Upon review of the plan the

Departmental Representative will do one of the following:

.1 Accept the plan.

.2 Accept portions of the plan and provide comments outlining required changes or additional information in other sections. Following completion of edits by the Contractor, the Contractor shall re-submit the complete plan for review.

.3 Reject the plan and provide comments outlining required changes or additional information needed before the plan will be reviewed in detail. Following completion of edits by the Contractor, the Contractor shall re-submit the complete plan for review.

.3 The Contractor shall allow time in the schedule for the reviews, and subsequent edits / re-submission.

.4 Work affected by the Traffic Management Plan (as determined by the Departmental Representative) shall not proceed until acceptance of the Traffic Management Plan by the Departmental Representative.

.5 The review of the Traffic Management Plan by the Departmental Representative shall not relieve the Contractor of responsibility for errors or omissions in the accepted Traffic Management Plan or of responsibility for meeting all requirements of construction and Contract Documents or for ensuring safe and appropriate traffic management.

.6 Should deficiencies in the Contractor's Traffic Management Plan be noted following acceptance of the submittal by the Departmental Representative but during the project work, the Departmental Representative reserves the right to provide additional comments to the Contractor and require re-submission of the Traffic Management Plan to ensure the correction of any deficiencies.

.2 Daily Sign Check Form.

.1 Submit to the Departmental Representative for review the "Daily Sign Check Form" as found in Appendix C: Templates for Traffic Management Plans in the BC

Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition. Submit via CentralCollab in accordance with the procedures outlined in Section 01 33 00 – Submittal Procedures.

.3 Other Submittals:

.1 Any other traffic control related documents such as incident reports, daily check sheets, daily reports, etc. shall be distributed to the Departmental Representative in electronic format via "CentralCollab" as discussed in Section 01 33 00 – Submittal Procedures of these specifications.

PART 2 – PRODUCTS

2.1 Temporary Traffic Control Devices

.1 Temporary Traffic Control Devices shall be in accordance with Section 4: Temporary Traffic Control Devices of the BC Ministry of Transportation and Infrastructure's Traffic Management Manual for Work on Roadways – 2020 Office Edition and the following requirements.

.1 Supply and maintain two (2) portable dynamic message signs (DMS) for the duration of the work. The DMS shall have a minimum of three (3) lines with eight (8) characters per line (minimum 450 mm character size)

.2 Unless preapproved by the Departmental Representative, where 45 cm, 70 cm, or 90 cm cones are called for by the BC Ministry of Transportation and Infrastructure's Traffic Management Manual for Work on Roadways – 2020 Office Edition, 100 cm tubular markers shall be used.

.3 Automated Flagger Assistance Devices (AFADs) shall not be used on the project.

.4 All sign supports shall either be a post mounted support per the requirements of Figure 01 35 00 – 01 or Wind Resistance Sign Stand per the requirements of Figure 01 35 00 – 02.

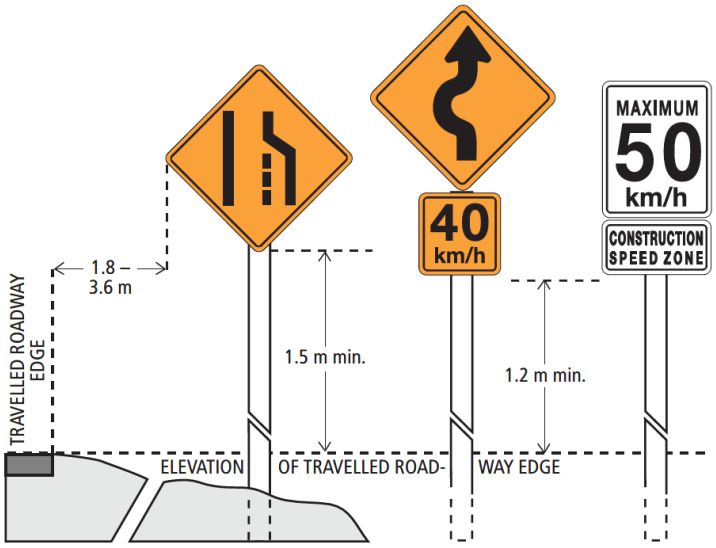


Figure 01 35 00 - 01: Post Mounted Supports

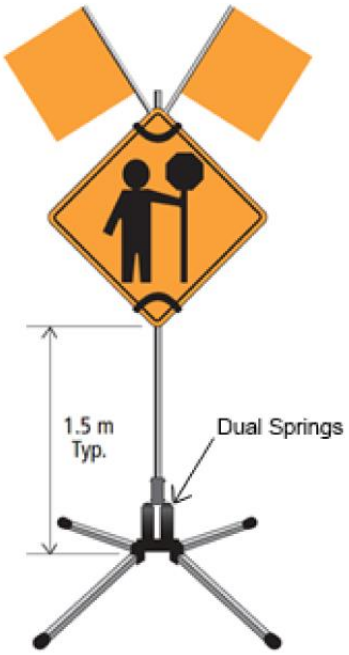


Figure 01 35 00 - 02: Wind Resistance Sign Stand

.5 Flags shall be used on the following signs:

.1 Traffic Control Person Ahead (C-001-1).

.2 Survey Crew Ahead (C-003).

.3 Crew Working Ahead (C-004).

.4 Accident Scene (C-058).

.6 Unless pre-approved by the Departmental Representative, one or more sandbags or weights shall always be in used to further stabilize all Wind Resistance Sign Stands.

.2 Where an option for a sign size is available, the sign size used shall be the larger dimension sign as listed in Appendix B.2: Sizes and Applications of Individual Signs of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition.

PART 3 – EXECUTION

3.1 General

.1 All traffic control on the project shall be undertaken in accordance with Section 1.1.3 – Applying the Principles in the Manual as defined in the BC Ministry of Transportation and Infrastructure's Traffic Management Manual for Work on Roadways – 2020 Office Edition.

.2 Responsibilities for traffic control shall be undertaken in accordance with Section 1.2.3 – Traffic Control Responsibilities of the BC Ministry of Transportation and Infrastructure's Traffic Management Manual for Work on Roadways – 2020 Office Edition and as follows.

.1 Road Authority shall be Public Services and Procurement Canada (PSPC).

.2 Prime Contractor shall be the Contractor as defined by GC1.1.2 – Terminology.

.3 Management and site supervision shall be the responsibility of the Contractor including the:

.1 Site Supervisor / Foreman / Superintendent.

.2 Traffic Control Manager.

.3 Traffic Control Supervisors and Traffic Control Persons.

.3 PSPC will assist the Contractor with the Public Information Plan by notifying DriveBC of the work and posting notice of the project on PSPC's permanent variable message signs along the highway. All other requirements of the Public Information Plan (Section 3.2.3 of the BC Ministry of Transportation and Infrastructure's Traffic Management Manual for Work on Roadways – 2020 Office Edition shall be included in the

Traffic Management Plan and by undertaken / implemented by the Contractor prior to commencing work.

.4 PSPC through their maintenance contractor will maintain "typical" snow plowing and sanding operations through the length of the project worksite for the duration of the project. "Typical" snow plowing, and sanding will be completed to the level and standard that would be undertaken in this area should there not be an active ongoing construction project. Any additional snow clearing and sanding desired by the Contractor for safety or other reasons shall be the responsibility of the Contractor to undertake.

3.2 Traffic Management

.1 Traffic management shall be undertaken in accordance with the requirements of:

.1 The reviewed and accepted Traffic Management Plan prepared by the Contractor (see Section 1.4 – Submittals).

.2 Section 2: Fundamentals of Traffic Management and Traffic Control of the BC Ministry of Transportation and Infrastructure's Traffic Management Manual for Work on Roadways – 2020 Office Edition and as follows.

.1 Section 2.5.3 – Road Authority Acceptance shall be replaced with the requirements of Section 1.5 – Submittals within this specification.

.2 References to Ministry shall be replaced with PSPC.

.3 Section 5: Traffic Control Persons (TCP's) of the BC Ministry of Transportation and Infrastructure's Traffic Management Manual for Work on Roadways – 2020 Office Edition.

.4 Section 6: Traffic Control Layouts – General Instructions of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition and as follows:

.1 Per section 6.3 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition, traffic management shall be managed as one continuous work zone where the work is one kilometer apart or less.

.2 Drop-offs shall be treated in accordance with Section 6.5 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition with the following exceptions:

.1 Barrier Removed (C-013) sign shall be installed in all instances when a barrier is removed.

.2 Drop-offs from the completion of Hot Mix Asphalt Concrete Pavement prior to the install of Gravel Shouldering ≤ 150 mm shall be signed with Low Shoulder (C-013) signs at least once every 1 kilometer for as long as the condition persists.

.3 Should temporary barriers be used, distance between the front of the barrier and the edge of the travel lane shall be 1.0 m.

.5 Section 7: Traffic Control Layouts – Two-Lane, Two-Way Roadways of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition. The traffic control layouts, revisions, and details, as listed below shall be used in conjunction with 13.3 Advanced Warning for Paving Work within the Limits of Construction.

.1 Section 7: Legend, Table A, and Table B.

.2 7.1 General Information – Two-Lane, Two Way Roadways shall apply as follows:

.1 A buffer space shall be used for all traffic control layouts.

.2 The use of a buffer vehicle when workers are present shall be at the Contractor's discretion.

.3 A portable dynamic message sign (DMS) shall be used in the location identified in 13.3 Advanced Warning for Paving Work.

.3 7.5 Work on Shoulder – Short and Long Duration can be used subject to the following:

.1 When work activities on part or all of the shoulder area (including parked vehicles, equipment, and equipment with components within reach of the shoulder) are on one side of the highway and do not encroach onto the driving lane.

.2 Work activities do not include unloading or loading of equipment or supplies.

.3 Advanced warning signs (Men Working (C-004) and Construction Ahead (C-018-1A)) shall be installed in the opposing direction of travel.

.4 Tubular markers shall replace cones and tubular markers can be used as a replacement for drums.

.5 The traffic control signage layout shall include the Men Working (C-004) sign in advance of the Construction Ahead (C-018-1A) sign using the applicable Construction Sign Spacing (Dimension A as defined in Table B of Section 7 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition) for the applicable speed (adjust all other sign spacing as required).

.4 7.8 Lane Closure with Traffic Control Persons – Single Lane Alternating Traffic – Short and Long Duration can be used when the length of the single lane alternating traffic does not exceed 300 m and access through the work area is not dangerous thus requiring a pilot vehicle. The traffic control signage layout shall include the Men Working (C-004) sign in advance of the Construction Ahead (C-018-1A) sign using the applicable Construction Sign Spacing (Dimension A as defined in Table B of Section 7 of the BC Ministry of

Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition) for the applicable speed (adjust all other sign spacing as required).

.5 7.10 Lane Closure with Temporary Signals – Single Lane Alternating – Short and Long Duration can be used subject to the following:

.1 Shall only be used during non-working hours.

.2 Temporary traffic signals shall only be used when the distance between the temporary signals is less than or equal to 150 m and a direct line of sight is available.

.3 The signal timing and signal head locations shall be established / designed in accordance with Section 4.8 Portable Traffic Signals of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition with the details included in the submitted and accepted Traffic Management Plan.

.4 A sign shall be installed on or near the temporary traffic signal indicating the maximum wait time (as determined by the signal timing plan).

.5 The traffic control signage layout shall include the Men Working (C-004) sign in advance of the Construction Ahead (C-018-1A) sign using the applicable Construction Sign Spacing (Dimension A as defined in Table B of Section 7 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition) for the applicable speed (adjust all other sign spacing as required).

.6 7.14 Roadside Diversion – Long Duration can be used if applicable on the project subject to the following:

.1 The traffic control signage layout shall include the Men Working (C-004) sign in advance of the Construction Ahead (C-018-1A) sign. The spacing shall be per applicable Construction Sign Spacing (Dimension A as defined in Table B of Section 7 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition) for the applicable speed (adjust all other sign spacing as required).

.7 7.16 Pilot Cars can be used subject to the following:

.1 When the length of the single lane alternating traffic exceeds 300 m or where access through the work would be otherwise dangerous.

.2 The traffic control signage layout shall include the Prepare to Stop (C-029) sign (sign spacing shall be adjusted to suit).

.3 During non-work hours temporary traffic signals, controlled by the Pilot Car Driver may be used to replace the traffic control persons. If this traffic control arrangement is used, the traffic control signage layout plan shall be revised to include applicable signage from 7.10 Lane Closure with Temporary Signals – Single Lane Alternating Traffic – Short and Long Duration and submitted as part of the Traffic Management Plan.

.4 The traffic control signage layout shall include the Men Working (C-004) sign in advance of the Construction Ahead (C-018-1A) sign. The spacing shall be per applicable Construction Sign Spacing

(Dimension A as defined in Table B of Section 7 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition) for the applicable speed (adjust all other sign spacing as required).

.8 Any duplicate signage resulting from the use Section 7 Traffic control layouts and the Traffic Control Layouts required under Sections 13, 14, or 15 shall be removed.

.9 No Road Lines (C-046) and Temporary Road Lines (C-047-1) shall be included in the Traffic Control Plan and installed at the applicable transitions.

.6 Section 8: Traffic Control Layouts – Multilane Undivided Roadways of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition. The traffic control layouts, revisions, and details as listed below shall be used in conjunction with 7.2 Typical Construction Speed Zone Signing – Two Lane, Two-Way Roadway (see Item 3.2 – Traffic Management, subsection .1.6 of this specification) within the Limits of Construction.

.1 Section 8: Legend, Table A, and Table B.

.2 The requirements of 8.1 General Information – Multilane Undivided Roadway shall apply subject to the following:

.1 A buffer space shall be used for all traffic control layouts.

.2 The use of a buffer vehicle when workers are present shall be at the Contractor's discretion.

.3 8.5 Work on Shoulder – Short and Long Duration can be used during the following:

- When work activities on part or all of the shoulder area (including parked vehicles, equipment, and equipment with components within reach of the shoulder) are on one side of the

highway and do not encroach onto the driving lane.

- When work activities do not include unloading or loading of equipment or supplies on part or all of the shoulder area.

The use of 8.5 Work on Shoulder – Short and Long Duration is subject to the following:

.1 Advanced warning signs (Men Working (C-004) and Construction Ahead (C-018-1A)) shall be installed in the opposing direction of travel.

.2 Tubular markers shall replace cones and tubular markers can be used as a replacement for drums.

.3 The traffic control signage layout shall include the Men Working (C-004) sign in advance of the Construction Ahead (C-018-1A) sign using the applicable Construction Sign Spacing (Dimension A as defined in Table B of Section 8 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition) for the applicable speed (adjust all other sign spacing as required).

.4 8.6 Right Lane Closed – Short- and Long-Term Duration can be used when can be used when the work activity encroaches into the outside highway driving lane in an area of the highway with two lanes in one direction. The traffic control signage layout in both directions shall include the Men Working (C-004) sign in advance of the Construction Ahead (C-018-1A) sign using the applicable Construction Sign Spacing (Dimension A as defined in Table B of Section 8 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition) for the applicable speed (adjust all other sign spacing as required). All requirements for long-duration work shall be applied.

.5 8.14 Passing / Climbing Lanes – Lane Shift – Short and Long Duration can be used when the work activity encroaches into the driving lane in an area of the highway with two lanes in the opposite direction. The traffic control signage layout in both directions shall include the Men Working (C-004) sign in advance of the Construction Ahead (C-018-1A) sign using the applicable Construction Sign Spacing (Dimension A as defined in Table B of Section 8 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition) for the applicable speed (adjust all other sign spacing as required). All requirements for long-duration work shall be applied.

.7 Section 11: Traffic Control Layouts – Intersections of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition. The traffic control layouts, revisions, and details as listed below shall be used in conjunction with 7.2 Typical Construction Speed Zone Signing – Two Lane, Two-Way Roadway (see Item 3.2 – Traffic Management, subsection .1.5 of this specification) within the Limits of Construction.

.1 Section 11: Legend, Table A, and Table B.

.2 The requirements of 11.1 General Information – Intersections shall apply.

.3 11.2 Intersection Lane Closure – Two-Lane, Two-Way Roadway with TCPs (Near Side) – Short and Long Duration shall be used when work activities (regardless of duration) extent onto part or all of the access road (cross street) driving lane (including parked vehicles, equipment, and equipment with components within reach of the driving lane). The use of 11.2 Intersection Lane Closure – Two-Lane, Two-Way Roadway with TCPs is subject to the following:

.1 Tubular markers shall replace cones.

.2 The traffic control signage layout shall include the Men Working (C-004) sign in advance of the

Construction Ahead (C-018-1A) sign using the applicable Construction Sign Spacing (Dimension A as defined in Table B of Section 11 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition) for the applicable speed (adjust all other sign spacing as required).

.3 At the Contractor's discretion the TCPs on the access road (cross street) may be omitted as outlined in the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition) due to low traffic volumes. TCPs are always required on the highway, adjacent to the intersection in both directions.

.4 7.5 Work on Shoulder – Short and Long Duration shall be used on the access road (cross street) when work activities (regardless of duration) extent onto part or all of the access road (cross street) shoulder area (including parked vehicles, equipment, and equipment with components within reach of the shoulder). The use of 7.5 Work on Shoulder – Short and Long Duration on the access road (cross street) shall follow Item 3.2 – Traffic Management, subsection .1.5.3 of this specification.

.6 Section 15: Traffic Control Layouts – Surveying of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition. The following are minimum requirements if the Contractor's surveyor will be on site prior to the Contractor setting up signage as per Section 7.2 of the above manual.

.1 Section 15: Legend, Table A, and Table B.

.2 15.2: Surveying on shoulder.

.3 15.3: Surveying on centerline.

.7 C-172-L/R signs shall be installed in advance of any gravel pit accesses, lay down area access, or other

access road where long or slow-moving trucks frequently enter or leave the highway and the access is located outside the "Limits of Construction" signage.

.8 Maintain existing conditions for traffic throughout the period of contract except that, when required for contract construction and when measures have been taken as specified herein and reviewed by Departmental Representative to protect and control public traffic. Existing conditions for traffic may be restricted to single lane (min 3.5 m lane width with 1.0 m shoulder on both sides) alternating traffic during completion of on-highway work including, full depth reclamation, regrading, paving, shouldering, line painting, rumble strip installation, or others works as preapproved by the Departmental Representative. Speed limit reduced during these times to 30 km/h (or 50 km/h, at the Contractor's discretion).

.9 Maintain traffic flow throughout the period of culvert installation. Traffic flow restrictions shall be consistent with the plan outlined on the accepted Construction Staging drawings and Traffic Management Plan. During culvert construction traffic may be restricted to single lane alternating traffic detours constructed to the following requirements.

.1 The horizontal and vertical geometrics for single lane alternating traffic shall conform with the requirements as defined in Table 01 35 00 - 01.

Table 01 35 00 - 01: Single Lane Alternating Traffic

Criteria	Value
Design Speed	30 km/h
Design Vehicle	WB-20
Max Grade	8%
Maximum Superelevation	6%
Minimum Lane Width	3.5 m
Minimum Shoulder Width (Open, width required both sides of lane)	0.5 m
Minimum Shoulder Width (Closed by Barrier, width required both sides of lane)	1.0 m

Note:

1. Other geometric requirements shall be in conformance with the BC Supplement to TAC Geometric Design Guide for Canadian Roads (latest edition, use Low-Volume Roads Chapter when

required for 30 km/h design speed), and the Transportation Association Canada Geometric Design Guide for Canadian Roads (latest edition) for a 30 km/h design speed and 3000 AADT.

2. Maintain 3H:1V or flatter embankment and gravel side slopes on both sides of all two way or single lane traffic lanes. Should the contractor choose to use temporary side slopes steeper than 3H:1V, temporary precast concrete barriers shall be installed with a minimum distance of 0.3 m from the back of the barrier to the top of the slope. All slopes shall be in conformance with WorkSafeBC regulations.

.10 The maximum allowable delay to any individual motorist travelling through the project limits as a result of the Contractor's operations will be 15 minutes.

.11 The Contractor may use the C-082 sign ("Minimum $196 Fine – Speeding in Work Zones" sign) as a speed management tool in areas where drivers have been failing to adjust speed or are failing to adhere to the regulatory or construction speed limit. When used in work zones in which a Construction Speed Zone exists, the C-082 sign should be posted in the advance warning area ahead of the work activity area. The C-082 sign may also be installed ahead of TCP locations and/or used as a standalone sign for speed management throughout the work zone, at the Contractor's discretion or as directed by the Departmental Representative.

.12 Load limit restrictions will be in accordance with British Columbia Highway Traffic Act pertaining to registered weight limits and vehicle size both within and outside Contract Limits.

.13 For sites with access roads / intersections, the following shall be used:

.1 At a minimum, a C-004 (or C-018-1A) sign shall be placed in front of a C-029 sign, followed by a C-001-1 sign (if traffic flaggers are used) or a C-027 sign (if traffic flaggers are not used). If traffic flaggers are not used, a custom sign stating, "wait for pilot vehicle" (or similar) must be displayed before the C-027 sign. Depending on the traffic volumes, flaggers may be necessary at all access road intersections. The need for flaggers shall be determined on site following discussion and acceptance by the Departmental Representative.

.2 Signs should be positioned so that they do not block the sight lines of drivers entering a roadway from side roads or other access points.

.3 The maximum allowable delay to any individual motorist travelling through the project limits from an access road / intersection as a result of the Contractor's operations will be 15 minutes.

3.3 Protection of Public Traffic .1 Ensure traffic control and other measures as necessary are in place for the duration of the works to protect and accommodate public traffic as follows:

.1 Contractor to complete and document checks of the signage using the "Daily Sign Check Form" found in Appendix C: Category 3 Traffic Management Plan Template in the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition. Complete and document checks a minimum of 3 times a day (start of workday, midday, and at completion of workday). Submit completed "Daily Sign Check Form" to the Departmental Representative weekly or more frequently as required by the Departmental Representative.

.2 Ensure that all vehicles can safely travel and traverse the entire length of the project (including detours) without damage to vehicles regardless of the material type placed and used as a driving surface.

.3 Protect passing vehicles from damage caused by extraneous materials from construction activities at the site.

.4 Keep travelled way and detours graded, free of potholes, and of sufficient width for required number of lanes of traffic.

.5 Provide well graded, signed, and maintained temporary traffic lanes and detours to facilitate passage of vehicles through limits of construction.

.6 Provide dust control, (if necessary).

.7 Complete new grade as soon as practical after disturbing existing roadway surface.

.8 Provide and maintain reasonable access to property in

vicinity of work under contract and in other area as indicated, unless other reasonable means of road access exist that meet approval of Departmental Representative.

.9 All existing signage that conflicts with the Contractor's temporary construction signage shall be covered over by the Contractor for the duration of the conflict.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 References.

1.2 Workers' Compensation Coverage.

1.3 Compliance with Regulations.

1.4 Submittals.

1.5 Project Specific Health and Safety Plan.

1.6 Contractor's Responsibility.

1.7 Health and Safety Coordinator.

1.8 General.

1.9 Project / Site Conditions.

1.10 Regulatory Requirements.

1.11 Work Permits.

1.12 Filing of Notice.

1.13 Emergency Procedures.

1.14 Hazardous Products.

1.15 Overloading.

1.16 Fire Safety Requirements.

1.17 Unforeseen Hazards.

1.18 Posted Documents.

1.19 Correction of Non-Compliance.

1.20 Medical.

1.21 Accidents and Accident Reports.

1.22 COVID-19.

PART 1 – GENERAL

1.1 References

.1 Government of Canada:

.1 Canada Labour Code - Part II

.2 Canada Occupational Health and Safety Regulations.

.2 National Building Code of Canada (NBC):

.1 Part 8, Safety Measures at Construction and Demolition Sites.

.3 Canadian Standards Association (CSA) as amended:

.1 CSA Z797-2009 Code of Practice for Access Scaffold.

.2 CSA S269.1-1975 (R2003) Falsework for Construction Purposes.

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

.4 National Fire Code of Canada 2015 as amended:

.1 Part 5 – Hazardous Processes and Operations and Division B as applicable and required.

.5 Fire Protection Engineering Services, HRSDC:

.1 FCC No. 301, Standard for Construction Operations.

.2 FCC No. 302, Standard for Welding and Cutting.

.6 American National Standards Institute (ANSI):

.1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.

.7 Province of British Columbia:

.1 Workers Compensation Act Part 3-Occupational Health and Safety (as amended).

.2 Occupational Health and Safety Regulation (as amended).

.8 Project Specific Health and Safety Plan Template (Appendix A).

.9 Canadian Construction Association, COVID-19 – Standardized Protocols for All Canadian Construction Sites, Version 5, May 26, 2020.

.10 WorkSafeBC Construction and COVID-19 Safety.

1.2 Workers' Compensation Coverage

.1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.

.2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.3 Compliance with Regulations

.1 PSPC may terminate the Contract without liability to PSPC where the Contractor, in the opinion of PSPC, does not comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.

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

1.4 Submittals

.1 The Contractor's Project Specific Health and Safety Plan shall be submitted to the Departmental Representative as a single PDF document (multiple files will not be accepted) for review and acceptance in accordance with the procedures outlined in Section 01 33 00 – Submittal Procedures. The Departmental Representative will review the plan (first submission and if required all subsequent re-submissions) within 14 days of submission. Upon review of the plan the Departmental Representative will do one of the following:

.1 Accept the plan.

.2 Accept portions of the plan and provide comments outlining required changes or additional information in other sections. Following completion of edits by the Contractor, the Contractor shall re-submit the complete plan for review.

.3 Reject the plan and provide comments outlining required changes or additional information needed before the plan will be reviewed in detail. Following completion of edits by the Contractor, the Contractor shall re-submit the complete plan for review.

.2 Submit the following to the Departmental Representative in accordance with the procedures outlined in Section 01 33 00 – Submittal Procedures:

.1 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.

.2 Copies of incident and accident reports.

.3 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.

.4 Emergency Procedures.

.5 Medical surveillance: where prescribed by legislation, regulation, or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.

.6 If requested, complete versions of the Contractor's corporate Health and Safety Policies / Procedures manual.

.3 The Contractor shall allow time in the schedule for the reviews, and subsequent edits / re-submission.

.4 Work affected by the submittal (as determined by the Departmental Representative) shall not proceed until acceptance of the submittal by the Departmental Representative.

.5 Submission of the Project Specific Health and Safety Plan, and any revised version, to the Departmental Representative are for information and reference purposes only. It shall not:

.1 Be construed to imply approval by the Departmental Representative.

.2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.

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

.6 Should deficiencies in the Contractor's Project Specific Health and Safety Plan be noted following acceptance of the submittal by the Departmental Representative but during the project work, the Departmental Representative reserves the right to provide additional comments to the Contractor and require re-submission of the Project Specific Health and Safety Plan to ensure the correction of any deficiencies.

1.5 Project Specific Health and Safety Plan

.1 The Contractor shall prepare and comply with the Project Specific Health and Safety Plan. The preparation and details of the Project Specific Health and Safety Plan shall include conducting a site-specific hazard assessment based on review of Contract Documents, required work, and project site. The Project Specific Health and Safety Plan shall address all concerns / requirements identified in the Contract Documents and identify any known and potential health risks and safety hazards.

.2 The Project Specific Health and Safety Plan shall, at a minimum, include all headings, sub-headings, details and presentation format as provided in the template found in Appendix A. The Contractor shall add additional headings and content to the Project Specific Health and Safety Plan as deemed necessary. PSPC has the right to reject the Project Specific Health and Safety Plan if the headings from this document are not used in the Contractor's Project Specific Health and Safety Plan. Minimum requirements for the Project Specific Health and Safety Plan includes:

.1 Contractor's safety policy.

.2 Identification of applicable compliance obligations.

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

.4 General safety rules for project.

.5 Job-specific safe work procedures that are not already included in the Contractor's corporate Health and Safety Polices / Procedures manual.

.6 Inspection policy and procedures.

.7 Incident reporting and investigation policy and procedures.

.8 Occupational Health and Safety Committee / Representative procedures.

.9 Occupational Health and Safety meetings.

.10 Occupational Health and Safety communications and record keeping procedures.

.11 Maps identifying the location of the nearest hospital(s) to the project site. The maps shall be of appropriate scale and sufficient detail allowing for their use to navigate to the hospital(s) in the event of an emergency.

.12 Blank copy of Contractor's daily toolbox meeting form.

.13 Emergency contact information including PSPC project personnel (including Consultants), Contractor office and field staff, fire, police, ambulance, air ambulance, and forest fire reporting.

.14 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.

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

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

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

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

.19 Identify personnel training requirements and training plan, including site orientation for new workers and personnel designated by the Departmental Representative as needing to visit the site.

.20 Identify employee training plans for wildlife encounters and prevention.

.21 Identify fire safety, fire reporting, and fire evacuation procedures.

.22 Completed "Preliminary Hazard Assessment Form" (see Appendix 1 of the Project Specific Health and Safety Plan template).

.23 Completed "Confirmation of Prime Contractor's Main Responsibilities Under the WorkSafeBC Occupational Health and Safety Regulations and Worker's Compensation Act" form (see Appendix 2 of the Project Specific Health and Safety Plan template).

.24 Resume(s) or certification(s) of Health and Safety Coordinator(s) responsible for site safety.

.3 Develop the plan in collaboration with all Sub-Contractors. Ensure that work/activities of Sub-Contractors are included in the hazard assessment and are reflected in the plan.

.4 Should health and safety requirements change throughout the project and require information not included in the Project Specific Health and Safety Plan, revise and update Project Specific Health and Safety Plan as required and re-submit to the Departmental Representative.

.5 Departmental Representative's review: the review of the Project Specific Health and Safety Plan by Public Services and Procurement Canada (PSPC) shall not relieve the Contractor of responsibility for errors or omissions in final Project Specific Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract Documents.

.6 Contractor's COVID-19 Safe Work plan, describing the protocols and procedures the Contractor shall implement throughout the duration of the work to mitigate the spread and risk of exposure to COVID-19, in accordance with Federal and Provincial COVID-19 guidelines, WorkSafeBC and Canadian Construction Association.

.7 Should Federal and/or Provincial guidelines change during the project, the Contractor shall update the Project Specific Health and Safety Plan and the Contractor's COVID-19 Safe Work Plan accordingly and submit to the Departmental Representative for review and acceptance.

1.6 Contractor's Responsibility

.1 Assume responsibility as the Prime Contractor for work under this Contract.

.2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of work.

.3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial, and local statutes, regulations, and ordinances, and with Project Specific Health and Safety Plan.

.4 The protection of persons off-site and the environment such that they may be affected by the conduct of the work.

1.7 Health and Safety Coordinator

.1 Employ and assign to work, a competent and authorized representative as Health and Safety Coordinator. The Health and Safety Coordinator shall:

.1 Be responsible for completing all health and safety training, site orientations, and ensuring personnel who do not successfully complete the required training are not permitted to enter the site to perform work.

.2 Be responsible for implementing, enforcing, and monitoring the Project Specific Health and Safety Plan.

.3 Be on site during execution of critical elements of the work or as required by the Contractor.

.4 Have a minimum of two (2) years site-related working experience specific to activities associated with Construction.

.5 Have working knowledge of occupational safety and health regulations.

.6 Attend pre-construction and construction progress meetings as required or as requested by the Departmental Representative.

1.8 General

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

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

.1 Provide appropriate means by use of barricades, fences, warning signs, traffic control persons, and temporary lighting as required.

.2 Secure site during non-work hours at nighttime or provide security guard as deemed necessary to protect site against entry.

.3 Conduct daily safety meetings and task specific meetings (toolbox) as required by special work. At minimum meetings shall include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Keep records of meetings and post to PSPC's cloud-based document filing system "CentralCollab" on a weekly or more frequent basis.

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

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

.6 Carry out work in confined spaces in accordance with current Provincial regulations.

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

1.9 Project / Site Conditions

.1 Work at the site will, at a minimum, involve contact with:

.1 Utilities / energized electrical services.

.2 General public (including large transport trucks) and PSPC maintenance personnel travelling the highway.

.3 Local wildlife.

.4 Unpredictable and adverse weather conditions.

.5 Hazards, see "Preliminary Hazard Assessment Form" in the appendices of the Project Specific Health and Safety Plan template in Appendix A.

1.10 Regulatory Requirements

.1 Comply with specified codes, acts, bylaws, standards, and regulations to ensure safe operations at site.

.2 In event of conflict between any provisions 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.

1.11 Work Permits

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

1.12 Filing of Notice

.1 The Contractor is to complete and submit an Advance Notice of Project as required by the Worker's Compensation Board and any other authority in effect at the place or work.

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

1.13 Emergency Procedures

.1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:

.1 Designated personnel from Contractor's company.

.2 Regulatory agencies applicable to work and as per legislated regulations.

.3 Local emergency resources.

.4 Departmental Representative.

.2 Include the following provisions in the emergency procedures:

.1 Notify workers and the first-aid attendant, of the nature and location of the emergency.

.2 Evacuate all workers safely.

.3 Check and confirm the safe evacuation of all workers.

.4 Notify the fire department or other emergency responders.

.5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.

.6 Notify Departmental Representative.

.3 Provide written rescue/evacuation procedures as required for, but not limited to:

.1 Work at high angles.

.2 Work in confined spaces or where there is a risk of entrapment.

.3 Work with hazardous substances.

.4 Underground work.

.5 Work on, over, under and adjacent to water.

.6 Workplaces where there are persons who require physical assistance to be moved.

.7 Work in areas where sudden movement of native or placed materials may occur.

.4 Design and mark emergency exit routes to provide quick and unimpeded exit.

.5 Emergency drills must be held at least once each year for all projects lasting longer than one year. The purpose of these drills is to ensure awareness and effectiveness of emergency exit routes and procedures. A record of the drills must be kept by the Contractor.

.6 Revise and update emergency procedures as required and re-submit to the Departmental Representative.

1.14 Hazardous Products

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS 2015) regarding use, handling, storage, and disposal of hazardous materials, and regarding labeling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canadian Labour Code.

.2 Where use of hazardous and toxic products cannot be avoided:

.1 Advise Departmental Representative beforehand of the product(s) intended for use. If requested, submit

applicable MSDS and WHMIS 2015 documents as per Section 01 33 00 – Submittal Procedures. Keep documents available for review in the project site as close as practical to where the hazardous and toxic product is being used.

.2 Provide adequate means of ventilation acceptable to the Departmental Representative and suitable for the hazard.

.3 The Contractor shall ensure that the product is applied as per manufacturers' recommendations and ensure only pre-approved products are brought onto the work site in an adequate quantity to complete the work.

.3 All asbestos-containing materials are prohibited from use and shall not be incorporated into the work by the Contractor.

1.15 Overloading

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

1.16 Fire Safety Requirements

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

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

1.17 Unforeseen Hazards

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

.2 Should contaminated site conditions be encountered when completing the work, refer to GC4.4 – Contaminated Site Conditions for procedures which the Contractor shall undertake.

1.18 Posted Documents

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

.1 Project Specific Health and Safety Plan.

.2 Sequence of work.

.3 Emergency procedures.

.4 Corporate Health and Safety Policies and Procedures manual(s).

.5 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshaling station, and the emergency transportation provisions.

.6 Notice of Project.

.7 Floor plans or site plans.

.8 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.

.9 Workplace Hazardous Materials Information System (WHMIS) documents.

.10 Material Safety Data Sheets (MSDS).

.11 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.

.2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.

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

1.19 Correction of Non-Compliance

.1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.

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

.3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

1.20 Medical

.1 Provide and maintain first aid facilities for all workers as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

.2 Provide the appropriate first aid kit, based on the number of workers, in accordance with the Workers' Compensation Act or the Occupational Health and Safety Regulations.

.3 Establish an emergency response plan acceptable to Departmental Representative, for the removal of any injured person to medical facilities or a doctor's care in accordance with applicable legislative and regulatory requirements.

.4 Provide proof of First Aid credentials to Departmental Representative prior to the start of construction. Provide the appropriate number of first aid attendants on site in accordance with Workers' Compensation Act or the Occupational Health and Safety Regulations.

.5 Emergency and First Aid Equipment:

.1 Locate and maintain emergency and first aid equipment in appropriate location on site including first aid kit to accommodate number of site personnel; portable emergency eye wash; fire protection equipment as required by legislation.

.2 Locate sufficient blankets and towels, stretcher; and one handheld emergency siren in all confined access locations.

.3 Provide a minimum of one qualified first aid attendant as per Workers' Compensation Act or the Occupational Health and Safety Regulations on site at all times when Work activities are in progress; duties of first aid attendant may be shared with other light duty Work related activities.

1.21 Accidents and Accident Reports

.1 Immediately report, verbally, followed by a written report within 24 hours, to Departmental Representative, all accidents of any sort arising out of or in connection with the performance of the Work, giving full details and statements of witnesses. If death or serious injuries or damages are caused, report the accident promptly to Departmental Representative by telephone in addition to any report required under federal and territorial laws and regulations.

.2 If a claim is made by anyone against Contractor or Sub-Contractor on account of any accident, promptly report the facts in writing to Departmental Representative, giving full details of the claim.

1.22 COVID-19

.1 The Contractor shall keep informed with the latest Federal and Provincial recommendations and protocols regarding COVID-19 at all times during construction and shall modify their construction approach accordingly to ensure adherence to these recommendations and protocols.

.2 If Federal and/or Provincial recommendations require that the project work be stopped, the Contractor shall consult with the Departmental Representative and the Departmental Representative will advise as to the course of action the Contractor shall take.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Definitions.

1.2 References.

1.3 Regulatory Overview.

1.4 Submittals.

1.5 Environmental Protection Plan (EPP).

1.6 Breeding Bird and Bird Nest Survey.

1.7 Notification.

PART 2 – PRODUCTS:

2.1 Products.

PART 3 – EXECUTION:

3.1 Environmental Monitoring.

3.2 Site Access and Parking.

3.3 Protection of Work Limits.

3.4 Erosion Control.

3.5 Pollution Control.

3.6 Equipment Maintenance, Fueling and Operation.

3.7 Operation of Equipment.

3.8 Managing of Invasive Plant Vegetation.

3.9 Fires and Fire Prevention and Control.

3.10 Wildlife.

3.11 Relics and Antiquities.

3.12 Waste Materials Storage and Removal.

3.13 Wastewater Discharge Criteria.

3.14 Camp Wastewater Discharge Criteria.

3.15 Drainage.

3.16 Site Clearing, Plant Protection and Nesting Bird Protection.

3.17 Environmental Protection Supplies.

PART 1 – GENERAL

1.1 Definitions

.1 Qualified Environmental Professional (QEP): A qualified environmental professional as defined by Section 21 of the BC Riparian Areas Protection Regulations. An individual may serve as a qualified environmental professional if

.1 The individual is one of the following professionals:

.1 An agrologist.

.2 An applied technologist or technician.

.3 A professional biologist.

.4 A professional engineer.

.5 A professional forester.

.6 A professional geoscientist.

.7 A registered forest technologist.

.2 The individual is registered and in good standing in British Columbia with the appropriate professional association constituted under an Act for the individual's profession, and:

.3 When carrying out that part of the assessment, the individual is acting

.1 Within the individual's area of expertise,

.2 Within the scope of professional practice for the individual's profession, and

.3 Under the code of ethics of the appropriate professional association and is subject to disciplinary action by that professional association.

.2 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably alter ecological

balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

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

.4 Wetted Perimeter: area of stream where water is currently running or pooled.

.5 In-stream Work: any work performed below the high-water mark, either within or above the Wetted Perimeter of any Fisheries Sensitive Zone.

.6 Fisheries Sensitive Zone: in-stream aquatic habitats and out of stream habitat features such as side channels, wetlands, and riparian areas.

.7 Invasive plants: are any alien plant species that have the potential to pose undesirable or detrimental impacts on humans, animals, or ecosystems. Invasive plants have the capacity to establish quickly and easily on both disturbed and un-disturbed sites, and can cause widespread negative economic, social, and environmental impacts.

.8 Noxious weeds: are invasive plants that have been designated under the BC Weed Control Act. This legislation imposes a duty on all land occupiers to control a set list of identified invasive plants.
https://www.for.gov.bc.ca/hra/plants/legislation.htm

1.2 References

.1 Standards and Best Practices for Instream Works, British Columbia Ministry of Land and Air Protection Ecosystem Standards and Planning Biodiversity Branch – March 2004 (See Reference Documentation – Table of Contents).

.2 Land Development Guidelines for the Protection of Aquatic Habitat, Fisheries and Oceans – September 1993 (See Reference Documentation – Table of Contents).

.3 Environmental Protection Plan (EPP) – Checklist (Appendix G).

.4 Responsibility Checklist for Authorizations / Approvals / Notifications / Permitting (Appendix H).

.5 Relevant Environmental Publications (Appendix I).

.6 Environmental Overview Assessment, Inga Lake Intersection Improvements, Alaska Highway, BC (Appendix K).

1.3 Regulatory Overview

.1 The Departmental Representative will complete the environmental Notification required under the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) regulations prior to the start of the project. Work within 30 m of any fisheries sensitive zone cannot commence until the Departmental Representative has received the Notification permit from FLNRORD. The Contractor shall be aware the submission of the Contractor's Environmental Protection Plan (EPP) to FLNRORD may be required as part of the Notification process and if submission is required, the approved EPP shall be provided to the Departmental Representative for submission a minimum of 15 days prior to the start of any construction within 30 m of any fisheries sensitive zone.

.2 Comply with all applicable environmental laws, regulations, and requirements of Federal, Provincial, and other regional authorities, and acquire and comply with such permits, approvals and authorizations as may be required.

.3 Comply with and be subject to those permits and approvals obtained from the Departmental Representative to conduct the Work.

.4 Pay specific attention to the provincial BC Land Use Permit, Water License and Quarry Permit.

.5 Pay specific attention to the Migratory Birds Convention Act, as amended in 1994.

.6 Pay specific attention to the provincial BC guidelines under Peace Region Least Risk Timing Windows: Biological Rational (2009).

.7 Pay specific attention to provincial standards for instream works, refer to British Columbia Ministry of Land and Air Protection Ecosystem Standards and Planning Diversity Branch publication, Standard and Best Practices for Instream Works – March 2004 (see Reference Documentation – Table of Contents).

1.4 Submittals

.1 The Contractor's EPP and Breeding Bird and Bird Nest Survey Memo shall be submitted to the Departmental Representative. Each plant / memo shall be submitted as a

single PDF documents (multiple files will not be accepted) for review and acceptance in accordance with the procedures outlined in Section 01 33 00 – Submittal Procedures. The Departmental Representative will review the EPP (first submission and if required all subsequent re-submissions) within 14 days of submission and the Breeding Bird and Bird Nest Survey (first submission and if required all subsequent re-submissions) within 3 weekdays of submission. Upon review of the plan / report / memo the Departmental Representative will do one of the following:

.1 Accept the plan / report / memo.

.2 Accept portions of the plan / report / memo and provide comments outlining required changes or additional information in other sections. Following completion of edits by the Contractor, the Contractor shall re-submit the complete plan / report / memo for review.

.3 Reject the plan / report / memo and provide comments outlining required changes or additional information needed before the plan / report / memo will be reviewed in detail. Following completion of edits by the Contractor, the Contractor shall re-submit the complete plan / report / memo for review.

.2 The Contractor shall allow time in the schedule for the reviews, and subsequent edits / re-submission.

.3 Work affected by the submittal (as determined by the Departmental Representative) shall not proceed until acceptance of the EPP and Breeding Bird and Bird Nest Survey by the Departmental Representative.

.4 Upon Departmental Representative acceptance of the Contractor's EPP, the Departmental Representative may submit the EPP as part of the environmental notification / permitting process to FLNRORD / MoE.

.5 The review of the EPP, Breeding Bird and Bird Nest Survey memo, Environmental Site Inspection Memos, and Environmental Monitoring Report by the Departmental Representative shall not relieve the Contractor of responsibility for errors or omissions in the accepted submittals or of responsibility for meeting all requirements of the Contract Documents.

.6 Should deficiencies in the Contractor's EPP or Breeding Bird and Bird Nest Survey be noted following acceptance of the

submittal by the Departmental Representative but during the project work, the Departmental Representative reserves the right to provide additional comments to the Contractor and require re-submission of the EPP or Breeding Bird and Bird Nest Survey to ensure the correction of any deficiencies.

1.5 Environmental Protection Plan (EPP)

.1 The Contractor is required to prepare an EPP. The EPP should include and address all relevant environmental impacts/issues at the site as indicated by the EPP Checklist (Appendix G), the Environmental Overview Assessment (Appendix K), and as identified in this Section of the specifications. The EPP will require the Contractor to carefully think through the entire project, including identifying what activities and works will be occurring, both generally and at specific sites, and by what methods. The Environmental Protection Plan shall be signed as being complete and appropriate for this project by a P.Biol or RPBio, or other qualified professional, and shall, at a minimum include the following:

.1 The process and protocol for ensuring that supervisors and individual staff employed by the Contractor are very clear on which environmental standards need to be achieved, how they will be achieved, and establishing how the Contractor will ensure that this is successfully occurring.

.2 Erosion, drainage, and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with the requirements of the applicable provincial regulatory requirements (FLNRORD / MoE) approval or notification for instream work or under FLNRORD / MoE guidelines, and all other applicable regulations including the requirements of these specifications. The Contractor may utilize marked-up contract drawings within the EPP to show the locations of the proposed activities.

.3 Typical Drawings showing the locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of any excess or spoil materials including methods to control runoff and to contain materials on site. The Contractor may utilize marked-up contract drawings within the EPP to show the locations of the proposed activities.

.4 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.

.5 Spill Control Plan: including procedures, instructions, and reports to be used in the event of unforeseen spill of regulated substance.

.6 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.7 Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.8 Outline the avoidance and mitigate measures which the Contractor will undertake and implement to ensure compliance with the environmental regulations applicable to the project (which may include requirements provided in FLNRORD Approval or Notifications for Instream Work, NWPA Approval for Instream Work, DFO Fisheries Act requirements, etc.) and these contract specifications.

.9 The procedures for stopping the work and implementing changes to the construction methods should the Contractor not be achieving the environmental requirements as outlined in these specifications.

.10 The procedures for stopping work should the Contractor encounter archaeological anomalies or human remains.

1.6 Breeding Bird and Bird Nest Survey

.1 The Contractor is required to complete a Breeding Bird and Bird Nest Survey prior to the completion of Tree Clearing operations. The results of the Breeding Bird and Bird Nest Survey shall be compiled in a memo. The Breeding Bird and Bird Nest Survey and memo shall achieve the following:

.1 Be completed by P.Biol, RPBio, or Qualified Environmental Professional (QEP). If a QEP

completes the field component of the Breeding Bird and Bird Nest Survey and or memo, the memo must be signed off by a P.Biol or RPBio.

.2 Be completed within seven (7) days of the commencement of the Tree Clearing. Should the Tree Clearing work stop for longer than 24 hours for any reason a new a Breeding Bird and Bird Nest Survey shall be completed.

.3 Be conducted in accordance with the Active Migratory Bird Nest Survey Program outlined by CWS (2008) and the Inventory Methods for Forest and Grassland Birds (RISC 1999).

.2 The Contractor shall contact the Departmental Representative for further instruction should a concern be identified during the Breeding Bird and Bird Nest Survey that would in the opinion of the QEP, P.Biol, or RPBio give cause for the delay or cancellation of the Tree Clearing. Details of the concerns shall be described and itemized in the memo by the QEP, P.Biol, or RPBio and submitted to the Departmental Representative.

1.7 Notification

.1 Departmental Representative will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, etc.

.2 Contractor: after receipt of such notice, shall inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.3 Departmental Representative will issue stop order of Work until satisfactory corrective action has been taken.

.4 No time extensions granted, or equitable adjustments allowed to Contractor for such suspensions.

PART 2 – PRODUCTS

2.1 Products

.1 Not used.

PART 3 – EXECUTION

3.1 Environmental Monitoring

.1 At a minimum the Contractor's site superintendent and or other onsite personnel shall be responsible for monitoring of environmental concerns or violations. The P.Biol or RPBio or other qualified professional who prepared the Contractor's EPP shall be available to respond to queries from the

Contractor or Departmental Representative or make revisions to the EPP throughout the project. Should the Contractor or the Departmental Representative determine that the Contractor is in violation of applicable regulatory requirements or these environmental specifications, the P.Biol or RPBio or other qualified professional whom prepared the Contractor's EPP shall visit the site when requested by the Contractor or Departmental Representative to oversee the implementation of the corrective measures to bring the work back into compliance with applicable regulatory requirements or these environmental specifications.

.2 The monitoring program must be anticipatory and responsive to construction practices or environmental changes, reflecting the site-specific conditions, level of sensitivity of the receiving environment, potential adverse effects, and level of environmental risk. Submitted documents regarding the proposed monitoring program should clearly identify how monitoring will adhere to this approach.

.3 The monitoring program shall satisfy all regulatory requirements and terms of these specifications. The onus is on the Contractor to monitor and ensure compliance, to identify arising problems, and to subsequently take responsibility and all necessary measures in response.

3.2 Site Access and Parking

.1 The Contractor shall review both short- and long-term access requirements with the Departmental Representative, both at the start-up and on an on-going basis. In consultation with the Departmental Representative, the Contractor shall formulate an agreement for worker transportation to and from the work site and where workers shall park their private vehicles. Generally, personal vehicles shall be parked at least 10 meters from any water course.

.2 The Contractor shall ensure that the environment beyond the work limits is not negatively impacted or damaged by workers' vehicles or construction machinery and shall instruct workers so that the "footprint" of the project is kept within defined boundaries.

3.3 Protection of Work Limits

.1 The Contractor shall include in the EPP details on the work limits, how these shall be marked and what procedures will be employed to ensure trespass outside these limits does not occur, to the satisfaction of the Departmental Representative.

3.4 Erosion Control

.1 Erosion control measures that prevent sediment from entering any waterway, water body or wetland in the vicinity of the construction site are a critical element of the project and shall be implemented by the Contractor as indicated in the

Environmental Overview Assessment (Appendix K).

.2 On-site sediment control measures shall be constructed and functional prior to initiating activities associated with the construction activities. The Contractor shall prepare an Erosion Control Plan, to be part of the EPP, to the satisfaction of the Departmental Representative.

.3 The regular monitoring and maintenance of all erosion control measures shall be the responsibility of the Contractor. If the design of the control measures is not functioning effectively, they are to be repaired. The Departmental Representative will monitor the Contractor's erosion control performance.

.4 Erosion control measures must follow both Federal and Provincial legislation where required. Contractors should be referencing the provincial MoE Standards and Best Practices for Instream Works (2004).

3.5 Pollution Control

.1 The Contractor shall prevent any deleterious and objectionable materials from entering streams, rivers, wetlands, water bodies or watercourses that would result in damage to aquatic and riparian habitat. Hazardous or toxic products shall be stored no closer than 100 metres to any surface water.

.2 A Spill Response Plan will be prepared as part of the EPP and shall detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative, and in accordance with all applicable federal and provincial legislation. The EPP shall include a list of products and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement and sand blasting agents.

.3 The containment, storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation. Hazardous products shall be stored no closer than 100 metres from any surface water.

.4 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berms shall be capable of holding 110% of tank storage volumes and shall be to the

satisfaction of the Departmental Representative. Measures such as collection/drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double lined fuel tanks can prevent spills into the environment.

.5 The Contractor shall prevent blowing dust and debris by covering and/or providing dust control for temporary roads and on-site work such as rock drilling and blasting by methods that are approved by the Departmental Representative.

.6 The Contractor shall provide spill kits, to the satisfaction of the Departmental Representative, at refueling, lubrication and repair locations that will be capable of dealing with 110% of the largest potential spill and shall be maintained in good working order on the construction site. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.

.7 Timely and effective actions shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. The Departmental Representative shall be notified immediately of any spill as well as the provincial authorities. Basic instructions and phone numbers shall be part of the Contractor's EPP.

.8 In the event of a major spill, the Contractor shall prioritize the cleanup and all other work shall be stopped, where appropriate, and personnel devoted to spill containment and cleanup.

.9 The costs involved in a major spill incident (control, clean up, disposal of contaminants, and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the pre-spill condition to the satisfaction of the Departmental Representative.

3.6 Equipment Maintenance, Fueling and Operation

.1 The Contractor shall ensure that all soil, seeds, and any debris attached to construction equipment to be used on the project site shall be removed (e.g. power washing) outside before delivery to the work site as indicated in the Environmental Overview Assessment (Appendix K).

.2 Equipment fueling sites will be identified by the Contractor to the satisfaction of the Departmental Representative. Except for chain saws, any fueling closer than 100 metres to any surface water (streams, wetlands, water bodies or watercourses) shall require discussion with the Departmental Representative. Regardless of fueling location, personnel

shall maintain a presence during refueling with immediate attention to the fueling operations.

.3 Diesel and gasoline delivery vehicles, including bulk tankers shall be not be parked within 100 metres from any surface water unless actively being used for refueling. Immediately following refueling bulk tankers shall be moved to a location 100 m or greater from any surface water. Gravity fed fuel systems are not allowed. Manual or electric pump delivery systems shall be used.

.4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage sites is addressed in Item 3.5 - Pollution Control, subsection .4 of this specification.

.5 Equipment used on the project shall be fueled with E10, and low Sulphur diesel fuels where available, and shall conform to local emission requirements. The Contractor is to ensure that unnecessary idling of the vehicles is avoided.

.6 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations satisfactory to the Departmental Representative. Waste lubrication product (e.g. oil filters, used containers, used oil, etc.) shall be secured in spill-proof containers and properly recycled or disposed of at an approved facility. No waste petroleum, lubricant products or related materials are to be discarded, buried, or disposed of in borrow pits, turnouts, picnic areas, viewpoints, etc. or anywhere within the work area.

.7 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working condition. Maintenance certificates or maintenance logs for all equipment shall be available onsite during work.

.8 Fuel containers and lubricant products shall be stored only in secure locations to the satisfaction of the Departmental Representative. Fuel tanks or other potential deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight. Alternatively, the Contractor may employ a security person to prevent vandalism.

.9 Equipment shall use environmentally sensitive / biodegradable hydraulic fluid in case of accidental loss.

3.7 Operation of Equipment

.1 Equipment movements shall be restricted to the “footprint” of the construction area. The work limits shall be identified by

stake and ribbon or other methods to the satisfaction of the Departmental Representative. No machinery will enter, work in or cross over streams, rivers, wetlands, waterbodies, or watercourse, nor damage aquatic and riparian habitat or trees and plant communities if working in the water. Where construction activities require working close to surface water, the Contractor is required to describe measures to be employed to ensure fugitive materials (e.g. rocks, soil, branches) and especially deleterious substances (e.g. chemicals) does not enter any surface water areas.

.2 The Contractor shall instruct workers to prevent pushing, placement, raveling, storage or stockpiling of any materials (e.g. slash, rock, fill or topsoil) in the trees bordering the right-of-way or into surface water.

.3 When, in the opinion of PSPC, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic features beyond the designated work area, the Contractor shall be responsible, at his or her expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of the Departmental Representative.

.4 Restrict vehicle movements to the work limits.

.5 Workers vehicles are to remain within the construction footprint.

3.8 Managing Invasive Plant Vegetation

.1 Keep equipment clean and avoid parking, turning around or staging equipment in known invasive species infested areas, or mow prior to use.

.2 Wash equipment prior to mobilization to site.

.3 Minimize unnecessary disturbance of roadside aggregates or soil and retain desirable roadside vegetation whenever possible.

.4 Where possible, begin mowing or brushing in “invasive plant free” areas and end in infested areas.

.5 Where possible, use only clean fill material from an “invasive plant free” source.

.6 Whenever possible, re-seed with grass mixtures that are free of weeds, locally adapted, non-invasive, and quick to establish. Spread seed in the early spring or late fall to ensure successful establishment. Refer to Section 32 93 21 – Hydraulic Seeding for additional requirements.

3.9 Fires and Fire Prevention and Control	.1	Fires or burning of waste materials is not permitting.
	.2	A fire extinguisher shall be carried and available for use on each of the Contractor's construction equipment in the event of fire.
	.3	Construction equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.
	.4	Care shall be taken while smoking on the construction site to ensure that the accidental ignition of any flammable material is prevented.
	.5	In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The Departmental Representative shall be notified of any fire immediately as well as the applicable Provincial Authorities. Basic instruction and phone numbers will be provided on site by the Contractor and will be discussed in the project pre-construction meeting.
	.6	Provide supervision, attendance and fire protection measures as directed by the Departmental Representative or other authorities.
3.10 Wildlife	.1	Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from bears, cougars, wolves, elk, moose, or bison, or other animals that display aggressive behavior or persistent intrusion. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) must be exercised at all times.
	.2	Notify the Departmental Representative immediately about dens, litters, nests, carcasses (road kills), bear activity or encounters on or around the site or crew accommodations. Other wildlife related encounters are to be reported within 24 hours.
3.11 Relics and Antiquities	.1	Artifacts, relics, antiquities, and items of historical interest such as cornerstones, commemorative plaques, inscribed tablets and any objects found on the work site that may be considered artifacts as defined by GC6.3 shall be reported to the Departmental Representative immediately. The Contractor and workers shall wait for instruction before proceeding with their work as per GC 6.3.
	.2	All historical or archaeological objects found in the project site are protected under federal and provincial Acts and

regulations. The Contractor and workers shall protect any articles found and request direction from the Departmental Representative as per GC 6.3.

.3 Human remains must be reported immediately to the local RCMP and Departmental Representative per GC 6.3.

3.12 Waste Materials Storage and Removal

.1 The Contractor and workers shall dispose of hazardous wastes in conformance with the applicable federal and provincial regulations and should be part of the EPP. All waste materials shall be disposed of at a disposal facility acceptable to the Departmental Representative. No waste materials shall be buried onsite.

.2 All wastes originating from construction, trade, hazardous and domestic sources, shall not be mixed, but will be kept separate.

.3 Construction, trade, hazardous waste, and domestic waste materials shall not be burned, buried, or discarded at the construction site. These wastes shall be contained and removed in a timely and approved manner by the Contractor and workers and disposed of at an appropriate waste landfill site located outside the work area.

.4 A concerted effort shall be made by the Contractor and workers to reduce, reuse, and recycle materials where possible.

.5 Sanitary facilities, such as portable container toilets, shall be provided by the Contractor and maintained in a clean condition.

3.13 Wastewater Discharge Criteria

.1 Wash water, meltwater collection, rinse water resulting from the cleaning of fuel tanks and pipelines, contaminated groundwater, and/or any other liquid effluent stream will be released onto the ground at a location that is a minimum of 30 metres from natural drainage courses and 100 metres from fish bearing waters, and will conform to the discharge requirements set out in provincial regulations.

.2 Contractor must obtain approval from the provincial Water Act Officer prior to discharging any treated wastewater.

3.14 Camp Wastewater Discharge Criteria

.1 Camp wastewater will be released onto the ground at a location that is a minimum of 30 metres from natural drainage courses and 100 metres from fish bearing waters and conform to the discharge requirements set out in the provincial Water Act Permit.

.2 If unable to meet the discharge criteria, provide additional storage and/or treatment necessary to meet criteria prior to discharge.

.3 Treat all camp wastewater to conform to the discharge requirements set out in the Water Act Permit.

.4 No direct discharge is allowed to wetland or surface waters.

.5 Contractor must obtain approval from the Water Act Officer prior to discharging treated wastewater.

3.15 Drainage

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water. Drainage plans shall be part of the EPP.

.2 Do not pump water containing suspended materials into waterways, sewer, or drainage systems.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements such as the provincial Water Act.

.4 Provide an erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan to include monitoring and reporting requirements to assure that control measures follow erosion and sediment control plan, Federal, Provincial, and Municipal laws, and regulations.

.5 As part of the EPP, submit details of proposed erosion, sediment and drainage control to Departmental Representative for review and approval prior to commencing work in fisheries sensitive areas or in areas that may affect fisheries sensitive areas and specifically address the protection of water bodies, water courses, and the following:

.1 Details of grading Work to prevent surface drainage into or out of Work areas.

.2 Details of erosion control works and materials to be used, including the deployment of coir logs, floating silt curtains and containment booms during construction and excavation activities.

.3 Work schedule including the sequence and duration of all related Work activities.

.4 The treatment of site runoff to prevent siltation of watercourses.

.5 Dewatering procedures for excavated materials including silt removal procedures prior to discharge.

.6 Stabilizing procedures during excavation.

.7 Maintenance of filters and sedimentation traps.

.6 Any dewatering activities will be released onto the ground at a location that is a minimum of 30 metres from natural drainage courses and 100 metres from fish bearing waters.

.7 Have on hand sufficient pumping equipment, machinery, and tankage in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment.

3.16 Site Clearing, Plant Protection and Nesting Bird Protection

.1 Prior to any clearing performed during the breeding bird nesting period (April 24 – August 29), the Contractor shall have a Breeding Bird and Bird Nest survey completed first per the requirements of Subsection 1.6 - Breeding Bird and Bird Nest Survey. No surveys are required if clearing is performed outside of the nesting period.

.2 Protect trees and plants on site and adjacent properties where indicated.

.3 Wrap 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.

.4 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.

.5 Minimize stripping of topsoil.

.6 Restrict tree removal to areas indicated or designated by Departmental Representative and shown on Contract Drawings.

3.17 Environment Protection Supplies

.1 Comply with federal and provincial fisheries and environmental protection legislation, including preventing the loss or destruction of fish habitat, and minimizing the impact of sedimentation, siltation or otherwise causing a degradation in water quality.

.2 Provide a minimum of 30 m, and as required, of biodegradable coir logs, sized accordingly for use (minimum

diameter of 0.3 m), and the necessary stakes (minimum 1 stake per 1 m of coir log) and materials required by the manufacture's installation specification. Prior to purchase of coir logs, submit manufacturer's product data and installation instructions to the Departmental Representative for review and acceptance. Store and handle in strict compliance with the manufacturer's instructions and recommendations. This will be used as necessary to prevent sediment transport into water bodies.

.3 Provide a minimum of 50 lineal metres or more and as required of 200 mm diameter hydrophobic, sorbent booms. This will be used as necessary to prevent the migration of hydrocarbons.

.4 Supply, transport, install and maintain erosion, sediment, and drainage controls necessary to complete the Work in accordance with the requirements of Departmental Representative.

.5 At the completion of construction, leave coir logs in place if requested by the Departmental Representative.

.6 Unused Erosion, Sediment and Drainage Control supplies will remain the property of Departmental Representative until the completion of the Contract.

.7 Provide inventory of environmental protection supplies prior to mobilization.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

1.3 Definitions.

1.4 Responsibilities.

1.5 General.

1.6 Submittals.

1.7 Quality Management Plan.

1.8 Quality Control Personnel.

1.9 QC Documentation and Submittal to Departmental Representative.

1.10 QC Testing / Survey Inspection.

1.11 Non-Conformance Reports.

1.12 Departmental Representative Inspection and Audits.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Quality Management will be made on the basis of the Price per Unit Bid for Quality Management in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for the completion and adherence to the Quality Management Plan including Quality Control and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of the Quality Management will be made by Lump Sum based on the percentage of the work completed and accepted by the Departmental Representative provided all of the associated Quality Management requirements have been achieved with respect to check sheets, testing frequency, documentation and reporting, staffing, etc.

1.2 References

.1 British Columbia MoTI – 2020 Standard Specifications for Highway Construction.

.2 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.2 ASTM D5519, Standard Test Methods for Particle Size Analysis of Natural and Man-Made Riprap Materials.

.3 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.4 ASTM C143, Standard Test Method for Slump of Hydraulic-Cement Concrete.

.5 ASTM C173, Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

.6 ASTM C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

.7 ASTM C117, Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.

.8 ASTM D5821, Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.

.9 ASTM C127, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.

.10 ASTM C142, Standard Test Method Clay Lumps and Friable Particles in Aggregates.

.11 ASTM D6928, Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.

.12 ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.13 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.14 ASTM D2419, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

.15 ASTM C566, Standard Test Methods for Total Evaporable Moisture Content of Aggregate by Drying.

.16 ASTM D2216, Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

.17 ASTM D5581 - Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus (6 inch-Diameter Specimen).

.18 ASTM D6307, Standard Test Method for Asphalt Content of Asphalt Mixture by Ignition Method.

.19 ASTM D5 / D5M, Standard Test Method for Penetration of Bituminous Materials.

.20 ASTM D2171, Standard Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer.

.21 ASTM D2726, Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.

.22 ASTM D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

.3 American Association of State Highway and Transportation Officials (AASHTO), latest edition.

.1 AASHTO T 245, Standard Method of Test for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.

.2 AASHTO T 304, Standard Method of Test for Uncompacted Void Content of Fine Aggregate.

1.3 Definitions

.1 Quality Control (QC): The process of independently checking specific product or services to determine if they comply with the contract documents and relevant quality standards and identifying ways to eliminate causes of unsatisfactory product or service performance.

.2 Quality Assurance (QA): The process of ensuring that the Contractor's Quality Management Plan (QMP) (QC, non-conformances, etc.) are being followed. The results of the

QA are provided as feedback to the QC team. Where required the Contractor shall implement changes to the project based on the feedback received from the QA process.

.3 Quality Management Plan (QMP): The complete details of the contractors plan and processes to ensure quality on the project.

.4 Deficiency / Non-conformance: Work or product failing to meet the conditions or requirements of the contract (general conditions, specifications, drawings, or other section(s) forming the project contract).

1.4 Responsibilities

.1 The quality management responsibilities for this project are as follows:

.1 Quality Control: The Contractor's responsibility.

.2 Quality Assurance: The Departmental Representative's responsibility.

.3 Quality Management Plan: Prepared by the Contractor.

.4 Non-conformance Report: Prepared by the Contractor's QC in conjunction with the Contractor and if necessary prepared by the Departmental Representative.

1.5 General

.1 The Contractor shall be responsible for ensuring the product meets the contractual quality requirements and that Quality Control measuring and documenting the quality of the work is completed by qualified personnel independent from the Contractor's organization. Quality Control work includes monitoring, inspecting, testing, and documenting the means, methods, materials, workmanship, processes, and products of all aspects of the work as necessary to ensure conformance with the Contract.

.2 The Contractor shall provide unrestricted access to all Quality Control operations and documentation produced by or on behalf of the Contractor and shall allow the Departmental Representative full access at any time during working hours.

.3 The Departmental Representative will review the Contractor's performance of the work and determine the acceptability of the work based on the Departmental Representative's Quality Assurance results and, where deemed appropriate by the Departmental Representative,

supplemented by the Contractor's Quality Control results. If needed, the Departmental Representative may request further testing.

.4 Work failing to meet the conditions of the Contract shall be considered a non-conformance. A non-conformance report will then be issued by the Contractor's Quality Manager. Non-conforming work shall be removed / replaced from the work unless an exception to the contract documents is accepted by the Owner.

.5 The Contractor shall not be entitled to payment for work that lacks the appropriate Quality Control documentation, verified by the Quality Control Manager, as required by the Contract or is subject to an unresolved NCR.

.6 The Contractor shall implement a well-coordinated approach to all operations related to the work and will organize its team and operations in keeping with the goal of doing things right the first time.

1.6 Submittals

.1 The Contractor's Quality Management Plan shall be submitted to the Departmental Representative as a single PDF document (multiple files will not be accepted) for review and acceptance in accordance with the procedures outlined in Section 01 33 00 – Submittal Procedures. The Departmental Representative will review the plan (first submission and if required all subsequent re-submissions) within 14 days of submission. Upon review of the plan the Departmental Representative will do one of the following:

.1 Accept the plan.

.2 Accept portions of the plan and provide comments outlining required changes or additional information in other sections. Following completion of edits by the Contractor, re-submit the complete plan for review.

.3 Reject the plan and provide comments outlining required changes or additional information needed before the plan will be reviewed in detail. Following completion of edits by the Contractor, re-submit the complete plan for review.

.2 The Contractor shall allow time in the schedule for the reviews, and subsequent edits / re-submission.

.3 No work shall be undertaken on any element of Project Work (including payments, incidental work, or submittals for

review) for which the applicable portions of the Quality Management Plan have not been accepted by the Departmental Representative.

.4 The review of the Quality Management Plan by the Departmental Representative shall not relieve the Contractor of responsibility for errors or omissions in the accepted Quality Management Plan or of responsibility for meeting all requirements of the Contract Documents.

.5 Should deficiencies in the Contractor's Quality Management Plan be noted following acceptance of the submittal by the Departmental Representative but during the project work, the Departmental Representative reserves the right to provide additional comments to the Contractor and require re-submission of the Quality Management Plan to ensure the correction of any deficiencies.

1.7 Quality Management Plan

.1 The Contractor shall prepare a Quality Management Plan. The purpose of the plan is to ensure the performance of the work in accordance with Contract requirements.

.2 The Quality Management Plan is required to cover the work in its entirety, including without limitation all materials the Contractor and Subcontractors are supplying, monitoring, and testing of the construction, documentation, and all items and phases of construction on the Project. At a minimum this shall include:

.1 Procedures for verifying and documenting conformance of the work to the contract requirements including but not limited to review of the work and completion of check sheets and daily reports.

.2 Procedure for immediately notifying the Contactor's management so work can be stopped, and corrective action taken when material, product, processes, or submittals are deficient or non-compliant with the contract requirements.

.3 List of the testing and survey checks, including minimum frequencies, to be completed by the Contractor (e.g. compaction, concrete, aggregate gradation, and tolerances of the work completed).

.4 The environmental monitoring and reporting procedures to assure that the Environmental Monitoring and all work is being completed in compliance with the requirements of the EPP and all

other applicable regulations including the requirements of these specifications.

.5 All forms to be filled in by the Quality Control Personnel (ex. check sheets, test forms, daily reports, NCR's, etc.).

.6 Procedures for the review of the project submissions by the QC Manager and Contractor to ensure accuracy and completeness of each submission against the project / specification requirements by the Contractor prior to submission to the Departmental Representative for review approval.

.7 Resumes of Quality Control Manager and designated replacement (if applicable) detailing the Quality Control Manager(s) past experience performing similar roles on similar projects.

.8 Details of the anticipated work schedule (onsite and breaks) for the Quality Control Manager and designate replacement Quality Control Manager.

.9 Details (including frequencies) and records of the calibration and correlation of testing equipment (plant sensors, lab equipment, nuclear/density gauges, etc.) which have been undertaken or will be undertaken during the work.

.10 Details of the QC procedures and processes which will be undertaken during the preparation of the Mix design(s).

.11 Details of the asphalt plant mixing procedures (cold feed, sampling, AC flow rate, temperature control, records, weigh scale, etc.).

.12 Details of the professional standards for asphalt placement including joints, placing temperature, rolling procedures, etc., which will be undertaken to help ensure the quality standards on the project will be achieved.

.13 Details of the procedure which will be undertaken by the Contractor to ensure that all workers are familiar with the Quality Management Plan, its goals, and their role under it, as well as the Contract Specifications associated with the work they are to undertake.

.14 The Quality Management Plan should describe how the Quality Control Personnel are allocated to Project requirements, the tasks assigned to each, and how their work will be coordinated.

.3 The Quality Management Plan shall include the following information:

.1 The name and qualifications of the Quality Control Manager, including designated replacement (if applicable), and details of their qualifications establishing a proven capability to provide the specific services required for the Project.

.2 The name of Quality Control testing agencies and details of their qualifications and relevant experience to provide the specific services required for the Project.

.3 A listing of Quality Control Staff (including names, qualifications, and relevant experience) and their assigned roles and work scheduling in performing Quality Control duties.

.4 A list of testing equipment to be used for the work.

.4 The Contractor shall ensure that all workers are familiar with the Quality Management Plan, its goals, and their role under it, as well as the Contract Specifications associated with the work they are to undertake.

.5 The Quality Management Plan shall be reviewed and signed by QC Manager prior to submission to the Departmental Representative for review. The QC Manager's signature shall also include a note indicating the that the Quality Management Plan is complete and conforms with the project requirements for QC as noted in the Contract Specifications and any additional QC requirements that the Contractor may have for the project prior to submission to the Departmental Representative for review.

1.8 Quality Control Personnel

.1 The Contractor shall appoint qualified, and experienced Quality Control Personnel (Quality Control Manager and Quality Control Staff as necessary to complete required QC workload), who are dedicated to quality matters, and work for an engineering consulting company which is owned and operates independently from the Contractor's organization. The Quality Control Manager and Quality Control Staff will report regularly to the Contractor's management and report

on the Contractor's conformance with the quality requirements on the project.

.2 The Contractor shall designate one person as the Quality Control Manager and if needed one person as the designate replacement Quality Control Manager (when the Quality Control Manager is offsite on a break) who shall be responsible for the implementation of the QC Plan. The Quality Control Manager and designate replacement Quality Control Manager shall be a qualified Professional Engineer, Certified Engineering Technician, or Applied Science Technologist, or other person with knowledge, skills, and abilities acceptable to the Departmental Representative.

.3 The Quality Control Manager, or a designated replacement Quality Control Manager, shall remain on site at all times the Contractor is performing work which must be tested or inspected in-process, and must be readily accessible and able to return when off-site. Unless preapproved by the Departmental Representative, the Quality Control Manager shall only be replaced by the designate replacement Quality Control Manager during scheduled breaks as outlined in the Quality Control Plan.

.4 At a minimum the Quality Control Manager shall:

.1 Be responsible to measure conformance of the work with the contract requirements and ensure that quality is not being compromised by production measures.

.2 Be empowered by the Contractor to resolve Quality Control matters.

.3 Direct and monitor Quality Control work completed by Quality Control testing agencies and Quality Control Staff.

.4 Review, sign, and be responsible for all reports (material and testing results).

.5 Immediately notify the Contactor's management so work can be stopped, and corrective action taken when material, product, processes, or submittals are deficient or non-compliant with the contract requirements.

.6 Complete internal Non-conformance Reports (NCR's).

.7 Respond to NCR's issued by the Departmental Representative.

.8 Attend pre-construction and construction progress meetings.

.5 PSPC reserves the right to reject one or more of the Contractor's Quality Control Personnel and require the Contractor to find alternative Quality Control Personnel prior to or during the work should the Quality Control Personnel not have the necessary qualifications as listed in this specification or not provide quality control services as required by this specification during the work. Should Quality Control Personnel be rejected, any work which cannot undergo complete quality control as outlined in these specifications shall stop while the Contractor finds replacement Quality Control Personnel.

1.9 QC Documentation and Submittal to Departmental Representative

.1 Check sheets:

.1 Check sheets to verify and document conformance of the work to the quality requirements of the contract are fundamental to the QC process. The check sheets prepared as part of the Quality Management Plan shall include all components of the project work and all checks required to ensure the components of the work are completed in conformance with the requirements of the Contract Documents.

.2 The frequency of check sheets completed by the Quality Control Staff to verify and document conformance of the work to the quality requirements of the contract shall be established by the Quality Control Manager to ensure the quality of the work is thoroughly documented. At a minimum, the frequency of check sheets shall achieve the following:

.1 Daily (relative to the work being performed).

.2 Daily QC reports:

.1 Daily Reports shall be completed by the Quality Control Manager each day work in being completed requiring QC.

.2 The Daily Report shall include a list of the QC activities completed that day (checks sheets and

tests) and note any concerns with respect to quality, all non-conformances identified by the Quality Control Personnel (even when immediately corrected by the Contractor), and all Non-conformance Reports issued by the Quality Control Manager.

.3 The Daily Report shall include photos of any QC concerns or non-conformances identified by the Quality Control Personnel.

.3 All check sheets and daily reports shall be reviewed and signed by the Quality Control Manager prior to submission to the Departmental Representative.

.4 Check sheets, daily reports, NCR's, test results, and other documents and forms prepared as part of the Quality Management Plan and completed throughout the project to verify conformance with the contract requirements shall be distributed to the Departmental Representative in electronic format via PSPC's cloud-based document filing system "CentralCollab" within 24 hrs. of the completion. Submit to the Departmental Representative hardcopies of the same documents, forms, and test results if requested.

1.10 QC Testing / Survey Inspection

.1 QC Testing and survey inspection required to provide Quality Control to assure that the work strictly complies with the Contract requirements shall be completed as follows:

.1 Be completed using a fully equipped, operational, and staffed laboratory (on site field laboratory if necessary) during times of construction activity and gravel manufacturing and at a minimum include:

.1 All testing and survey inspection specified in the Contract Documents.

.2 Any other testing or survey inspection required as a condition for deviation from the specified Contract procedures.

.2 The frequency of testing / survey inspections shall be outlined in the Quality Management Plan. At a minimum the Contractor shall achieve the most stringent Quality Control testing / survey inspection frequencies as follows:

.1 The specific frequencies defined elsewhere in these specifications.

.2 The minimum QC testing / survey inspection frequencies as defined in Table 01 45 00 – 01.

Table 01 45 00 - 01: Minimum QC Testing and Inspection Frequencies

Activity	Test / Inspection	Frequency
Manufacture – Crushed Base Gravel, Crushed Surfacing Gravel, Gravel Shouldering, Culvert Bedding	ASTM C136, Sieve Analysis of Fine and Coarse Aggregates	The more stringent of 1 test per 3000 m^3 or 1 test for every two (2) hours of manufacturing.
Gradation – Sub-base Course Gravel	ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates	Three per source at the discretion of the Departmental Representative
Gradation – Highway Embankment Fill, Culvert Native Backfill	ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates	Once per source at the discretion of the Departmental Representative
Screening / sorting riprap	ASTM D5519, Particle Size Analysis of Natural and Man-Made Riprap Materials	1 Test per every 1 day of production
Placement / Site Tolerance – Gravel Shouldering	Survey	2 points every 20 Stations on each side of road
Placement / Site Tolerance – Culvert Bedding	Survey	1 point every 2 m^2 of placed material.
Placement / Site Tolerance – Crushed Base Gravel	Survey	Final lift, 5 points Along Each Cross Section at 20 m Stations
Manufacture – Asphalt Aggregate	ASTM C-136, Dry Sieve Analysis of Aggregate or C117 Sieve Analysis by Washing	- Split Stockpile: 1 for each stockpile for every 2 hours of production. - One main stockpile: for every 300t - Blend Sand: 1 for every 100t during stockpiling. - Natural filler: 1 for every 50t during stockpiling
Manufacture – Asphalt Aggregate	ASTM D-5821 Determining the Percentage of Fracture Particles in Coarse Aggregate	Every second coarse aggregate sieve test
Manufacture – Asphalt Aggregate	ASTM C-117 Sieve Analysis of Aggregates by Washing (Field Lab)	1 per shift on reduced sample obtained from combined samples from the crusher
Manufacture – Asphalt Aggregate	ASTM C-136, Dry Sieve Analysis of Aggregate	1 of combined aggregate (off the belt) every 300t
Manufacture – Asphalt Aggregate (Coarse Aggregates)	ASTM C127, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate (1)	The more stringent of: - 1 for each coarse aggregate gravel pit source - 1 for any change in nature or source of aggregates within a gravel pit
Manufacture – Asphalt Aggregate (Coarse Aggregates)	ASTM C142, Clay Lumps and Friable Particles in Aggregates (1)	1 per every 3,000t of coarse aggregate manufactured

Manufacture – Asphalt Aggregate (Coarse Aggregates)	ASTM D6928, Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus (1)	The more stringent of: - 1 for each coarse aggregate gravel pit source - 1 for any change in nature or source of aggregates within a gravel pit
Manufacture – Asphalt Aggregate (Coarse Aggregates)	ASTM D4791, Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate (1)	The more stringent of: - 1 for each coarse aggregate gravel pit source - 1 for any change in nature or source of aggregates within a gravel pit
Asphalt Products Test	Asphalt Tack Coat and Asphalt Prime	Contractor's option
Tests During Asphalt Plant Mixing	ASTM C-566 & D2216, Moisture Content	Aggregate: 2 tests/Lot Asphalt Mix: 1 on first Sub-lot and every second day.
Tests During Asphalt Plant Mixing	ASTM C-117 Sieve Analysis of Aggregates by Washing (Field Lab)	1 per shift on reduced sample obtained from combined samples from the plant cold feed.
Tests During Asphalt Plant Mixing	ASTM D-5581, Resistance to Plastic Flow Using Marshall Apparatus	One set of three briquettes for 1,200t or Lot, whichever is less
Tests During Asphalt Plant Mixing	Asphalt Extraction Test ASTM D-6307 Ignition Method	One per Lot
Tests During Asphalt Plant Mixing	Penetration of Bituminous Materials ASTM D -5	One per Manufacturer's Batch. Samples should be taken every 3000t of mix production
Tests During Asphalt Plant Mixing	Viscosity ASTM D-2171	Contractor's Option
Test Following Asphalt Paving for Density Testing	ASTM D2726, Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures (Core Samples)	At start, two (2) cores for each Sub-Lot. After rolling pattern established, only one core for each Sub-Lot. All cores to be a minimum of 100 mm diameter.
Test During Asphalt Paving for Density Testing	AASHTO T 245-97 Resistance to Plastic Flow Using Marshall Apparatus	One 15 kg sample for every sub-lot or minimum 1/day for field testing.
Compaction of Embankment Fill, Culvert Native Backfill	In-Place Density, Proof Roll	Proof roll over full width and length of each lift of materials placed.
Compaction of Granular Base, Sub-base, Crushed Surfacing Gravel, and Gravel shouldering	In-Place Density (ASTM D6938)	3 randomly located tests over the full width of material placed every 20 m station, per each lift of material placed.
Compaction – Culvert Bedding Material	In-Place Density (ASTM D6938)	4 randomly located tests over the full length of the culvert per each lift of material placed if using open cut method

.3 As defined in the BC MoTI 2020 Standard Specifications for Highway Construction (Volumes 1 and 2, and applicable Amendments available at time of tender closing). Should one of these specifications be silent on a particular testing frequency the testing frequencies shall be as defined in the Alberta Transportation Standard Specification for Highway Construction (latest edition and applicable Amendments available at time of tender closing). Wherever these standard specifications refer to standards (e.g. CSA, ASTM, and others) the minimum testing frequencies in these standards shall be utilized.

.4 If not specified elsewhere one test per each individual area / location the material is utilized.

.3 Quality Control Testing agencies, their inspectors, and their representatives are not authorized to revoke, alter, relax, or release any requirement of the Contract Documents, nor to approve or accept any part of the work.

.4 The Contractor shall complete testing in the following manner:

.1 Provide testing facilities and personnel for the tests and inform the Departmental Representative in advance to enable the Departmental Representative to witness the tests if so desired. Onsite testing laboratories to conform to 1.10.1 – QC Testing / Survey Inspection of this specification.

.2 Notify the Departmental Representative when sampling will be conducted.

.3 Within 24 hrs. of the completion of a test and prior to transport or placement of material, submit the test result to the Departmental Representative (hardcopy if requested) and in electronic format via PSPC's cloud-based document system "CentralCollab".

.4 Identify test reports with the name and address of the organization performing all tests, and the date of the tests.

.5 Immediately after completion of tests, provide all test results on Contractor-supplied forms acceptable to the Departmental Representative or on forms used by the BC Ministry of Transportation and Infrastructure.

.6 Initiate other Quality Control tests or procedures as necessary for ensuring production of a quality product and include them in the Quality Control Plan. Tests or procedures may also be introduced after the start of work as necessary as amendments to the Quality Control Plan.

.7 Repair and fill all core holes created to collected quality control core samples as per the requirements of 1.4.8 of Section 32 12 16 – Hot Mix Asphalt Concrete Pavement.

1.11 Non-Conformance Reports

.1 The Contractor shall, and the Departmental Representative may review, the work to determine conformance with the contract requirements.

.2 Should the Contractor's Quality Control reporting indicate that the work, product, or methodology is not in conformance, the Quality Control Manager shall:

.1 Inform the Contractor of the deficiency. The Contractor shall then take appropriate action to correct the deficiency.

.2 Ensure that the action taken by the Contractor corrected the deficiency and any substandard product was eliminated from the work. If the deficiency was not corrected and substandard product remains or becomes part of the work, an internal Non-Conformance Report (NCR) shall be issued to the Contractor, with a copy to the Departmental Representative. Included as part of the NCR will be a required response time.

The Contractor shall then respond to the NCR (within the specified response time) by notifying the Quality Control Manager and the Departmental Representative of the proposed resolutions and corrective actions. The Contractor and/or the Quality Control Manager may consult with the Departmental Representative on the resolutions but is not required to do so.

Payment for the work for which the NCR has been issued may be withheld until the NCR issue is resolved.

.3 Should the Contractor's Quality Control reporting indicate that an aspect of the Contractor's work is continually deficient, the Quality Control Manager shall issue an internal procedural Non-Conformance Report (NCR) to the

Contractor, with a copy to the Departmental Representative. Included as part of the NCR will be a required response time.

The Contractor shall then respond to the NCR (within the specified response time) by notifying the Quality Control Manager and the Departmental Representative of the proposed resolutions and corrective actions. The Contractor and/or the Quality Control Manager may consult with the Departmental Representative on the resolutions but is not required to do so.

Payment for the work for which the NCR has been issued may be withheld until the NCR issue is resolved.

.4 Should the Departmental Representative Quality Assurance reporting indicate that the work is not in conformance, the Departmental Representative may issue to the Contractor an NCR with a required response time or direct the Quality Control Manager to prepare an NCR.

The Contractor shall then respond to that NCR, within the specified response time, with proposed resolutions and corrective actions. The Departmental Representative will accept or reject the proposed resolution and corrective action proposal. If the proposed resolution is rejected by the Departmental Representative, the Contractor shall resubmit with an alternative response until a solution acceptable to the Departmental Representative is found.

Quality Assurance testing and inspection may be performed by the Departmental Representative to determine if the corrective action has provided an acceptable product. Acceptance and rejection will continue until the Departmental Representative determines that a quality product has been achieved.

Payment for the work for which the NCR has been issued may be withheld until the NCR issue is resolved.

.5 If in the opinion of the Departmental Representative it is not viable to correct non-conforming work or work not performed in accordance with Contract Documents, the Departmental Representative may deduct from the Contract Price the difference in value between work performed and that called for by Contract Documents, the amount of which shall be determined by the Departmental Representative.

1.12 Departmental Representative Inspection and Audits

.1 The Departmental Representative may perform quality assurance audits as desired. Such audits will not relax

the responsibility of the Contractor to perform work in accordance with Contract Documents.

.2 Allow the Departmental Representative access to work. If part of the work is in preparation at locations other than the place of work, allow access to such work whenever it is in progress.

.3 If Contractor covers, or permits to be covered, work that has been designated for Quality Assurance testing, inspections, or approvals before such is made, uncover such work, have inspections or tests satisfactorily completed, and make good such work.

.4 Independent Inspection/Testing Agencies may be engaged by the Departmental Representative for the purpose of Quality Assurance inspection and/or testing portions of the work. Costs of such services will be borne by the Departmental Representative.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 Installation and Removal.

1.3 Scaffolding.

1.4 Hoisting.

1.5 Site Storage / Loading.

1.6 Security.

1.7 Equipment, Tool and Materials Storage.

1.8 Sanitary Facilities.

1.9 Construction Signage.

1.10 Construction Laydown Area, Construction Parking and Site Office.

1.11 Departmental Representative's Office Trailer.

1.12 Power.

1.13 Communications.

1.14 Temporary Heating, Ventilation and Lighting.

1.15 Fire Protection.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for the Departmental Representative's Office Trailer will be made on the basis of the Price per Unit Bid for Departmental Representative's Office Trailer in the Bid and Acceptance Form. The Price per Unit Bid shall include the supply, installation, and maintenance of the Departmental Representative's Office Trailer and related washroom facilities and all other items necessary for the successful completion of the task.

.2 Measurement for Payment for the Departmental Representative's Office Trailer will be made by Lump Sum based on the percentage of work completed and accepted by the Departmental Representative.

1.2 Installation and Removal	.1	Provide construction facilities in order to execute work expeditiously.
	.2	Remove from site all such work after use.
1.3 Scaffolding	.1	Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, and temporary stairs as necessary to carry out work.
1.4 Hoisting	.1	Provide, operate, and maintain hoists and cranes as necessary for moving of workers, materials, and equipment.
	.2	Hoists and cranes shall be operated by qualified operators.
1.5 Site Storage / Loading	.1	Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
	.2	Do not load or permit to load any part of work with a weight or force that will endanger the work or existing infrastructure.
1.6 Security	.1	Provide and pay for responsible security personnel as required.
1.7 Equipment, Tool and Materials Storage	.1	If required by the Contractor provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
	.2	Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with public.
1.8 Sanitary Facilities	.1	Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
	.2	Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
1.9 Construction Signage	.1	No other signs or advertisements, other than those required by Section 01 35 00 – Traffic Management, are permitted on site.
1.10 Construction Laydown Area, Construction Parking and Site Office	.1	Confine construction laydown areas, site office locations, and construction parking to the locations identified below in compliance with Section 01 35 43 – Environmental Protection and as preapproved by the Departmental Representative.
		.1 Within highway right of way, in areas previously disturbed, off the traveled potion of the highway, off travel portions of all nearby side roads such that access is not impeded, and outside the highway clear zone.

.2 Other areas as preapproved by the Departmental Representative.

1.11 Departmental Representative's Office Trailer

.1 Provide Departmental Representative with office trailer set up in a location preapproved by the Departmental Representative.

.2 The Departmental Representative's Office Trailer shall be of I-Beam frame with exterior aluminum or wood siding and panel wall (or similar) interior finish. Am office trailer constructed from a sea container with steel walls will not be accepted.

.3 Departmental Representative's Office Trailer shall have:

.1 Outside dimensions measuring a minimum 4.8 m long excluding hitch x 2.4 m wide x 2.1 m high, with floor minimum 0.3 m above grade, complete with 4 50% opening windows and one lockable door.

.2 Insulation and heating system to maintain 22 degrees C inside temperature at -10 degrees C outside temperature.

.3 Finished inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colors. Finish floor with 19 mm thick plywood.

.4 Equip office with 1 x 2 m table, 3 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, and one coat rack and shelf.

.5 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10 % upward light component.

.6 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet and maintain supply of paper towels and toilet tissue.

.7 Power for the on-site trailer shall be available at all times by means of a generator or connection to power utility, supplied and maintained by the Contractor, or by other hook-ups as accepted by the Departmental Representative.

1.12 Power

.1 Provide and pay for power as required for the completion of the works and operations of construction offices.

1.13 Communications

.1 Ensure Contractor's onsite representatives have suitable onsite phone communications allowing the Departmental

		Representative reliable communication to the Contractors onsite representative when onsite.
1.14 Temporary Heating, Ventilation and Lighting	.1	Provide temporary heating, ventilation, and lighting as required during construction period to facilitate construction of the works.
1.15 Fire Protection	.1	Provide and maintain temporary fire protection equipment during performance of work.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Installation and Removal.

1.2 Hoarding.

1.3 Guiderails and Barricades.

1.4 Access to Site.

1.5 Public Traffic Flow.

1.6 Fire Routes.

1.7 Protection for Off-site and Public Property.

1.8 Protection of Structure Finishes.

PART 1 – GENERAL

1.1 Installation and Removal	.1	Provide temporary controls in order to execute Work expeditiously.
	.2	Remove from site all such work after use.
1.2 Hoarding	.1	Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures (see Section 01 35 43 – Environmental Protection for more information).
1.3 Guiderails and Barricades	.1	Provide secure, rigid guiderails and barricades around deep excavations and open shafts.
	.2	Provide as required by governing authorities.
1.4 Access to Site	.1	Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.
1.5 Public Traffic Flow	.1	Provide and maintain competent signal flag persons, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the Public.
1.6 Fire Routes	.1	Maintain access to property for use by emergency response vehicles.
1.7 Protection for Off-site and Public Property	.1	Protect surrounding private and public property from damage during performance of Work.
	.2	Be responsible for damage incurred.

1.8 Protection of Structure Finishes

.1 Provide protection for finished and partially finished structure finishes and equipment during performance of Work.

.2 Provide necessary screens, covers and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule three (3) days prior to installation.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 General Requirements.

1.2 Requirements of Regulatory Agencies.

PART 2 – PRODUCTS:

2.1 Products.

PART 3 – EXECUTION:

3.1 Mobilization.

3.2 Maintenance.

3.3 Demobilization.

PART 1 – GENERAL

1.1 General Requirements

.1 The Contractor to provide its own construction camp as necessary. Obtain approval from landowner should Contractor choose to setup construction camp. The construction camp shall not be located within PSPC's right-of-way, PSPC's maintenance yards, PSPC's gravel pits / quarries, or on any other land owned or leased by PSPC.

.2 The Contractor shall be responsible for all utility services to the construction camp. The construction camp to be established and operated in accordance with local regulations.

1.2 Requirements of Regulatory Agencies

.1 Obtain necessary licenses and approvals required by Authority having Jurisdiction for authorized use of water and disposal of domestic sewage and other waste.

.2 Comply with Environmental regulations.

PART 2 – PRODUCTS

2.1 Products

.1 Not Used.

PART 3 – EXECUTION

3.1 Mobilization

.1 Mobilize equipment, personnel, and materials as necessary to establish temporary construction camp and offices. Obtain necessary licenses and approvals from authorities having jurisdiction prior to mobilization. Camp and service area location and layout plan to be submitted to Departmental Representative for review and acceptance.

	.2	Temporary construction camps to be established and operated in accordance with local regulations.
3.2 Maintenance	.1	Maintain construction camp and offices in a neat and tidy condition.
3.3 Demobilization	.1	Upon vacating the construction camp, offices and temporary services, clean-up and leave site in a condition satisfactory to the Departmental Representative and the authorities having jurisdiction.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Project Cleanliness.

1.2 Final Cleaning.

PART 1 – GENERAL

1.1 Project Cleanliness

.1 Maintain work in a tidy condition, free from accumulation of waste products and debris.

.2 Remove waste materials from site at regularly scheduled times or dispose of as directed by the Departmental Representative.

.3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.4 Provide wildlife resistant containers for collection of waste materials and debris.

.5 Dispose of waste materials and debris off site.

.6 Clear snow and ice from areas of work.

.7 Ensure work site cleaning and worker hygiene practices are in accordance with the Contractor's COVID-19 Safe Work Plan.

1.2 Final Cleaning

.1 When work is substantially performed, remove surplus products, tools, construction machinery, and equipment not required for performance of remaining work.

.2 Remove waste products, debris, and materials used in construction. Reinstate the work site to the conditions pre-existing and to the satisfaction of the Departmental Representative.

.3 Prior to final review, remove surplus products, tools, construction machinery, and equipment.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Inspect finishes and fitments and ensure specified workmanship and operation.

.6 Remove dirt and other disfiguration from exterior surfaces.

.7 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.8 Sweep and wash clean paved finished areas.

.9 Clean drainage systems.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Substantial Performance.

1.2 Completion.

PART 1 – GENERAL

1.1 Substantial Performance

.1 Project "Substantial Performance" shall be attained through the following process:

.1 When the project work has achieved Substantial Performance as defined by GC1.1.4, the Contractor and all subcontractors shall conduct an inspection of work, identify deficiencies and defects and repairs as required to conform to Contract Documents. Correct deficiencies and defects and complete repairs identified.

.2 Notify the Departmental Representative in writing of completion of the Contractor's Inspection, correction of deficiencies, defects, and repairs, and request the Departmental Representative's Substantial Performance inspection.

.3 Upon request from the Contractor, the Departmental Representative will complete a Substantial Performance inspection. If requested by the Departmental Representative, the Contractor shall accompany Departmental Representative during the Substantial Performance inspection.

.4 Unless stated otherwise by the Departmental Representative, the Contractor shall correct all deficiencies, defects, and repairs identified during the Substantial Performance inspection by the Departmental Representative prior to the preparation of the "Certificate of Substantial Performance".

.5 Should the Departmental Representative determine that Substantial Performance as defined by GC1.1.4 has been achieved, the Contractor shall prepare a "Request for Progress Payment" with the final project quantities and all Progress Payment submissions as outlined in Section 01 29 00 – Payment Procedures. The Departmental Representative will use the submitted "Request for Progress Payment" to prepare a "Certificate of Substantial Performance" in accordance with GC5.5.

.6 Should the "Certificate of Substantial Performance" include remaining defects, faults, and incomplete work etc. the Contractor shall provide to the Departmental Representative a schedule for the completion / correction of each remaining defect, fault, and incomplete work etc. The "Certificate of Substantial Performance" will not be processed for payment until the Contractor's schedule has been provided, reviewed, and accepted by the Departmental Representative. The Contractor's schedule shall be provided in writing as follows:

.1 Include the completion / correction dates for all items of defects, faults, incomplete work etc. identified by the Departmental Representative.

.2 Be provide in a letter with company letter head and be signed by an authorized representative of the Contractor.

1.2 Completion

.1 The project shall be deemed to have reached "Completion" when all requirements of GC1.1.5 have been achieved. The "Certificate of Completion" shall then be prepared by the Departmental Representative in accordance with GC5.6.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Submissions.

1.2 Recording As-Built Conditions (As-Built Drawings).

1.3 As-Built Survey.

PART 1 – GENERAL

1.1 Submissions

.1 Submit submissions for Departmental Representative review. Following each review, the submission will be returned with the Departmental Representative's comments. Revise and re-submit submission per the comments provided.

.2 Provide the following submissions to the Departmental Representative within two (2) weeks of substantial performance:

.1 As-built drawing and Shop Drawing mark-ups.

.2 As-built survey.

1.2 Recording As-Built Conditions (As-Built Drawings)

.1 The Departmental Representative will provide one set of Issued for Construction (or Issued for Tender) drawings for use by the Contractor to record as-built conditions and submit at the completion of the project as the "As-built Drawings".

.2 Record information concurrently with construction progress on the Issued for Construction (or Issued for Tender) drawings. Do not conceal work until the required information is recorded.

.3 Legibly mark each item on the Issued for Construction (or Issued for Tender) drawings and Shop Drawings in red ink to record actual construction conditions and any changes made by addenda and change orders.

.4 Maintain record documents in clean, dry, and legible condition.

.5 Keep record documents available for inspection by the Departmental Representative.

.6 Submit to the Departmental Representative one copy of Issued for Construction (or Issued for Tender) drawings which have been marked up by the Contractor to include all "as-built" conditions.

1.3 As-Built Survey

.1 At the completion of the work complete an as-built survey of the works. At a minimum the survey shall include.

.1 Topo of all areas disturbed and modified during construction (between limits of clearing including cut and fill slopes, embankment and gravels placed).

.2 Culverts (inverts at inlet and outlet) and size, length, and type.

.3 Signage (new, modified or relocated).

.4 Edge of Asphalt Pavement.

.5 Gravel Shoulder.

.6 Pavement Markings.

.7 Riprap.

.8 Any other feature or elements of work incorporated into the project.

.2 The survey to include sufficient point density to adequately characterize the work. Survey methods and point density is subject to prior approval of the Departmental Representative. At a minimum the Contractor shall survey all features at 20 m station intervals and the location of all treatment boundaries including changes in material type / placement, changes in surface treatment, and changes in terrain.

.3 Survey data shall be collected at an accuracy of +/- 0.020 m horizontal and +/- 0.020 m vertical or better and shall be referenced / tie into the PSPC's monument / coordinate system as shown on the Contract Drawings.

.4 The following files shall comprise the as-built survey provided to the Departmental Representative:

.1 Digital csv file with the xyz data and an appropriate descriptor code as to the type of material surface or feature being surveyed.

.2 Breaklines for all survey data in DXF file formation or another format pre-approved by the Departmental Representative.

.3 A list of all point descriptors used in the survey data.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

PART 2 – PRODUCTS:

2.1 Signposts and Hardware.

PART 3 – EXECUTION:

3.1 Sign Removal.

3.2 Sign Relocation.

3.3 Culvert Removal.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Sign Removal will be made on the basis of the Price per Unit Bid for Sign Removal in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for removal and offsite disposal, and all other items necessary for successful completion of the work.

.2 The measurement for Payment for completion of Sign Removal will be made on the count of each sign removed and accepted by Departmental Representative.

.3 Payment for Sign Relocation will be made on the basis of the Price per Unit Bid for Sign Relocation in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for:

.1 Removal, stockpile, transport, and reinstallation existing signs.

.2 Supply and installation of new signposts and hardware.

.3 All other items necessary for successful completion of the work.

.4 The measurement for Payment for completion of Sign Relocation will be made on the count of each sign removed and reinstalled and accepted by Departmental Representative.

.5 Payment for Culvert Removal will be made on the basis of the Price per Unit Bid for Culvert Removal in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for:

.1 Native Material: excavation, backfill (when required), disposal (in a pre-approved offsite location if unsuitable for re-use).

.2 Culverts and associated components removal, loading, transport, and offsite disposal.

.3 All other items necessary for successful completion of the work.

.6 Measurement for Payment of Culvert Removal will be made on the length of culvert removed measured in linear metres and accepted by Departmental Representative.

PART 2 – PRODUCTS

2.1 Signposts and Hardware

.1 Signposts and hardware shall be in conformance with Section 10 14 53 – Traffic Signage.

PART 3 - EXECUTION

3.1 Sign Removal

.1 All existing regulatory signs and posts and other signs designated for removal on the Contract Drawings shall be removed by the Contractor. The removed signs and posts shall be disposed in an offsite location pre-approved by the Departmental Representative. If requested by the Departmental Representative, the Contractor shall salvage the signs, posts and associated components and stockpile in a location as directed by the Departmental Representative. The order and timing of sign removal shall be completed in conjunction with the Contractor's Traffic Management Plan to ensure necessary signage for the protection and control of public traffic is available throughout the construction.

3.2 Sign Relocation

.1 All existing regulatory signs and posts and other signs designated for relocation on the Contract Drawings shall be removed, stockpiled, and reinstalled as shown on Contract Drawings. The Contractor shall take necessary precautions to prevent damage to the signs or posts during the removal, transport, stockpiling and reinstallation process. The order and timing of sign removal shall be completed in conjunction with the Contractor's Traffic Management Plan to ensure necessary signage for the protection and control of public traffic is available throughout the construction. The sign relocation comprises of the following two steps:

.1 Remove the existing signs.

.2 Stockpile, transport and reinstall the removed signs to locations as shown on Contract Drawings.

.2 The wood posts and signs shall be installed per the BC MoTI Manual of Standard Traffic Signs & Pavement Markings and BC MoTI 2020 Standard Specification for Highway Construction (or latest edition), See Section 635, subsection 635.27 and subsection 635.32 and the following requirements.

.1 Post embedment depth shall be 1600 mm.

.2 Green and white paint not required.

.3 If signpost located in embankment or gravels, the post hole shall be via an auger with a diameter 100 mm greater than the post dimensions.

3.3 Culvert Removal

.1 Take all necessary precautions as outline in Section 01 35 43 – Environmental Protection and the Contractor's EPP to mitigate against sediment transport and other environmental pollution or damage during construction.

.2 Excavate and remove all existing culverts as indicated on Contract Drawings and associated components (screens, debris catchments etc., if present) within the limits of the work. Dispose of the culverts in an offsite disposal facility within British Columbia permitted to accept the culvert materials and acceptable to the Departmental Representative. If requested by the Departmental Representative, salvage the associated culvert components (screens, debris catchments etc.) and stockpile in a location directed by the Departmental Representative.

.3 Dispose excavated material in an offsite location and condition acceptable to the Departmental Representative.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Definitions.

1.2 Submittals.

1.3 Storage and Handling.

1.4 Transportation.

PART 2 – PRODUCTS:

2.1 Materials.

PART 3 – EXECUTION:

3.1 Disposal.

PART 1 – GENERAL

1.1 Definitions

.1 Dangerous Goods: Product, substance, or organism that is specifically listed or meets the hazard criteria established in Transportation of Dangerous Goods Regulations.

.2 Hazardous Material: Product, substance, or organism that is used for its original purpose and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.

.3 Hazardous Waste: Any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment, or disposal.

.4 Workplace Hazardous Materials Information System (WHMIS): A Canada-wide system designed to give employers and workers information about hazardous materials used in the workplace. Under WHMIS, information on hazardous materials is to be provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by a combination of federal and provincial laws.

1.2 Submittals

.1 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.

.2 If requested by the Departmental Representative, submit to the Departmental Representative a current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.

.3 If requested by the Departmental Representative, submit Hazardous Materials Management Plan to the Departmental Representative that identifies all hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.

1.3 Storage and Handling

.1 Abide by internal requirements for labeling and storage of materials and wastes. If required coordinate storage of hazardous materials with the Departmental Representative.

.2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

.3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.

.4 Store all flammable and combustible liquids in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval.

.5 Transfer of flammable and combustible liquids is prohibited within buildings.

.6 Transfer of flammable and combustible liquids will not be carried out in the vicinity of open flames or any type of heat-producing devices.

.7 Flammable liquids having a flash point below 38°C, such as naphtha or gasoline, will not be used as solvents or cleaning agents.

.8 Store flammable and combustible waste liquids for disposal in approved containers located in a safe, ventilated area. Keep quantities to a minimum.

.9 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used, or handled.

.10 Abide by the following storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 L for liquids:

.1 Store hazardous materials and wastes in closed and sealed containers that are in good condition.

.2 Label containers of hazardous materials and wastes in accordance with WHMIS.

.3 Store hazardous materials and wastes in containers compatible with that material or waste.

.4 Segregate incompatible materials and wastes.

.5 Ensure that different hazardous materials or hazardous wastes are not mixed.

.6 Store hazardous materials and wastes in a secure storage area with controlled access.

.7 Maintain a clear egress from storage area.

.8 Store hazardous materials and wastes in a manner and location which will prevent them from spilling into the environment.

.9 Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.

.10 Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

.11 Ensure personnel have been trained in accordance with WHMIS requirements.

.12 Report spills or accidents involving hazardous materials immediately to the Provincial Emergency Program 24-hour phone line at 1-800-663-3456, other local authority having jurisdiction, and the Departmental Representative. Submit a written spill report to the Departmental Representative within 24 hours of incident.

.13 Store and handle all hazardous materials away from any water course as outlined in Section 01 35 43 – Environmental Protection.

1.4 Transportation

.1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.

PART 2 – PRODUCTS

2.1 Materials

.1 Only bring on site the quantity of hazardous materials required to perform work.

.2 Maintain MSDS in proximity to where the materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

PART 3 – EXECUTION

3.1 Disposal

.1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines. Costs for disposal to be considered incidental to the work.

.2 Recycle hazardous wastes for which there is an approved, cost-effective recycling process available.

.3 Send hazardous wastes only to authorized hazardous waste disposal or treatment facilities.

.4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.

.5 Disposal of hazardous materials in waterways, storm, or sanitary sewers, or in municipal solid waste landfills is prohibited.

.6 Dispose of hazardous wastes in a timely fashion in accordance with applicable provincial regulations.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

PART 2 – PRODUCTS:

2.1 Wood Posts and Hardware.

2.2 Signs.

PART 3 – EXECUTION:

3.1 Wood Posts and Signs.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Traffic Signage (the supply and placement of permanent traffic signs) will be made on the basis of the Price per Unit Bid for Traffic Signage in the Bid and Acceptance Form. The price per Unit Bid shall include all costs for supply and install of the sign and post, hardware, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for Traffic Signage will be made by the count of each traffic sign (sign and post) installed and accepted by the Departmental Representative. A single sign post designated to hold multiple signs will only be counted as one sign for payment. Refer to Section 02 41 13 – Selective Site Demolition for measurement of relocated signs.

.3 Refer to Section 02 41 13 – Selective Site Demolition for the Measurement and Payment Procedures for Sign Relocation.

1.2 References

.1 British Columbia MoTI – Manual of Standard Traffic Signs & Pavement Markings (September 2000, or latest edition).

.2 British Columbia MoTI – 2020 Standard Specifications for Highway Construction (November 1, 2020 or latest edition).

.3 Transportation Association of Canada – Manual of Uniform Traffic Control Devices for Canada (January 2014, or latest edition).

PART 2 – PRODUCTS

2.1 Wood Posts and Hardware

.1 The signposts and hardware shall be in conformance with the BC MoTI 2020 Standard Specification for Highway Construction (or latest edition), See Section 635, subsection 635.27 and the following requirements.

.1 The signpost shall be 6" x 4" pressure treated Douglas Fir / Larch, No. 1 Grade.

2.2 Signs

.1 Signs shall be per the BC MoTI 2020 Standard Specification for Highway Construction (or latest edition), See Section 635, subsection 635.32 and the following requirements.

.1 Signs shall be sheet aluminum.

.2 All sign shall be per the current BC MoTI Manual of Standard Traffic Signs & Pavement Markings. If not provided in the BC MoTI Manual of Standard Traffic Signs & Pavement Markings, the sign shall be per the Manual of Uniform Traffic Control Devices for Canada.

PART 3 – EXECUTION

3.1 Wood Posts and Signs

.1 The wood posts and signs shall be installed per the BC MoTI Manual of Standard Traffic Signs & Pavement Markings and BC MoTI 2020 Standard Specification for Highway Construction (or latest edition), See Section 635, subsection 635.27 and subsection 635.32 and the following requirements.

.1 Post embedment depth shall be 1600 mm.

.2 Green and white paint not required.

.3 If signpost located in embankment or gravels, the post hole shall be via an auger with a diameter 100 mm greater than the post dimensions.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

PART 2 – PRODUCTS:

2.1 General.

2.2 Crushed Base Gravel and Crushed Surfacing Gravel.

2.3 Sub-Base Course.

PART 3 – EXECUTION:

3.1 Processing.

3.2 QA Sampling by the Departmental Representative.

3.3 Handling and Transportation.

3.4 Stockpiling.

3.5 Cleanup.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Measurement and Payment for Aggregate Materials shall be per the applicable work included in Section 32 11 19 – Sub-base Course, Section 32 11 24 – Crushed Base Gravel, Section 32 11 25 – Crushed Surfacing Gravel, Section 33 42 13 – Pipe Culverts, Section 32 12 16 – Hot Mix Asphalt Concrete Pavement, and any other section as required by these specifications.

1.2 References

.1 British Columbia Ministry of Transportation and Infrastructure (BC MOTI) – 2020 Standard Specifications for Highway Construction (or latest edition).

.2 Geotechnical Data Report produced for this project is available for the Contractor's reference (Appendix J).

.3 American Society for Testing and Materials (ASTM)

.1 ASTM C136 (latest edition), Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.2 ASTMD2487 (latest edition), Standard Practice for Classification of Soils for Engineering Purposes (United Soil Classification System).

.3 ASTM D4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.4 ASTM C117-03, Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.

.5 CGSB Spec.8-GP-2M, Sieves Testing, Woven Wire, Metric Series.

.6 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.7 ASTM C131-01, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

PART 2 – PRODUCTS

2.1 General

.1 The Contractor will be responsible for the manufacture, screening, blending, aeration or drying, or any other required processing to achieve all material requirements.

.2 Aggregate Source: The Contractor shall provide his own source(s) for all aggregate materials for this project. The Contractor will be solely responsible for ensuring that the aggregate source(s) selected by the Contractor continuously achieve all aggregate material properties, quality and gradation requirements as outlined in this contract specification for the material intended use.

.3 A minimum of seven (7) calendar days prior to supply or commencement of manufacture of materials from the Contractor's selected aggregate source(s), provide to the Departmental Representative for review and acceptance the following:

.1 Location, name, and owner of material source(s) and test results confirming source(s) meet this Contract's required aggregate material properties and quality.

2.2 Crushed Base Gravel and Crushed Surfacing Gravel

.1 Crushed Base Gravel and Crushed Surfacing Gravel shall be manufactured by the Contractor and ensure the materials conform with the following requirements:

.1 The material shall consist of hard durable particles free from clay lumps, frozen material, organic matter, and other deleterious materials.

.2 When tested in accordance to ASTM C136, or latest edition, the material shall have a gradation conforming to the following gradation limits:

Table 31 05 16 – 01: Gradation Limits: Crushed Base Gravel

Sieve Designation (mm)	Percent Passing by Weight
25	100
19	80 – 100
9.5	50 - 85
4.75	35 - 70
2.36	25 - 50
1.18	15 - 35
0.300	5 - 20
0.075	3 - 8

Table 31 05 16 – 02: Gradation Limits: Crushed Surfacing Gravel

Sieve Designation (mm)	Percent Passing by Weight
25	100
19	85 – 100
9.5	60 - 85
4.75	40 - 70
1.18	20 - 50
0.30	10 - 30
0.075	7 - 15

.3 Liquid limit when tested in accordance to ASTM D4318-00, maximum 25.

.4 Plasticity index when tested in accordance to ASTM D4318-00, maximum 6.

.5 Los Angles degradation when tested in accordance to ASTM C131-01, maximum percent loss by weight 35.

.6 Fracture, at least 60% of particles by mass retained on 4.75 mm sieve to have at least one freshly fractured face.

2.3 Sub-Base Course

.1 The Sub-base Course material should be manufactured by Contractor to achieve the following requirements:

.1 The material shall consist of hard durable particles free from clay lumps, frozen material, organic matter, and other deleterious materials.

.2 When tested in accordance to ASTM C136, or latest edition, the material shall have a gradation conforming to the following gradation limits:

Table 31 05 16 – 03: Gradation Limits: Sub-Base Course

Sieve Designation (mm)	Percent Passing by Weight
75	100
19	15 – 100
9.5	0 - 100
0.600	0 - 100
0.300	0 - 15
0.075	0 - 8

.3 Grading of material shall not show marked fluctuations from opposite extremes of the limits given in above Table, and the curve plotted from the sieve analysis shall flow in a similar manner from acute changes in direction.

.4 Even though particle sizes are within the limits of the grading sizes herein provided, materials will be considered unsuitable if particle shapes are thin or elongated or exhibit other characteristics precluding satisfactory compaction to create a roadbed acceptable to the Departmental Representative.

.5 Liquid limit when tested in accordance to ASTM D4318-00, maximum 25.

.6 Plasticity index when tested in accordance to ASTM D4318-00, maximum 6.

.7 Fracture, at least 20% of particles by mass retained on 4.75 mm sieve to have at least one freshly fractured face.

PART 3 – EXECUTION

3.1 Processing

.1 Process aggregate uniformly using methods that prevent contamination, segregation, and degradation.

.2 Blend, screen, or crush aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Departmental Representative.

.3 Wash aggregates, if required to meet specifications. Use only equipment approved by Departmental Representative.

.4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.

3.2 QA Sampling by the Departmental Representative

.1 Provide Departmental Representative with access to source and processed material for sampling during production.

.2 Install sampling facilities at discharge end of production conveyor, to allow Departmental Representative to obtain representative samples of items being produced. Stop conveyor belt when directed by Departmental Representative to permit full cross section sampling.

.3 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

.4 Aggregates that do not meet specified tolerances for intended use are subject to rejection by the Departmental Representative as part of the QA process.

3.3 Handling and Transportation

.1 Avoid segregation, contamination, and degradation of aggregate during handling and transporting.

.2 Load limit restrictions will be in accordance with British Columbia Highway Traffic Act pertaining to registered weight limits and vehicle size.

.3 Repair and maintain stockpile / laydown areas as necessary to a condition equal to or better than when work began.

3.4 Stockpiling

.1 Stockpile aggregates in locations approved by Departmental Representative and not closer than 1.5 m from the edge of the excavation slopes. Do not stockpile on completed pavement surfaces.

.2 Stockpile aggregates in sufficient quantities to meet project schedules.

.3 Stockpile sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.4 Except where stockpiled on acceptably stabilized areas, provide compacted crushed gravel base not less than 100 mm in depth to prevent contamination of aggregate. Do not incorporate compacted base of pile into work.

.5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.

.6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative.

.7 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpiles as required to prevent segregation.

.8 Do not cone piles or spill material over edges of piles.

.9 Do not use conveying stackers.

.10 Prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.5 Cleanup

.1 Any stockpiles temporarily placed on the highway right of way or on PSPC property will be completely removed and the site restored to its natural condition.

.2 The Contractor shall be responsible for any cleanup of aggregate sources.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 Definitions.

1.3 Protection.

PART 2 – PRODUCTS:

2.1 Products.

PART 3 – EXECUTION:

3.1 Preparation.

3.2 Tree Clearing.

3.3 Removal and Disposal.

3.4 Finished Surface.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Tree Clearing will be made on the basis of the Price per Unit Bid for Tree Clearing in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for clearing of trees and brush, disposal, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Tree Clearing will be made on the total area within the limits of Tree Clearing shown in the Contract Drawings, surveyed in square metres, incorporated in the works, and accepted by the Departmental Representative.

1.2 Definitions

.1 Clearing: cutting off trees, brushing vegetative growth to ground level and disposing of felled trees, previously uprooted trees and stumps, and surface debris.

.2 License to Cut: License required under Province of British Columbia's Forest Act that authorizes a Contractor to salvage and remove timber from Crown Land.

1.3 Protection

.1 Prevent damage to natural features and man-made structures which are to remain.

.2 Repair any damaged caused by Tree Clearing operations and if damaged, replace any trees designated to remain.

PART 2 – PRODUCTS

2.1 Products .1 Not Used.

PART 3 – EXECUTION

3.1 Preparation .1 Inspect the site and verify with the Departmental Representative, the limits of the Tree Clearing and items designated to remain.

.2 Unless advised otherwise, receive from the Departmental Representative the License to Cut prior to undertaking the work.

3.2 Tree Clearing .1 Clear trees, brush, and other vegetation designated for removal within the limits of Tree Clearing shown on the contract drawings and as direct by the Departmental Representative.

.2 Cut off branches and cut down trees of overhanging areas.

3.3 Removal and Disposal .1 Dispose of cleared materials by chipping or mulching. Spread cleared materials that are onsite as directed by the Departmental Representative.

.2 Burning of cleared materials shall not be permitted.

3.4 Finished Surface .1 Leave ground surface in a condition suitable for grubbing of stumps and stripping of topsoil.

.2 In areas of flush cutting, leave stumps cut flush with ground elevation and root structure undisturbed.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

1.3 Submittals.

1.4 Quality Management.

PART 2 – PRODUCTS:

2.1 Materials.

PART 3 – EXECUTION:

3.1 Preparation.

3.2 Placement.

3.3 Asphalt Repairs Following Gravel Shouldering.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Gravel Shouldering will be made on the basis of the Price per Unit Bid for Gravel Shouldering in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for the supply, manufacture, loading, transport, placement, and compaction of gravel shouldering aggregate, and all other items necessary for successful completion of the works.

.2 Measurement for Payment for completion of Gravel Shouldering will be made by the length of material surveyed in lineal meters, measured parallel to the direction of the highway, and accepted by the Departmental Representative. Gravel Shouldering on each side of the highway will be measured separately for payment.

1.2 References

.1 American Society for Testing and Materials (ASTM), latest edition:

.1 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

1.3 Submittals

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.4 Quality Management	.1	Quality Control and Quality Assurance in accordance with Section 01 45 00 – Quality Management.

PART 2 – PRODUCTS

2.1 Materials	.1	Gravel Shouldering Material shall be Crushed Base Gravel in accordance with Section 31 05 16 – Aggregates: General.

PART 3 – EXECUTION

3.1 Preparation	.1	Complete compaction and grading of Granular Material and placement of Hot Mix Asphalt Concrete Pavement prior to placement of Gravel Shouldering.
3.2 Placement	.1	Place Gravel Shouldering to the lines and grades shown on the Contract Drawings using a purpose-built shouldering machine or other equipment pre-approved by the Departmental Representative.
	.2	When compacted, finished surfaces of Gravel Shouldering shall be within +/-25 mm of the lines and grades shown in the Contract Drawings but not uniformly high or low.
	.3	Compact Gravel Shouldering to a density not less than 95% of the standard maximum dry density in accordance with ASTM D698.
	.4	Use sweeper to clean any shouldering material from the Hot Mix Asphalt Concrete Pavement surface.
3.3 Asphalt Repairs Following Gravel Shouldering	.1	If the adjacent Hot Mix Asphalt Concrete Pavement is damaged during the shouldering operation, the damage shall be repaired to the satisfaction of the Departmental Representative at no cost to the owner.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 Definitions.

1.3 References.

PART 2 – PRODUCTS:

2.1 Embankment Material.

2.2 Nonwoven Geotextile.

2.3 Biaxial Geogrid.

2.4 Topsoil.

PART 3 – EXECUTION:

3.1 Grubbing.

3.2 Stripping.

3.3 Excavating.

3.4 Embankment Fill Materials.

3.5 Placement of Nonwoven Geotextile.

3.6 Placement of Biaxial Geogrid.

3.7 Topsoil.

3.8 Disposal of Excavated Material.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Stripping will be made on the basis of the Price per Unit Bid for Stripping in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with grubbing / removal and offsite disposal of all stumps and roots upon completion of Tree Clearing, excavating and temporarily stockpiling the stripped material for reuse as Topsoil, off-site disposal of stripping material not reused, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Stripping will be made on the in-situ volume of material surveyed

(surveyed prior to and following stripping) in cubic metres, excavated within the limits of the work, and accepted by the Departmental Representative. The volume will be determined by comparing the preconstruction and post stripping survey of the area stripped. Stripping depth shall not exceed 0.3 m from the preconstruction surface unless pre-approved prior to construction by the Departmental Representative.

.3 Payment for the Common Excavation will be made on the basis of the Price Per Unit Bid for Common Excavation in the Bid and Acceptance Form. This includes excavated earth and gravel materials after stripping and sawcut operations. The Price per Unit Bid shall include all costs for excavation, transport, stockpile, off-site disposal of material, and all other items necessary for successful completion of the work. Sawcut of existing asphalt pavement is incidental and no additional costs will be paid for sawcut of existing asphalt concrete pavement

.4 Measurement for Payment for completion of Common Excavation will be made on the volume of material surveyed in cubic metres and accepted by the Departmental Representative. The volume will be determined by comparing the post stripping surface and post saw cutting surface with the post excavation surface. No separate measurement or payment for hauling of the material will be made.

.5 Payment for Embankment Fill will be made on the basis of the Price per Unit Bid for Embankment Fill in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for supplying material for Embankment Fill from offsite source(s), hauling, transport, placement, compaction of Embankment Fill and all other items necessary for successful completion of the work.

.6 Measurement for Payment for completion of Embankment Fill will be made on the volume of material surveyed in cubic metres incorporated into the finished highway cross section (at the completion of compaction) and accepted by the Departmental Representative. No separate measurement or payment for hauling of the material will be made.

.7 Payment for the supply and installation of Nonwoven Geotextile will be made on the basis of the Price per Unit Bid for Nonwoven Geotextile in the Bid and Acceptance Form. The Price per Unit Bid shall include all cost costs for the supply and installation of the Nonwoven Geotextile, and all

other items necessary for the successful completion of the work.

.8 Measurement for Payment for completion of the Nonwoven Geotextile will be made per the area of material surveyed in square metres, incorporated into the works, and accepted by the Departmental Representative. The Price per Unit Bid shall include all costs for supply, transport, placement of Nonwoven Geotextile and all other items necessary for successful completion of the work.

.9 Payment for the supply and installation of Biaxial Geogrid will be made on the basis of the Price per Unit Bid for Biaxial Geogrid in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for the supply and installation of the biaxial geogrid, and all other items necessary for the successful completion of the work.

.10 Measurement for Payment for completion of the Biaxial Geogrid will be made per the area of the material surveyed in square metres, incorporated into the works, and accepted by the Departmental Representative. The Price per Unit Bid shall include all costs for supply, transport, placement of biaxial geogrid and all other items necessary for successful completion of the work.

.11 Payment for Topsoil Placement will be made on the basis of the Price per Unit Bid for Topsoil Placement in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for the spreading, raking, and grooming of the previously stripped material being reused as Topsoil, grading and cleanup in preparation for Hydraulic Seeding, and all other items necessary for successful completion of the work.

.12 Measurement for Payment for completion of Topsoil Placement will be made on the area of material surveyed in square metres incorporated into the works and accepted by the Departmental Representative. The placement of the topsoil shall be up to the base course gravel inclusive.

1.2 Definitions

.1 Stripping: excavation of organic material covering the original ground.

.2 Grubbing: excavating and disposing stumps and roots to 200 mm below the ground surface, after completion of Stripping.

.3 Common excavation: excavation of materials that are not rock excavation or stripping.

.4 Embankment: material from offsite source(s) to be supplied by the Contractor for Embankment Fill.

.5 Rock excavation:

.1 Material from solid masses of igneous, sedimentary, or metamorphic rock which, prior to removal, was integral with parent mass. Material that cannot be ripped with reasonable effort from Caterpillar D9L or equivalent and considered integral with parent mass.

.2 Boulder or rock fragments measuring in volume one cubic metres or more.

1.3 References

.1 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM D4318-10 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 ASTM D698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).

.3 ASTM D1556-07 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

.4 ASTM D2167-08 Standard Test Methods for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

.5 ASTM D6938-10 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods.

.2 Engineering Services for Safety Improvements at Inga Lake Intersection Area, Km 145.8, Alaska Highway, BC, Geotechnical Data Report. Tetra Tech, January 17, 2019 (Appendix J).

PART 2 – PRODUCTS

2.1 Embankment Material

.1 Embankment material shall not contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps, or any other unsuitable material unless otherwise directed by Departmental Representative.

.2 The Contractor is to supply and haul all required Embankment Material from offsite source(s) to the project

site. The Contractor is responsible for ensuring the material achieves the requirements for Embankment Fill materials for this project (Item 2.1 Embankment Material of Section 31 24 13 – Roadway Excavation, Embankment, and Compaction).

2.2 Nonwoven Geotextile

.1 The Nonwoven geotextile shall achieve or exceed the following minimum requirements:

.1 Grab Tensile Strength 712 N – ASTM D-4632.

.2 Grab Elongation 50% - ASTM D-4632.

.3 CBR Puncture 1820 N – ASTM D-6241.

.4 Trapezoidal Tear 265 N – ASTM D-4533.

.5 Apparent Opening Size 0.212 mm – ASTM D-4751.

.6 Permittivity 1.5 sec-1 – ASTM – D-4491.

.7 Water Flow Rate 4880 l/m/m2 – ASTM D-4491.

.8 UV resistance 70% - ASTM D-4355 – 500 hours of UV light.

2.3 Biaxial Geogrid

.1 The Biaxial geogrid shall be polymeric grid formed by regular network of integrally connected tensile elements with apertures of sufficient size to allow interlocking with surrounding soil, rock or earth and function primarily as reinforcement. The biaxial geogrid shall achieve or exceed the following minimum requirements:

.1 Ultimate Tensile Strength (kN/m) MD: 19.2 XMD: 28.8 – ASTM D-6637 Method A (Note: MD = machine direction; XMD = cross machine direction).

.2 Junction Efficiency 90% - ASTM D-7737.

.3 UV resistance 100% - ASTM D-4355 – 500 hours of UV light.

2.4 Topsoil

.1 Shall be organic material stripped from the native ground during stripping and temporarily stockpiled for later reuse. Topsoil shall be free of rocks > 100 mm in diameter and other debris hindering good vegetative growth.

PART 3 – EXECUTION

3.1 Grubbing	.1	Grub out stumps and wood debris, including roots and embedded logs, to a depth not less than 200 mm below the anticipated Stripping depth.
3.2 Stripping	.1	Complete stripping to the design lines and grades shown on the Contract Drawings unless directed otherwise by the Departmental Representative.
	.2	Haul as needed, and stockpile stripped material within the limits of construction (or outside if needed) for re-use later as topsoil. Selection of a stockpile location and relocation of the stripped material stockpiles during the work (if needed) shall be the Contractor's responsibility.
3.3 Excavating	.1	Complete common excavation to the design lines and grades shown on the Contract Drawings. Common excavation material and sawcut and milling materials of the existing asphalt concrete pavement shall be disposed in an offsite location pre-approved by the Departmental Representative.
	.2	During excavation maintain profiles, crowns, and cross slopes to provide good surface drainage. Provide ditches as work progresses to provide drainage and construct interceptor ditches as shown on plans or as directed before excavating or placing embankment in adjacent area.
	.3	If, during excavation, material appearing to conform to classification for rock excavation is encountered, notify Departmental Representative, and provide sufficient time to enable measurements to be made to determine volume of rock. Payment for rock excavation (if required) will be completed via change order.
3.4 Embankment Fill Material	.1	The Contractor is to supply all required Embankment Fill from offsite source(s). All Embankment Fill material shall achieve requirements of Item 2.1 Embankment Material of Section 31 24 13 Roadway Excavation, Embankment, and Compaction.
	.2	Remove any snow and ice from existing surfaces prior to placement. Do not place material which is frozen nor place material on frozen surfaces or surfaces covered in snow or ice.
	.3	Maintain crowned or superelevated surface during construction to ensure ready run-off of surface water.
	.4	Drain low areas before placing materials.

.5 Place and compact to full width in layers not exceeding 200 mm loose thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.

.6 Where material consists of rock:

.1 Place to full width in layers of sufficient depth to contain maximum sized rocks, but in no case is layer thickness to exceed 1 m.

.2 Carefully distribute rock material to fill voids with smaller fragments to form compact mass.

.3 Fill surface voids at subgrade level with rock spalls or selected material to form earth-tight surface.

.4 Do not place boulders and rock fragments with dimensions exceeding 150 mm within 300 mm of subgrade elevation.

.7 Break material down to sizes that enable required compaction and mix for uniform moisture to full depth of layer. Embankment Fill materials which cannot be compacted to the required density due to high moisture content, or embankment materials with a natural moisture content greater than optimum, shall not be used without prior aeration and drying.

.8 Compact each layer and test compaction of the embankment using proof rolling.

Proof rolling shall require one complete coverage of the entire embankment area for each lift by the tires of a truck having a 9 tonne single axle dual tire or 17 tonne tandem axle group with dual tires with a tire pressure of 600 kPa.

When testing the compaction of the embankment material using proof rolls, the material shall be plus or minus 2% of optimum moisture content.

When testing the compaction of the embankment material using proof rolling, the material shall be considered compacted when upon completing a pass over the embankment area, the embankment exhibits no observed unsuitable deflections or rutting.

.9 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction and complete compaction testing.

.10 Shape entire embankment to within 100 mm of design lines and grades. Finish slopes and ditch bottoms to neat condition, true to lines, grades, and drawings where applicable.

.11 Remove rocks over 150 mm in any dimension from slopes and ditch bottoms.

.12 Hand finish slopes that cannot be finished satisfactorily by machine.

.13 Run dozer tracks over slopes exceeding 3 m in height to leave grouser tracks parallel to centerline of highway.

.14 Trim between constructed slopes and edge of Clearing to provide drainage free of humps, sags, ruts, and protruding stones.

.15 Maintain finished surfaces in condition conforming to this Section until acceptance by Departmental Representative.

3.5 Placement of Nonwoven Geotextile

.1 Place Nonwoven geotextile material by unrolling onto the prepared subgrade in orientation, manner and locations indicated on Contract Drawings and retain in position with pins. All Nonwoven geotextile placed on a slope shall at a minimum be secured with pins min 300 mm long every 2 m^2 of geotextile.

.2 Place Nonwoven geotextile material smooth and free of tension stress, folds, wrinkles, and creases.

.3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of Nonwoven geotextile.

.4 Overlap each successive strip of Nonwoven geotextile a minimum of 1 m over previously laid strip, such that overlaps are shingled in the direction the fill placement will be spread. Follow Manufacturer's guidelines for overlap of adjacent rolls along their sides and ends.

.5 Pin successive strips of Nonwoven geotextile with securing pins at 1000 mm interval at midpoint of lap.

.6 Protect installed Nonwoven material from displacement, damage, or deterioration before, during and after placement of material layers.

.7 Replace damaged or deteriorated Nonwoven geotextile to approval of Departmental Representative.

.8 Upon acceptance by the Departmental Representative, place succeeding material as shown on the Contract Drawings.

3.6 Placement of Biaxial Geogrid

.1 Once the placement of the Nonwoven geotextile on subgrade is complete, place 150 mm thick Sub-base Course gravel and compact to density not less than 98% maximum dry density in accordance with ASTD D698. Construction equipment shall not track directly on top of the Nonwoven geotextile.

.2 Place Biaxial Geogrid material by unrolling onto compacted Sub-base layer surface in orientation, manner and locations indicated on Contract Drawings. Tension and pin Biaxial Geogrid material in accordance with Manufacturer's guidelines.

.3 Correct orientation of the geogrid shall be verified by the Contractor. Strength direction is typical perpendicular to road control line.

.4 Overlap each successive strip of Biaxial Geogrid a minimum of 600 mm over previously laid strip, such that overlaps are shingled in the direction the fill placement will be spread. Follow Manufacturer's guidelines for overlap of adjacent rolls along their sides and ends.

.5 Geogrid lengths shall be continuous. Splicing parallel to road control line is not allowed.

.6 Place remaining depth of Sub-base Course gravel on top of geogrid. See Section 32 11 19 – Sub-base Course.

.7 Construction equipment shall not track directly on top of the Biaxial Geogrid. Spread and place a minimum of 150 mm thick of Sub-base Course gravel on the Biaxial Geogrid prior to tracking/driving over with construction equipment.

3.7 Topsoil

.1 Spread topsoil on finished embankment slopes and ditches in locations shown on Contract Drawings and approved by the Departmental Representative. Finished slopes have to be accepted by the Departmental Representative and surveyed prior to spreading topsoil on them. Place topsoil to a thickness of 100 mm (+/- 25 mm, but not uniformly high or low). Neatly shape outside limits of topsoil material to eliminate sharp changes in lines and grades. Ensure ready run-off of surface water.

.2 Screen materials to remove rocks > 100 mm in diameter and other debris hindering good vegetative growth from the placed topsoil.

.3 Finish surface even, free of large openings and neat in appearance.

.4 Maintain finished surfaces in condition conforming to this Section until acceptance by Departmental Representative.

3.8 Disposal of Excavated Material

.1 Grubbed materials, Stripping not reused as topsoil, excavated material, and Sawcut and Milling materials of existing asphalt concrete pavement shall be disposed at an offsite location pre-approved by the Departmental Representative.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

PART 2 – PRODUCTS:

2.1 Asphalt Millings.

2.2 Milling Machine Equipment.

PART 3 – EXECUTION:

3.1 Asphalt Milling.

3.2 Protection.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Milling (Reshaping Asphalt Pavement) will be made on the basis of the Price per Unit Bid for Milling in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for equipment, labour, removal of existing asphalt concrete pavement by milling, loading, transport, placement, and spreading of the millings in the designated disposal location, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Milling will be made on the area of asphalt material milled and surveyed in square metres, incorporated in the works, and accepted by the Departmental Representative.

1.2 References

.1 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM C136 / C136M, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

PART 2 – PRODUCTS

2.1 Asphalt Millings

.1 Dispose the asphalt milling and sawcut of existing asphalt concrete pavement at an offsite location pre-approved by the Departmental Representative.

2.2 Milling Machine Equipment

.1 The milling machine shall be self-propelled and shall be equipped with automatic longitudinal and transverse grade control, which shall be used when directed by the Departmental Representative. A profiling ski or boom of a

recommended minimum 4 m length, approved by the Departmental Representative, shall be used. No substitute equipment will be permitted. The cutting drum shall be a minimum of 1.8 m in width, totally enclosed and with replaceable cutting teeth. The milling machine shall have an effective means of removing the loosened material from the surface and for preventing dust from escaping into the air.

.2 The milling machine shall be equipped with a "kill" switch installed or approved by the manufacturer of the milling machine. This "kill" switch shall be automatically actuated whenever the operation of the machine is so impeded that a hazardous situation, such as "kick back", would result were that operation to continue. When so actuated the "kill" switch shall instantly shut down the operation of the milling machine.

.3 The milling machine shall be equipped with an automatic audible warning device which will activate whenever the vehicle is backing up. The warning device shall be clearly audible above the ambient noise level at a minimum distance of 6 m from the back of the vehicle.

PART 3 – EXECUTION

3.1 Asphalt Milling

.1 The existing asphalt concrete pavement shall be removed to the depth and width as specified in the Contract Specifications, on the Contract Drawings or as directed by the Departmental Representative to provide a surface that is free of longitudinal and transverse irregularities. The use of a heating device to soften the pavement will not be permitted.

.2 At all times, during the milling operation, the traveled roadway shall be kept clean of all loose materials.

.3 At the end of the milling shift or at the end of each section to be milled, prior to reopening the road to traffic, the pavement shall be cleaned and swept so that all loose material is removed. In addition, the transition from the milled surface to the existing paved surface shall be tapered at a slope no steeper than 25H:1V, or as directed by the Departmental Representative. The Departmental Representative shall indicate whether the taper is to be milled or a tar paper letdown shall be constructed using asphalt mix.

.4 No more than one milling shift shall be carried out in any one lane to minimize the length of the grade difference between the lanes. At no time, at the end of a shift, shall there be a grade difference that is not at lane dividing lines, centerline or at locations indicated by the Departmental Representative.

When the milling operation traverses intersecting roads, the transition from the milled surface to the existing pavement shall be at a slope no steeper than 25H:1V or as directed by the Departmental Representative. This transition can be done with the milling machine or by using tar paper letdowns as approved by the Departmental Representative.

.5 If, due to delays between the milling and paving operations, the milled surface starts to pothole or deteriorate, repairs shall be carried out at once using asphalt mix. All repairs shall be at the Contractor's expense. At no time shall there be a grade difference between lanes of more than 50 mm at the end of a shift. If the milling is carried out to a depth greater than 50 mm, the full width of the driving surface shall be milled, or a lift of leveling course shall be constructed to maintain a maximum depth of 50 mm.

.6 In areas of milling, the Contractor shall cut drainage channels as required to prevent water from collecting in the milled area. If washouts occur at any time during the milling operations, they shall be immediately repaired by the Contractor, at the Contractor's own expense, with approved materials and as directed by the Departmental Representative.

.7 During the milling process, care must be taken not to disturb or damage any structures or devices such as manholes, catch basins, valves, boxes, and other utilities. Damage to visible, referenced, or plan-indicated manholes, catch basins, valves, valve covers and concrete/asphalt curb, or any other infrastructure shall be repaired at the Contractor's expense. All metal and concrete faces must be cleaned of old pavement and painted with primer, prior to repaving.

.8 Haul and dispose asphalt milling materials to an offsite location pre-approved by the Departmental Representative.

3.2 Protection

.1 Maintain milled surface in condition conforming to this section until succeeding material is applied.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

PART 2 – PRODUCTS:

2.1 Materials.

PART 3 – EXECUTION:

3.1 Inspection and Survey of Underlying Surface.

3.2 Placing.

3.3 Compaction.

3.4 Tolerances.

3.5 Protection.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Sub-Base Course material will be made on the basis of the Price per Unit Bid for Sub-Base Course in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with supply, manufacture, loading, transport, placing, shaping, watering and/or drying and compaction of the sub-base course material, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Sub-Base Course will be made on the volume of material surveyed in cubic metres, incorporated in the works (at the completion of compaction and grading) and accepted by the Departmental Representative.

1.3 References

.1 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM D6938 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

PART 2 – PRODUCTS

2.1 Materials

.1 Material shall be Sub-Base Course material in accordance with Section 31 05 16 – Aggregates: General.

PART 3 – EXECUTION

3.1 Inspection and Survey of Underlying Surface	.1	Place Sub-base Course material after underlying surface is surveyed by the Contractor and is inspected and approved by Departmental Representative.
3.2 Placing	.1	Place Sub-base Course material to lines and grades shown on the Contract Drawings.
	.2	Ensure no frozen material or material containing snow or ice is placed.
	.3	Place material only on clean unfrozen surface, properly shaped and compacted, and free from snow and ice.
	.4	Begin spreading Sub-base Course material on crown line or on high side of one-way slope.
	.5	Place Sub-base Course material using methods which do not lead to segregation or degradation.
	.6	Place material in uniform layers not exceeding 200 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
	.7	Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
	.8	Remove and replace segregated material.
	.9	Complete dust control using water as required throughout the work (see Section 32 15 60 – Roadway Dust Control).
3.3 Compaction	.1	Compact to density not less than 98% maximum dry density in accordance with ASTM D6938.
	.2	Shape and roll alternately to obtain smooth, even, and uniformly compacted structure.
	.3	Apply water as necessary during compacting to obtain specified density. If Sub-base Course material is excessively moist, take remedial action as directed by Departmental Representative.
	.4	In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.

.5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 Tolerances

.1 Finished Sub-base Course surface to be within plus or minus 50 mm of the design lines and grades but not uniformly high or low.

3.5 Protection

.1 Maintain finished base in condition conforming to this section until acceptance by Departmental Representative and succeeding material is applied. No separate payment will be made for maintenance.

.2 Complete dust control using water as required succeeding material is applied (see Section 32 15 60 – Roadway Dust Control).

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

PART 2 – PRODUCTS:

2.1 Crushed Base Gravel.

PART 3 – EXECUTION:

3.1 Inspection and Survey of Underlying Surface.

3.2 Placing.

3.3 Compaction.

3.4 Tolerances.

3.5 Protection.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Crushed Base Gravel will be made on the basis of the Price per Unit Bid for Crushed Base Gravel in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with the supply, manufacture, stockpiling, loading, transport, placing, shaping, watering and/or drying and compaction of the crushed base gravel, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Crushed Base Gravel will be made on the volume of material surveyed in cubic metres, incorporated in the works (at the completion of compaction and grading) and accepted by the Departmental Representative. The volume of Crushed Base Gravel measured for payment shall include Crushed Base Gravel used in the bedding of culverts as shown on the Contract Drawings.

1.2 References

.1 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM D6938 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

PART 2 – PRODUCTS

2.1 Crushed Base Gravel

.1 Material shall be Crushed Base Gravel in accordance with Section 31 05 16 – Aggregates: General.

PART 3 – EXECUTION

3.1 Inspection and Survey of Underlying Surface

.1 Place Crushed Base Gravel after underlying surface is surveyed by the Contractor and is inspected and approved by Departmental Representative.

3.2 Placing

.1 Place Crushed Base Gravel material to lines and grades shown on the Contract Drawings.

.2 Ensure no frozen material or material containing snow or ice is placed.

.3 Place material only on clean unfrozen surface, properly shaped and compacted, and free from snow and ice.

.4 Begin spreading Crushed Base Gravel material on crown line or on high side of one-way slope.

.5 Place Crushed Base Gravel using methods which do not lead to segregation or degradation.

.6 Place material in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.

.7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.8 Remove and replace segregated material.

.9 Complete dust control using water as required throughout the work (see Section 32 15 60 – Roadway Dust Control).

3.3 Compaction

.1 Compact to density not less than 100% maximum dry density in accordance with ASTM D6938.

.2 Shape and roll alternately to obtain smooth, even, and uniformly compacted structure.

.3 Apply water as necessary during compacting to obtain specified density. If Crushed Base Gravel material is excessively moist, take remedial action as directed by Departmental Representative.

.4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.

.5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 Tolerances

.1 Finished base surface to be within plus or minus 20 mm of the design lines and grades but not uniformly high or low.

3.5 Protection

.1 Maintain finished base in condition conforming to this section until succeeding material is applied or until acceptance by Departmental Representative. No separate payment will be made for maintenance.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

PART 2 – PRODUCTS:

2.1 Materials.

PART 3 – EXECUTION:

3.1 Inspection and Survey of Underlying Surface.

3.2 Placing.

3.3 Compaction.

3.4 Tolerances.

3.5 Protection.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Crushed Surfacing Gravel will be made on the basis of the Price per Unit Bid for Crushed Surfacing Gravel in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with the supply, manufacture, stockpiling, loading, transport, placing, shaping, watering and/or drying and compaction of the crushed surfacing gravel, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Crushed Surfacing Gravel will be made on the volume of material surveyed in cubic metres, incorporated in the works (at the completion of compaction and grading) and accepted by the Departmental Representative.

1.2 References

.1 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM D6938 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

.2 BC MoTI 2020 Standard Specifications for Highway Construction, BC Ministry of Transportation and Infrastructure (or latest edition).

PART 2 – PRODUCTS

2.1 Materials

.1 Material shall be Crushed Surfacing Gravel in accordance with Section 31 05 16 – Aggregates: General.

PART 3 – EXECUTION

3.1 Inspection and Survey of Underlying Surface

.1 Place Crushed Surfacing Gravel after underlying surface is surveyed by the Contractor and is inspected and approved by Departmental Representative.

3.2 Placing

.1 Place Crushed Surfacing Gravel to lines and grades shown on the Contract Drawings.

.2 Ensure no frozen material or material containing snow or ice is placed.

.3 Place material only on clean unfrozen surface, properly shaped and compacted, and free from snow and ice.

.4 Begin spreading Crushed Surfacing Gravel material on crown line or on high side of one-way slope.

.5 Place Crushed Surfacing Gravel using methods which do not lead to segregation or degradation.

.6 Place material in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.

.7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.8 Remove and replace segregated material.

.9 Complete dust control using water as required throughout the work (see Section 32 15 60 – Roadway Dust Control).

3.3 Compaction

.1 Compact to density not less than 100% maximum dry density in accordance with ASTM D6938.

.2 Shape and roll alternately to obtain smooth, even, and uniformly compacted structure.

.3 Apply water as necessary during compacting to obtain specified density. If Crushed Surfacing Gravel material is excessively moist, take remedial action as directed by Departmental Representative.

.4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.

.5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 Tolerances

.1 Finished base surface to be within plus or minus 20 mm of the design lines and grades but not uniformly high or low.

3.5 Protection

.1 Maintain finished gravel surface in condition conforming to this section until acceptance by Departmental Representative. No separate payment will be made for maintenance.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

1.3 Definitions.

1.4 Submittals.

1.5 Quality Management.

PART 2 – PRODUCTS:

2.1 Asphalt Cement.

2.2 Anti-Stripping Agent.

PART 3 – EXECUTION:

3.1 Anti-Stripping Agent Dosage Rate.

3.2 Delivery of Asphalt Cement.

3.3 Storage.

3.4 Execution.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Asphalt Cement will be incidental to Hot Mix Asphalt Concrete Pavement. No additional payment will be made for the incidental asphalt cement.

1.2 References

.1 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM D140/D140M, Standard Practice for Sampling Asphalt Materials.

.2 American Association of State Highway and Transportation Officials (AASHTO), latest edition.

.1 AASHTO M 320, Standard Specification for Performance-Graded Asphalt Binder.

.3 British Columbia Ministry of Transportation and Infrastructure.

.1 Recognized Product List (latest version available at time of tender closing).

1.3 Definitions

.1 Supply: Supply will include ordering, purchase, scheduling, delivering, supplying storage facilities, handling, storing, heating, sampling, testing, and other related work.

1.4 Submittals

.1 Submit samples in accordance with Section 01 33 30 – Submittal Procedures, manufactures recommended procedures, and ASTM D140/D140M.

.2 Prior to ordering Asphalt Cement, submit manufacturer's instructions, printed product literature, and data sheets for review and acceptance by Departmental Representative. Include product characteristics, performance criteria, showing materials meet the requirements of this contract specification.

.3 For each load of Asphalt Cement delivered for the project, provide to the Departmental Representative within 24 hrs. of delivery, weigh tickets to show gross and tare weights (before and after unloading).

.4 For each load of Asphalt Cement delivered for the project, prior to use and following delivery to site, submit one – 1 Liter samples of Asphalt Cement material in a clean, airtight, sealed, wide-mouth plastic-lined container to the Departmental Representative.

1.5 Quality Management

.1 Quality Control and Quality Assurance in accordance with Section 01 45 00 – Quality Management.

.2 Provide access throughout the work as requested by the Departmental Representative to sample asphalt cement to be incorporated into work.

PART 2 – PRODUCTS

2.1 Asphalt Cement

.1 Asphalt Cement, Performance Grade (PG) 58-31 to meet the requirements of AASHTO M320.

.2 Asphalt Cement shall be supplied by one of the "Accepted Producers" from one of the accepted "Terminal Supplier from Accepted Producers" as indicated in the Asphalt Cement section of the British Columbia Ministry of Transportation and Infrastructure Recognized Product List.

2.2 Anti-Stripping Agent .1 Anti-Stripping Agent shall be in conformance with Section 32 12 16 – Hot Mix Asphalt Concrete Pavement.

PART 3 – EXECUTION

3.1 Anti-Stripping Agent Dosage Rate .1 The anti-stripping agent dosage rate shall be a minimum of 0.3% by weight of Asphalt Cement or greater as necessary to achieve the minimum tensile strength ratio (TSR) of 80 in the Asphalt Concrete Mix (See item 2.4 – Asphalt Concrete Mix and Job Mix Formula of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement). The use of a dosage rate of > 0.5% by weight of Asphalt Cement to achieve the minimum TSR of 80 shall be pre-approved by the Departmental Representative.

3.2 Delivery of Asphalt Cement .1 The Contractor shall ensure the supplier delivers asphalt in good condition, uniform in product, and at correct temperature to the specified delivery point.

.2 Record of delivery must be kept, and every bill of landing must show:

.1 Delivery date / time / location.

.2 Type of product.

.3 Batch number.

.4 Mass.

.5 Relative density at 15 ºC.

.6 PG specification information.

.7 Temperature of product at delivery point.

3.3 Storage .1 The Contractor is responsible for properly storing and heating the Asphalt Cement until use.

3.4 Execution .1 As required in the production of Hot Mix Asphalt Concrete Pavement as specified in Section 32 12 16 – Hot Mix Asphalt Concrete Pavement.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

1.3 Definitions.

1.4 Submittals.

PART 2 – PRODUCTS:

2.1 Materials.

PART 3 – EXECUTION:

3.1 Equipment.

3.2 Application.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Asphalt Tack Coat will be made on the basis of the Price per Unit Bid for Asphalt Tack Coat in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with the supply, transport, storage, heating, handling, and placement of the Asphalt Tack Coat, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Asphalt Tack Coat will be made on the area of material surveyed in square metres, incorporated in the works, and accepted by the Departmental Representative.

1.2 References

.1 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM D140/D140M, Standard Practice for Sampling Asphalt Materials.

1.3 Definitions

.1 Asphalt Tack Coat: an application of liquid asphalt to promote bonding between two separate lifts of Hot Mix Asphalt Concrete Pavement.

1.4 Submittals

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures, manufactures recommended procedures, and ASTM D140/D140M.

.2 Prior to ordering materials, submit manufactures instructions, printed product literature, and data sheets for review and

acceptance by Departmental Representative. Include product characteristics, performance criteria, showing asphalt tack coat materials meet the requirements of this contract specification.

.3 Prior to use and following delivery to site, submit one – 1 Liter samples of Asphalt Tack Coat material in a clean, airtight, sealed, wide-mouth plastic-lined container to the Departmental Representative.

.4 Provide access as requested by the Departmental Representative to sample Asphalt Tack Coat material throughout the work.

.5 For each application, submit written summary report to Departmental Representative within 24 hrs. of application and include information as follows.

.1 Total area covered (station start and end, width, and lane).

.2 Quantity of Asphalt Tack Coat used and mean application rate. Dipstick measurements or electronic printouts are acceptable. Carry out measurements in presence of Departmental Representative upon request.

PART 2 – PRODUCTS

2.1 Materials

.1 Asphalt Tack Coat shall be one of the "Accepted Products" from one of the accepted "Producers" as indicated in the Tack Coats section of the British Columbia Ministry of Transportation and Infrastructure (BC MoTI) Recognized Products List.

.2 Water shall be clean, potable, and free of foreign matter.

PART 3 – EXECUTION

3.1 Equipment

.1 Equipment required for Work of this Section to be in satisfactory working condition and maintained for duration of Work.

.2 Pressure distributor:

.1 Designed, equipped, maintained, and operated so that asphalt material can be.

.1 Maintained at even temperature.

.2 Applied uniformly on variable widths of surface up to 6 meters.

.3 Applied at readily determined and controlled rates from 0.2 L/m^2 and greater with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m^2.

.4 Distribute in uniform spray without atomization at temperature required.

.3 Equipped with meter, registering travel in meters per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.

.4 Equipped with pump having flow meter graduated in units of 2 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.

.5 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.

.1 Measure temperature to closest whole number.

.6 Equipped with accurate volume measuring device or calibrated tank.

.7 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.

.8 Equipped with nozzle spray bar, with operational height adjustment in increments of 0.6 meters and capable of being raised or lowered.

.9 Cleaned if previously used with incompatible asphalt material.

3.2 Application

.1 Apply Asphalt Tack Coat only on clean, dry, and unfrozen asphalt pavement surface before placing additional lift of Hot Mix Asphalt Concrete Pavement.

.2 If desired by the Contractor, dilute asphalt emulsion with water at 1:1 ratio for application if recommended by the Asphalt Tack Coat supplier and preapproved by the Departmental Representative. Mix thoroughly by pumping or other method approved by Departmental Representative.

.3 Apply Asphalt Tack Coat evenly to Hot Mix Asphalt Concrete Pavement surface at rate between 0.2 L/m^2 and

0.4 L/m^2 unless recommended otherwise by the product manufacture and preapproved by the Departmental Representative.

.4 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of Asphalt Tack Coat material.

.5 Apply Asphalt Tack Coat only when air temperature greater than 10˚C and when rain is not forecast within 2 hours of application.

.6 Apply Asphalt Tack Coat only to surfaces that are expected to be overlaid by Hot Mix Asphalt Concrete Pavement on same day unless pre-approved by the Departmental Representative.

.7 Evenly distribute localized excessive deposits of tack coat by brooming as directed by Departmental Representative.

.8 Where traffic is to be maintained, treat no more than one half of width of surface in one application.

.9 Keep traffic off tacked areas until Asphalt Tack Coat has set.

.10 Re-apply Asphalt Tack Coat to contaminated or disturbed areas as directed by Departmental Representative.

.11 Allow sufficient time for Asphalt Tack Coat to set before placing Hot Mix Asphalt Concrete Pavement as directed by Departmental Representative.

.12 Inspect Asphalt Tack Coat application to ensure uniformity.

.1 Re-spray areas of insufficient or non-uniform tack coat coverage as directed by Departmental Representative.

.2 Ensure tack coating performed using handheld devices is consistent in appearance with adjacent areas of machine applied material.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

1.3 Definitions.

1.4 Submittals.

PART 2 – PRODUCTS:

2.1 Materials.

PART 3 – EXECUTION:

3.1 Equipment.

3.2 Application.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Asphalt Prime will be made on the basis of the Price per Unit Bid for Asphalt Prime in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with the supply, transport, storage, heating, handling, and placement of the Asphalt Prime, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Asphalt Prime will be made on the area of material surveyed in square metres, incorporated in the works, and accepted by the Departmental Representative.

1.2 References

.1 American Society for Testing and Materials (ASTM).

.1 ASTM D140/D140M, Standard Practice for Sampling Asphalt Materials.

1.3 Definitions

.1 Asphalt Prime: an application of liquid asphalt to promote bonding between the finished Crushed Base Gravel surface and the bottom lift of Hot Mix Asphalt Concrete Pavement.

1.4 Submittals

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures, manufactures recommended procedures, and ASTM D140/D140M.

.2 Prior to ordering materials, submit manufacturer's instructions, printed product literature, and data sheets for review and acceptance by Departmental Representative.

Include product characteristics, performance criteria, showing Asphalt Prime materials meet the requirements of this contract specification.

.3 Prior to use and following delivery to site, submit one – 1 Liter samples of Asphalt Prime material in a clean, airtight, sealed, wide-mouth plastic-lined container to the Departmental Representative.

.4 Provide access as requested by the Departmental Representative to sample Asphalt Prime material throughout the work.

.5 For each application, submit written summary report to Departmental Representative within 24 hrs. of application and include information as follows.

.1 Total area covered (station start and end, width, and lane).

.2 Quantity of Asphalt Prime used and mean application rate. Dipstick measurements or electronic printouts are acceptable. Carry out measurements in presence of Departmental Representative upon request.

PART 2 – PRODUCTS

2.1 Materials

.1 Asphalt Prime shall be one of the "Accepted Products" from one of the accepted "Producers" as indicated in the Primers section of the British Columbia Ministry of Transportation and Infrastructure (BC MoTI) Recognized Product List.

.2 Water shall be clean, potable, and free of foreign matter.

.3 Sand blotter shall be sand or fine aggregate.

PART 3 – EXECUTION

3.1 Equipment

.1 Equipment required for Work of this Section to be in satisfactory working condition and maintained for duration of Work.

.2 Pressure distributor:

.1 Designed, equipped, maintained, and operated so that asphalt material can be.

.1 Maintained at even temperature.

.2 Applied uniformly on variable widths of surface up to 5 meters.

.3 Applied at readily determined and controlled rates from 0.2 L/m^2 and greater with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m^2.

.4 Distribute in uniform spray without atomization at temperature required.

.3 Equipped with meter, registering travel in meters per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.

.4 Equipped with pump having flow meter graduated in units of 2 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.

.5 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.

.1 Measure temperature to closest whole number.

.6 Equipped with accurate volume measuring device or calibrated tank.

.7 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.

.8 Equipped with nozzle spray bar, with operational height adjustment in increments of 0.6 meters and capable of being raised or lowered.

.9 Cleaned if previously used with incompatible asphalt material.

3.2 Application

.1 Proceed with placement of Asphalt Prime in areas designated to receive a lift of Hot Mix Asphalt Concrete Pavement only after the Crushed Base Gravel surface is complete and accepted by the Departmental Representative and the surface proposed for Asphalt Prime is clean, dry, and unfrozen.

.2 Dilute asphalt emulsion with water at 1:1 ratio for application. Mix thoroughly by pumping or other method approved by Departmental Representative.

.3 Apply Asphalt Prime evenly to prepared surface at rate between 1.0 L/m^2 and 1.5 L/m^2 unless recommended by the

product manufacture and preapproved by the Departmental Representative.

.4 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of Asphalt Prime material.

.5 Apply Asphalt Prime only when air temperature greater than 10˚C and when rain is not forecast within 2 hours of application.

.6 Apply Asphalt Prime only to surfaces that are expected to be overlaid by Hot Mix Asphalt Concrete Pavement on same day unless pre-approved by the Departmental Representative.

.7 Evenly distribute localized excessive deposits of Asphalt Prime by brooming as directed by Departmental Representative.

.8 Where traffic is to be maintained, treat no more than one half of width of surface in one application.

.9 Prevent overlap at junction of applications.

.10 Apply Asphalt Prime to areas receiving Hot Mix Asphalt Concrete Pavement. Do not apply Asphalt Prime to surfaces that will be visible when paving is complete.

.11 Keep traffic off primed areas until Asphalt Prime has set.

.12 Re-apply Asphalt Prime to contaminated or disturbed areas as directed by Departmental Representative.

.13 Allow sufficient time for Asphalt Prime to set before placing asphalt pavement.

.14 Inspect Asphalt Prime application to ensure uniformity.

.1 Re-apply Asphalt Prime to areas of insufficient or non-uniform coverage as directed by Departmental Representative.

.2 Ensure Asphalt Prime applied using handheld devices is consistent in appearance with adjacent areas of machine-applied material.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 Definitions.

1.3 References.

1.4 Submittals.

1.5 Quality Management.

PART 2 – PRODUCTS:

2.1 Aggregate.

2.2 Asphalt Cement.

2.3 Anti-Stripping Agent.

2.4 Asphalt Concrete Mix and Job Mix Formula.

PART 3 – EXECUTION:

3.1 Plant and Mixing Requirements.

3.2 Equipment.

3.3 Preparation.

3.4 Transportation & Delivery of Mixtures.

3.5 Placing.

3.6 Compaction.

3.7 Temporary Line Markings.

PART 4 – PAYMENT ADJUSTMENTS AND REJECTION LIMITS:

4.1 General.

4.2 Pavement Density.

4.3 Asphalt Content.

4.4 Aggregate Gradation.

4.5 Material Application Rate.

4.6 Surface Segregation.

4.7 Smoothness.

4.8 Workmanship Defects.

4.9 Appeal Testing.

4.10 Asphalt Concrete Overlays as a Corrective Measure.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Hot Mix Asphalt Concrete Pavement will be made on the basis of the Price per Unit Bids for Hot Mix Asphalt Concrete in the Bid and Acceptance Form. The Price per Unit Bids shall include all costs for the supply, manufacture, loading, transport, and mixing of asphalt mix aggregate, the supply of asphalt cement, the supply, manufacture, loading, transport, placement, and compaction of asphalt concrete mix, temporary line markings, quality control, preparation of mix design, and all other items necessary for successful completion of the works. The price per unit shall further include the supply, certification, the operation of a scale to weigh all asphalt concrete mix prior to delivery to the site and the purchase, scheduling, delivery, storage, handling, and incorporation of the anti-stripping agents into the asphalt concrete mix as required.

The Hot Mix Asphalt Concrete Pavement will be subject to Payment Adjustments as detailed in Part 4 – Payment Adjustments and Rejection Limits. The bonus / penalty amounts as determined by the Payment Adjustments will be paid via change order following Substantial Performance of the project.

Acceptance of any Lot or Sub-Lot of Hot Mix Asphalt Concrete Pavement for payment will occur if the Lot or Sub-Lot complies with the requirements of the Contractor's QC plan, Part 2 – Products, and Part 3 – Execution of this specification and the following.

.1 The test results for End Product Specification (EPS) acceptance parameters are such that the Lot or Sub-Lot meets the requirements for acceptance at an adjusted rate.

.2 The Lot or Sub-Lot is approved in respect of all other requirements.

.3 The Contractor has not notified the Departmental Representative in writing that it shall exercise its option to either repair or remove and replace the work, at its own cost, with work meeting the requirements for acceptance at full or increased payment.

.2 Measurement for Payment for completion of Hot Mix Asphalt Concrete Pavement will be made by the mass of material measured in tonnes incorporated into the work, scaled, and accepted by the Departmental Representative. Provide a copy of each weigh scale ticket to the Departmental Representative upon delivery of the Hot Mix Asphalt Concrete Pavement to the site or at the end of each workday as directed / approved by the Departmental Representative. The measurement for payment of Hot Mix Asphalt Concrete Pavement will include Hot Mix Asphalt incorporated in the Access Road Letdowns and barrier flares.

Unless accepted otherwise by the Departmental Representative, only acceptable Hot Mix Asphalt Concrete Pavement will be included in the payment quantity. Any material failing to achieve the rejection limits (see Part 4 – Payment Adjustments and Rejection Limits) shall not be measured or included for payment. Where overlays are used as a corrective measure (see Item 4.10 – Asphalt Concrete Overlays as a Corrective Measure of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement), the overlay will not be included in the payment quantity but the quantity of Hot Mix Asphalt Concrete Pavement covered by the overlay will be measured in the payment quantity whether or not it was acceptable to the Departmental Representative.

In the Departmental Representative's sole discretion and without setting precedence, where any work is rejected but the Departmental Representative determines that it may be left in place, the Departmental Representative may authorize partial payment to the Contractor as full compensation for any residual value the work may have. Notwithstanding the foregoing, PSPC is under no obligation to make any payment for such work.

1.2 Definitions

.1 Additives: solid or liquid materials used to enhance the properties of the liquid Asphalt Cement or Asphalt Concrete Mix.

.2 Aggregate: the crushed or screened gravel.

.3 Asphalt Cement: performance grade asphalt used in Hot Mix Asphalt Concrete Pavement.

.4 Asphalt Concrete Mix: high quality, carefully controlled, hot plant mix of Asphalt Cement and dense graded high-quality crushed aggregate.

.5 Hot Mix Asphalt Concrete Pavement: paver-laid Asphalt Concrete Mix compacted to uniform density.

.6 Asphalt Content: the quantity of Asphalt Cement in the Asphalt Concrete Mix expressed as a percentage by weight of the total dry aggregate in the mix determined by the oven test procedures.

.1 Design Asphalt Content: the asphalt content upon which the Job Mix Formula is initially established.

.2 Approved Asphalt Content: Design Asphalt Content or subsequent adjustments to it, incorporated in a Job Mix Formula or revised Job Mix Formula as approved by Departmental Representative.

.3 Actual Asphalt Content: amount of asphalt binder in mix as determined by testing done under Departmental Representative's Quality Assurance program. Testing includes an amount to correct for asphalt binder lost due to absorption by the aggregate or aggregate loss.

.7 Asphalt Mix Aggregate: the processed crushed aggregate prior to the addition of the Asphalt Cement.

.8 Asphalt Mix Design: The Asphalt Concrete Mix design that is developed by the Contractor through the initial trials and testing to determine and optimize the Job Mix Formula for the end product of Asphalt Concrete Mix.

.9 Driving Lane: A driving lane shall mean a single lane in any area of the pavement other than a shoulder or a barrier flare.

.10 End Product Specification (EPS): A specification whereby the Contractor is responsible for the workmanship and Quality Control of the construction processes, and whereby the Departmental Representative reviews the workmanship and may perform the specified Quality Assurance sampling and testing of the end product for the purpose of determining acceptance / rejection and payment.

.11 Job Mix Formula: The Job Mix Formula establishes aggregate proportioning, gradation, and Asphalt Cement content to be used for production of Asphalt Concrete Mix and requires approval of Departmental Representative on basis of the Asphalt Mix Design.

.12 Leveling Course: Hot Mix Asphalt Concrete Pavement used to improve cross fall, level, and strengthen existing pavements.

.13 Lift: a layer of Hot Mix Asphalt Concrete Pavement laid in a single application then compacted.

.1 Top Lift: the uppermost lift, forming the final running surface.

.2 Lower Lift: Any lift below Top Lift.

.3 Bottom Lift: The lowest Lift (excluding Leveling Course).

.14 Lot:

.1 A Lot is a portion of work being considered for acceptance and for determination of payment.

.2 For the application of the Contract requirements for Density, Asphalt Content, Aggregate Gradation and Material Application Rate, a Lot is defined as.

.1 One day's scheduled production of at least 4 hours of plant production where no changes have occurred to criteria such as, but not limited to.

.1 Accepted Job Mix Formula.

.2 Specified lift being placed.

.3 Required material application rate.

A change in any of the above criteria may require a new Lot designation, subject to the Departmental Representative’s decision.

.2 One day's production of less than 4 hours will be added to the next Lot, provided there are no changes in the Job Mix Formula, or the specified lift being placed.

.3 A Lot shall be no more than two days total production even if above criteria have not changed or been met.

.3 For application of the Contract requirements for Segregation and Smoothness, a Lot is defined as.

.1 One (1) kilometer length of top lift pavement for each driving lane.

.15 Quality Assurance: Departmental Representative's sampling and testing of the end product for the purpose of determining Payment Adjustments and compliance with rejection limit properties (acceptance/rejection). See Section 01 45 00 – Quality Management for further details.

.16 Quality Control: sum of all Contractor's activities to ensure a product meets Contract specification requirements which may include material handling and construction procedures, calibration and maintenance of equipment, production process control and any sampling, testing and inspection that is done for these purposes. The Contractor is entirely responsible for Quality Control. See Section 01 45 00 – Quality Management for further details.

.17 Reject Mix: Asphalt Concrete Mix that is deemed unacceptable for use in the project.

.18 Sample Mean: arithmetic mean of a set of test results constituting the sample.

.19 Sub-Lots: A portion of a Lot being considered for acceptance and for the determination of payment adjustments as follows:

.1 For Density, Asphalt Content and Aggregate Gradation, each Lot shall be divided into three equal Sub-Lots, defined by lineal metres of production.

.2 For Smoothness, each Lot shall be divided into 100 m Sub-Lots.

.20 Surplus Aggregate: aggregate surplus to the works, in split or un-split stockpiles which singly or combined will meet the desired Aggregate Gradation for Asphalt Concrete Mix.

.21 Stratified Random Sample: a set of test measurements taken from a number of separate (stratified) areas or Sub-Lots within a Lot in an unbiased way.

.22 Voids in Mineral Aggregate (VMA): the space available to accommodate the effective volume of Asphalt Cement (not absorbed in the aggregate) and volume of air voids necessary in the Asphalt Concrete Mix.

1.3 References

.1 Alberta Transportation.

.1 Paving Guidelines and Segregation Rating Manual (2002).

.2 British Columbia Ministry of Transportation and Infrastructure (BC MoTI).

.1 Recognized Product List (latest edition).

.2 Traffic Management Manual for Work on Roadways – 2020 Office Edition.

.3 2020 Standard Specifications for Highway Construction.

.3 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.2 ASTM C117, Test Method for Material Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.

.3 ASTM C127, Test Method for Specific Gravity and Absorption of Coarse Aggregate.

.4 ASTM C142, Test Method for Clay Lumps and Friable Particles in Aggregates.

.5 ASTM C566, Test Method for Total Evaporable Moisture Content of Aggregate by Drying.

.6 ASTM D5, Standard Test Method for Penetration of Bituminous Materials.

.7 ASTM D 2171, Standard Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer.

.8 ASTM D2419, Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

.9 ASTM D2726, Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.

.10 ASTM D4791, Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.11 ASTM D5821, Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.

.12 ASTM D6307, Standard Test Method for Asphalt Content of Asphalt Mixture by Ignition Method.

.13 ASTM D6926, Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus.

.14 ASTM D6928, Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.

.15 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.4 Asphalt Institute (AI).

.1 Asphalt Institute MS-2 Sixth Edition, Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types.

.5 American Association of State Highway and Transportation Officials (AASHTO), latest edition.

.1 AASHTO T 304, Standard Method of Test for Uncompacted Void Content of Fine Aggregate.

1.4 Submittals

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit Job Mix Formula (Asphalt Mix Design) to Departmental Representative as a single PDF document (multiple files will not be accepted) for review and acceptance in accordance with the procedures outlined in Section 01 33 00 – Submittal Procedures. The Asphalt mix design shall achieve the requirements of 2.4 – Asphalt Concrete Mix and Job Mix Formula of this specification. The Asphalt Mix Design must be reviewed and accepted by the Departmental Representative prior to commencement of pavement construction. The Departmental Representative

will review the plan (first submission and if required all subsequent re-submissions) within 7 days of submission. Upon review of the plan the Departmental Representative will do one of the following:

.1 Accept the Asphalt Mix Design.

.2 Accept portions of the Asphalt Mix Design and provide comments outlining required changes, additional information, or completion of a new mix design. Following completion of required changes, additional information, or completion of a new mix design by the Contractor, the Contractor shall re-submit the complete Asphalt Mix Design for review.

.3 Reject the Asphalt Mix Design and provide comments outlining required changes or additional information needed before the Asphalt Mix Design will be reviewed in detail. Following completion of the required changes or additional information required by the Contractor, the Contractor shall re-submit the complete Asphalt Mix Design for review.

.3 Prior to ordering additives (if necessary), submit manufacturer's instructions, printed product literature, and data sheets for review and acceptance by Departmental Representative. Include product characteristics, performance criteria, showing materials meet the requirements of this contract specification.

.4 Prior to use and following delivery to site, submit one – 1 Liter samples of anti-stripping agent material in a clean, airtight, sealed, wide-mouth plastic-lined container to the Departmental Representative.

.5 Provide access as requested by the Departmental Representative to sample anti-stripping agent, and other additives throughout the work.

.6 For each shift with the placement of Hot Mix Asphalt Concrete Pavement, submit written summary report to Departmental Representative within 24 hrs. of application and include information as follows.

.1 Location (station start and end) lane and lift paved. Notes pertaining to the paving of any appurtenances (letdowns, intersections, tapers, etc.)

.2 Asphalt Concrete Mix tonnage quantity summary and copies of the weigh scale tickets for each load of

asphalt mix received at the placement operation. Weigh scale tickets shall include:

.1 Truck number.

.2 Weigh ticket number and net weight of load.

.3 Date, time, and location by station of delivery.

.3 Asphalt Cement, and any other additives summary tonnage or volume quantity incorporated into the asphalt mix.

.4 Material application rate dimensions and calculations shall be provided for each Lot and each 10 truckloads of Hot Mix Asphalt Concrete Pavement placed during the applicable shift.

.7 Prior to commencement of use, provide weigh Scale and if being used Plant Silo documentation, including:

.1 Location and type of scale.

.2 Calibration Test results.

.8 Coring: The contractor shall be responsible for providing all core samples for Quality Assurance and Payment Adjustments purposes. Unless instructed otherwise, the randomly selected locations for cores shall be supplied by the Departmental Representative to the Contractor. The Contractor shall provide 100 mm diameter cores for these purposes. If requested, the Contractor shall prepare the cores prior to the submission by removing all material not representative of the Hot Mix Asphalt Pavement Lift to be tested. The Contractor shall deliver these cores and provide the locations of the coring to the Departmental Representative, within 24 hours of being provided the locations for the coring, to a designated location as directed by the Departmental Representative.

The Contractor shall fill all core holes before the roadway is re-opened to traffic. Core holes shall be filled by the following method:

.1 Empty the hole of water and loose material.

.2 Remove any excess moisture by wiping the inside with a dry towel.

.3 Apply Tack Coat to the inside surfaces. Apply emulsified asphalt to the outside perimeter.

.4 Place Hot Mix Asphalt Concrete Pavement in loosely, so that the compacted Lifts do not exceed 75 mm.

.5 With a minimum of 20 blows per Lift, compact the loose material using a minimum 2 kg sledgehammer and tamper.

.6 For additional Lifts, repeat Steps 1 to 5.

.7 The final Lift shall be a minimum thickness of 25 mm and finished to a level higher but not exceeding 6 mm, than the elevation of the surrounding pavement.

The Contractor may use an alternative method if acceptable to the Departmental Representative.

All costs associated with obtaining the cores, including the filling and compaction of the core holes are considered incidental to the Contract and are the responsibility of the Contractor.

.9 Loose samples: The Contractor shall allow for the collection of two (2) loose samples per Sub-Lot by the Departmental Representative from the paver screed or behind the paver screed at random locations. The loose samples shall be collected for Quality Assurance (Payment Adjustments purposes) and as appeal samples should they be needed.

If requested by the Departmental Representative, the Contractor shall collect the two (2) loose samples per Sub-Lot from the paver screed or behind the paver screed at random locations. The random locations shall be chosen per the procedure outlined in the Contractor's Quality Management Plan or as directed by the Departmental Representative. The Contractor shall deliver the samples to the Departmental Representative within 24 hours of being collected, to a designated location as directed by the Departmental Representative.

.10 Upon submission and acceptance of the Asphalt Mix Design by the Departmental Representative, the Contractor shall prepare and submit to the Departmental Representative blank aggregate samples for correlation of the Contractor's, Departmental Representative's, and appeal laboratory ignition ovens. The Blanks shall be prepared in accordance

with BC MoTI 2020 Standard Specifications for Highway Construction, Section 502, Appendix 3 – Blank Aggregate Sample Preparation. The Departmental Representative will randomly select which of the individual blanks will be used by each party. Within 3 working days and prior to any mix production, the Contractor and the Departmental Representative shall prepare and test Asphalt Concrete Mix samples in accordance with Section 502, Appendix 4 – Ignition Oven Correlation Procedure of the BC MoTI 2020 Standard Specifications for Highway Construction.

1.5 Quality Management

.1 Quality Control and Quality Assurance in accordance with Section 01 45 00 – Quality Management.

.2 Provide access throughout the work as requested by the Departmental Representative to sample Asphalt Cement to be incorporated into work.

.3 Quality Control Testing Frequency: Minimum test frequency requirements as described in Table 01 45 00 – 01.

.4 Quality Control of aggregate production is responsibility of Contractor. Tests performed by Departmental Representative will be Quality Assurance tests and will not be considered as Quality Control tests. The Contractor shall not produce paving aggregate until the Contractor has received written notification that their Quality Management Plan is acceptable and has in-place testing facilities for aggregate production that are in accordance with their Quality Management Plan.

.5 Provide and maintain equipment and qualified personnel to perform all field testing necessary to determine the characteristics of the materials produced and incorporated into work.

.6 Use professional engineering services and a qualified test laboratory licensed to practice in British Columbia to assess and where necessary, modify aggregate materials being produced to ensure their end use meets all specification requirements.

.7 Departmental Representative reserves the right to test and monitor quality of material being produced by the Contractor at any time and as often as necessary. Departmental Representative is under no obligation to provide Contractor with test results and this testing shall not in any way relieve Contractor of responsibility of producing aggregates that meet specifications in all respects.

PART 2 – PRODUCTS

2.1 Aggregate

.1 The Contractor shall provide their own source(s) of aggregate materials for Hot Mix Asphalt Concrete Pavement. Asphalt Mix Aggregate materials shall be in accordance with Section 31 05 16 – Aggregates: General and the requirements of this specification section.

.2 Aggregate shall be composed of sound, hard and durable particles of sand, gravel, and rock free from injurious quantities of elongated, soft, or flaky particles, shale, loam and organic or other deleterious materials.

.3 Aggregate shall fully comply with specifications and the Contractor shall recognize and satisfy himself as to the type and amount of work (including washing or other means as necessary) that may be needed to produce the material in accordance with the requirements of these specifications.

.4 Contractor shall split aggregates into coarse and fine fractions prior to crushing coarse fraction. Crushed coarse and fine fractions shall be stockpiled separately with no intermixing of materials.

.5 Aggregate shall meet the following requirements:

.1 Coarse Aggregate.

.1 Shall be all mineral filler retained on sieve designated in test procedures for each individual test.

.2 Shall consist of crushed stone, crushed gravel, or combination thereof, or materials naturally occurring in a fractured condition, or materials naturally occurring of highly angular nature or rough texture.

.3 Shall be free from coating of clay, silt, or other deleterious material, and shall meet requirements in Table 32 12 16 – 01. The tests referenced in Table 32 12 16 – 01 shall be completed to the minimum frequencies and schedule (when applicable) listed in Table 01 45 00 – 01 (Section 01 45 00 – Quality Management).

Table 32 12 16 – 01: Requirements for Coarse Aggregates		
Test Reference #	**Procedures**	**Requirement**
ASTM C127	Maximum Water Absorption: % by mass	2
ASTM C142	Maximum % by mass of clay balls and friable particles	1.0
ASTM D5821	2 Fractured Faces: Minimum % by Mass retained on the 4.75mm sieve	90
ASTM D5821	1 Fractured Faces: Minimum % by Mass retained on the 4.75mm sieve	98
ASTM D6928	Maximum Micro-Deval abrasion loss factor, %	18
ASTM D4791	Flat and Elongated Particles, Max.% by weight	5

.2 Fine Aggregate.

.1 Shall be all mineral filler retained on sieve designated in test procedures for each individual test.

.2 Shall be clean, tough, durable, moderately sharp, and free from coatings of clay, silt, or other deleterious material, and shall contain no clay balls or other aggregations of fine material.

.3 Shall have a sand equivalent of not less than 40 when tested in accordance with ASTM D2419.

.4 Shall have a minimum value of 45 when tested according to the AASHTO Test T 304, Method "A" - Uncompacted Void Content of Fine Aggregate when determining Fine Aggregate Angularity.

.5 Fine aggregate shall have a minimum 60% manufactures fines (passing the 4.75 mm sieve).

.3 Mineral Filler and Mineral Dust:

.1 Mineral filler shall consist of all matter passing the 0.600 mm sieve and mineral dust shall consist of all matter passing the 0.075 mm sieve.

.2 Mineral filler and mineral dust to be free from organic matter.

.3 Mineral filler shall be non-plastic when tested with ASTM D4318.

.6 Coarse aggregate, fine aggregate, mineral filler, and mineral dust when required shall be combined to produce the gradation of Hot Mix Asphalt Concrete Pavement shown in Table 32 12 16 – 02.

Table 32 12 16 – 02: Gradation Limits Asphalt Mix Aggregate

Sieve Size (mm)	Percentage Passing by Mass
16.0	100
12.5	90 – 100
9.5	73 – 90
4.75	50 – 75
2.36	35 – 57
1.18	26 – 45
0.600	18 – 34
0.300	10 – 26
0.150	6 – 17
0.075	3 – 7

.7 If blend sand is required, it shall be screened to pass the 4.75 mm sieve. There shall be a minimum of 1000 tonnes of blend sand in stockpile at all times, unless less than 1000 tonnes is required to complete the work.

2.2 Asphalt Cement

.1 Purchase, supply, deliver, store, and handle Asphalt Cement to plant site until use in accordance with Section 32 12 10 – Asphalt Cement.

.2 Any change in Asphalt Cement type or grade must be preapproved by the Departmental Representative.

2.3 Anti-Stripping Agent

.1 An anti-stripping agent shall be used by the Contractor in accordance with Section 32 12 10 – Asphalt Cement. The supply to the project site of an Anti-Stripping Agent separate from the Asphalt Cement will not be accepted.

2.4 Asphalt Concrete Mix and Job Mix Formula

.1 Preparation and submittal of the Asphalt Mix Design for acceptance by the Departmental Representative is the responsibility of Contractor. All costs incurred in Asphalt Mix Design formulation are the responsibility of the Contractor. The Asphalt Mix Design shall be submitted in accordance with Item 1.4 – Submittals, Subsection .2 of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement.

.2 The Contractor shall utilize a qualified registered member of the Association of Professional Engineers and Geoscientists of British Columbia or a qualified, registered member of the Applied Science Technologists and Technicians of British Columbia who shall sign off the asphalt mix design. The Contractor shall also utilize a CCIL certified testing laboratory meeting the requirements of Section 01 45 00 – Quality Management and acceptable to the Departmental Representative, to assess the aggregate material proposed for use and to carry out the asphalt mix design(s).

.3 Aggregate proportioning and Asphalt Content for the approved Asphalt Mix design will form the Job Mix Formula for production of Asphalt Concrete Mix. Asphalt Mix Design, Job Mix Formulas, and field adjustments made in accordance with these specifications must all be based on the Asphalt Mix meeting the requirements of Item 2.4 - Asphalt Concrete Mix and Job Mix Formula, Subsection .4 of this specification and Table 32 12 16 – 02.

.4 Requirements for Asphalt Mix Design:

.1 Asphalt Mix design shall be performed using the asphalt cement grade specified in Section 32 12 10 – Asphalt Cement and which is from the same refinery contracted to supply the asphalt cement for the duration of the project. Any subsequent changes in the asphalt cement supplied by the Contractor will require a new Asphalt Mix Design unless accepted otherwise by the Departmental Representative.

.2 Asphalt Mix Design shall follow Marshall Method of Mix Design as outlined in latest edition of the Asphalt Institute Manual Series No. 2 (MS-2). The Asphalt Mix Design, at the Design Asphalt Content, shall meet requirements in Table 32 12 16 - 03.

Table 32 12 16 – 03: Marshall Design and Production Criteria

Property of Laboratory Compacted Paving Mixture	Requirement
Number of blows each face of test specimens	75
Minimum % Voids in mineral aggregate for maximum particle size	14.5
Voids Fill with Asphalt (VFA)	65% – 75%
Percentage of Air Voids in laboratory compacted mixture	2.5 to 4.0
Minimum Marshall Load, N @ 60^0C	10,000
Flow Index, units of 0.25mm	8 to 14
Asphalt Film Thickness	Min 8.0 microns
Minimum Tensile Strength Ratio (TSR) - AASHTO T283	75

.3 The Asphalt Concrete Mix shall at all times use an anti-stripping agent and have a tensile strength ratio (TSR) of 80 or greater. The Contractor shall be responsible to incorporate an anti-stripping agent into the Asphalt Concrete Mix at a sufficient volume to achieve this minimum TSR ratio.

.4 The Asphalt Mix Design submission shall include the following information:

.1 Gradation of each aggregate to be used in mixture.

.2 Percentage by mass of each aggregate to be used in mixture.

.3 Asphalt Mix Design gradation of combined aggregate.

.4 Aggregate characteristics including sand equivalent, percentage of fractured faces, and bulk specific gravity.

.5 All Marshall mix design characteristics, including graphs used in arriving at final mix design, bulk specific gravity of combined aggregates, and asphalt absorption of combined aggregates.

.6 Recommended Design Asphalt Content expressed as a percentage of dry weight of aggregate.

.7 Theoretical maximum specific gravity of asphalt mix design at design asphalt content and at asphalt contents considered above and below design asphalt content.

.8 Identification of each asphalt supplier by name, location and type and grade of asphalt to be supplied.

.9 For each asphalt sample supplied, include the asphalt specific gravity and recommended mixing and compaction temperature for the preparation of design specimens.

.10 Void tables to include air voids, VMA and voids filled with asphalt for various asphalt

content (0.1% increments) and bulk densities (increment of 5 kg/m3).

.5 Verification of Asphalt Mix Design.

.1 Verification of the Asphalt Mix Design will be carried out by the Contractor during the course of production of the first 1,000 tonnes of mix using the Asphalt Mix Design.

.2 During the first 1,000 tonnes of plant production, the Contractor may make any adjustments it chooses to the Asphalt Mix Design, testing the mix, and refining the Asphalt Mix Design to a state that fully complies with Table 32 12 16 – 02 and Table 32 12 16 – 03, Item 2.4 - Asphalt Concrete Mix and Job Mix Formula, Subsection .6 of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement, and these Contract Specifications.

.3 All mix of the Asphalt Mix Design laid must be tracked by the Contractor, and reported to the Departmental Representative, as to lay-down location and the Asphalt Mix Design values in effect at the time that mix was produced, to ensure appropriate values are used in comparing design to sampled properties.

.4 After production of the first 1,000 tonnes, the Contractor shall declare their Job Mix Formula (JMF) to the Departmental Representative and provide volumetric properties / test data on the final mix produced. Any future adjustments to the JMF shall comply with all requirements of Item 2.4 - Asphalt Concrete Mix and Job Mix Formula, Subsection .6 of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement.

.5 Where the JMF varies from the Asphalt Mix Design by a cumulative amount greater than any tolerance specified in Item 2.4 - Asphalt Concrete Mix and Job Mix Formula, Subsection .6.1 of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement, the Contractor shall do a single point confirmatory Asphalt Mix Design and report the results to the Departmental Representative.

.6 A Field Adjustment of Job Mix Formula may be undertaken by the Contractor to improve the quality of the Hot Mix

Asphalt Concrete Pavement and bring or keep the properties of the Hot Mix Asphalt Concrete Pavement in conformance with the requirements for Asphalt Concrete Mix and Job Mix Formula (Item 2.4 – Asphalt Concrete Mix and Job Mix Formula, Subsection .1 through .4 of this specifications section) and Table 32 12 16 -02. A field Adjustment of Job Mix Formula must further comply with the following:

.1 A field adjustment to the Job Mix Formula is defined as a change in the asphalt cement content of the mix, aggregate gradation and/or proportioning of various aggregate sizes, within the specified limits without review and acceptance of a new Asphalt Mix Design. The maximum cumulative field adjustment from the job mix formula shall be:

.1 +/- 2.0% passing the 12.5 mm and 9.5 mm sieve.

.2 +/- 1.5% passing the 4.75 mm, 2.36 mm, 1.18 mm, 0.600 mm, 0.300 mm, and 0.150 mm sieve.

.3 +/- 0.5% passing the 0.075 mm sieve.

.4 +/- 0.3% Asphalt Content.

.2 The proposed field adjustment shall be submitted in writing per Section 01 33 00 – Submittal Procedure together with supporting documentation to the Departmental Representative. The Departmental Representative will review the field adjustment for conformance with the contract requirements and notify the Contractor whether or not it is acceptable.

.4 After the Job Mix Formula has been established in accordance with Item 2.4 - Asphalt Concrete Mix and Job Mix Formula, Subsection .6 of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement, no field adjustment to the Job Mix Formula will be permitted without prior written approval of the Departmental Representative. The Contractor shall be limited to two field adjustments of the Job Mix Formula from the originally derived Asphalt Mix Design.

PART 3 – EXECUTION

3.1 Plant and Mixing Requirements

.1 Mixing plants shall be operated in accordance with manufacturer's recommendations and shall be calibrated

prior to commencing production of the specified Asphalt Concrete Mix.

.2 Storage facilities for Asphalt Cement shall be capable of heating material under effective and positive control and shall contain provision for measuring and sampling. Each tank shall contain only one asphalt cement material.

.3 Contractor shall supply equipment necessary to add additives (if necessary).

.4 Asphalt Concrete Mix Production.

.1 Aggregate and Asphalt Cement shall be combined to produce a uniform mixture of specified gradation at an Asphalt Content in accordance with the approved Job Mix Formula and in which all particles of aggregate are uniformly coated.

.2 The temperature of the asphalt mix measured at the plant discharge chute shall be maintained at plus or minus 15°C of the Design Mixing Temperature designated in the accepted Mix Design, with adjustments within that range made at the Contractor's discretion. Where the Contractor plans to adjust the actual mix temperature to 10°C or more above the Design Mixing Temperature, the Contractor shall notify the Departmental Representative prior to making the adjustment. To optimize mix properties during inclement weather or to address other specific circumstances, the Departmental Representative may agree, in advance, to a higher mixing temperature. Mix produced at a temperature above the upper tolerance limit may be deemed Reject Mix by the Departmental Representative.

.3 Plant emissions shall not exceed the limits set by British Columbia Ministry of the Environment.

.4 Asphalt plant must be equipped with pollution control devices in addition to, or in replacement of standard cyclone dust collectors, to effectively eliminate emission of dust and smoke pollutants into atmosphere. The use of secondary dust collection systems which require discharge of dust polluted water into natural drainage system will not be allowed. Regardless of requirements stated in the above, asphalt plant operation must comply with all

environmental pollution control regulations applicable to the work area.

.5 A uniform mixture shall be produced in which all particles are thoroughly coated. Aggregate particles shall not be coated with residue from fuel combustion.

.6 Contractor shall dispose of rejected Asphalt Concrete Mix in a manner acceptable to Departmental Representative.

3.2 Equipment

.1 Rollers shall be reversible and self-propelled with compaction capability to match plant production rates.

.2 Pavers shall be self-propelled and operated with automatic electronic screed controls to maintain required levels, crossfalls, and joint matching.

.3 Pavers shall have a paver hopper insert with a minimum capacity of 12 tonnes installed in the hopper of conventional paving equipment when a Materials Transfer Vehicle (MTV) is used.

.4 Pavers shall have the option of attaching a “sloper” for use along the outside edge of the Hot Mix Asphalt Concrete Pavement shoulder should the Departmental Representative request its use.

.5 MTV shall be equipped as follows.

.1 To have a truck unloading system which receives the Asphalt Concrete Mix from the hauling equipment and independently delivers mixture from the hauling equipment to the paving equipment.

.2 Has remixing capability by either a storage bin in the MTV with a minimum capacity of 12 tonnes of Asphalt Concrete Mix and a remixing system in the bottom of MTV storage bin, or a dual pugmill system located in the paver hopper insert with two full length transversely mounted paddle mixers to continuously blend the Asphalt Concrete Mix as it discharges to a conveyor system.

.3 Provide the paver with a homogeneous, non-segregated mixture of uniform temperature with no more than 11ºC difference between the highest and lowest temperatures when measured transversely across the width of the mat in a straight line at a

distance of 0.3 m to 0.9 m from the screed while the paver is operating.

.6 If the MTV malfunctions during spreading operations, discontinue placement of Hot Mix Asphalt Concrete after there is sufficient material placed to maintain traffic in a safe manner. Placement of Hot Mix Asphalt Concrete in a lift not exceeding 50 mm may continue until any additional Hot Mix Asphalt Concrete in transit at the time of the malfunction has been placed. Cease spreading operations thereafter until the MTV in operational.

.7 Ensure the MTV is empty when crossing a bridge and is moved across without any other Contractor vehicles or equipment on the bridge. Move the MTV across a bridge in a travel lane and not on the shoulder. Ensure the speed of the MTV is no greater than 8 km/h without any acceleration or deceleration while crossing a bridge.

3.3 Preparation

.1 Failed areas in existing surfaces shall be repaired as directed by Departmental Representative. Areas requiring repair will be identified by Departmental Representative in consultation with Contractor.

.2 Before Hot Mix Asphalt Concrete Pavement is placed, dirt and other objectionable material shall be removed from the surface to be paved, by brooming or other methods.

.3 Existing fillets and ramps at approaches to railway crossings and bridge structures, or adjacent to paved surfaces or other structures, shall be removed to depths shown on plans or in a manner acceptable to Departmental Representative. Removed material shall be disposed of and exposed surfaces shall be prepared in a manner acceptable to Departmental Representative.

.4 Where new surfacing materials are placed against an existing pavement structure, joint shall be of a vertical butt type, well bonded, sealed and finished to provide a continuous, smooth profile across the joint.

.1 Contact edges of existing asphalt mats shall be coated with Asphalt Tack Coat in accordance with Section 32 12 13.16 before placing Hot Mix Asphalt Concrete Pavement.

.2 Existing concrete pavement surface shall be coated with Asphalt Tack Coat in accordance with Section 32 12 13.16 before the asphalt overlay is constructed.

.3 When paving bottom lift of asphalt, apply and let set Asphalt Prime in accordance with Section 32 12 13.23 – Asphalt Prime.

.5 When two or more lifts of Hot Mix Asphalt Concrete Pavement are required, apply Asphalt Tack Coat between each lift in accordance with Section 32 12 13.16 - Asphalt Tack Coat.

.6 Asphalt Prime and Asphalt Tack Coat shall be allowed to cure prior to placing subsequent lifts of Hot Mix Asphalt Concrete Pavement.

3.4 Transportation & Delivery of Mixtures

.1 Trucks used for transportation of the Asphalt Concrete Mix shall be compatible with the size and capacity of the spreading equipment.

.2 Load limit restrictions will be in accordance with British Columbia Highway Traffic Act pertaining to registered weight limits and vehicle size.

.3 Truck boxes shall be clean, free from accumulations of asphalt mix and foreign material.

.4 Excess truck box lubricants such as light oil, detergent or lime solutions shall not be allowed to contaminate the mix and shall be disposed of in an environmentally acceptable manner.

.5 During transport, Asphalt Concrete Mix shall be completely covered to protect it from precipitation and excessive heat loss by securely fastened waterproofed tarpaulins, unless otherwise approved by Departmental Representative.

.6 No loads shall be sent out so late in the day as to prevent completion of spreading and rolling of Hot Mix Asphalt Concrete Pavement during daylight.

3.5 Placing

.1 Hot Mix Asphalt Concrete Pavement shall not be placed when air temperature is below 4°C, or when weather is rainy.

.2 Hot Mix Asphalt Concrete Pavement shall be placed only on clean, dry, and unfrozen surfaces.

.3 Hot Mix Asphalt Concrete Pavement shall be placed in an MTV in advance of the paver.

.4 Hot Mix Asphalt Concrete Pavement shall be placed to the widths, thicknesses, and locations shown on the Contract

Drawings. Unless otherwise shown on the Contract Drawings, Hot Mix Asphalt Concrete Pavement shall be placed in the following lift thickness.

.1 New Construction: Driving Lanes, Shoulder, and Access Road Letdowns. The lifts thicknesses shall be as follows:

.1 Top lift: 50 mm (to be paved over entire road section).

.2 Lower lift: 60 mm.

.3 Bottom lift: 70 mm.

.2 Overlay on Existing Pavement:

.1 50 mm Hot Mix Asphalt Concrete Pavement Overlay (to be placed together with the top lift for new construction).

.5 If, during construction, it is found that the spreading and finishing equipment in operation leaves tracks or indented areas that are not satisfactorily corrected by the scheduled operations, or if it produces other permanent blemishes, the use of such equipment shall be discontinued and other satisfactory spreading and finishing equipment shall be provided by the Contractor.

.6 Longitudinal joints shall not be permitted in driving lane on the final lift of Hot Mix Asphalt Concrete Pavement.

.7 Longitudinal joints shall be offset a minimum of 150 mm from one lift to the next.

.8 Longitudinal and transverse joints shall be vertical butt type, well bonded and sealed, and finished to provide a continuous, smooth profile across the joints. Surplus material will be disposed of in a manner acceptable to the Departmental Representative. Broadcasting surplus material across the mat will not be permitted.

.9 If requested by the Departmental Representative finish the outside edge of the Hot Mix Asphalt Concrete Pavement shoulder using the paver “sloper”. The width, rise, and run of “sloper” to be as agreed to with the Departmental Representative.

.10 If required by the Departmental Representative the contact edge of any mat placed by the Contractor shall be coated with Asphalt Tack Coat before placing the adjacent mat.

.11 When paving is temporarily discontinued in any lane, the mat shall be tapered to a slope of 10 horizontal to 1 vertical. The taper may be placed on tar paper and shall be removed when paving is resumed. The transverse joint shall be straight and have a vertical face when the taper is removed.

.12 Transverse construction joints from one lift to the next shall be separated by at least 2 meters.

.13 Where the construction of a final lift of pavement next to a concrete curb section or curb and gutter section will be delayed, the Contractor shall construct a temporary asphalt concrete fillet next to the concrete section in accordance with the plans or as directed by the Departmental Representative. These fillets shall be removed when paving is resumed.

.14 Road intersections and entrances shall be paved in accordance with the plans or as directed by the Departmental Representative. Unless otherwise permitted by the Departmental Representative, the Hot Mix Asphalt Concrete Pavement shall be spread on intersections by means of a paver as paving of the main lanes progress.

.15 Contact faces of curbs, gutters, manholes, and sidewalks shall be coated with asphalt using a hand applicator before placing the Hot Mix Asphalt Concrete Pavement.

3.6 Compaction

.1 All Hot Mix Asphalt Concrete Pavement shall be free from segregation, waves, hairline cracks, and other obvious defects after final rolling of mat.

.2 After final rolling is complete, Contractor shall ensure finished mat has cooled a minimum of 2 hours before opening to traffic.

.3 Lubricants such as light oil, fuel oil, detergent or lime solutions shall not be allowed on rollers. Hot Mix Asphalt Concrete Pavement will be rejected if Asphalt Concrete Mix is contaminated by any lubricants other than water.

.4 Contractor should take core samples to determine actual pavement density. At the start of paving, the Contractor should take a minimum of two pavement cores from each Sub-Lot. The Contractor may employ a nuclear densometer to ensure intermediate density control. Two nuclear densities may be determined for each Sub-Lot, based on accepted

Asphalt Concrete Mix densities obtained from the most recent mix briquettes.

3.7 Temporary Line Markings

.1 The Contractor shall provide daily interim centreline painted traffic markings (spotting) on all newly constructed Hot Mix Asphalt Concrete Pavement to be exposed to traffic overnight.

.2 All temporary pavement marking shall be completed per the requirements of Section 4.4.2 of the British Columbia Ministry of Transportation Traffic Manual for Work on Roadways – 2020 Office Edition.

PART 4 – PAYMENT ADJUSTMENTS AND REJECTION LIMITS

4.1 General

.1 The Hot Mix Asphalt Concrete Pavement will be subject to the Payment Adjustments and Rejection Limits as detailed in this section. PSPC's Quality Assurance testing results will be used to determine the Payment Adjustment amounts (bonus / penalty) and to determine if the minimum Rejection Limits are achieved (acceptance or rejection) of the Hot Mix Asphalt Concrete Pavement.

Payment Adjustment amounts will be made via change order following Substantial Performance of the project.

Hot Mix Asphalt Concrete Pavement which does not achieve minimum rejection limits will be subject to correction and or rejection without payment.

Unit Price Adjustments and Rejection Limits will apply to the following end product properties of the Hot Mix Asphalt Concrete Pavement as detailed in Section 4.2 – 4.8 of this specification.

.1 Pavement Density (Unit Price Adjustments and Rejection Limits).

.2 Asphalt Content (Unit Price Adjustments and Rejection Limits).

.3 Aggregate Gradation (Rejection Limits only).

.4 Material Application Rate (Unit Price Adjustments and Rejection Limits).

.5 Surface Segregation (Rejection Limits only).

.6 Smoothness (Unit Price Adjustments and Rejection Limits.

.7 Workmanship Defects (Rejection Limits only).

.2 For the first 1000 tonnes of Asphalt Concrete Mix produced under a contract the following provisions take precedence over all other payment adjustment provisions of Section 4.2 – 4.8 of this specification, but do not take precedence over the rejection criteria.

.1 Unless requested otherwise by the Contractor in writing in advance of Asphalt Concrete Mix production, the first 1,000 tonnes of Asphalt Concrete Mix production and placement shall not be subject to the bonus/penalty payment adjustments for Asphalt Cement content, density, and gradation. Payment adjustments will apply to smoothness, segregation, and material application rate if the Hot Mix Asphalt Concrete Pavement is applied in a Top Lift location.

.2 Contrary to any other provision of this specification for Hot Mix Asphalt Concrete Pavement, any Asphalt Concrete Mix produced during the initial 1,000 tonnes will only be considered acceptable if.

.1 The Asphalt Mix Design has been reviewed and accepted by the Departmental Representative.

.2 Aggregate gradation per Item 2.1 – Aggregate of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement is within the gradation limits specified in Table 32 12 16 – 02, or in the banana formed by applying the Table 32 12 16 - 06.

.3 All other properties fall inside the allowable limits specified in this specification for the Hot Mix Asphalt Concrete Pavement including the marshal design, Table 32 12 16 – 03.

.4 Asphalt Cement content of the sample is within +/- 0.5% of the design value for top lift and is within +/- 0.55% of the design value for the bottom lift.

All values are measured against the Asphalt Mix Design value at the time the sampled mix was produced.

Any Asphalt Concrete Mix with any characteristic outside the limits listed above is Reject Mix. Additionally, rejection limits for smoothness, segregation, density, application rate, and workmanship defects shall apply in accordance with this specification.

4.2 Pavement Density

.1 Payment Adjustments: Payment Adjustments for pavement density will be made on the average Marshall Percent Density for each Lot as follows:

$$\text{Marshall Percent Density} = \frac{\text{In-place Density (core sample)}}{\text{Marshall Briquette Density}} \times 100$$

.1 In-Place Density: The average in-place density will be determined from core samples of the completed Lift of pavement. One random core sample from each Sub-Lot will be tested and the test results for the Sub-Lots will be averaged to determine the in-place density for the Lot.

.2 Marshall Briquette Density: The Marshall briquette density will be determined by forming three (3) briquettes from the sample selected for Quality Assurance testing for each sub-lot. The test results will be averaged to obtain a Marshall Briquette Density for the Lot.

Note: the samples shall be allowed to cool and then reheated to form briquettes.

.3 Should the initial test results for Marshall Percent Density in any Sub-Lot be lower than 97.0%, one additional core shall be taken within the Sub-Lot and tested, result shall be averaged with the initial result to determine the Marshall Percent Density for the Sub-Lot.

.4 Payment adjustment for pavement density will be the amount shown in Table 32 12 16 – 04 for the Sample Mean of the test results for that Lot.

Table 32 12 16 – 04: Payment Adjustment for Density	
Marshall % Density (Lot Average)	**Payment Adjustment ($ per tonne) for Design Lift Thickness**
≥ 98.0	$1.50
≥ 97.5 to < 98.0	$1.00
≥ 97.0 to < 97.5	$0.50
≥ 96.5 to < 97.0	-$1.00
≥ 96.0 to < 96.5	-$2.00
< 96.0	Reject

.2 Rejection Limits: If any Sub-Lot has a Marshall Percent Density below 96.0%, the Sub-Lot will be considered rejectable (regardless of the values of other acceptance parameters) and subject to the Contractor's opportunity to correct the density, will be rejected and not paid for. The Contractor shall either overlay or remove and replace the previously placed area of reject Hot Mix Asphalt Concrete Pavement (see Item 4.10 – Asphalt Concrete Overlays as a Corrective Measure, subsection .1 and .2 of this specification). To minimize the cost of rejection to the Contractor, the Contractor will be provided the opportunity to isolate the area of low density within the Sub-Lot. The limits of the rejected area shall be verified and accepted by the Departmental Representative before remedial work proceeds.

.3 Payment Adjustments for Pavement Density Rejected Work Made Acceptable: Payment Adjustments for pavement density rejected work made acceptable will be based on testing of the replacement or Asphalt Concrete Overlay material where applicable. Where replacement or Asphalt Concrete Overlay material does not cover the entire Lot or Sub-Lot, prior tests of the uncovered area or remaining area will be averaged with new tests on the corrective work.

.4 Pavement Density Testing: Pavement density testing will be completed in accordance with.

.1 ASTM D6926 (latest edition) – Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus.

.2 ASTM D2726 (latest edition) - Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.

4.3 Asphalt Content

.1 Payment Adjustments: Payment Adjustments for Asphalt Content will be made on the average Asphalt Content for each Lot obtained from all of the Sub-Lots samples as follows.

.1 Determination of Asphalt Content will be made from random loose Quality Assurance samples obtained from each Sub-Lot (3 per Lot) and tested in accordance with ASTM test procedures.

.2 Asphalt Content of Hot Mix Asphalt Concrete Pavement will be determined using average of results obtained from all Sub-Lot samples. The Actual Asphalt Content of Lot will be compared to Job Mix Formula Asphalt Content and the deviation will be used for Payment Adjustment purposes.

.3 Payment Adjustments for Asphalt Content will be the amount shown in Table 32 12 16 - 05.

Table 32 12 16 – 05: Payment Adjustment for Asphalt Content

Deviation from Actual Asphalt Content from Approved Asphalt Content (% of Dry Aggregate, Lot Average)	Payment Adjustment for Asphalt Content $ per tonne	
Percent Greater than Specified in JMF	**Top Lift**	**Lower Lift**
≥ -0.05 to ≤ 0.35	$0.00	$0.00
> 0.35 to ≤ 0.40	-$2.00	-$2.00
> 0.40 to ≤ 0.45	-$3.50	-$3.50
> 0.45 to ≤ 0.50	-$5.00	-$5.00
> 0.50 to ≤ 0.55	Reject	-$6.50
> 0.55	Reject	Reject
Percent Less than Specified in JMF	**Top Lift**	**Lower Lift**
≥ -0.05 to ≤ 0.20	$0.00	$0.00
> 0.20 to ≤ 0.30	-$1.00	-$1.00
> 0.30 to ≤ 0.35	-$3.00	-$3.00
> 0.35 to ≤ 0.40	-$5.00	-$5.00
> 0.40 to ≤ 0.45	-$7.00	-$7.00
> 0.45 to ≤ 0.50	-$8.00	-$8.00
> 0.50 to ≤ 0.55	Reject	-$9.00
> 0.55	Reject	Reject

.2 Rejection Limits: Rejection limits for Asphalt Content are the limiting values of the sample mean as shown in Table 32 12 16 - 05, beyond which the Lot is rejected and not paid for. If Asphalt Content of a Lot is outside acceptance limits, the Lot is rejected automatically regardless of values of other acceptance parameters. For top lift deviation of more than 0.50%, the Contractor shall either overlay or remove and replace the Lot (see 4.10 – Asphalt Concrete Overlays as a Corrective Measure). For lower lift deviations of more than 0.55%, the Departmental Representative will determine whether removal and replacement are necessary. For material that is allowed to stay in place, a deduction at 50% of the unit price bid per tonne of material will be implemented.

.3 Payment Adjustments for Asphalt Content Rejected Work Made Acceptable: Payment Adjustments for Asphalt Content rejected work made acceptable will be based on testing of the replacement or Asphalt Concrete Overlay material where applicable. Where replacement or Asphalt Concrete Overlay material does not cover the entire Lot or Sub-Lot, prior tests of the uncovered area or remaining area will be averaged with new tests on the corrective work.

.4 Asphalt Content Testing: Asphalt Content testing will be completed in accordance with.

.1 ASTM D6307 – Standard Test Method for Asphalt Content of Asphalt Mixture by Ignition Method. Note: the ignition oven calibration factor will be applied to Asphalt Content measured by the ignition oven, and the corrected Asphalt Content used to determine acceptability of the mix and any payment adjustments.

4.4 Aggregate Gradation

.1 Payment Adjustments: Payment Adjustments for aggregate gradation will not be made.

.2 Rejection limits: Where one or more values of the sample mean for the specified sieves falls outside the Limits for Aggregate Gradation (Divergence from Job Mix Formula Grading Curve) specified in Table 32 12 16 - 06, or the requirements for fracture as specified in Table 32 12 16 - 01 is not achieved, the Lot is rejected and not paid for regardless of the values of other acceptance parameters. For top lifts the Contractor shall either overlay or remove and replace the Lot (see 4.10 – Asphalt Concrete Overlays as a Corrective Measure). For bottom lifts the lift shall remain in place, however no payment will be made for this lot.

.3 Payment Adjustments for Aggregate Gradation Rejected Work Made Acceptable will not be made.

.4 Rejection limits: Rejection limits for aggregate gradation rejected work made acceptable will be based on testing of the replacement or Asphalt Concrete Overlay material where applicable.

.5 Aggregate Gradation Testing: Aggregate Gradation testing will be completed in accordance with.

.1 ASTM C117 – Standard Test Method for Materials Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

Table 32 12 16 – 06: Reject Limits for Aggregate Gradation (Divergence from Job Mix Formula Grading Curve), Percentage passing by mass ASTM C117 and C136

Sieve Size (mm)	Limiting Values for Acceptance (%)
12.5	+/- 7.0
4.75	+/- 6.0
0.6	+/- 4.0
0.07	+/- 1.5

4.5 Material Application Rate

.1 Payment Adjustments: Payment Adjustments for material application rate will be made on the actual material application rate, expressed as a percentage of the specified material application rate for each Lot as follows.

.1 Hot Mix Asphalt Concrete Pavement will be applied to roadway at rate specified on the drawings, contract specifications, or as directed in writing by Departmental Representative. Material application rates will be determined by tonnage delivered to paver as recorded by weigh tickets generated by automated scales, divided by the area covered by the Lot after allowances have been made for entrance letdowns and/or intersections. Contractor will provide material application rate calculations to Departmental Representative at end of each shift.

.2 Payment Adjustments for material application rate will be the amount shown in Table 32 12 16 – 07, based on the actual material application rate, expressed as a percentage of the specified material application rate.

Table 32 12 16 – 07: Payment Adjustments for Material Application Rates		
Actual Application Rate Expressed as % of Specified Application Rate	**Payment Adjustment $ Per Tonne of Material in the Lot**	
	Bottom Lift or Levelling Course	**Top Lift**
≥ 110	-$7.00 for all material in the Lot up to 110% and no payment for product in excess of 110.0%	-$7.00 for all material in the Lot up to 106% and no payment for product in excess of 106.0%
≥ 106.0 to < 110.0	-$5.00	
≥ 105.0 to < 106.0		-$5.00
≥ 104.0 to < 105.0	-$1.00	-$3.00
≥ 96.0 to < 104.0	+$0.50	+$0.50
≥ 94.0 to < 96.0	-$2.00	-$2.00
≥ 92.0 to < 94.0	-$3.00	-$3.00
≥ 90.0 to < 92.0	-$4.00	-$4.00
≥ 85.0 to < 90.0	-$7.00	-$7.00
< 85.0	Reject	Reject

.2 Rejection Limits: Where actual material application rate for the Lot is within the reject zone as shown in Table 32 12 16 - 07, the Lot is rejected with no payment made for the Lot. A Lot rejected for material application rate may be corrected by mill and fill (see 4.10 – Asphalt Concrete Overlays as a Corrective Measure), and/or rejected with no remedial work required at the discretion of Departmental Representative.

.3 Payment Adjustments for Material Application Rejected Work Made Acceptable: Payment Adjustments for material application rejected work made acceptable will be based on the material application rate of the final product (remedial mill and fill combined with any remaining Asphalt Concrete Mix) for the Lot.

4.6 Surface Segregation

.1 Payment Adjustments: Payment Adjustments for surface segregation will not be made.

.2 All top lift segregation (slight, moderate, and severe) shall be repaired such that the finished pavement surface is homogeneous, free from segregation and shall be uniform with respect to surface texture. A segregated area is defined as an area within the driving lanes of the pavement wherein the texture differs visually from the texture of the surrounding pavement.

.3 Determination of Segregation.

.1 The Contractor and Departmental Representative shall establish through use of photographs as contained in the Alberta Transportation – Paving Guidelines and Segregation Rating Manual (2002), the visual appearance as provided in Table 32 12 16 - 08, and / or other mutually agreed tools, the definition of slight, moderate and severe segregation.

.2 At the request of the Departmental Representative, the Departmental Representative and Contractor shall evaluate first two Lots upon completion of the second Lot, after opening to traffic, to confirm "agreed to" guidelines.

.3 Contractor and Departmental Representative will observe finished pavement to evaluate the existence, severity and extent of segregation and other defect only when all paving is complete.

.4 Evaluation will be completed following substantial performance of the work prior to Completion.

.4 Repair of Surface Segregation.

.1 On the top lift, all segregation, including any areas outside the driving lanes assessed for Payment Adjustments shall be repaired according to Table 32 12 16 – 08.

.2 All segregated patch repairs shall be completed to a rectangular shape.

.3 Repairs shall be to the neat lines and dimensions of the segregated areas using sand cement slurry or other product acceptable to the Departmental Representative. Acceptable sand cement slurry can be made as follows, with proportions varied as needed for workability.

.1 25 liters of ss-1 (or equivalent) emulsions.

.2 4 – 5 kg (2 shovels) of ≤ 3 mm sand.

.3 2 – 3 kg (1 shovel) Type GU (general use) Portland Cement.

.4 Additional water, if needed for workability.

.5 Or other products preapproved by the Departmental Representative.

.4 After repairs, the Lot will be re-evaluated for acceptance, not for segregation Payment Adjustment.

.5 Continuous or semi-continuous longitudinal blemishes which have not been rated as segregated areas shall be repaired using a fog coat where directed by Departmental Representative.

.6 Repairs shall be carried out by the Contractor at his own expense and will not affect the assessment of Pay Adjustments for segregation.

.7 If an Asphalt Concrete Overlay is used as a corrective measure on a defective Lot, the Asphalt Concrete Overlay thickness will be subject to approval of Departmental Representative. Where an Asphalt Concrete Overlay is used as a corrective measure in any lane, adjacent lane(s) shall also be overlaid to same thickness and length, regardless of whether adjacent lanes were acceptable or not. The Asphalt Concrete Overlay will be subject to same specifications as original pavement. Minimum thickness of Asphalt Concrete Overlay shall be 40 mm.

.8 Whether the Asphalt Concrete Overlay is applied as a corrective measure or is placed over otherwise acceptable pavement in order to match an adjacent lane, acceptability and payment will be determined as follows.

.1 Acceptability, and eligibility for either positive or negative Payment Adjustment, will be determined entirely on the results of testing and observations conducted on the Asphalt Concrete Overlay, regardless of test results that have been obtained on the underlying, overlaid lift of pavement.

Table 32 12 16 – 08: Segregation - Remediation Methodology			
Segregation Severity	**Visual Appearance**	**Repair Procedures**	**Lift**
None	Uniform surface texture	N/A	Top
Slight	Matrix of asphalt binder, coarse and fine aggregate exists, visually increased presence of stone sizes.	Sand, asphalt emulsion slurry	Top
Moderate	Significantly more stone than surrounding pavement; matrix of asphalt binder and coated sand particles is reduced	Seal coat or sand asphalt emulsion slurry patch or neat hot mix patch or mill and fill patch	Top
Severe	Appears as an area of very stony mix - stone against stone - little or no matrix	Remove and replace or overlay to limits defined by Departmental Representative	Top and bottom

4.7 Smoothness

.1 Smoothness Deficiencies: Smoothness deficiencies (bumps and dips) less than 12 mm over 3 m will not have remedial work required. Individual deficiencies between 8 mm and 12 mm over 3 m will result in a -$200.00 Payment Adjustment for each occurrence. Deficiencies exceeding 12 mm over 3 m will require remedial work.

.2 Remedial Work: If the test results on a Sub-Lot(s) of pavement indicate a payment reduction or rejection because of smoothness, the Contractor may propose remedial work to improve the smoothness. Such proposals are subject to approval of the Departmental Representative, but such approval does not imply the proposed remedy will be successful and does not reduce the Contractor's responsibility for meeting the acceptance requirements. Grinding may be acceptable, but an Asphalt Concrete Overlay may be required. Only one attempt may be made to improve smoothness, and this must be completed within ten (10) calendar days from the time the Contractor receives notification from the Departmental Representative of the original smoothness test results for that Sub-Lot.

No payment will be made for any material, equipment or labour used to improve, or attempt to improve, smoothness.

.3 Payment Adjustments for Smoothness Rejected Work Made Acceptable: Following any attempt to improve the smoothness of a Sub-Lot or Sub-Lots, the Departmental Representative will retest the Sub-Lot(s), and the new results will replace the previous data for the purposes of determining acceptance and payment.

4.8 Workmanship Defects

.1 Finished surface of any lift shall have a uniform close texture and be free of visible signs of poor workmanship. Any obvious defects as determined by Departmental Representative such as, but not limited to the following, will be cause for automatic rejection of Hot Mix Asphalt Concrete Pavement regardless of the values of any other control characteristic.

.1 Individual bumps and dips that exceed 12 mm over a 3 m length.

.2 Areas of excess or insufficient asphalt.

.3 Improper matching of longitudinal and transverse joints.

.4 Roller marks.

.5 Tire marks.

.6 Cracking or tearing.

.7 Improperly repaired sampling locations.

.8 Improperly constructed patches.

.2 When Hot Mix Asphalt Concrete Pavement is rejected by reason of obvious defects, the minimum area of rejection will be the actual length of the defect for the full width of the driving lane in which the defect exists.

.3 Rejected work shall be promptly repaired, remedied, overlaid, or removed and replaced all in a manner acceptable to Departmental Representative. Contractor shall be responsible for all costs including materials.

.4 No payment will be made for work in any Lot which has been rejected, until defects have been remedied.

4.9 Appeal Testing

.1 Density, Asphalt Content and Gradation.

.1 Contractor may appeal results of acceptance testing of density or Asphalt Content for any rejected or penalized Lot only once. Appeals will only be considered if cause can be shown. Appeal shall be for all tests within the Lot, and there will be no appeal allowed for single tests within a Lot. Quality Control tests for density which are provided to Departmental Representative after Contractor's receipt of Quality Assurance test results for that Lot

will not be considered when evaluating cause for an appeal.

.1 Any attempt to improve density on the appeal Lot after Departmental Representative has tested the Lot for acceptance shall void the appeal and original test results will apply.

.2 Following procedures will apply for an appeal:

.1 Contractor shall serve notice of appeal to Departmental Representative, in writing, within 48 hours of receipt of test results with exception of appeals for gradation and Asphalt Content where appeal period will be within 72 hours of receipt of test results.

.2 Departmental Representative will arrange and pay for an independent testing laboratory to perform appeal testing. Neither personnel employed or testing laboratory retained by Contractor for Quality Control testing nor personnel employed or testing laboratory retained for quality assurance testing for PSPC/Departmental Representative on project will be used for appeal testing.

.3 The appeal testing laboratory shall hold current certification from the Canadian Council of Independent Laboratories (CCIL) (http://www.ccil.com/) under both the Asphalt Laboratory and Aggregate Laboratory Certification Programs, and at least one technician in the asphalt laboratory shall hold current certification under the Asphalt Technician Certification Program.

.4 For Density appeals the Contractor will within 2 working days of filing the appeal and in the presence of the Departmental Representative take 5 core samples from random locations from a Sub-Lot and provide the core samples to the Departmental Representative. The Departmental Representative will provide the core samples and the companion loose Asphalt Concrete Mix samples from the

appealed Sub-Lots to the independent appeal testing laboratory.

.5 For Density, the appeal agency shall prepare new briquette densities from the previously taken companion samples. The appeal agency shall determine the BRD/MTD from the companion sample and the densities of the cores and report the results to the Departmental Representative and the Contractor. The original core test results will be discarded, and a new sample mean will be calculated from the 5 random cores and shall be used for acceptance and Payment Adjustments for the Sub Lot. The new results will be binding on the Contractor and PSPC.

.6 For Asphalt Content and gradation, the original test results will be discarded. A new sample mean for three new test results will be determined using the appeal samples and will be used for acceptance and Payment Adjustments. New results will be binding on the Contractor and PSPC.

.2 Smoothness.

.1 The Contractor may appeal acceptance test results of smoothness of any rejected or penalized Lot once. The appeal shall be in writing and submitted within 72 hours of receipt of the test results.

.2 Any attempt to improve smoothness on the appealed Lot after the Departmental Representative has tested the Lot for acceptance shall void the appeal and the original test results will apply.

.3 The appeal testing will be performed by the Departmental Representative, and the Contractor will be given the opportunity to witness, the appeal testing, and new results will be binding on the Contractor and PSPC.

.3 Surface Segregation, Material Application Rate, and Workmanship Defects.

.1 The Contractor’s appeal of surface segregation ratings must be done in writing and submitted within 72 hours of receipt of Ratings.

.2 Appeal of surface segregation ratings will first be handled by a joint review with the Contractor within 14 calendar days of receipt of written notice of appeal.

.3 If consensus cannot be reached then PSPC and the Contractor will engage a mutually agreed upon third party to assess the area(s) in question. New values will be binding on the Contractor and PSPC.

.4 Payment for Appeal Testing

.1 If the new results indicate a change in the Payment Adjustment in the Contractor's favour, then sampling and testing costs incurred during the appeal procedures for that Lot will be borne by PSPC.

.2 If the new results verify that any payment reductions or rejections remains valid for that Lot, then the costs of testing (plus 10% mark-up) incurred during the appeal procedure will be charged to the Contractor.

4.10 Asphalt Concrete Overlays as a Corrective Measure

.1 If an Asphalt Concrete Overlay is used as a corrective measure on a defective Lot or Sub-Lot, the overlay thickness will be subject to approval of Departmental Representative. Where an Asphalt Concrete Overlay is used as a corrective measure in any lane, adjacent lane(s) shall also be overlaid to same thickness and length, regardless of whether adjacent lanes were acceptable or not. The overlay will be subject to same specifications as original pavement, except minimum thickness of overlay shall be 40 mm.

.2 Whether the Asphalt Concrete Overlay is applied as a corrective measure or is placed over otherwise acceptable pavement in order to match an adjacent lane, acceptability and payment will be determined as follows:

.1 Acceptability, and eligibility for either positive or negative Payment Adjustment, will be determined entirely on the results of testing and observations conducted on the Asphalt Concrete Overlay, regardless of test results that have been obtained on the underlying, overlaid lift of pavement; but

.2 The payment quantity, for application of the Unit Prices for Hot Mix Asphalt Concrete Pavement, and the quantity, to which any Payment Adjustment is to be applied, will be derived from the tonnage of

Asphalt Concrete Mix in the underlying, overlaid lift.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

PART 2 – PRODUCTS:

2.1 Products.

PART 3 – EXECUTION:

3.1 Equipment.

3.2 Installation.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for Rumble Strips will be made on the basis of the Price per Unit Bid for Rumble Strips in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with the equipment, labour, materials, and installation of the Rumble Strips as indicated on Contract Drawings, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Rumble Strips will be made on the length of Rumble Strips measured in kilometers, measured parallel to the direction of the highway centerline, and accepted by the Departmental Representative. The shoulder Rumble Strips on each shoulder of the highway shall be measured separately then added together to get the total quantity. Gaps in the Rumble Strips (i.e. intersections) shall be included in the total quantity unless the gap exceeds 200 m.

PART 2 – PRODUCTS

2.1 Products

.1 Not Used.

PART 3 – EXECUTION

3.1 Equipment

.1 The milling machine shall be equipped to meet or exceed the following requirements:

.1 The cutting head shall be capable of producing grooves meeting the requirements as shown on the Contract Drawings.

.2 The machine shall either be equipped with an integral sweeping device mounted directly behind the cutter or, a separate sweeping operation shall be

conducted as construction of the Rumble Strips progresses within the signed construction zone.

3.2 Installation

.1 Install patterned Rumble Strips in the locations and layout as shown on the Contract Drawing.

.2 Shoulder Rumble Strips shall not extend across intersections, tapers or accesses as indicated on the Contract Drawings or as directed in the field by the Departmental Representative.

.3 After milling the grooves, the Contractor shall pickup and dispose of all detritus created from the milling operation.

.4 Patterns of milled Rumble Strips constructed outside the tolerances as shown on the plans or exhibiting obvious defects will be rejected, and the Contractor shall be responsible for repairing the unacceptable work.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

PART 2 – PRODUCTS:

2.1 Water.

PART 3 – EXECUTION:

3.1 Dust Control Using Water.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Measurement for Payment for the completion of dust control using water shall not be made and shall be considered incidental to the work.

PART 2 – PRODUCTS

2.1 Water

.1 If necessary, apply for necessary environmental permits for the extraction of water from local sources.

PART 3 – EXECUTION

3.1 Dust Control Using Water

.1 Complete dust control using water over the full width of all utilized driving lanes whenever:

.1 Dust from travelling vehicles impairs driver's vision such that objects greater than 150 mm are obscured.

.2 As deemed necessary by the Departmental Representative.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

PART 2 – PRODUCTS:

2.1 Paint.

PART 3 – EXECUTION:

3.1 Equipment.

3.2 Layout and Location of Work.

3.3 Dimensions of Lines.

3.4 Condition of Surfaces.

3.5 Application.

3.6 Tolerances.

3.7 Protection of Completed Work.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for the Pavement Markings will be made on the basis of the Lump Sum Price in the Bid and Acceptance Form. The Lump Sum Price shall include all costs included with the layout, eradication of previous paint marks (where required), supply and installation of the line painting, traffic arrows, stop bars, median yellow hatches, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Pavement Markings will be made on the Lump Sum Price.

PART 2 – PRODUCTS

2.1 Paint

.1 Paint.

.1 To CGSB 1 206 M89, alkyd traffic paint.

.2 Color: to CGSB 1-GP-12C, yellow 505 – 308 and 1-GP-12C, white 513 – 301.

.2 Thinner.

.1 To CGSB 1-GP-5M.

.3 Glass Beads.

.1 Overlay Type: to CGSB 1-GP-74M.

PART 3 – EXECUTION

3.1 Equipment

.1 Provide all equipment including but not limited to painting truck, pilot truck and ancillary equipment to load and transport materials.

.2 Painting truck to apply paint and beads as specified.

.3 Eradicator to remove lines if required as directed by Departmental Representative.

3.2 Layout and Location of Work

.1 Layout work as follows.

.1 Contractor shall be responsible for all pre-marking required to properly apply markings.

.2 Paint line types in the locations as provided on the Contract Drawings.

.2 Paint pavement markings shall follow the current BC Ministry of Transportation and Highway's Manual of Standard Traffic Signs & Pavement Markings. The pavement types are as follows:

.1 Solid 100mm white edge or left turn line.

.2 100mm white continuity line 3m line – 3m gap

.3 Double solid 100mm yellow line.

.4 Solid 100mm yellow line.

.5 Yellow pavement hatch for median (chevrons).

.6 White pavement arrow.

.7 White 600mm stop bar.

3.3 Dimensions of Lines

.1 Dimensions of lines as per Contract Drawings.

3.4 Condition of Surfaces

.1 Contractor is to ensure that pavement surface is free from surface water, frost, ice, dust, oil, grease, and other foreign materials as required before painting.

3.5 Application

.1 Set up traffic control.

.2 Clean pavement surface of water, frost, ice, dust, gravel, oil, or grease.

.3 Apply paint only when air temperature is above 10°C and no rain is forecast for 6 hours.

.4 Apply paint evenly at a wet film thickness of 400 micrometers, or 45 litre/Km of solid 100 mm line.

.5 Do not thin paint unless approved by Departmental Representative.

.6 Symbols and letters to conform to Uniform Traffic Control Devices for Canada.

.7 Paint lines to be uniform color and density with sharp edges.

.8 Thoroughly clean distributor tank before refilling with paint of different color.

.9 Apply glass beads at rate of 700-grams/ litre of paint.

.10 Remove traffic control.

3.6 Tolerances

.1 Paint markings to be within plus or minus 12 mm of indicated dimensions.

.1 Paint thickness to be within plus or minus 10% of specified thickness or volume.

.2 Application of glass beads to be within 25 grams/litre of paint.

.3 Repaint or correct, as directed, markings that do not meet these tolerances.

3.7 Protection of Completed Work

.1 Protect pavement markings until dry.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 Product Data.

1.3 Scheduling.

1.4 Product Handling and Storage.

PART 2 – PRODUCTS:

2.1 Materials.

2.2 Equipment.

PART 3 – EXECUTION:

3.1 Workmanship.

3.2 Protection of Surfaces.

3.3 Preparation of Slurry.

3.4 Slurry Application.

3.5 Warranty and Maintenance.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for hydraulic seeding will be made on the basis of the Price per Unit Bid for Hydraulic Seeding in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for supply, placement, warranty, and maintenance of the Hydraulic Seeding in all areas of topsoil, cut slopes, excavation, access development, and other disturbed areas as detailed in these specifications or as directed by the Departmental Representative.

.2 Measurement for Payment for completion of Hydraulic Seeding will be made on the area of material surveyed in hectares, incorporated in the works, and accepted by the Departmental Representative.

1.2 Product Data

.1 Provide product data, prior to seeding for:

.1 Seed:

.1 Shipping Bill: issued by supplier of material, identifying manufacturer and supplier,

material, and net mass or volume in each container.

.2 Biotic Soil Media.

.1 Shipping Bill: issued by supplier of material identifying manufacturer and supplier, material, and net dry-air mass in each container.

.3 Hydraulic Erosion Control Product (HECP).

.1 Shipping Bill: issued by supplier of material, identifying manufacturer and supplier, material, and net dry-air mass in each container.

.4 Fertilizer

.1 Shipping Bill: issued by supplier of material, identifying manufacturer and supplier, material, and net dry-air mass in each container.

.2 Guarantees.

.3 Chemical Analysis.

.2 Unless advised otherwise in advance of the work by the Departmental Representative, submit in writing to the Departmental Representative 14 days prior to commencing work:

.1 Volume capacity of hydraulic seeder in litres.

.2 Amount of material to be used per tank based on volume.

.3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

1.3 Scheduling

.1 Schedule hydraulic seeding to coincide with the completion of surface on which the hydraulic seeding shall be applied and Construction Staging requirements as outlined in Section 01 14 00 – Work Restrictions, Access Development, Construction Staging, and Restoration.

1.4 Product Handling and Storage

.1 Deliver and store seed in original containers individually labeled in accordance with “Seeds Regulations” and indicating name of supplier.

.2 Deliver and store mulch, tackifier, and fertilizer in moisture-proof containers displaying product date.

.3 Protect all product as required during transportation and storage.

.4 Remove from project area, product that has become wet or otherwise damaged during transportation or storage or does not meet requirements specified.

PART 2 – PRODUCTS

2.1 Materials

.1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.

.1 Grass Mixture: "Certified", Canada No. 1 seed for common cultivars in accordance with Government of Canada Seeds Act and Regulations and shall conform to the following:

Table 32 93 21 – 01: Grass Seed Mix

% By Weight	Species
30%	Creeping Red Fescue
20%	Slender Wheatgrass
10%	Alsike Clover
10%	Timothy
10%	Canada Bluegrass
15%	Smooth Brome Grass
5%	Sheep Fescue

.2 Fall rye.

.2 Biotic Soil Media shall be a Wood Fibre Based Product certified for use in Canada containing the following ingredients:

.1 Renewable Thermally Refined Bark and Wood Fibers.

.2 Biochar.

.3 Cross-Linked Polysaccharide Biopolymers.

.4 Soil Building Components containing Seaweed Extract, Humic Acid, and Endomycrrhizae.

.3 Hydraulic Erosion Control Product (HECP) shall be a Wood Fibre Product certified for use in Canada with the following properties as detailed in Table 32 93 21 – 02:

Table 32 93 21 – 02: HECP		
Physical Properties (1)	**Test Method**	**Test Value**
Thickness	ASTM D6525 (2)	≥ 4 mm
Ground Cover	ASTM D6567 (2)	≥ 98%
Mass/Unit Area	ASTM D6566 (2)	≥ 390 g/m^2
Water Holding Capacity	ASTM D7367	≥ 1,400%
Material Color	Observed	Green
Physical Properties (1)	**Test Method**	**Test Value**
Cover Factor (3)	Large Scale (5)	≤ 0.05
Percent Effectiveness (4)	Large Scale (5)	≥ 95%
Cure Time	Observed	4 – 24 Hours
Vegetation Establishment	ASTM D7322 (2)	≥ 600%
Functional Longevity	ASTM 5338	≤ 12 Months
Environmental Properties (1)	**Test Method**	**Test Value**
Ecotoxicity	EPA 2021.0	48-hr LC_{50}> 100%
Biodegradability	ASTM D5338	Yes
Product Composition		**Typical Value**
Thermally Processed (7) (within a pressurized vessel) Virgin Wood Fiber		77%
Wetting Agents - including high-viscosity, colloidal polysaccharides, crossed-linked biopolymers and water absorbents (>10% of total formulation)		18%
Crimped, Biodegradable Interlocking Fibers		2.5%
Micro-Pore Granules		2.5%

Notes:

(1) When uniformly applied at a rate of 3,500 pounds per acre (3,900 kilograms/hectare) under laboratory conditions.

(2) ASTM test methods developed for Rolled Erosion Control Products that have been modified to accommodate Hydraulic Erosion Control Products.

(3) Cover Factor is calculated as soil loss ratio of treated surface versus an untreated control surface.

(4) % Effectiveness = One minus Cover Factor multiplied by 100%.

(5) Large scale testing conducted at Utah Water Research Laboratory and Texas Transportation Institute. For specific testing information please contact a Profile technical service representative at 800-508-8681.

(6) Functional Longevity is the estimated time period, based upon ASTM D5338 testing and field observations, that a material can be anticipated

to provide erosion control and agronomic benefits as influenced by composition, as well as site-specific conditions, including; but not limited to — temperature, moisture, light conditions, soils, biological activity, vegetative establishment and other environmental factors.

(7) Heated to a temperature greater than 380 degrees Fahrenheit (193 degrees Celsius) for 5 minutes at a pressure greater than 50 psi (345 kPa) in order to be Thermally Refined®/Processed and to achieve phytosanitization.

.4 Water: free of impurities that would inhibit germination and growth.

.5 Fertilizer:

.1 To Canada Fertilizers Act and Regulations.

.2 Complete synthetic, ratio: 18:18:18.

2.2 Equipment

.1 Capable of mixing and evenly distributing seed, fertilizer, and mulch mixtures for efficient treatment of areas to be seeded.

.2 Agitation system:

.1 To be built in.

.2 To have sufficient capacity to agitate, suspend and homogeneously mix slurry of materials in amounts specified using slurry recirculation or mechanical agitation method.

.3 To be capable of operating during seeding and charging of the tank.

.3 Slurry tank to have working capacity of at least 4,500 litres with pump capable of maintaining continuous, nonfluctuating stream of slurry. Distribution lines to be equipped with appropriate nozzles and of sufficient diameter to prevent blockage. Tank volume to be certified by certifying authority and identified by authorities with the Volume Certification Plate.

.4 Capable of seeding by 50 m hand operated hose or tower with appropriate nozzles.

PART 3 – EXECUTION

3.1 Workmanship

.1 Apply Hydraulic Seeding in all areas of topsoil, cut/fill slopes, disturbed areas, or other areas as detailed in these specifications or as directed by the Departmental Representative.

.2 Do not spray onto structures, signs, guardrails, plant material, and other than surfaces intended.

.3 Clean-up immediately, any material sprayed where not intended, to satisfaction of Departmental Representative.

.4 Do not perform work under adverse field conditions such as wind speeds that will carry product beyond area designed for hydraulic seeding or not uniformly applied, frozen ground or ground covered with snow, ice or standing water, or other adverse conditions unless otherwise pre-approved by the Departmental Representative.

.5 Protect seeded areas from trespass until plants are established.

3.2 Protection of Surfaces

.1 Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.

.2 Obtain Departmental Representative's review of grade, finished surface, and topsoil depth before starting to seed.

3.3 Preparation of Slurry

.1 Measure quantities of materials by weight or weight-calibrated volume measurement. Supply equipment required for this work.

.2 Calculate amount of material to be used and area to be covered for each tank load utilizing size of slurry tank and carrying capacities of water.

.3 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize Biotic Soil Media and HECP and charge slowly into seeder. Use optimum carrying capacity of water relative to Biotic Soil Media, and HECP as follows:

.1 Biotic Soil Media: 55kg/1000 L.

.2 HECP: 43kg/1000 L.

.4 Mix thoroughly to complete the slurry once all other material is in the seeder.

3.4 Slurry Application

.1 Hydraulic seeding equipment:

.1 Slurry tank.

.2 Agitation system for slurry to be capable of operating during charging of tank and during seeding,

consisting of recirculation of slurry and /or mechanical agitation method.

.3 Capable of seeding by 50 m hand operated hoses or tower with appropriate nozzles.

.2 The hydraulic seeding slurry mixture shall be applied in two separate applications. The second application shall be applied within 24 hours of the first application. The slurry mixture per hectare of each application shall be as follows:

.1 Application 1 (Biotic Soil Media and Seed):

.1 Biotic Soil Media: 3500 kg

.2 Fall rye: 110 kg.

.3 Fertilizer: 360 kg.

.2 Application 2 (HECP):

.1 HECP: 3900 kg.

.2 Grass Seed Mixture: 125 kg.

.3 Thoroughly mix and uniformly apply slurry, at optimum angle of application for adherence to surfaces and germination of seed over area to be seeded.

.1 Using correct nozzle for application.

.2 Using hoses for surfaces difficult to reach and to control application.

.4 Blend application 300 mm into adjacent grass areas previous applications to form uniform surfaces.

.5 Re-apply where application is not uniform.

.6 Immediately remove slurry from items and areas not designated to be sprayed.

.7 Protect seeded areas from trespass and damage.

.8 Remove protection devices.

3.5 Warranty and Maintenance

.1 The Contractor shall warranty the Hydraulic Seeding free of defects in accordance with General Conditions (GC3.13), for one full growing season or 12 months from the date of Substantial Performance whichever is greater.

.2 It is the responsibility of the Contractor to complete maintenance as the Contractor deems necessary on the Hydraulic Seeding such that a 90% survival rate is achieved at the end of the warranty period.

.3 If at the end or prior to the end of the warranty period a 90% survival rate is not achieved the Contractor shall at his own expense replace Hydraulic Seeding not surviving or in poor condition except when the loss or damage can be proven to be due to abnormal weather, or any causes beyond the control of the Contractor.

.4 An end-of-warranty inspection will be conducted by the Departmental Representative.

END OF SECTION

SECTION INCLUDES

PART 1 – GENERAL:

1.1 Measurement and Payment Procedures.

1.2 References.

1.3 Delivery, Storage, and Handling.

1.4 Material Certification.

PART 2 – PRODUCTS:

2.1 Aluminized CSP Culverts.

2.2 Zinc-rich Paint.

2.3 Culvert Bedding and Backfill.

2.4 Riprap.

PART 3 – EXECUTION:

3.1 General.

3.2 Culvert Bedding.

3.3 Culvert Placement.

3.4 Culvert Joints.

3.5 Culvert Backfilling.

3.6 Culvert End Treatment.

3.7 Culvert Inlet and Outlet Protection.

PART 1 – GENERAL

1.1 Measurement and Payment Procedures

.1 Payment for the supply and install of Aluminized CSP Culverts – 600 mm Diameter will be made on the basis of the Price per Unit Bid for Aluminized CSP Culverts in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with the supply, transport, dewatering (as required), excavation, install, bedding and backfill materials (Crushed Base Gravel Bedding Material), couplings, fittings, and hardware for the Aluminized CSP Culverts, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Aluminized CSP Culverts – 600 mm Diameter will be made on the length

of culvert surveyed in linear metres, measured parallel to the direction of the culvert along the invert of the culvert, and accepted by the Departmental Representative.

.3 Payment for riprap culvert end protection will be made on the basis of the Price per Unit Bid for Culvert Inlet and Outlet Riprap Protection in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for excavating and disposal of the native materials in preparation for the riprap, selecting, loading, transport, and placement of 50 Kg class riprap, the supply and install of nonwoven geotextile, and all other items necessary for successful completion of the work. The riprap protection in other locations as shown on Contract Drawings are accidental and will not be paid separately.

.4 Measurement for Payment for completion of the Culvert Inlet and Outlet Riprap Protection will be made by the count of each culvert inlet and outlet protection installed and accepted by the Departmental Representative. Each culvert shall receive both inlet and outlet protection which will be counted as one installation.

1.2 References

.1 Canadian Standards Association (CSA International).

.1 CSA-G401-01, Corrugated Steel Pipe Products.

.2 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM C127, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Course Aggregate.

1.3 Delivery, Storage, and Handling

.1 Handle and store pipe products in a manner to avoid damage, alteration, deterioration, and soiling.

.2 Where the material supplied is damaged, the Contractor shall immediately separate nested sections of the plate or pipe to facilitate more detailed inspection by the Departmental Representative. Culvert material designated by the Departmental Representative as unacceptable, due to damage or failure to meet specified requirements, shall be immediately repaired or replaced by the Contractor to the acceptance of the Departmental Representative.

PART 2 – PRODUCTS

2.1 Aluminized CSP Culvert

.1 Aluminized CSP Culverts shall be CSP with an aluminum coating such as Armtec Hel-Cor Aluminized Steel Type 2 CSP culverts, Atlantic Industries Aluminized Type CSP

culverts, or a pre-approved equivalent. All culverts used on the project shall conform to the following:

.1 Corrugated steel pipe: to CSA-G401.

.2 Culverts to be annular or spiral with annular ends. Coupling bands to be two-piece annular bolted with minimum width of nine corrugations.

.3 Minimum wall thickness to be:

.1 2.0 mm.

.4 Corrugations to be.

.1 68 mm x 13 mm.

.5 Aluminized Type 2 coating – provide 75-year service life in a low-abrasion environment with pH between 5 and 9 and resistivity above 1,500 ohm-cm.

.2 Alternate aluminized CSP culverts may be considered but must be pre-approved by the Departmental Representative. Should the Contractor propose an alternative aluminized CSP culvert product, it will be the Contractor's responsibility to prove that the product is equivalent or better than the product listed above.

.3 Ensure that all components for each particular Aluminized CSP Culvert comes from a single supplier.

2.2 Zinc-rich paint

.1 Zinc-rich paint shall be Galvacon™ or preapproved equivalent.

2.3 Culvert Bedding and Backfill

.1 Bedding and backfill material shall be Crushed Base Gravel in accordance with Section 32 11 24 – Crushed Base Gravel.

2.4 Riprap

.1 The Riprap shall be from offsite sources pre-approved by the Departmental Representative.

.2 The Riprap shall conform with the following requirements:

.1 Crushed / blasted angular stone consisting of hard durable particles free from clay lumps, frozen material, and other deleterious materials, and free from splits, seams, or defects likely to impair its soundness during handling or under action of water.

.2 Is a graded material conforming with the following gradation limits:

.1 50 Kg Class Riprap:

Table 33 42 13 – 01: 50 Kg Class Riprap		
Mass (kg)	**Nominal Diameter (mm) @ 2650 kg/m^3**	**Percent Larger Than**
300	600	0
150	500	15
50	350	50
5	160	85
1	95	100

.3 Neither the breadth nor the thickness of any individual piece of material is to be less than one-third of its length. A maximum of 2.0 percent by weight of such pieces will be permitted.

.4 Have a relative density: to ASTM C127, not less than 2.65.

PART 3 – EXECUTION

3.1 General

.1 Complete culvert installation and related works in conformance with the requirements of Section 01 35 43 – Environmental Protection.

3.2 Culvert Bedding

.1 Complete excavation and dewater excavation, as necessary, to allow placement of culvert bedding in dry condition. Excavate to the lines and grades shown on the Contract Drawings.

.2 Place required bedding thickness (as shown on Contract Drawings) of Crushed Base Gravel on bottom of excavation and compact to minimum 95% maximum density to ASTM D698.

.3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to the camber as indicated on the Contract Drawings, free from sags or high points.

.4 Place bedding in unfrozen condition.

3.3 Culvert Placement

.1 Place culvert such that when complete the alignment, grade, camber, location, and inverts follow the alignment, grade, location, and inverts shown on the Contract Drawings.

.2 Begin pipe placing at downstream end.

.3 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.

.4 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.

3.4 Culvert Joints

.1 Install culvert joints per the manufacture's recommendation and following requirements.

.1 Repair spots where damage has occurred to coating in the field by applying two coats of zinc rich paint. Allow each coat to dry before placing second coat, bedding or backfill.

3.5 Culvert Backfilling

.1 Backfill around and over culverts as indicated on the Contract Drawings.

.2 Place Crushed Base Gravel in 150 mm layers to full width, alternately on each side of culvert, so as not to allow movement or uplift of the culvert.

.3 Compact each layer to 98% maximum density to ASTM D698 taking special care to obtain required density under haunches. Hand tamp where necessary to obtain compaction.

.4 Protect installed culvert with minimum 900 mm cover of compacted fill before heavy equipment is permitted to cross. During construction, width of fill, at its top, to be at least twice diameter or span of pipe and with slopes not steeper than 2H:1V.

.5 Place backfill in unfrozen condition.

3.6 Culvert End Treatment

.1 End treatment shall include all cut edges made smooth by grinding so that all the burrs are removed. Any damaged galvanizing shall be restored by zinc metallizing in accordance with CSA G401.

3.7 Culvert Inlet and Outlet Protection

.1 Prior to or during installation of the culverts, excavate ground to the lines and grades shown on the Contract Drawings to facilitate the installation of the Inlet and Outlet Riprap Protection. Ensure excavation will allow for positive drainage upon placement of riprap.

.2 Dispose of excavated material offsite in a location pre-approved by the Departmental Representative.

.3 Install 50 Kg Class Riprap and Nonwoven Geotextile to the lines and grades shown on the Contract Drawings. Ensure positive drainage following riprap placement.

.4 Dress all riprap voids to ensure that the final surface is well keyed, densely placed, uniform, and allows for positive

drainage. Ensure that all surface voids are filled, and Nonwoven Geotextile is concealed by the riprap.

END OF SECTION

R.115570.001
Appendix A

Project Specific Health and Safety Plan Template

<insert company logo/information>

PROJECT SPECIFIC HEALTH AND SAFETY PLAN

Inga Lake Intersection Improvements
Alaska Highway, BC
<PROJECT No.>

<Date>

<Rev. Number>

Prepared for:

Public Services and Procurement Canada | Services publics et Approvisionnement Canada

This document will be available on site for the project duration and available to all workers.

<This template is provided to aid the Contractor in preparing their health and safety plan according to the contract requirements. It is the responsibility of the Contractor to ensure that all required information is presented in their project specific health and safety plan to meet the requirements of the project specifications and WorkSafeBC's health and safety obligations. The Contractor shall review all aspects of this template and make changes and additions as needed to suit the project requirements.>

Table of Contents

Appendix 6: Incident/Accident Report Template

Appendix 7: Key Member Resumes and Safety Certifications

Appendix 8: Local Hospital Maps

Appendix 9: Safe Work Procedures

1. Contractor Safety Policy / Statement

<A statement about the Contracting companies' policy regarding health and safety on the project site.>

2. Project Health and Safety Compliance Obligations

The submission of the Project Specific Health and Safety Plan indicates <*Contracting Company Name*> commitment to comply with all health and safety related obligations from the following:

- All procedures, rules and policies from this Project Specific Health and Safety Plan
- WorkSafeBC Requirements
- Project Specifications
- <*Other, add any other requirements that apply*>

3. Definition of Responsibilities

<A clear description of the health and safety related responsibilities for key members of the Contractor's project team. The table below is provided to assist with presenting this information.>

Position	Name(s)	Description of Health and Safety Responsibilities
Project Manager		
Project Superintendent		
Health and Safety Coordinator		
First Aid Attendant		
Supervisors		
Workers		
Sub-Contractors		

4. General Project Safety Rules

<*A list of general construction safety rules and regulations that the company will adhere to. Additionally, a description of the disciplinary action procedure for disregard or negligence of the provide rules.****>***

Health and Safety Risks / Hazards and Engineering and Administrative Control Measures

5.1 Workplace Hazard Assessment – Health and Safety Risks Identified

<Summary of health risks and safety hazards resulting from hazard assessment analysis of the circumstances of each "workplace" including:

- *The number of workers who may require first aid at any time;*
- *The nature and extent of the risks and hazards in the workplace;*
- *The types of injuries likely to occur;*
- *Any barriers to first aid being provided to an injured worker or member of the public; and*
- *The time that may be required to obtain transportation and to transport an injured worker to medical treatment>*

<Statement from the Contractor indicating the hazard rating assignment (low, moderate, or high) for each "workplace" as defined by WorkSafeBC and applicable to the application of G3.16 of WorkSafeBC Occupational Health and Safety Regulations>

<The table below can be used as a template for the format of this section. Three workplaces are shown as an example, but the Contractor may extend or trim the table as applicable to the proposed work in the Contract.>

Workplace 1	
Number of Workers	
Risks / Hazards Descriptions	
Type of Injuries	
Barriers to First Aid	
Time to Obtain Transport	
WorkSafeBC Hazard Rating Assessment	*Low, Medium, or High*
Workplace 2	
Number of Workers	
Risks / Hazards Descriptions	
Type of Injuries	
Barriers to First Aid	
Time to Obtain Transport	
WorkSafeBC Hazard Rating Assessment	*Low, Medium, or High*
Workplace 3	
Number of Workers	
Risks / Hazards Descriptions	
Type of Injuries	
Barriers to First Aid	
Time to Obtain Transport	
WorkSafeBC Hazard Rating Assessment	*Low, Medium, or High*

<WorkSafeBC Hazard Assessment Rating: The following links to the specific sections of the WorkSafeBC OHS regulations will assist in determining the Hazard Rating Assessment for each workplace>

https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-guidelines/guidelines-part-03#SectionNumber:G3.16

https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-regulation/part-03-rights-and-responsibilities#Schedule3A

5.2 Hazards Materials

<List of hazardous materials to be brought onsite as required by the work>

5.3 Job Specific Safe Work Procedures

<Review your company safe work procedures to ensure that there are procedures for all tasks relevant to the project. In the case that your company does not have an existing safe work procedure for a specific task please provide this procedure in appendix 8.>

All job specific safe work procedures are available in <*Contracting Company Name*> corporate Health and Safety Plan and are available to all employees on site and the PSPC team upon request. Procedures that are not available in <Contracting Company Name> corporate Health and Safety Plan can be found in Appendix 8. *<remove last sentence if not required>.*

5.4 Required PPE and Training

<Identification of the PPE and description of the training required for any members of the contractor's project team and PSPC's team visiting the site.>

5.5 First Aid Requirements

<Identification of the First Aid Requirements for each "workplace" in compliance with WorkSafeBC and project requirements as follows:

.1 Estimated travel time from the "workplace" to the nearest hospital.

.2 Maximum numbers of workers at any time per "workplace".

.3 The first aid supplies, equipment, and facilities which will be available at each "workplace".

.4 The first aid attendant certificate level onsite at each "workplace".

.5 The first aid transportation which will be used on the project (i.e. ETV), if required by Contractor or WorkSafeBC requirements. Details of were the ETV will be located / parked relative to the locations of the first aid attendant(s) during the work.>

6. Inspection Policy and Procedures

<*A description of the site inspection policy and procedure. The procedure should include identification of investigator, completion of a site inspection form and how the findings of the inspection will be presented to the remainder of the construction team.****>***

7. Incident Reporting and Investigation Policy

<A description of the procedure completed following an incident occurring on site. The procedure should include the completion of an incident/accident report (template to be provided by the contractor in Appendix 5)>

8. Occupational Health and Safety

8.1 Representative/Committee Procedures

<*A description of the procedures that will be completed regularly throughout the project to keep the project site safe for all contractor's personnel, travelling public and PSPC's project team members.>*

8.2 Meetings

<*A description of the health and safety meetings that will be completed throughout the project. This section could include the frequency of meetings and the agenda that will be followed.****>***

8.3 Communications and Record Keeping Policies

<*A description of the policies related to health and safety communications and record keeping. This could include a description of the files that will be kept and how communication regarding health and safety will proceed with the entire project team, including the owner's team, the prime contractor's team, and all sub-contractors.****>***

9. Emergency Contact Information

9.1 Key Project Contact Numbers

Contractor's Team		
Name and Position	**Office Number**	**Cell Phone Number**
Project Superintendent		
Health and Safety Coordinator		
First Aid Attendant		
Key Sub-Contractor Representatives		
PSPC Team		
Name and Position	**Office Number**	**Cell Phone Number**
George Smith – Contract Asset Performance Manager, Alaska Highway	250.774.6956	250.321.0174
XXX – Onsite Inspection and QA Representative		

9.2 Emergency Response Agencies/Assistance

<Note: The contractor is responsible for verifying that all the numbers listed below are correct and up to date and that all required numbers are presented. Please remove any emergency numbers that are not in the project vicinity. ***911*** *is not available in the Fort Nelson Northern Rockies Regional Municipality. Please check whether* ***911*** *is available in the project location. If not available in project location, make note in table as not available at project site >*

Agency/Assistance	**Contact**
RCMP	911
Local Police – Fort Nelson (emergency)	250.774.2777
Local Police – Fort Nelson (non-emergency)	250.774.2700
Local Police – Fort St. John (emergency)	250.787.8100
Local Police – Fort St. John (non-emergency)	250.787.8140
Local Police – Watson Lake (emergency)	867.536.5555
Local Police – Watson Lake (non-emergency)	867.536.2677

BC Ambulance (BC Emergency Health Services)		911 / 1.800.461.9911 / 250.374.5937
Ambulance – Fort Nelson		250.774.2344
Ambulance – Fort St. John		250.785.5559
Ambulance – Watson Lake		867.536.4444
S.T.A.R.S Ambulance		1.888.888.4567
Hospitals		
Local Hospital – Fort Nelson		250.774.8100
Local Hospital – Fort St. John		250.262.5200
Local Hospital – Watson Lake		867.536.4444
Fire and Rescue		911
Fire and Rescue – Fort St. John		250.785.4333
Fire and Rescue – Fort Nelson (emergency)		250.774.2222
Fire and Rescue – Fort Nelson (non-emergency)		250.774.3955
Fire and Rescue – Watson Lake (emergency)		867.536.2222
Fire and Rescue – Watson Lake (non-emergency)		867.536.8008
Forest Fire Reporting		1.800.663.5555 / *5555 (Cell)
Yukon Forest Fire Reporting		1.888.798.3473
WorkSafeBC Work Site Emergency	24 hr.	1.888.621.7233
WorkSafeBC Regional Office		1.800.663.4630 / 250.785.1283
HazMat	24 hr.	1.800.663.3456
BC Environmental – PEP	24 hr.	1.800.663.3456
BC Environmental Regional Office		250.787.3411
BC Hydro – Power (emergency)	24 hr.	911
BC Hydro – Power (non-emergency)		1.800.224.9376
Fortis BC – Natural Gas Emergencies	24 hr.	1.800.663.9911
NorthwesTel – Corporate Office (Whitehorse)		867.668.5300
BC One Call		1.800.474.6886 / *6868 (Cell)
Poison Control		1.800.567.8911 / *311 (Cell)
Commercial Vehicle Inspection and Standards (CVSE)		
Reporting Safety Violations	24 hr.	1.888.775.8785
Peace River Regional Office		1.250.784.2363

10. Wildlife Management

<Identify any training and processes for project members regarding wildlife encounters and prevention.>

11. Fire Safety, Reporting and Evacuation

<Identify any fire safety policies (remove if in corporate health and safety policy), project specific reporting and evacuation procedures.>

12. Contractor's Team Review and Acceptance

This document has been prepared through discussions with the Contractor's entire project team *<including sub-contractors>* and will be enforced by the contractor for the duration of the project. By signing this document, the signee confirms that they have reviewed the document and agree with its contents.

Project Manager	Date
Health and Safety Representative	Date
Quality Control Manager	Date
<Major Sub-Contractor Representatives>	Date

This page is intentionally blank.

Appendix 1: Preliminary Hazard Assessment Form

PRELIMINARY HAZARD ASSESSMENT FORM

Project Number:	**R.115570.001**
Location:	**Inga Lake Road Intersection with the Alaska Highway (Km 145.8), BC**
Date:	
Name of Departmental Representative:	
Name of Client:	PSPC
Name of Client Project Co-ordinator	

Site Specific Orientation Provided at Project Location **Yes** ☐ **No** ☐

Notice of Project Required **Yes** ☐ **No** ☐

NOTE:
PSPC REQUIRES A Notice of Project FOR ALL CONSTRUCTION WORK RELATED ACTIVITIES

NOTE:
OHS law is made up of many municipal, provincial, and federal acts, regulations, bylaws, and codes. There are also many other pieces of legislation in British Columbia that impose OHS obligations.

Important Notice: This hazard assessment has been prepared by PSPC for its own project planning process, and to inform the service provider of actual and potential hazards that may be encountered in performance of the work. PSPC does not warrant the completeness or adequacy of this hazard assessment for the project and the paramount responsibility for project hazard assessment rests with the service provider.

TYPES OF HAZARDS TO CONSIDER	Potential Risk for:				COMMENTS
Examples: Chemical, Biological, Natural, Physical, and Ergonomic Listed below are common construction related hazards. Your project may include pre-existing hazards that are not listed. Contact the Regional Construction Safety Coordinator for assistance should this issue arise.	**PSPC, OGD's, or tenants**		**General Public or other contractors**		Note: When thinking about this pre-construction hazard assessment, remember a **hazard** is anything that may cause harm, such as chemicals, electricity, working from heights, etc.; the **risk** is the chance, high or low, that somebody could be harmed by these and other hazards, together with an indication of how serious the harm could be.
	Yes	**No**	**Yes**	**No**	

Typical Construction Hazards					
Concealed/Buried Services (electrical, gas, water, sewer etc.)					
Slip Hazards or Unsound Footing					
Working at Heights					
Working Over or Around Water					
Heavy overhead lifting operations, mobile cranes etc.					

Marine and/or Vehicular Traffic (site vehicles, public vehicles, etc.					
Fire and Explosion Hazards					
High Noise Levels					
Excavations					
Blasting					
Construction Equipment					
Pedestrian Traffic (site personnel, tenants, visitors, public)					
Multiple Employer Worksite					Example: Contractor working in an occupied Federal Employee space.

Electrical Hazards					**Comments**
Contact with Overhead Wires					
Live Electrical Systems or Equipment					
Other:					
Equipment Slippage Due to Slopes/Ground Conditions					
Earthquake					
Tsunami					
Avalanche					
Forest Fires					
Fire and Explosion Hazards					
Working in Isolation					
Working Alone					
Violence in the Workplace					
High Noise Levels					
Inclement weather					
High Pressure Systems					
Other:					
Hazardous Work Environments					
Confined Spaces / Restricted Spaces					Review and provide confined space assessment(s) from PSPC or client confined space inventories. Refer to PSPC Standard on Entry into Confined Spaces. Contact the Regional Construction Safety Coordinator.
Suspended / Mobile Work Platforms					
Other:					
Biological Hazards					
Mould Proliferations					
Accumulation of Bird or Bat Guano					
Bacteria / Legionella in Cooling Towers / Process Water					
Rodent / Insect Infestation					
Poisonous Plants					
Sharp or Potentially Infectious Objects in Wastes					
Wildlife					
Chemical Hazards					

Asbestos Materials on Site					If "yes" a pre-project asbestos survey report is required. Provide Contractor with DP – 057 ELF Form 16 "Contractor Notification and Acknowledgement"
Designated Substance Present					If "yes" a pre-project designated substance survey report is required.
Chemicals Used in work					
Lead in paint					If "yes" a pre-project lead survey report is required.
Mercury in Thermostats or Switches					If "yes" a pre-project mercury survey report is required.
Application of Chemicals or Pesticides					
PCB Liquids in Electrical Equipment					
Radioactive Materials in Equipment					
Other:					
Contaminated Sites Hazards					
Hazardous Waste					
Hydrocarbons					
Metals					
Other:					

Security Hazards					**Comments**
Risk of Assault					
Other:					
Other Hazards					

Other Compliance and Permit Requirements[1]	**YES**	**NO**	**Notes / Comments[2]**
Is a Building Permit required?			
Is an Electrical permit required?			
Is a Plumbing Permit required?			
Is a Sewage Permit required?			
Is a Dumping Permit required?			
Is a Hot Work Permit required?			
Is a Permit to Work required?			Mandatory for ALL AFD managed work sites.
Is a Confined Space Entry Permit required?			Mandatory
Is a Confined Space Entry Log required			Mandatory for all Confined Spaces
Discharge Approval for treated water required			

Notes:

(1) Does not relieve Service Provider from complying with all applicable federal, provincial, and municipal laws and regulations.

(2) TBD means To Be Determined by Service Provider.

Service Provider Acknowledgement: We confirm receipt and review of this Pre-Project Hazard Assessment and acknowledge our responsibility for conducting our own assessment of project hazards and taking all necessary protective measures (which may exceed those cited herein) for performance of the work.

Service Provider Name			
Signatory for Service Provider		**Date Signed**	
RETURN EXECUTED DOCUMENT TO PSPC DEPARTMENTAL REPRESENTATIVE PRIOR TO ANY WORK COMMENCING			

Appendix 2: Confirmation of Prime Contractor's Main Responsibilities Under WorkSafeBC Occupational Health and Safety Regulations and Worker's Compensation Act Form

Public Services and Procurement Canada | Services publics et Approvisionnement Canada

Confirmation of Prime Contractor's Main Responsibilities Under the WorkSafeBC. Occupational Health and Safety Regulations and *Worker's Compensation Act*

Name of Project: Inga lake Intersection Improvements, Alaska Highway, BC

Owner: Public Services and Procurement Canada

Contractor: _____

Consulting Engineer: Tetra Tech	YES	NO
1.The Contractor acknowledges appointment as Prime Contractor on the construction project noted below	☐	☐
2.The name of the Prime Contractor's Qualified Coordinator of occupational health and safety activities for this project has been submitted to the Owner and is as shown below.	☐	☐
3. The Prime Contractor understands that in any conflict of directions, WCB OH&S Regulations and/or the Worker's Compensation Act shall prevail.	☐	☐
4. The Prime Contractor understands and will direct that all supervisors/coordinators must immediately report any apparent conflict as described above.	☐	☐
5. The Prime Contractor agrees that their supervisor shall immediately notify the consulting Engineer's representative of any reported conflict.	☐	☐
6. The Prime Contractor has requested and received information from the Owner regarding any known hazards to the health and safety of persons pre-existing at the workplace.	☐	☐
7. The Prime Contractor has conducted an inspection of the workplace to verify the presence of any hazards.	☐	☐
8. The Prime Contractor will communicate hazards information to any persons who may be affected and ensure that appropriate measures are taken to effectively control or eliminate the hazards.	☐	☐
9. The Prime Contractor accepts that written documentation such as notes, records, inspections, meeting minutes, etc., on all health and safety issues must be available upon request to the PSPC departmental representatives and/or to a WCB officer at the workplace.	☐	☐
10. The Prime Contractor will confirm that all workers are suitably trained and competent to perform the duties for which they have been assigned.	☐	☐
11. The Prime Contractor confirms that safety orientation of all new workers will be conducted.	☐	☐
12. The Prime Contractor's written Safety Program has been provided to the Owner's representative.	☐	☐
13. The Prime Contractor confirms that meetings to exchange information on any safety issues, concerns, hazards, or safety directives will be conducted weekly or more often if required.	☐	☐
14. The Prime Contractor confirms that before the commencement of work, crews will attend a daily crew safety meeting.	☐	☐
15. The Prime Contractor confirms that their supervisor has assessed and will coordinate the workplace first-aid requirements	☐	☐
16. The Prime Contractor confirms that the procedure to transport injured workers is established	☐	☐

Prime Contractor Representative's

Name:_____

Title:_____ Signature:_____

Date:_____

Prime Contractor's OH&S Coordinator

Name:_____

Title:_____ Signature:_____

Date:_____

Appendix 3: Contractor's COVID-19 Safe Work Plan

<provided by the Contractor>

Appendix 4: Contractor Daily Toolbox Meeting Form

<provided by the Contractor>

Appendix 5: Site Safety Orientation Form

<provided by the Contractor>

Appendix 6: Incident/Accident Report Template

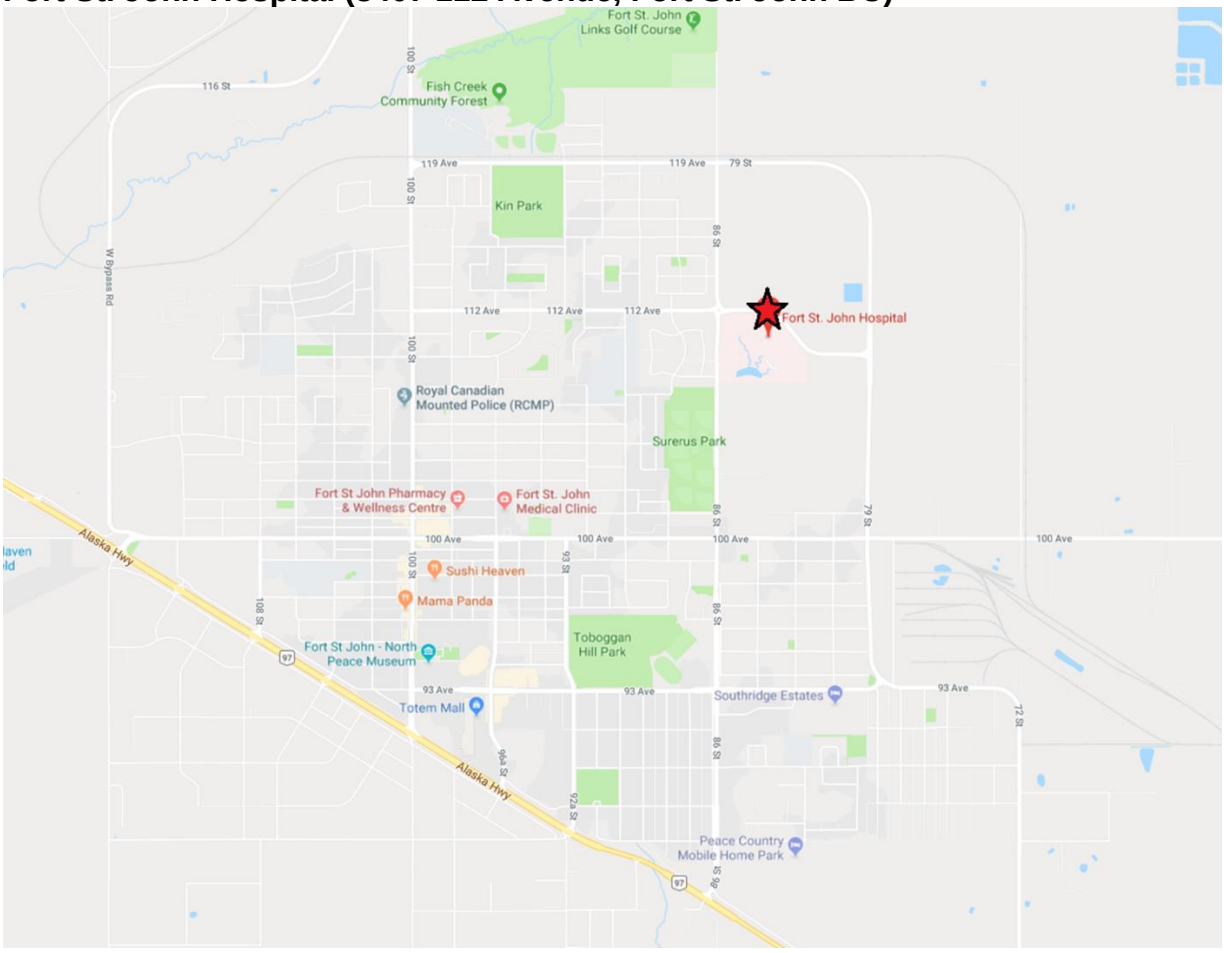
<*provided by the Contractor*>

Appendix 7: Key Member Resumes and Safety Certifications

<*provided by the Contractor*>

Appendix 8: Local Hospital Maps

Fort St. John Hospital (8407 112 Avenue, Fort St. John BC)



Directions

Head Southbound on the Alaska Highway

Turn Left onto 100 Ave.

Turn Left onto 86 St.

At the roundabout, take the 1st exit onto 112 Avenue

Turn Right toward Drop-off Loop

Continue straight onto Drop-off Loop

Appendix 9: Safe Work Procedures <*if required*>

R.115570.001
Appendix B

Written Communication / Document Management Protocol

Alaska Highway Inga Lake Intersection Improvements Project: Written Communication / Document Management Protocol

Communication for the Alaska Highway Inga Lake Intersection Improvements (R.115570.001) will occur using CentralCollab, email, telephone, and through the delivery of hardcopy documents (if requested by PSPC). CentraCollab will act as the primary communication and document management tool throughout the project. It will act as the central file storage location for all project documents, allows for retrieval of these documents at any time during the project by group members and is capable of storing and sharing large electronic files.

Email and telephone may be used for general communication, transitory information, and other communications where a record is not considered necessary (e.g. day-to-day coordination, in-depth discussion of project elements, etc.). Email shall not be used for the submission of deliverables or other project documentations. Email contact information for project members is provided in the project contact list.

Hardcopy documents are to only be provided if specifically requested by PSPC. The Departmental Representative will provide the Contractor with the necessary address information at the time of the request. Material samples shall be provided directly to the testing lab specified by the Departmental Representative for Quality Assurance purposes or be delivered to the project site.

CentralCollab

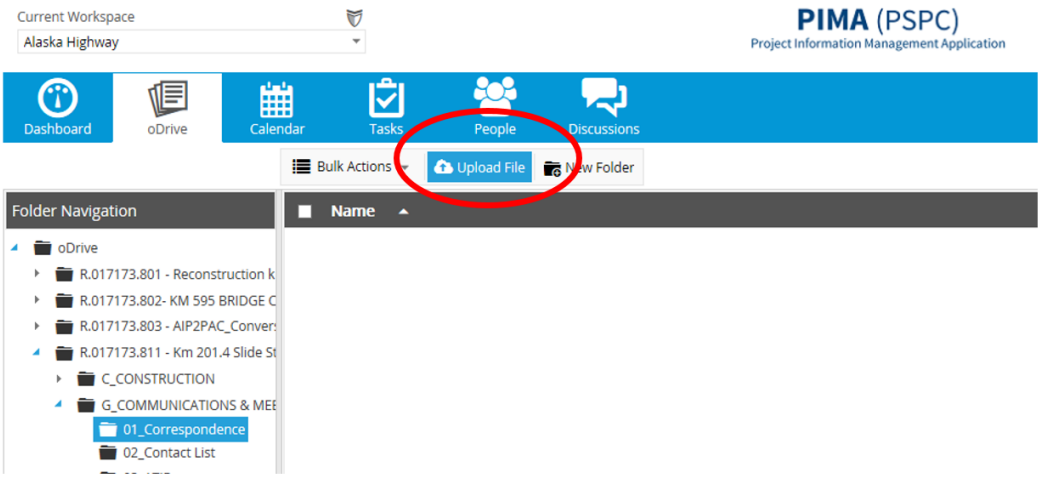
CentralCollab is a web-based collaborative platform that is used to submit and store project documentation. It is the responsibility of the submitting party to upload documents to CentralCollab in the correct folder and with the correct file naming convention.

CentralCollab can be accessed at the following address: https://app.centralcollab.com/
The contractor is encouraged to have CentralCollab accounts for project team members who are involved with accessing or posting project documentation. Accounts can be created by PSPC throughout the project by contacting the PSPC project team.

Project documentation includes but is not limited to: submittals, deliverables, drawings, reports, meeting minutes, project schedules, notifications, contemplated change notices, change orders, etc.

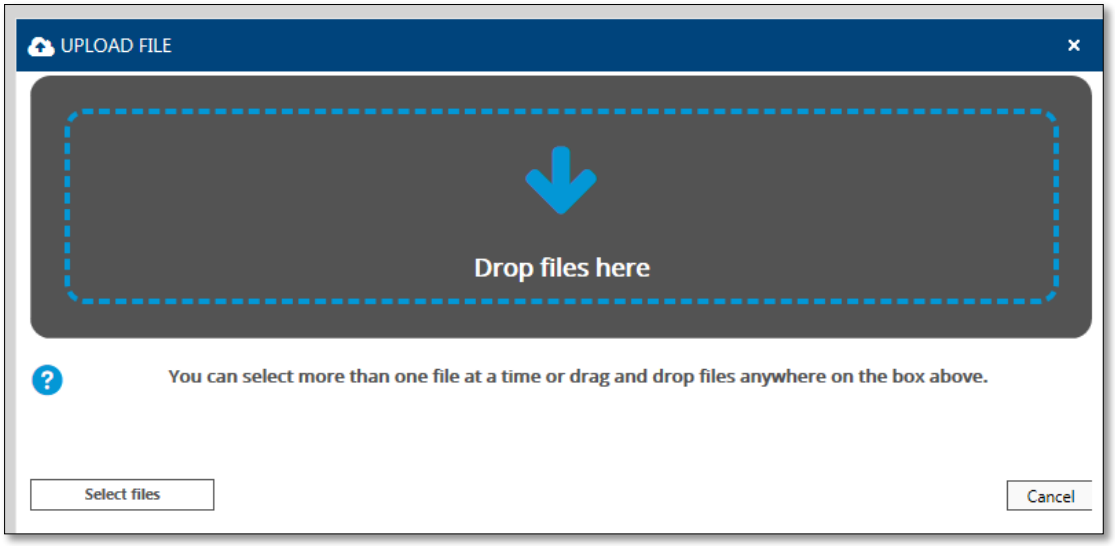
1 Uploading to CentralCollab

Upload individual documents to the appropriate folder on CentralCollab. For folder names, refer to Table 2 of this document. To add files, click on **Upload File**:

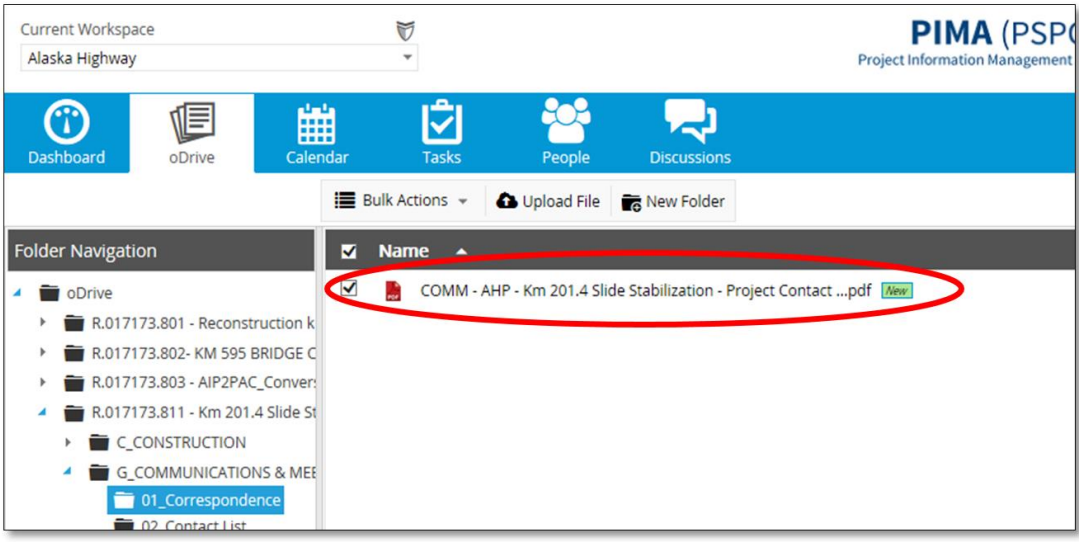


Drag and drop your document(s), then press Save.

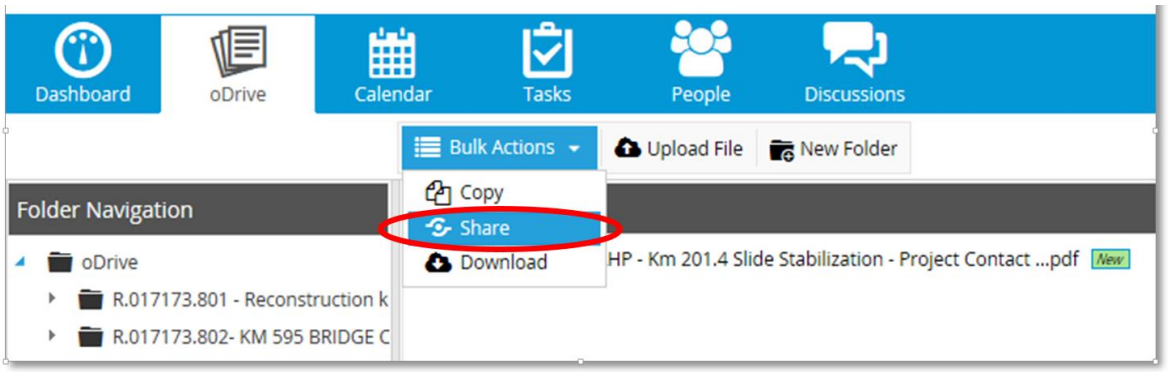
NOTE: Make sure you have named your document correctly, as explained in Section 2.2 CentralCollab File Naming Convention.



Once saved, you will see your new document (circled below), but no one else will be notified until you share it.

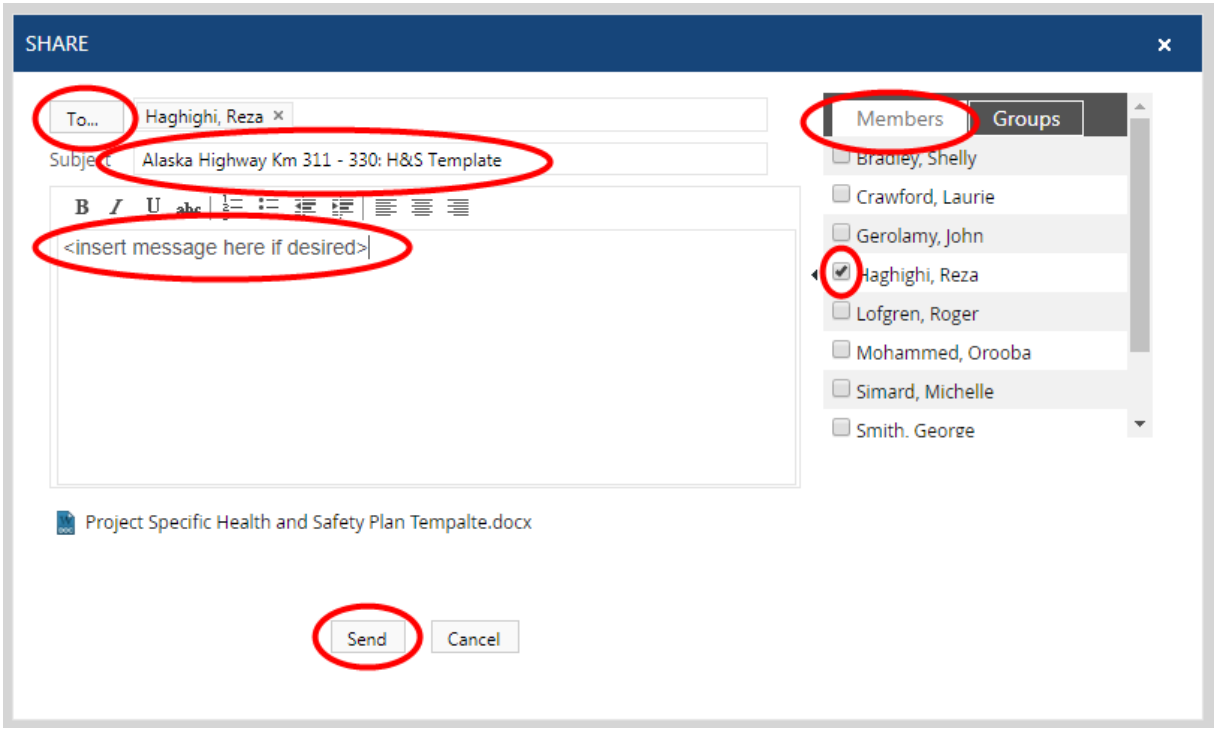


To **notify members** of the new document, check the box next to the document √ then click **Bulk Actions > Share** :

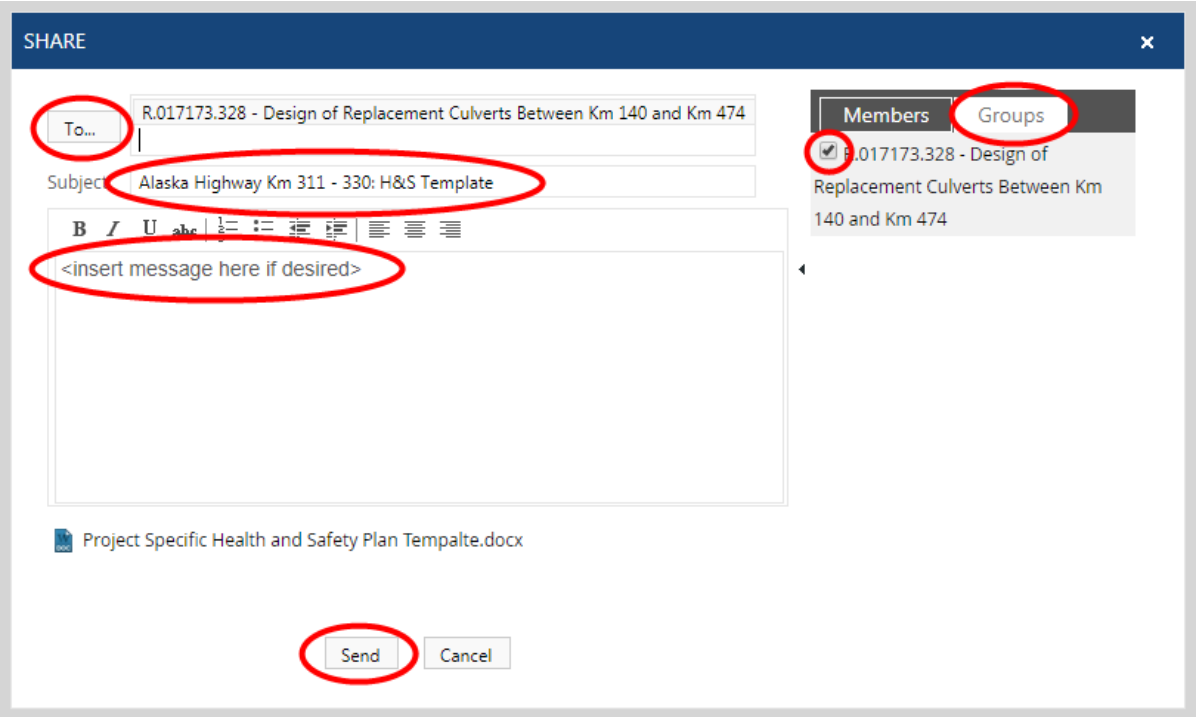


Once the new window opens, select **To,** and then <u>select the **Members** tab and all Members for whom you wish to notify (as directed during the preconstruction meeting or otherwise by PSPC) or select the **Groups** tab and select the pre-set groups:</u>

Example – Notification Members:



Example – Notification Pre-set Group (if available):



Insert a message related to the uploaded submittal in the **subject line** and if desired in the form before sending. Then press **Send**. An email with the link to the document will then be provided to all individuals notified with a copy of this email provided to the sender.

2. CentralCollab File Naming Convention:

All CentralCollab users shall upload files named according to the following convention:

Doc Type – AHP – Km XXX Project – File Description or Document Name – YYYY MM DD

Example file names:

- Plan – AHP – Km XXX Project – Quality Management Plan – 021 06 15
- Schedule – AHP – Km XXX Project – Project Schedule – 2021 06 20
- Finance – AHP – Km XXX Project – Progress Payment 01 – 2021 06 26

The file description should clearly identify the document. The Document type should be selected from the options provided in Table 1:

Table 1: Document Type Options

Document Type Acronym	Description
Comm	Communication related docs; correspondence, letters, memos, briefing notes, contact lists

Contract	Request for Information (RFI), Contemplated Change Notices (CCN), Change Orders (CO)
Email	Emails
Draw	Drawings and site plans
Finance	Project financial documentation
Image	All non-drawing images, photos etc.
Minutes	Meeting minutes, agendas, and associated documents
Plan	Planning documents, BMPs, SOPs, workplans
Report	Reports of all types- most frequently used for consultant deliverables
Schedule	Any project related schedules
Specs	Specs and terms of references
Other	Other document types, project specific, one-off documents

3. CentralCollab Folder Arrangement:

All files must be uploaded to the correct folder in CentralCollab. To aid in the filing of documents, a listing of common filing / folder locations has been prepared as shown in Table 2.

Table 2: Common Document Filing / Folder Locations

Folder Names	Description of Typical Documents
CentralCollab folder: R.115570.001 – Inga Lake Intersection Improvements Project > C_CONSTRUCTION > Contract >	
01_Contract	Contract Documents (typically related to documents posted to Buyandsell.gc.ca)
02_Request for Information	Request for Information from Contractor
03_Permits	Permits obtained by Contactor or PSPC
04_Site Instructions	Site Instructions (typically generated by PSPC)
05_CCN	Contemplated Change Notice forms generated by PSPC and pricing responses from Contractor
06_Change Orders	Change Orders (typically generated by PSPC)
07_Progress Payments	Progress Payment documents (as instructed by PSPC)
08_Field Reviews	Field Review forms (typically generated by PSPC)

Table 2: Common Document Filing / Folder Locations	
Folder Names	**Description of Typical Documents**
09_Health & Safety	Health and Safety related documentation including Health and Safety Plan, Tailgate Safety Meeting documentation, and other Health and safety related submittals.
10_Testing Services	Testing Reports completed by Contractor's QC
11_Environmental Plan	Environmental Protection Plan and other environmental related documents
12_Environmental Reporting	Environmental monitoring reports generated by the Contractor's environmental monitor
13_Shop Drawings	Shop drawing submissions provided by the Contractor as required by the contract specifications
14_Deliverables	Contractor Deliverables as required by the contract specifications throughout the project including such items as: • Project Schedule • Traffic Management Plan • Construction Staging Drawings • Culvert Mill Certificates • Other supplier information as needed
15_Deficiency List	Deficiency lists (typically generated by PSPC)
16_Certificate of Substantial Performance	Certificate of Substantial Performance as generated by PSPC
17_Certificate of Completion	Certificate of Completion as generated by PSPC
18_Claims	Documentation related to any claims on the project
19_Contract Close out	Documentation related to contract closeout including closeout submittals such as: • As-built Surveys • As-built Redline Drawing Mark-ups • Warranties • Instruction Manuals
20_Advisory	Advisories in response to RFIs or other notices as generated by PSPC.
21_Quality Management	Quality control and Quality Assurance documentation generated by the Contractor and PSPC • Quality Management Plan • Check Sheets • Daily Reports • NCR's

Table 2: Common Document Filing / Folder Locations	
Folder Names	**Description of Typical Documents**
CentralCollab folder: R.115570.001 – Inga Lake Intersection Improvements Project > G_COMMUNICATIONS & MEETINGS >	
01_Correspondence	Emails and other correspondence requiring posting to CentralCollab, generated by the Contractor or PSPC
02_Contact List	Project contact list generated by PSPC
03_ATIP	
04_Communications Plan	Communication plan generated by PSPC
05_Supporting Documents	
06_Meeting Minutes	Meeting minutes as generated by PSPC
07_Inquiries	
08_Public Notices	
09_Other	
CentralCollab folder: R.115570.001 – Inga Lake Intersection Improvements Project > H_PROJECT MONITORING>	
01_Project Time Scope Budget	For PSPC only
02_Progress Report	For PSPC only
03_Photos	For PSPC only
04_Project Commissioning	For PSPC only
05_Compliance & Audits	For PSPC only
CentralCollab folder: R.115570.001 – Inga Lake Intersection Improvements Project > Z_BASE DATA>	
01_Base Data	Digital drawings and other documentation required by the Contractor (typically generated by PSPC)

Typical folders Users are encouraged to create sub-folders and categorize documents of similar or related data.

Example sub-folders:

- 09_Health & Safety > **Tailgate Meetings > February**
- 14_Deliverables > **Project Schedule**

21_Quality Management > **Check Sheets > February**

R.115570.001
Appendix C

Category 3
Traffic Management Plan Template

<insert company logo/information>

Category 3
Traffic Management Plan

Inga Lake Intersection Improvements
Alaska Highway, BC
<PSPC Project No.>

<Date>

Rev. *<Number>*

Prepared for:

Public Services and Procurement Canada
Services publics et Approvisionnement Canada

The Contractor shall ensure that this document is available on site to all workers for the project duration.

<This template is provided to aid the Contractor in preparing their traffic management plan according to the contract requirements. It is the responsibility of the Contractor to ensure that all required information is presented in their traffic management plan to meet the requirements of the project specifications and British Columbia Ministry of Transportation and Infrastructure's Traffic Management Manual for Work on Roadways – 2020 Office Edition. The Contractor shall review all aspects of this template and make changes and additions as needed to suit the project requirements.>

Table of Contents

1. Category Definition

Based on the steps outlined in Section 3.2: Project Category Determination in BC MoTI's Traffic Management Manual for Work on Roadways (2020 Office Edition), the <Project Name> Project calls for at Category <#> Traffic Management Plan.

A Category <#> Traffic Management Plan is characterized by:

-
-
-
-

<Add as many points as deemed required for the project>

A Category <#> Traffic Management Plan consists of:

-
-
-
-

<Add as many points as deemed required for the project>

The aim of the Category <#> Traffic Management Plan is to minimize the site-specific risks that were identified for the project.

2. Traffic Control Plan

See also Appendix A: Traffic Control Plan Drawings in this Traffic Management Plan for the proposed layouts of the traffic control devices for the project. A list of the drawings is provided in Section 2.4 Drawing List.

Plan Date	*<Date when plan was initiated.>*
Latest Revision	*<Date of latest revision.>*
Site Name	*<Name of project.>*
Plan Developed By	*<Name of person who developed the plan.>*
Exact location, direction, and distance to nearest landmarks	*<Highway number and name of location, etc.>*
Project Supervisor	*<Name of Project Supervisor.>*
Prime Contractor	*<Name of Prime Contractor.>*
Traffic Control Manager	*<Name of Traffic Control Manager (if applicable).>*
Traffic Engineer	*<Name of Traffic Engineer (if applicable).>*
Traffic Control Supervisor	*<Name of Traffic Control Supervisor and company.>*
Traffic Control Persons	*<Names of TCPs and company.>*
Project Start Date	*<Date>*
Project Completion Date	*<Date>*

2.1 Traffic Control Provisions

Traffic Control Supervisor	<*Name of Traffic Control Supervisor and company.*>
Traffic Control Persons	<*Name of TCPs and company.*> Automated Flagger Assistance Devices will not be used on the project.
Off-Hours Traffic Control	<*Types of traffic control devices.*>
Illumination	Traffic Control Persons (TCPs) will be used during non-daylight hours (before sunrise after sunset). Details of the overhead lighting to be used at each TCP location are included in <*Report Section/Appendix*>. Details shown include the location, direction, height, brightness, and use of shields on the lights to suitably illuminate the TCP but not obstruct the visibility of drivers approaching the TCP.
Means of Communication	<*How will TCPs communicate?*>
Signage	<*Are signs installed for short-duration or long-duration work?*> <*Are the signs spaced in accordance with posted speed?*> <*Are details provided for the procedures, processes, and sequencing used to determine the layout of the signs in the field and the order of installation and order of removal of the signs in the field? Refer to Section 6: Traffic Control Layouts – General Instructions of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition for further details. At a minimum the text and figures included in Item 6.7.4 – Two-Lane, Two-Way Roadways shall be included within the Contractor's Traffic Management Plan for reference during the work (in main body of the plan or in Appendices of the plan with reference to applicable Appendix in main body of the plan). The Contractor shall customize the details of the steps for the project as required.*> <*Are graphical representation of the sign supports planned for use on the project shown; including Post Mounted Supports found in Figure 01 35 00 – 01 and or the Wind Resistant Sign Stand found in Figure 01 35 00 – 02 (both shown below)?*> All sign supports shall either be a post mounted support per the requirements of Figure 01 or Wind Resistance Sign Stand per the requirements of Figure 02.

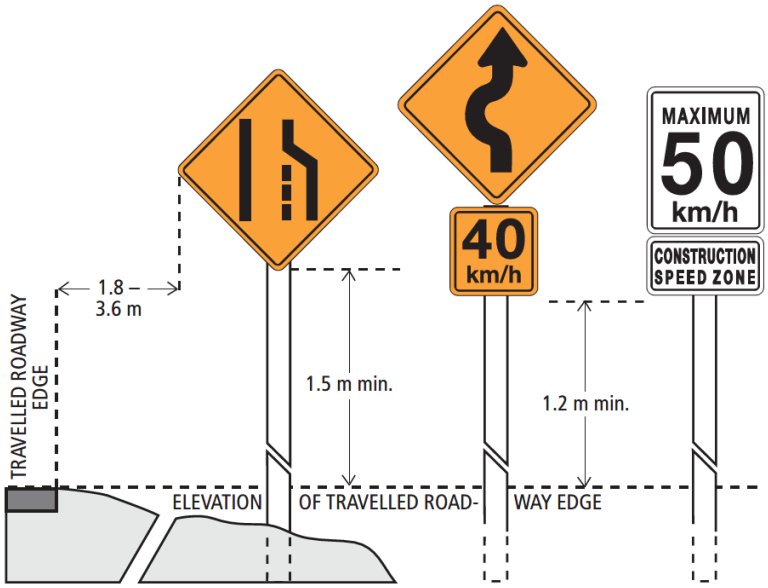


Figure 01: Post Mounted Supports

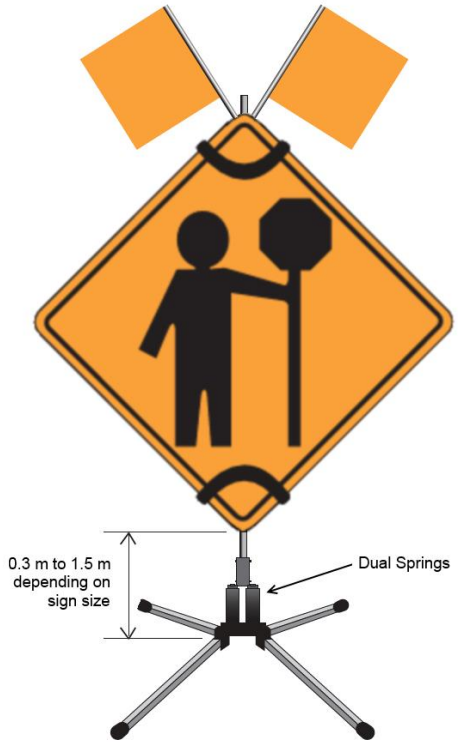


Figure 02: Wind Resistance Sign Stand

Flags will be used on the following signs:

.1 Traffic Control Person Ahead (C-001-1).

	.2 Survey Crew Ahead (C-003). .3 Crew Working Ahead (C-004). .4 Accident Scene (C-058). Unless pre-approved by the Departmental Representative, one or more sandbags or weights will be in used at all times to further stabilize all Wind Resistance Sign Stands. Where an option for a sign size is available, the sign size used will be the larger dimension sign as listed in Appendix B.2: Sizes and Applications of Individual Signs of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition. Signs will be positioned so that they do not block the sight lines of drivers entering a roadway from side roads or other access points.
Portable Dynamic Message Signs (DMS)	*<Are DMS required? Where will they be located?>* Two (2) portable dynamic message signs (DMS) will be used for the duration of the work. The DMS will have a minimum of 3 lines with 8 characters per line (minimum 450 mm character size) A portable dynamic message sign (DMS) will be used in the location identified in 7.2 Typical Construction Speed Zone Signing – Two-Lane, Two-way Roadway (Item 3.2 – Traffic Management, subsection .1.5.3 of the contract specification). A list of DMS messages which will be displayed on the DMS throughout the project is shown in Appendix D. Messages that will be used on the DMS are per Section 4 – Temporary Traffic Control Devices (Table 4.5 and Table 4.2) of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition plus other messages anticipated to be required on the project.
PSPC Permanent Variable Message Signs	PSPC will assist <*Name of Contractor*> with the Public Information Plan by notifying DriveBC of the work and posting notice of the project on PSPC's permanent variable message signs along the highway. <*Name of Contractor*> will inform PSPC a minimum 7 days in advance of any scheduled work to be posted. All other requirements of the Public Information Plan (Section 3.2.3 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition has been included in the Traffic Management Plan and will be undertaken / implemented <*Name of Contractor*> prior to commencing work.
Intersections affected by work zone or traffic control devices	*<Are intersections affected by the work zone or traffic control devices?>* *<If so, how will the intersections be controlled?>*

	<*Will additional traffic control devices be required?*>
Flexible Drums	<*Will flexible drums be used to delineate lane drops?*> <*Will they be used to identify construction accesses to the work activity area?*> Unless preapproved by the Departmental Representative, where 45 cm, 70 cm, or 90 cm cones are called for by the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition, 100 cm tubular markers will be used.
Traffic Stoppages	<*Are there any anticipated traffic stoppages?*> <*If so, for how long?*> <*Will there be single lane alternating traffic?*>
Layout of Devices	<*Identify spacing between traffic control devices.*>
Emergency Vehicles	<*Will emergency vehicles have clear, unobstructed access to the site.*> <*What procedures will be in place to ensure that emergency vehicles are able to access the site without delay?*>
Pilot Cars	Pilot cars will not be used when the length of the single lane alternating traffic does not exceed 300 m. The traffic control signage layout used in conjunction with pilot cars will include the Prepare to Stop (C-029) sign (sign spacing shall be adjusted to suit). During non-work hours temporary traffic signals, controlled by the Pilot Car Driver may be used to replace the traffic control persons. If this traffic control arrangement is used, the traffic control signage layout plan will be revised to include applicable signage from 7.10 Lane Closure with Temporary Signals – Single Lane Alternating Traffic – Short and Long Duration and submitted as part of the Traffic Management Plan. .4 The traffic control signage layout shall include the Men Working (C-004) sign in advance of the Construction Ahead (C-018-1A) sign. The spacing shall be per applicable Construction Sign Spacing (Dimension A as defined in Table B of Section 7 of the BC Ministry of Transportation Traffic Management Manual for Work on

	Roadways – 2020 Office Edition) for the applicable speed (adjust all other sign spacing as required).
Drop-offs	Drop-off's are defined as an abrupt change in elevation created by construction activity such as milling, paving, or excavation that is steeper than 3H:1V. Drop-off's will be treated in accordance with Section 6.5 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition whenever the drop-off is within 1.5 m of the edge of the travel lane. Additionally, drop-offs ≥ 150 mm between 1.5 m and 3.0 m of the travel lane will be signed with Low Shoulder (C-013) signs at least once every 1 kilometer for as long as the condition persists.

2.2 Work Activity Specific Risk Assessment and Traffic Plan

<A separate table and traffic control plan drawing (Table in Section 2.4 and drawings in Appendix A) is required for each unique element of work. Example elements of work are to include but are not limited to unloading of equipment, paving, line painting, rumble strip installation, excavation on highway, excavation off highway, culvert installation, etc. The Contractor is to add additional tables as necessary.>

Work Activity	*<Type of work: stationary, slow-moving, emergency, brief, short-duration, or long-duration work?>*
Station / Location	
Traffic Control Drawing	Appendix A – Drawing *<Drawing number of associated traffic control set-up>*
Identified Risks	*<What potential risks associated with the work have been identified?>*
Work On/Off Roadway	*<Is the work on or off the roadway?>*
Site Access/Egress	*<How will equipment access and exit from the site?>*
Intersections affected by work zone or traffic control devices	
Delays, Closures, Diversions, and Detours	*<Will delays, closures, diversions, and/or detours be in place?>* *<If so, illustrate in Appendix B: Detour Traffic Control Plan Drawing.>* *<What is the design speed for the detour?>* *<Can it withstand the traffic that will be using the road?>* *<For what duration will these be in place?>*
Hours of Work	*<The hours during which the work will occur.>* *<The time period during which the work will affect traffic.>*
Dump Site	*<Location of dump site and access/exit requirements.>*
Construction Equipment	*<How will construction equipment be protected during working hours? During off-hours?>*

2.3 Drawing List

Below is a table summarizing the of drawing(s) showing the applicable traffic accommodation strategies which will be used during specific elements of the work.

<Include a table or list of each element of work on the project and the applicable traffic accommodation strategies and layout drawing(s) which will be used during that element of work throughout all project locations. The table or list of each element of work on the project shall also include the applicable traffic accommodation strategies and layout drawing(s) to be used during non-work hours.>

Traffic Control Drawing(s)	**Corresponding Tender Drawing(s)**	**Project Location(s)**	**Construction Element(s)**
<Drawing No.>	*<Drawing No.>*	*<Station Range, ex.283+360 to 308+905>*	*<ex. ACP Placement, Rest Stop, Culvert Installation, etc.>*

3. Incident Management Plan

The Incident Management Plan defines processes for responding to unplanned events or traffic incidents in the work zone so that incident response operations within the work site are managed effectively.

The Incident Management Plan requirements are partially determined by the project category (see Section 3.2: Traffic Management Plan Sub-Plans and Section 3.4: Traffic Management Plan Requirements by Category in the **Traffic Management Manual for Work on Roadways).**

Traffic Control Supervisor and Qualifications	*<Name and qualifications.>*
Traffic Control Manager and Qualifications	*<Name and qualifications.>*
Emergency Response Agencies and Contact Information	*<Name and contact information (may be listed in Section 6: Contact List).>*
Types of traffic incident that could occur within work zone	*<Motor vehicle incident, motor vehicle incident with injuries, vehicle stalls, emergency vehicle transit of work zone, dangerous goods incident, wide load passing, etc.>*
Procedures for responding to traffic incident that occurs within work zone	*<Will there be a radio announcement?>* *<Who will evaluate the incident?>* *<Who will call 911?>* *<Will traffic be stopped, or will there be single lane alternating traffic?>* *<Who will assist the emergency responders through the site, and how?>* *<Who will assist if it is necessary to clear vehicles, and how?>*
Procedures to restore traffic flow around incident site as quickly as possible	*<How will traffic movement be restored?>* *<Will traffic control devices be used?>* *<If so, how?>*
Procedures to clear incident and restore normal project traffic	*<How will the incident be cleared to restore traffic movement?>* *<How many TCPs are required?>*

operations as soon as possible	
Procedure to inform and update PSPC regarding incident in work zone	*<What is the procedure for advising the PSPC that an incident occurred, what response measures are being taken, what clearance measures are required, and what the estimated clearance time will be?>*
Procedure to inform travelling public of estimated duration of delay and alternative routes (if applicable)	*<Will DMS be used to display information?>*
Incident Reporting	*<Who will provide details to the PSPC?>* *<What is the process for incident follow-up?>*
Investigation Process	*<Who will lead the incident investigation?>* *<What investigation process will be used to assess the incident and those involved?>*
Review and Continuous Improvement Process	*<How incidents will be reviewed and followed up to reduce the severity and frequency of future incidents?>*

4. Public Information Plan

The Public Information Plan identifies actions and procedures for informing the travelling public, project stakeholders, and the PSPC of current traffic operations and planned changes to traffic operations.

PSPC will assist the Contractor with the Public Information Plan by notifying DriveBC of the work and posting notice of the project on PSPC's permanent variable message signs along the highway. All other requirements of the Public Information Plan (Section 3.2: Traffic Management Plan Sub-Plans and Section 3.4: Traffic Management Plan Requirements by Category in the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition) shall be included in the Traffic Management Plan and by undertaken / implemented by the Contractor prior to commencing work.

Process for routinely notifying PSPC of changes to scheduled work plans	<*Who will be responsible for the changes?*> <*What is the person's title?*>
Process for notifying travelling public of scheduled traffic delays and project duration	<*Identify the forms of communication to be used [radio, project signs, Permanent Dynamic Message Signs), Portable Dynamic Message Signs, public meetings, etc.].*>
Process for notifying travelling public of unscheduled traffic delays	<*Identify the forms of communication to be used [project signs, Permanent Dynamic Message Signs, Portable Dynamic Message Signs, public meetings, etc.].*>
Major user groups for alternating lane closures or road closures	<*Identify the major user groups (BC Trucking Association, BC Transit, emergency response agencies, school districts, etc.).*

5. Implementation Plan

The Implementation Plan identifies responsibilities and procedures for ensuring that traffic management sub-plans are developed and implemented in a coordinated manner.

It identifies the qualifications, responsibilities, and duties of supervisory and management personnel responsible for implementing the Traffic Management Plan and includes the designation of a Traffic Control Manager and a Traffic Control Supervisor.

See also Section 3.2: Traffic Management Plan Sub-Plans and Section 3.4: Traffic Management Plan Requirements by Category in the Traffic Management Manual for Work on Roadways.

Traffic Control Manager and Responsibilities	*<Name, qualifications, responsibilities, and duties.>*
Traffic Control Supervisor and Responsibilities	*<Name, qualifications, responsibilities, and duties.>*
Person who will manage emergency traffic control operations	*<Name and title.>*
Person who will maintain daily traffic control logs	*<Name and title.>*
Person who will manage Incident Management Plan	*<Name and title.>*
Person who will manage Public Information Plan	*<Name and title.>*
Person who will monitor inactive work site	*<Name, title, and responsibilities.>*

6. Contact List

6.1 Emergency Response Agencies/Assistance

Agency/Assistance		Contact 1	Contact 2
RCMP		**911**	
Local Police – Fort Nelson (emergency)		250.774.2777	
Local Police – Fort Nelson (non-emergency)		250.774.2700	
Local Police – Fort St. John (emergency)		250.787.8100	
Local Police – Fort St. John (non-emergency)		250.787.8140	
Local Police – Watson Lake (emergency)		867.536.5555	
Local Police – Watson Lake (non-emergency)		867.536.2677	
BC Ambulance			
Ambulance – Fort Nelson		250.774.2344	
Ambulance – Fort St. John		250.785.5559	
Ambulance – Watson Lake		867.536.4444	
S.T.A.R.S Ambulance		1.888.888.4567	
Fire and Rescue			
Fire and Rescue – Fort St. John		250.785.4333	
Fire and Rescue – Fort Nelson (emergency)		250.774.2222	
Fire and Rescue – Fort Nelson (non-emergency)		250.774.3955	
Fire and Rescue – Watson Lake (emergency)		867.536.2222	
Fire and Rescue – Watson Lake (non-emergency)		867.536.8008	
BC Forest Fire Reporting		1.800.663.5555	*5555 (Cell)
Yukon Forest Fire Reporting		1.888.798.3473	
WorkSafeBC Work Site Emergency	**24 hr.**	1.888.621.7233	1.800.663.4630 250.785.1283 (Non-emergency)
HazMat	**24 hr.**	1.800.663.3456	
BC Environmental Provincial Emergency Program	**24 hr.**	1.800.663.3456	
BC Environmental Regional Office		250.787.3411	
BC Hydro – Power (Emergency)	**24 hr.**	911	1.800.224.9376 (Non-emergency)
Fortis BC – Natural Gas Emergencies	**24 hr.**	1.800.663.9911	
BC One Call		1.800.474.6886	*6868 (Cell)
NorthwesTel (Corporate Office Whitehorse)		1.867.668.5300	
Poison Control		1.800.567.8911	*311 (Cell)
Reporting Safety Violations	**24 hr.**	1.888.775.8785	
Peace River Regional Office		250.784.2363	

Provincial Emergency Program **24 hr.** (Ground Search & Rescue)	**1.800.663.3456**	
Commercial Vehicle Inspection and Standards (CVSE)	1.888.775.8785	
Towing Company	<Contact #>	
Road Maintenance Contractor – White Bear Industries	250.635.3169	
Other		
Northern Rockies Regional Municipality	250.774.2541	
School District 60	250.262.6000	
School District 81	250.774.2591	
Media		
Peace Sun / 101.5 The Bear	250.787.0669 (Studio)	250.785.6334 (Reception)
1001. Moose FM	250.787.2222 (Control Room)	250.787.100 (Office)
Alaska Highway News	250.785.5631	

6.2 Prime Contactor's Contact Numbers

Name and Position	Office Number	Cell Phone Number
<*Name*>, Project Superintendent	<Contact #>	<Contact #>
<*Name*>, Health and Safety Coordinator	<Contact #>	<Contact #>
<*Name*>, First Aid Attendant(s)	<Contact #>	<Contact #>
<*Name*>, Traffic Control Supervisor	<Contact #>	<Contact #>
<*Name*>, Traffic Control Company	<Contact #>	<Contact #>
<*Name*>, Key Subcontractor Representatives	<Contact #>	<Contact #>

6.3 PSPC Contact Numbers

Name and Position	Office Number	Cell Phone Number
George Smith – Operations Manager, Alaska Highway	250.774.6956	250.321.0174 600.700.0131 (Satellite Phone)
<*Name*> – Onsite Inspection and QA Representative	<Contact #>	<Contact #>

Appendix A: Traffic Control Plan Drawings

Appendix A: Traffic Control Plan Drawings

Site Diagram
<Use additional pages as necessary>

<Show all site factors affecting traffic control, traffic control devices, spacing, signs (including sizes), explanatory notes, North arrow, etc.>

<Per section 6.3 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition, traffic management shall be managed as one continuous work zone where the work is one kilometer apart or less.>

Appendix B: Detour Traffic Control Plan Drawings

Appendix B: Detour Traffic Control Plan Drawings

Site Diagram
<Use additional pages as necessary>

<Show all site factors affecting traffic control, traffic control devices, spacing, signs (including sizes), explanatory notes, North arrow, etc.>

<Per section 6.3 of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition, traffic management shall be managed as one continuous work zone where the work is one kilometer apart or less.>

Appendix C: Daily Sign Check Form

Daily Sign Check Form

Project Name and Number	**Project Location**
Type of Work	**Highway Location**

Date yyyy/mm/dd	Time of Inspection	Location and Deficiency Type	Comments	Initials

Date yyyy/mm/dd	Time of Inspection	Location and Deficiency Type	Comments	Initials

Appendix D: DMS Message Library

Appendix D: DMS Message Library

<*Provide a* list of DMS messages which will be displayed on the DMS throughout the project. Messages that will be used on the DMS shall be per Section 4 – Temporary Traffic Control Devices (Table 4.5 and Table 4.2) of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2020 Office Edition plus other messages anticipated to be required on the project.>

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Appendix D

On-site Construction Start-up Form

Public Services and Procurement Canada | Services publics et Approvisionnement Canada

On-site Construction Start-up Form

Project Name:	Inga Lake Intersection Improvements Project
Project Number:	
Departmental Representative:	
Contractor:	
Contractor Representative:	Ph: ( ) - -

The Contractor or its subcontractors shall not perform any on-site work until they receive a completed version of this form which has been signed by PSPC's Departmental Representative.
PSPC reserves the right to refuse payment for any on-site work performed prior to the receipt of the completed and signed form.
The list below is meant to be a guide and is not intended to be a comprehensive list of required submittal items for the project. Refer to 2.8 Contract Submittals for the list of submittals.

Submission Item	**Reviewed & Accepted by PSPC**	**Date** (yyyy-mm-dd)	**Comments / Exclusions**
Contract, Bonding, and Insurance	☐		
Health & Safety Plan	☐		
Traffic Management Plan	☐		
Environmental Protection Plan	☐		
Project Construction Schedule	☐		
Cash Flow Plan	☐		
Quality Management Plan	☐		
Construction Staging Plan	☐		
Construction Equipment List	☐		
Other:	☐		
Other:	☐		

Below to be completed by the Departmental Representative and returned to the Contractor

Has the Contractor submitted all required documents for construction work to commence? ☐ Yes ☐ No

Have all listed documents required prior to construction commencement been accepted by PSPC? ☐ Yes ☐ No

Comments:_____

_____

_____

_____

Name of Departmental Representative: _____

Signature: _____ Date: _____

Canada

R.115570.001
Appendix E

Progress Payment Submittal Form

Public Services and Procurement Canada | Services publics et Approvisionnement Canada

Progress Payment Submittal Form

Project Name:	Inga Lake Intersection Improvements Project
Progress Payment Number:	
Departmental Representative:	
Contractor:	
Contractor Representative:	Ph: ( ) - -

This form, completed and signed by the Contractor's Representative, shall be submitted with all documentation listed below for each progress payment request.
Upon receipt of this form and all documents, PSPC will commence review of the progress payment request in accordance with General Conditions 5 – Terms of Payment.
The list below is meant to be a guide and is not intended to be a comprehensive list of required submittal items for each progress payment. PSPC may request additional documentation not listed below.

Submission Item	Submitted	Comments
Progress Payment	☐	
Statutory Declaration	☐	
WorkSafeBC Clearance Letter	☐	
Project Schedule (with baseline tasks and updates showing completion dates and % complete)	☐	
Survey Details for each quantity claimed (See Appendix F)	☐	
Other:	☐	
Other:	☐	

Prime Contractor Representative:

Name:_____

Title:_____ Signature:_____

Date:_____

Canada

R.115570.001
Appendix F

Measurement for Payment Survey Details Form

Measurement for Payment Survey Detail Form

Project Name:	Inga Lake Intersection Improvements
Progress Payment Number:	

This form shall be submitted with the progress payment request form to identify how the surveyed quantities for specific line items were obtained.

<Note: remove the examples below and add lines as needed to provide details for every item included in the progress payment measured by survey. Provide individual entries for each task (ex: a line for gravel placed at rest stop A and a separate line for gravel placed at rest stop B). A progress payment line item may have more than one entry – the total entries for a particular line item shall equal the quantity shown on the progress payment)>

Progress Payment Line Item	Specification Defining Payment Requirements	Work Description	Claimed Quantity for Payment	File Name(s) (include point files and break line files names to be compared to compute quantity)	Additional Details
13	*31 24 14*	*Excavation at Km 282 Rest Stop Sta. 282+020 to Sta. 282+070*	*1400 m^3*	• *Km 282 Rest Stop – OG.csv* • *Km 282 Rest Stop – OG Breaklines.dxf* • *Km 282 Rest Stop – Bottom Excavation.csv* • *Km 282 Rest Stop – Bottom Excavation Breaklines.dxf*	*In the provided csv files the difference between the 2 surfaces "OG" and "As-built" is equal to 1400 m^3*
14	*32 11 19*	*Crushed Base Gravel at Km 282 Rest Stop Sta. 282+020 to Sta. 282+070*	*800 m^3*	• *Km 282 Rest Stop – Bottom Excavation.csv"* • *Km 282 Rest Stop – Bottom Excavation Breaklines.dxf* • *Km 282 Rest Stop – As-Built Survey Data.csv* • *Km 282 Rest Stop – As-Built Survey Breaklines.dxf*	*In the provided csv files the difference between the 2 surfaces "OG" and "As-built" is equal to 1400 m^3*

R.115570.001
Appendix G

Environmental Protection Plan (EPP) – Checklist

Environmental Protection Plan (EPP) — Checklist

Note: This checklist was developed to assist the Contractor in determining and mitigating environmental issues at site. It is considered a generic checklist and it is in the Contractor's best interest to review the PSPC Environmental Management Plan (EMP) or the Environmental Assessment (EA) as supporting documents in the completion of the site Environmental Protection Plan (EPP). This EPP Checklist does not need to be submitted for review by the Departmental Representative.

EPP Framework	Content Requirements	No	Yes	N/A
Project Setting and Site Activities				
Project Description	A brief description of the project and its location is provided.			
Environmental Sensitivities	Sensitive or protected features that could be impacted as a result of the Contractor's activities are described.			
Site Activities	A scope of work and a list of all construction or related activities to be undertaken during the project are provided.			
Project Schedule and Site Drawings				
Project Schedule	A project schedule is provided, including scheduled shutdowns and restricted work periods due to environmental requirements.			
Site Drawing	One or more site drawings(s) are provided, indicating the site location; site set-up and layout; erosion and sediment controls; in-stream work areas; and environmental sensitivities.			
Potential Environmental Impacts and Controls				
Potential Environmental Issues and Impacts	The potential environmental issues and impacts that may result from the construction activities are described. Environmental Reports (Environmental Assessments; Fish Habitat and Compensation etc.) will be provided to the contractor especially with respect to any in-stream work procedures that will be required. For example, in-stream works will impact fish and fish habitat in the surrounding ecosystem. It is the Contractor's responsibility to ensure the work is completed in a manner that causes the least impact on the ecosystem (see section on Mitigation).			
Permits, Approvals, and Authorizations	List required permits, approvals, and authorizations. As applicable, environmental mitigation measures prescribed by regulatory agencies and included in project permits, approvals and authorizations are described. NOTE: DFO, MoE and NWPA approvals and authorizations for in-stream works are PSPC's responsibility however, the Contractor must be aware of the requirements of these approvals/authorizations. Permitting for water withdrawal from the waterbody as part of construction activities is part of the Contractor's responsibility.			
Mitigation Strategies	Procedures, controls, or best management practices (BMPs) to prevent or reduce adverse impacts on the environment are provided. All work in BC must adhere to the BC MoE "Standards and Best Practices for Instream Works".			
Erosion and Sediment	Erosion and sediment controls are provided, as appropriate for the jurisdiction.			

Waste Management and Hazardous Materials				
Waste Management and Hazardous Materials	Hazardous materials that will be used and/or stored on site are listed. Expected hazardous and non-hazardous waste materials along with proper handling, containment, storage, transportation, and disposal methods are listed. As appropriate for the jurisdiction, estimated waste quantities and specific handling procedures are also provided. For example, refueling of equipment will be conducted at least 100m away from any active drainage courses.			
EPP Implementation				
Site Representative	Name(s) and contact details for the person(s) who will be the Contractor's Site Representative(s) are provided.			
Training and Communication	Training and communication details are provided.			
Monitoring and Reporting	Monitoring and inspection procedures, including a schedule of monitoring activities and reporting procedures are provided. For example, this would include downstream monitoring activities for increased siltation during in-stream works.			
Documentation	Information and/or records that will be maintained relating to the EPP and end environmental matters on the project site are described.			
EPP Update	EPP review and update procedures are provided.			
Environmental Emergency Response Procedures				
Environmental Emergency Response Procedures	Potential incidents that may impact the environment are identified, and emergency response procedures to prevent and respond to incidents are provided. An environmental emergency response contact list is also provided.			

R.115570.001
Appendix H

Responsibility Checklist for Authorizations / Approvals / Notifications / Permitting

Responsibility Checklist for Authorizations/Approvals/Notifications/Permitting

Project Title	Inga Lake Intersection Improvements, Alaska Highway, BC
Project Description	Inga Lake Road on Alaska Highway, BC
Project Type	
Comments	

Issued By	Document Type	Yes	No	N/A
PSPC Responsibility				
Federal				
DFO - Fisheries Act http://laws.justice.gc.ca/en/F-14/	Section 35(2) Authorization for Harmful Alteration Disruption or Destruction (HADD) to fish habitat (e.g. new bridges that are not clear span; erosion protection works that extend into the river channel).			
	Section 32 Authorization for Destruction of Fish (when explosives are used). Protects fish from being destroyed except by fishing or as Authorized by DFO.			
	Section 20 Approval – The Need for Safe Fish Passage – Every obstruction across or in any stream where DFO determines it necessary that a fish-pass should exist requires either a fish way or canal around the obstruction.			
	Notification process required for culverts and those works that fall under DFO Operational Statements. Stream Crossings by Roads: • Clear Span Bridges • Temporary Ford Stream Crossing • Ice Bridges and Snow Fills • Bridge Maintenance • Maintenance of Riparian Vegetation in Existing Rights-of Way			
	Section 36 – under this Section of the Fisheries Act the proponent can be FINED resulting from deposition of substances deleterious to fish in waters frequented by fish – this includes release of silt laden waters from construction activities.			
Transport Canada NWPA http://laws.justice.gc.ca/en/N-22/text.html	Section 5(1) Formal Approval for construction of new structures (new bridges, culverts, scour protection).			

	Section 5(2) Work Assessment for work resulting in insignificant impacts on navigability.			
	Section 6(4) Formal Approval for existing structures (existing bridges).			
	Minor Works and Waters Order – This is an amendment to the NWPA that streamlines the federal review process by establishing classes of waters and works (projects) that do not require an Application or Approval through the NWPP because they are "minor" in nature. These would include such “works” as repairs to riprap (no groynes) or “waters” that are not large enough for vessel traffic (i.e. Contact Creek). http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-minorworks-menu-1743.htm			
Indian and Northern Affairs Canada – Indian Act	Approval for activities on lands under their jurisdiction. This is addressed under the EA review process in most cases. If the project is exempt from an EA it must be addressed by the PM or ES personnel.			
Migratory Birds Convention Act (MBCA)	Environment Canada is responsible for implementing the *Migratory Birds Convention Act*, which provides for the protection of migratory birds through the *Migratory Birds Regulations*. This is addressed under the EA review process in most cases. If the project is exempt from and EA it must be addressed by the PM or ES personnel.			
ECMP	Has taken over for our old CEAA form. The ECMP Checklist and the Preliminary Identification of Environmental Support Required (PIESR) Form have been developed to ensure that applicable environmental legislation and relevant aspects are identified during a project. The ECMP Checklist replaces the PSPC CEAA Checklist and will be the mechanism by which project information is submitted to PSPC Environmental Services to determine whether environmental support is required. The ECMP Checklist is located in ELF (Form 183_e). By completing and submitting the ECMP Checklist to Environmental Services, PSPC project managers1 will ensure that their projects are systematically evaluated for compliance with environmental legislation, policies, and sustainable development requirements			
Species at Risk Act (SARA) http://www.sararegistry.gc.ca/default_e.cfm	A list of federally listed species at risk likely to occur at a given subject site must be compiled in order to identify potential impacts & propose mitigation measures for minimizing impacts to these species as a result of project activities. In			

[1] Project Manager refers to anyone who leads, manages or delivers a project

	cases where suitable habitat for a given species exists at/near the project site, mitigation measures are recommended, including avoidance of areas containing said habitat and informing site workers of these issues to prevent incidents.			
First Nations Notifications and Consultations http://clss.nrcan.gc.ca/googledata-donneesgoogle-eng.php	Natural Resources Canada has developed an overlay to be used with Google Earth & Google Maps to identify First Nations lands throughout the country. Notifications of projects within 5 km of such lands and/or directly upstream from such lands should be submitted to the relevant First Nations for a determination of their interest in a given project and/or to request any traditional knowledge they may have to offer.			
Provincial – **Note one submission package for instream works is sent to FrontCounterBC at MoE who then send off to the appropriate departments for approval/notification/permitting – this does not apply to the archeological.**				
Wildlife Act – WLAP – MoE http://www.qp.gov.bc.ca/statreg/stat/W/96488.01.htm	Wildlife Act – Section 34 – Birds, Nests and Eggs – vegetation clearing should not occur during critical bird nesting periods, which typically occur in the spring and summer. Contact the local WLAP for vegetation clearing timing windows.			
Water Act - ***Water Stewardship Division - Ministry of Forests, Lands, Natural Resource Operations, and Rural Development***	Section 11 – regulates changes in or about a stream and ensure that water quality, riparian habitat, and the rights of licensed water users are not compromised. This is an approval process and takes approximately 140 days. An application fee is also required. Works requiring approval include channel realignment, retaining wall or bank protection stabilization etc.			
Environmental Stewardship Division - MoE	Notification process for such works as replacement and maintenance of culverts and outfalls; temporary stream diversions around a worksite and takes approximately 45 days to receive notification approval. In general, those works requiring a notification are those that do not involve any diversion of water.			
Fish Protection Act – MoE http://wlapwww.gov.bc.ca/habitat/fishprotectionact/	This Act was passed in 1997 and is reviewed as part of the Water Act under Section 11 when applying for approval.			
Ministry of Forests, Lands, Natural Resource Operations, and Rural Development Archaeological http://www.for.gov.bc.ca/archaeology/requesting_archaeological_site_information/process_steps.htm *Contact: Hayley Bond (250) 953-3343*	When completing projects such as quarry pits and new highway alignments, a request is put into the archaeological branch of MFLNSO via the EA process to search the data base. An archaeological assessment may be required on those areas that are previously undisturbed or undeveloped.			
BC Parks	Various permits are required when completing construction activities within the Parks. Please note that all works within 150 feet of the centreline of the highway (Right-of-Way) are NOT			

	subject to construction permitting. (this does not include permitting for fish surveys).			
Canada-British Columbia Agreement for Environmental Assessment Cooperation http://www.ceaa.gc.ca/default.asp?lang=En&n=04A20DBC-1	Most Alaska Highway Projects will not trigger this agreement, as both the Vancouver CEAA office and the Victoria BC Environmental Assessment Office (EAO) have confirmed that the types and scopes of the projects are not described in the BC Environmental Assessment Act – Reviewable Projects Regulation. However, for due diligence, it is recommended that notifications for all Alaska Highway projects be submitted to CEAA (info@ceaa-acee.gc.ca) for review and, if necessary, a determination of whether or not CEAA and/or the BC EAO should be involved.			
BC Ministry of Environment – BC Species and Ecosystems Explorer http://a100.gov.bc.ca/pub/eswp/	A list of provincially listed species at risk likely to occur at a given subject site must be compiled in order to identify potential impacts & propose mitigation measures for minimizing impacts to these species as a result of project activities. This process involves conducting a search of the BC Species and Ecosystems Explorer inventory for the specific area of BC containing the proposed project site.			
Consultant Responsibility				
Provincial				
BC Parks Ministry of Forests, Lands, Natural Resource Operations, and Rural Development http://www.env.gov.bc.ca/bcparks/permits/	Permit to Collect Fish For a Scientific Purpose - Regulation Research activities in parks and protected areas, including: collection; monitoring; survey and inventory; and, other research trigger a Park Permit - Ministry of Forests, Lands, Natural Resource Operations, and Rural Development is responsible for the administration of fish and wildlife permits. Note that these permits are taking approx. 6 months to receive due to recent involvement and subsequent consultation with Treaty 8.			
Water Act – Regulation's Protection of Habitat - Section 42(1)	Permit to Collect Fish for a Scientific Purpose – Subsection 42(1)(e) – It is the responsibility of the salvage crew to obtain the necessary permit required to complete a fish and amphibian salvage – in conjunction with the BC Parks permitting.			
Note: research projects and inventory projects are under the same Permit and are applied for under the "Application to Collect Fish for a Scientific Purpose". **http://www.env.gov.bc.ca/pasb/applications/process/scientific_fish_collect.html#a5**				
Contractor Responsibility				
Federal				
DFO – End of Pipe Guidelines	End-of- pipe guidelines for freshwater intake to avoid fish entrainment.			

Provincial				
Water Act - MoE	Schedule A – Water License Applications – use of water from waterbody for road maintenance.			

R.115570.001
Appendix I

Relevant Environmental Publications

Relevant Environmental Publications

The below list of documents is those commonly used when determining how to design and advance a project with the potential to impact a waterbody.

Agency	Publications	Summary
DFO	***Land Development Guidelines for the Protection of Aquatic Habitat - 1993***	This document is a good reference guide for any works that are occurring in or around the water.
	Canada's Fish Habitat Law	Document explaining the fish and fish habitat laws under the Fisheries Act.
	Riparian Revegetation	Information on minimizing, stabilizing and revegetating construction areas.
	Freshwater Intake End-of Pipe Fish Screen Guideline - 1995	Provides guidelines for the contractor to follow to ensure fish screens are used during freshwater intake operations at construction sites.
	Operational Statements Stream Crossings by Roads: • Clear Span Bridges • Temporary Ford Stream Crossing • Ice Bridges and Snow Fills • Bridge Maintenance • Maintenance of Riparian Vegetation in Existing Rights-of Way	Fisheries and Oceans Canada has developed a series of Operational Statements to streamline the undertaking of low risk activities. The Operational Statements outline conditions and measures for avoiding harmful alteration, disruption, and destruction (HADD) of fish habitat, and applying them will ensure the project complies with subsection 35(1) of the *Fisheries Act*. You are NOT required to submit a proposal for review by Fisheries and Oceans Canada when you incorporate the measures and conditions outlined in an appropriate Operational Statement into your plans. http://www.pac.dfo-mpo.gc.ca/habitat/os-eo/index-eng.htm
MoE	***Fish-stream Crossing Guidebook - 2002***	Guidelines in protection of fish and fish habitat and the safe passage of fish during construction at/on stream crossings.
	Standards and Best Practices for Instream Works - 2004	Guide to planning and carrying out the proposed construction activities to comply with relevant legislation, regulations, and policies.
	A User's Guide to Working in and Around Water - 2005	Understanding the regulation under British Columbia's Water Act.
	Fish-Stream Identification Guidebook - 1998	Assists in providing information on determining fish streams.
	The Streamkeepers Handbook	A practical guide to stream and wetland care in regards to rehabilitation planting.

R.115570.001
Appendix J

Engineering Services for Safety Improvements at Inga Lake Intersection, Km 145.8, Alaska Highway, BC
Geotechnical Data Report

TETRA TECH

January 17, 2019

ISSUED FOR USE
FILE: TRN.VHWY03092-01
PSPC PROJECT #: R.017173.218

Public Services and Procurement Canada
219, 800 Burrard St.
Vancouver, BC V6Z 0B9

Attention: Vicky Wong, P. Eng.

Subject: Engineering Services for Safety Improvements at Inga Lake Intersection Area, km 145.8, Alaska Highway, BC
Geotechnical Data Report

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained by Public Services and Procurement Canada (PSPC) to provide multi-disciplinary engineering services for the design of safety improvements at the above-noted intersection area located at km 145.8 of the Alaska Highway in northern British Columbia.

This letter report presents the results of a recent geotechnical exploration completed at the site and summarizes the soil and groundwater conditions encountered.

The Limitations on the Use of this Document, attached in Appendix A, forms an integral part of this report.

1.1 Background

Safety issues were identified at km 145.8 in the Alaska Highway in service road safety reviews conducted by Tetra Tech in 2010 and 2017. The safety issues include sightline issues due to the sharp crest curve just west of the intersection, lack of left turn and right turn lanes on the highway for turning traffic, and no advanced information signage. Given the increase in vehicle activity from oil and gas industries in the area, it is anticipated that safety improvements will be required at this intersection based on collision statistics from recent years.

Tetra Tech is currently evaluating various options to improve intersection safety at km 145.8, the findings of which will be presented to PSPC under separate cover. The options currently under consideration include realignment of the roads intersecting the Alaska Highway and lowering of the highway grade to address the sightline issues.

2.0 SURFICIAL GEOLOGY

According to the Geological Survey of Canada map 1460A (Mathews 1978), the soil conditions at the site are anticipated to consist of glacial till-like deposits, described as "*till and stony silty clay, locally including thin and patchy cover of lacustrine material*", over sandstone bedrock.

Tetra Tech Canada Inc.
Suite 1000 – 10th Floor, 885 Dunsmuir Street
Vancouver, BC V6C 1N5 CANADA
Tel 604.685.0275 Fax 604.684.6241

3.0 GEOTECHNICAL SITE EXPLORATION

3.1 General

The geotechnical site exploration at km 145.8 was completed on October 14, 2017 and consisted of a total of thirteen (13) machine-excavated testpits completed using a CASE 580N rubber-tired backhoe supplied by Haab Contracting Ltd. of Baldonnel, BC. The testpits were excavated to terminus depths of up to 4 m below ground surface. A summary of the completed testpits is provided in Table 1. The testpit locations are shown on Figure 1.

Table 1: Testpit Locations – km 145.8 (Inga Lake)

Testpit	Location (UTM Zone 10) (1)		Terminus Depth (m)	Location Comments
	Easting	Northing		
TP-01	583996	6277740	3.5	Southbound Hwy ROW (ditch slope)
TP-02	583794	6277749	4	Southbound Hwy ROW (ditch slope)
TP-03	583639	6277774	4	Southbound Hwy ROW (ditch slope)
TP-04	583735	6277773	3.1	Northbound Hwy ROW (ditch slope)
TP-05	583890	6277762	3.8	Northbound Hwy ROW (ditch slope)
TP-06	584039	6277763	3.3	Northbound Hwy ROW (ditch slope)
TP-07	584057	6277804	3.3	West side of Inga Lake Road (ditch slope)
TP-08	584081	6277763	3.4	Northbound Hwy ROW (ditch slope)
TP-09	584235	6277764	3	Northbound Hwy ROW (ditch slope)
TP-10	584405	6277767	3	Northbound Hwy ROW (ditch slope)
TP-11	584169	6277742	3.1	Southbound Hwy ROW (ditch slope)
TP-12	584321	6277745	3	Southbound Hwy ROW (ditch slope)
TP-13	584478	6277748	3.1	Southbound Hwy ROW (ditch slope)

1. Testpit locations were obtained from a hand-held GPS at the time of excavation and are approximate.

3.2 Logging and Sampling

A Tetra Tech field inspector was on site during advancement of the testpits to log and sample the material encountered as well as to direct the termination depths and backfilling. Details are shown on the attached testpit logs in Appendix B.

3.3 Laboratory Testing

Soil samples recovered from the testpits were sent to Tetra Tech's laboratory for geotechnical index laboratory testing. The following tests were conducted on selected samples:

- Water Content (ASTM D2216).
- Atterberg Limits (ASTM D4318).

The laboratory test results are presented on the testpit logs in Appendix B. Soil descriptions on the logs were adjusted where necessary based on the results of the laboratory testing.

4.0 SUBSURFACE CONDITIONS

The results of the site exploration and laboratory testing are presented on the testpit logs in Appendix B. The logs provide a more detailed description of the subsurface conditions encountered and should be used in preference to the generalized descriptions given below.

4.1 Interpreted Soil Stratigraphy

In general, the results of the testpit exploration are consistent with the soil conditions indicated from the surficial geology mapping (Mathews 1978). A summary of the interpreted soil stratigraphy is as follows, listed in order of increasing depth below ground surface:

- **Topsoil**: Varying mixtures of grass, topsoil and organic silt were encountered within each of the testpits. This layer ranges from 0.2 m to 0.3 m thick.
- **Stiff to Hard Silt:** The topsoil layer is underlain by an irregular veneer of stiff to hard silt with some clay and trace sand and gravel, generally becoming finer-grained with depth. The natural water content of this material ranges from 11% to 16% (average ~ 13%).
- **Stiff to Hard Silty Clay**: The silt layer is underlain by stiff to hard, medium to high plastic silty clay with trace sand and gravel. The natural water content of this material ranges from 15% to 34% (average ~ 21%).
- **Bedrock**: Testpits TP-03 to TP-06, located on the northbound side of the highway to the west of Inga Lake Road, encountered sandstone bedrock at the bottom of the excavation.

4.2 Groundwater

Perched water was observed in TP-06 at the bedrock interface at 3 m depth below ground surface. Groundwater was not encountered in any other testpit. However, during periods of wet weather, we expect that perched groundwater may also accumulate on the surface of the silt / silty clay deposits.

5.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Public Services and Procurement Canada and their agents. Tetra Tech Canada Inc. (operating as Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Public Services and Procurement Canada, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.

6.0 CLOSURE

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

Respectfully submitted,
Tetra Tech Canada Inc.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
K. L. JOHNSTON

January 17, 2019

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/JP/KJ

Attachments: Figure (1)
Appendix A – Tetra Tech's Limitations on the use of this Document
Appendix B – Testpit Logs

REFERENCES

Mathews, W.H. 1978. Surficial Geology, Charlie Lake (094A), British Columbia. Geological Survey of Canada Map 1460A, Scale 1:250,000.

FIGURES

LEGEND
- Testpit Locations
- Highway ROW

NOTES
1. Imagery from Google Earth Pro.

ISSUED FOR USE

SCALE 1:2500

20 0 20 60 100m

CLIENT

Public Works and Government Services Canada

INTERSECTION IMPROVEMENTS ALASKA HIGHWAY, BC

TESTPIT LOCATION PLAN KM 145.8 (INGA LAKE)

TETRA TECH

PROJECT NO.	DWN	CKD	REV
ENG.VHWY03092-01	RH	JP	0
OFFICE: VANC	DATE: November 1, 2017		

Figure 1

APPENDIX A

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOTECHNICAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

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

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

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

1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

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

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

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

1.9 LOGS OF TESTHOLES

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

1.10 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

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

1.11 PROTECTION OF EXPOSED GROUND

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

1.12 SUPPORT OF ADJACENT GROUND AND STRUCTURES

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

1.13 INFLUENCE OF CONSTRUCTION ACTIVITY

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

1.14 OBSERVATIONS DURING CONSTRUCTION

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

1.15 DRAINAGE SYSTEMS

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

1.16 BEARING CAPACITY

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

1.17 SAMPLES

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

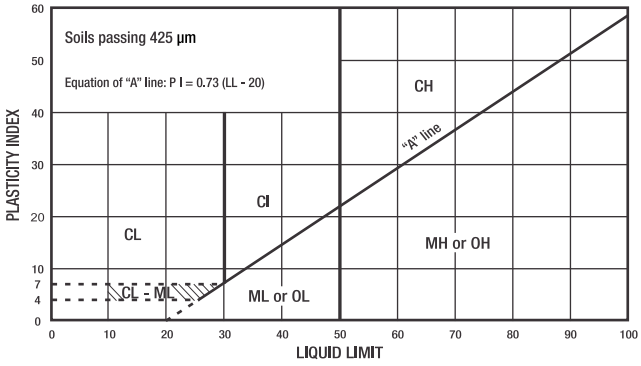
APPENDIX B

TESTPIT LOGS

MODIFIED UNIFIED SOIL CLASSIFICATION

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA		
COARSE-GRAINED SOILS More than 50% retained on 75 µm sieve*	GRAVELS 50% or more of coarse fraction retained on 4.75 mm sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines. Less than 5% Pass 75 µm sieve; More than 12% Pass 75 µm sieve; 5% to 12% Pass 75 µm sieve. GW, GP, SW, SP GM, GC, SM, SC Borderline Classification requiring use of dual symbols	$C_U = D_{60} / D_{10}$ Greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines		Not meeting both criteria for GW	
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits plot below "A" line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits plot above "A" line or plasticity index greater than 7	
	SANDS More than 50% of coarse fraction passes 4.75 mm sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines		$C_U = D_{60}/D_{10}$ Greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
			SP	Poorly graded sands and gravelly sands, little or no fines		Not meeting both criteria for SW	
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures		Atterberg limits plot below "A" line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures		Atterberg limits plot above "A" line or plasticity index greater than 7	
FINE-GRAINED SOILS (by behavior) 50% or more passes 75 µm sieve*	SILTS Liquid limit <50		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands of slight plasticity	For classification of fine-grained soils and fine fraction of coarse-grained soils.		
	SILTS Liquid limit >50		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts			
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit <30		CL	Inorganic clays of low plasticity, gravelly clays, sandy clays, silty clays, lean clays			
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit 30-50		CI	Inorganic clays of medium plasticity, silty clays			
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit >50		CH	Inorganic clays of high plasticity, fat clays			
	ORGANIC SILTS AND CLAYS Liquid limit <50		OL	Organic silts and organic silty clays of low plasticity			
	ORGANIC SILTS AND CLAYS Liquid limit >50		OH	Organic clays of medium to high plasticity			
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils			

PLASTICITY CHART



*Based on the material passing the 75 mm sieve
Reference: ASTM Designation D2487, for identification procedure see D2488. USC as modified by PFRA

SOIL COMPONENTS

FRACTION	SIEVE SIZE PASSING	SIEVE SIZE RETAINED	DEFINING RANGES OF PERCENTAGE BY MASS OF MINOR COMPONENTS PERCENTAGE	DESCRIPTOR
GRAVEL			>35 %	"and"
coarse	75 mm	19 mm		
fine	19 mm	4.75 mm	21 to 35 %	"y-adjective"
SAND				
coarse	4.75 mm	2.00 mm	10 to 20 %	"some"
medium	2.00 mm	425 µm		
fine	425 µm	75 µm	>0 to 10 %	"trace"
SILT (non plastic) or CLAY (plastic)	75 µm		as above but by behavior	

OVERSIZE MATERIAL

Rounded or subrounded

COBBLES	75 mm to 300 mm
BOULDERS	> 300 mm

Not rounded

ROCK FRAGMENTS	>75 mm
ROCKS	> 0.76 cubic metre in volume

Tt_Modified Unified Soil Classification.cdr

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BOREHOLE KEYSHEET

Water Level Measurement

 Measured in standpipe, piezometer or well

 Inferred

Sample Types

 A-Casing

 Core

 Disturbed, Bag, Grab

 HQ Core

 Jar

 Jar and Bag

 NQ Core

 No Recovery

 Split Spoon/SPT

 Tube

 CRREL Core

Backfill Materials

 Asphalt

 Bentonite

 Cement/ Grout

 Drill Cuttings

 Grout

 Gravel

 Sand

 Slough

 Topsoil Backfill

Lithology - Graphical Legend[1]

 Asphalt

 Bedrock

 Cobbles/Boulders

 Clay

 Coal

 Concrete

 Fill

 Gravel

 Limestone

 Mudstone

 Organics

 Peat

 Sand

 Sandstone

 Shale

 Silt

 Siltstone

 Till

 Topsoil

1. The graphical legend is an approximation and for visual representation only. Soil strata may comprise a combination of the basic symbols shown above. Particle sizes are not drawn to scale

TETRA TECH

Public Works and Government Services Canada

Testpit No: **TP-01**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 583996.21 E; 6277740.48 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Field Vane (kPa) / Plastic Limit / Moisture Content / Liquid Limit	Depth (ft)
0							Post-Peak ◇ Peak; 40 80 120 160	0
			GRASS, silty, sandy, organics, moist, soft				Plastic Limit ◆ Moisture Content ◆ Liquid Limit; 20 40 60 80	
			CLAY, silty, trace sand, trace gravel, stiff, low plastic, increasing plasticity with depth, moist, grey and brown, trace mottled organic streaks					1
1	CASE 580N Rubber Tired Backhoe					1		2
								3
2						2		4
								5
								6
			- Trace cobbles at 2.5 m					7
								8
								9
3						3		10
								11
			Testpit terminated at 3.5 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.					12
4								13
								14
4.6								15

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3.5 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

Public Works and Government Services Canada

Testpit No: **TP-02**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 583793.86 E; 6277749.48 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Field Vane (kPa) / Plastic Limit / Moisture Content / Liquid Limit	Depth (ft)
0							Post-Peak 40 80 120 160 Peak; Plastic Limit 20 40 60 80 Liquid Limit	0
	CASE 580N Rubber Tired Backhoe		GRASS, silty, sandy, organics, moist, soft					1
			SILT, some clay, trace gravel, trace sand, hard, damp, brown					2
1						1		3
								4
								5
			CLAY, silty, trace sand, trace gravel, firm, high plastic, increasing plasticity with depth, moist, grey and brown					6
2						2		7
								8
			- Trace cobbles at 2.5 m					9
3						3		10
								11
			Testpit terminated at 3.5 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.					12
4								13
								14
4.6								15

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3.5 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

Public Works and Government Services Canada

Testpit No: **TP-03**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 583639.23 E; 6277774.46 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Field Vane (kPa) / Plastic Limit / Moisture Content / Liquid Limit	Depth (ft)
0							Post-Peak ◇ Peak; 40 80 120 160	0
			GRASS, silty, sandy, organics, moist, soft				Plastic Limit ⟷ Liquid Limit; 20 40 60 80	
			SILT, sandy, some clay, trace gravel, trace sand, hard, damp, brown					
1	CASE 580N Rubber Tired Backhoe					1		3
			CLAY, silty, trace sand, trace gravel, firm, medium plastic, damp, grey and brown					
2						2		7
3			- with cobble to boulder-sized bedrock (sandstone) fragments below 3 m			3		10
			Testpit terminated at 3.5 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.					
4								13
4.6								15

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3.5 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

Public Works and Government Services Canada

Testpit No: **TP-04**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 583734.63 E; 6277772.97 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Depth (ft)
0							0
	CASE 580N Rubber Tired Backhoe		GRASS, silty, sandy, organics, moist, soft				
			SILT, some clay, trace gravel, trace sand, hard, damp, brown			1	
1							3
			CLAY, cobbly, silty, trace sand, trace gravel, very stiff to hard, medium plastic, damp, grey and brown			2	
2							7
						3	
3			BEDROCK (SANDSTONE), platy, slightly weathered, weak, yellowish brown				10
			Testpit terminated at 3.1 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.				
4							13
4.6							15

Field Vane (kPa): Post-Peak ◇ / Peak ◆ — 40 80 120 160

Plastic Limit — Moisture Content — Liquid Limit: 20 40 60 80

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3.1 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

Public Works and Government Services Canada

Testpit No: **TP-05**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 583890.44 E; 6277761.86 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Depth (ft)
0							0
	CASE 580N Rubber Tired Backhoe		GRASS, silty, sandy, organics, moist, soft				1
			SAND, some silt, fine sand, yellowish brown				2
1			CLAY, silty, trace sand, trace gravel, trace cobbles, stiff to very stiff, medium plastic, damp, brown and grey, trace mottled organic streaks			1	3
2						2	4
							5
							6
							7
							8
3						3	9
							10
							11
			BEDROCK (SANDSTONE), platy, slightly weathered, weak, yellowish brown				12
4			Testpit terminated at 3.8 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.				13
							14
4.6							15

Field Vane (kPa): Post-Peak ◇ / Peak ◆ — 40 80 120 160

Plastic Limit | Moisture Content | Liquid Limit — 20 40 60 80

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3.8 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

Public Works and Government Services Canada

Testpit No: **TP-06**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 584039.48 E; 6277762.83 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Field Vane (kPa) Post-Peak / Peak (40, 80, 120, 160); Plastic Limit / Moisture Content / Liquid Limit (20, 40, 60, 80)	Depth (ft)
0	CASE 580N Rubber Tired Backhoe		GRASS, silty, sandy, organics, moist, soft					0
			CLAY, silt, trace sand, trace gravel, trace cobbles, very stiff to hard, medium plastic, damp, brown and grey, trace mottled organic streaks					1, 2
1						1		3, 4, 5, 6
2						2		7, 8, 9
3 (10/14/2017)			BEDROCK (SANDSTONE), platy, slightly weathered, weak, yellowish brown			3		10 (10/14/2017)
			Testpit terminated at 3.3 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.					11, 12, 13, 14
4								
4.6								15

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3.3 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

Public Works and Government Services Canada

Testpit No: **TP-07**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 584056.65 E; 6277803.79 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Field Vane (kPa) / Plastic Limit / Moisture Content / Liquid Limit	Depth (ft)
0			GRASS, silty, sandy, organics, moist, soft				Post-Peak ◇ Peak; 40 80 120 160; Plastic Limit ● Moisture Content Liquid Limit; 20 40 60 80	0
1	CASE 580N Rubber Tired Backhoe		CLAY, silty, some cobbles, stiff, medium plastic, increasing plasticity with depth, brown and grey, moist, trace mottled organic streaks; interbedded with SILT, some clay, trace sand, trace gravel, stiff, moist, brown			1		1 2 3 4 5 6 7 8 9 10
2						2		
3						3		
4			Testpit terminated at 3.3 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.					11 12 13 14 15
4.6								

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3.3 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

Public Works and Government Services Canada

Testpit No: **TP-08**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 584081.49 E; 6277762.69 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Field Vane (kPa) Post-Peak / Peak 40 80 120 160; Plastic Limit / Moisture Content / Liquid Limit 20 40 60 80	Depth (ft)
0								0
	CASE 580N Rubber Tired Backhoe		GRASS, silty, sandy, organics, moist, soft					1
			SAND, some silt, fine grained, yellowish brown					2
1			CLAY, silty, trace sand, trace gravel, very stiff to hard, medium plastic, increasing plasticity with depth, moist, brown and grey, trace mottled organic streaks			1		3
2						2		4
								5
								6
								7
3						3		8
								9
								10
								11
			Testpit terminated at 3.4 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.					12
4								13
								14
4.6								15

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3.4 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

Public Works and Government Services Canada

Testpit No: **TP-09**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 584235.3 E; 6277763.63 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Depth (ft)
0			GRASS, silty, sandy, organics, moist, soft				0
	CASE 580N Rubber Tired Backhoe		CLAY, silty, trace sand, trace gravel, trace cobbles, stiff, medium plastic, increasing plasticity with depth, moist, brown and grey, trace mottled organic streaks			1	1
1							2
						2	3
2							4
							5
							6
							7
						3	8
3			Testpit terminated at 3.0 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.				9
							10
							11
							12
4							13
							14
4.6							15

Field Vane (kPa): Post-Peak ◇ / Peak ◆ — 40 80 120 160

Plastic Limit — Moisture Content — Liquid Limit: 20 40 60 80

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

Public Works and Government Services Canada

Testpit No: **TP-10**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 584405.48 E; 6277766.91 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Field Vane (kPa) Post-Peak / Peak 40 80 120 160; Plastic Limit / Moisture Content / Liquid Limit 20 40 60 80	Depth (ft)
0								0
	CASE 580N Rubber Tired Backhoe		GRASS, silty, sandy, organics, moist, soft					
			CLAY, some silt, trace sand, trace gravel, trace cobbles, stiff, moist, brown					
1						1		3
2						2		7
3						3		10
			Testpit terminated at 3.0 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.					
4								13
4.6								15

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

Public Works and Government Services Canada

Testpit No: **TP-11**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 584477.43 E; 6277747.41 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Field Vane (kPa) Post-Peak ◇ Peak ◆ 40 80 120 160 / Plastic Limit Moisture Content Liquid Limit 20 40 60 80	Depth (ft)
0			GRASS, mossy, silty, sandy, organics, moist, soft					0
	CASE 580N Rubber Tired Backhoe		CLAY, silty, trace sand, trace gravel, trace cobbles, trace organics, hard, medium to high plastic, increasing plasticity with depth, moist, brown and grey, trace mottled organic streaks					1
1						1		3
2						2		6
3						3		10
			Testpit terminated at 3.1 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.					11
4								13
4.6								15

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3.1 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

Public Works and Government Services Canada

Testpit No: **TP-12**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 584321 E; 6277744 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Field Vane (kPa) / Plastic Limit / Moisture Content / Liquid Limit	Depth (ft)
0							Field Vane (kPa): Post-Peak, Peak; 40 80 120 160	0
	CASE 580N Rubber Tired Backhoe		GRASS, silty, sandy, organics, moist, soft				Plastic Limit, Moisture Content, Liquid Limit; 20 40 60 80	
			SILT, some clay, trace gravel, trace sand, hard, damp, brown					1 2 3 4 5 6
1						1		
2			SAND, silty, trace cobbles, non-plastic, fine sand, yellowish brown			2		7 8 9
3						3		10
			Testpit terminated at 3.0 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.					11 12
4								13 14
4.6								15

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

Public Works and Government Services Canada

Testpit No: **TP-13**

Project: Intersection Improvements (Inga Lake)	Project No: 704-TRN.VHWY03092-01
Location: Km 145.8 Alaska Highway	
Alaska Highway, BC	UTM: 584168 E; 6277741 N; Z 10

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Field Vane (kPa) Post-Peak / Peak 40 80 120 160; Plastic Limit / Moisture Content / Liquid Limit 20 40 60 80	Depth (ft)
0								0
	CASE 580N Rubber Tired Backhoe		GRASS, silty, sandy, organics, moist, soft					
			CLAY, silty, trace sand, trace gravel, very stiff to hard, medium to high plastic, moist brownish grey, trace mottled organic streaks					
1						1		3
2						2		7
			SAND, silty, trace cobbles, non-plastic, fine sand, yellowish brown					
3						3		10
			Testpit terminated at 3.1 m due to practical refusal. - Upon completion, testpit was backfilled to surface with excavated cuttings. - Soil description is based on visual assessment. - Estimates of soil consistency were determined from visual classification of testpit sidewalls and field classification of recovered samples. These estimates are based on engineering judgment. - Testpit elevation and coordinates were recorded using a handheld Garmin GPS.					
4								13
4.6								15

TETRA TECH

Contractor: Haab Contracting Ltd.	Completion Depth: 3.1 m
Drilling Rig Type: CASE 580N Rubber Tired Backhoe	Start Date: 14 October 2017
Logged By: OB	Completion Date: 14 October 2017
Reviewed By: JP	Page 1 of 1

R.115570.001
Appendix K

Environmental Overview Assessment, Inga Lake Intersection Improvements, Alaska Highway, BC

TETRA TECH

OQM CERTIFIED

Environmental Overview Assessment
Inga Lake Intersection Improvements
Alaska Highway, BC



PRESENTED TO

Public Services and Procurement Canada

MARCH 24, 2021
ISSUED FOR USE
FILE: 704-TRN.VHWY03092-01

Tetra Tech Canada Inc.
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TABLE OF CONTENTS

LIST OF FIGURES IN TEXT

LIST OF TABLES IN TEXT

APPENDIX SECTIONS

FIGURES

PHOTOGRAPHS

APPENDICES

ACRONYMS & ABBREVIATIONS

Acronyms/Abbreviations	Definition
AQHI	Air Quality Health Index
BC CDC	BC Conservation Data Centre
BC ENV	Ministry of Environment and Climate Change Strategy
BEC	Biogeoclimatic Ecosystem Classification
BMP	Best Management Practices
BWBS	Boreal White and Black Spruce
CEAA	*Canadian Environmental Assessment Act*
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Fisheries and Oceans Canada
ECCC	Environment and Climate Change Canada
EM	Environmental Monitor
EMA	*Environmental Management Act*
EMP	Environmental Management Plan
EPP	Environmental Protection Plan
EOA	Environmental Overview Assessment
ESC	Erosion and Sediment Control
FLNRORD	BC Ministry of Forests, Lands and Natural Resource Operations and Rural Development
HADD	Harmful Alteration, Disruption or Destruction of Fish Habitat
IAA	*Impact Assessment Act*
km	kilometre
m	metre
MBCA	*Migratory Birds Convention Act*
PRRD	Peace River Regional District
PSPC	Public Services and Procurement Canada
ROW	Right-of-Way
SAR	Species at Risk
SARA	*Species at Risk Act*
TDG	Transport of Dangerous Goods
WSA	*Water Sustainability Act*
VCs	Valued Components

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Public Services and Procurement Canada and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Public Services and Procurement Canada or for any Project other than the proposed work at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix A or Contractual Terms and Conditions executed by both parties.

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained by Public Services and Procurement Canada (PSPC) to conduct an environmental overview assessment (EOA) for the Inga Lake Intersection Improvement Project, located between Wonowon and Fort St. John at KM 145+800 of the Alaska Highway (herein referred to as the "Project").

The purpose of the EOA is to describe the Project, characterize existing environmental features, identify potential environmental impacts, present mitigation to minimize or avoid the identified impacts, and, facilitate regulatory submissions.

2.0 PROJECT DESCRIPTION

Since 1964, PSPC has been the federal custodian for the Alaska Highway and is responsible for the maintenance of the current highway. PSPC's current operational jurisdiction of the Alaska Highway extends from KM 133 (north of Fort St. John) to the British Columbia-Yukon border at KM 968.

Tetra Tech conducted an in service safety review of the Alaska Highway in 2010 and 2017 which identified safety issues at the existing intersection of the Alaska Highway and Inga Lake Road. The safety issues include limited stopping sight distance due to the sharp crest curve just west of the Inga Lake Intersection, lack of left turn, right turn and acceleration lanes on the highway for turning traffic, geometry deficiencies due to the intersection offset and limited highway signage. Given the anticipated increase in vehicle activity from oil and gas industries in the area, safety improvements will be completed at this intersection.

The proposed construction works at the Inga Lake Intersection will include:

- Construct auxiliary lanes for both northbound and southbound traffic, including left turn, right turn and acceleration lanes;
- Realigning the cross road on the north side of the Alaska Highway to align with Inga Lake Road and placing additional surfacing gravel;
- Extending the existing 600 mm diameter Corrugated Steel Pipe (CSP) culvert under the Alaska Highway at KM 145+300 to facilitate the highway widening. Culvert extensions generally include:
  - Isolate and dewater work area (install fish stop nets, conduct salvage, install check dams and pumps, dewater) if there is flow at the time of construction;
  - Localized excavations around the culvert inlet and outlet to prepare the work site;
  - Adding a length of 600 mm diameter CSP culvert using a coupler to extend the culvert inlet and outlet;
  - Placing and compacting culvert bedding material and backfill material (e.g. crushed base gravel) around the new length of culvert; and
  - Placing erosion protection (e.g., rip rap) around culvert inlet and outlet.
- Remove and dispose of the two existing 600 mm diameter CSP drainage culverts at the intersection underneath Inga Lake Road (both the north and south sides of the Alaska Highway), and install two new 600 mm diameter CSP culverts under Inga Lake Road;
- Regrading roadside ditches to accommodate the widened highway;
- Relocating and adding advanced information signs; and
- Hydraulically seed all disturbed areas at the conclusion of construction.

Table 2-1: Culverts to be Replaced or Extended as Part of the Inga Lake Intersection Project

Culvert ID	UTM Coordinates (at Inlet)		Existing Culvert Diameter (mm)	Proposed Culvert Diameter (mm)	Construction Footprint (m2)
	Easting	Northing			
Km 145+300 Culvert Extension	584452	6277749	600	600	50
Km 145 + 800 Culvert replacement under Inga Lake Road north of the Highway	584063	6277760	600	600	100
Km 145 +800 Culvert replacement under Inga Lake Road south of the Highway	584056	6277730	600	600	100

2.1 Project Schedule

Construction of the Inga Lake Intersection Improvements project is anticipated to commence in late-May 2021 and be completed by September 2021.

3.0 METHODOLOGY

3.1 Desktop Review

Tetra Tech conducted a desktop review of existing information to determine known environmental conditions and potentially sensitive features in the Project area. Background information was obtained from publicly available databases and mapping services such as:

- British Columbia (BC) Conservation Data Centre (CDC) Internet Mapping Service – iMapBC;
- BC CDC Species and Ecosystems Explorer;
- BC Ministry of Environment and Climate Change Strategy (MOE) Fisheries Information Summary System (FISS) databases;
- BC MOE Habitat Wizard;
- BC Ministry of Forest and Range Biogeoclimatic Ecosystem Classification (BEC);
- Government of Canada Species at Risk (SAR) Public Registry (Environment Canada); and
- Site photos from previous engineering visits.

A 5 km search area was applied around each culvert to identify nearby watercourses and known occurrences of Species at Risk (SAR) and fish occurrences near to the Project area (Figure 2). Photos of the Inga Lake intersection and the three culverts are appended to this EOA.

4.0 RELEVANT ENVIRONMENTAL LEGISLATION

The Project will be subject to the terms and conditions of any regulatory permit or approval obtained. The Project is subject to various environmental legislation, as described in the subsections below.

4.1 Provincial

4.1.1 BC Wildlife Act

The British Columbia (BC) *Wildlife Act* protects most vertebrate animals from direct harm or harassment except as allowed by regulation (e.g., hunting or trapping). Section 34 of the BC *Wildlife Act* specifically protects the nests of Eagles, Peregrine Falcons, Gyrfalcons, Osprey, Herons, and Burrowing owls year-round. This means that a tree or other structure containing such a nest must not be felled, even outside of the breeding season. Section 34 of the *Wildlife Act* also protects the nests of all species of birds when birds or eggs are present in the nest.

The Project will require construction works to be conducted within watercourses, which may provide habitat for fish and wildlife. To avoid undue harm to fish and wildlife under the *Wildlife Act,* fish and wildlife salvages must be completed to remove animals, from the construction area. As such, a General *Wildlife Act* Permit will have to be obtained through FrontCounter BC to allow for the capture and relocation of numerous potential wildlife species. In addition, a Fish Collection Permit must be obtained through FrontCounter BC for the capture and relocation of all potential fish species in watercourses affected by construction activities. Acquisition of this permit will be pursuant to the Angling and Scientific Collection Regulations of the *Wildlife Act.* For both of these permits, at minimum, 30 days should be allowed for permit processing.

4.1.2 BC Water Sustainability Act

Previously known as the *Water Act,* the BC *Water Sustainability Act* (WSA) was brought into force on February 29, 2016. The WSA is the main provincial statute regulating water resources in British Columbia. Under the WSA, it is an offence to divert or use water, or alter a stream, without formal approval from the Province. The WSA defines “stream” as a natural watercourse or source of water supply, whether usually containing water or not, and a lake, river, creek, spring, ravine, swamp or gulch. “Stream” is used to describe any watercourse that is considered to be fish habitat, including channelized streams, and ditches that provide fish habitat. Under the WSA, the *Water Sustainability Regulation* addresses the requirements to allocate both ground and surface water and identifies the requirements for using water or making changes to a stream.

Change Approvals, issued under Section 11 of the WSA, are written authorization required for complex works with substantial impacts. *Notifications* are typically used for low-risk works that do not include permanent water diversion, can be completed in a short period of time, and have minimal impacts. Submitted notifications are subject to a 45-day review period. If there is no response from the assigned habitat officer within this time period, the proponent may proceed with the project. Notifications must meet the requirements of the Water Sustainability Regulation and comply with any additional conditions set out by a habitat officer.

This Project will require the replacement of three culverts, only one of which (at KM 145+300) is on a watercourse that meets the definition of a ‘stream’ under the WSA. Installation, removal and maintenance of a culvert is considered a *Notification*. Armouring culvert inlet and outlet with rip rap has, in some cases, required a *Change Approval* application. However, based on recent experience with the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) and past experience, only a *Notification* will likely be required.

4.1.3 BC Weed Control Act

The BC *Weed Control Act* identifies invasive plant species defined as "noxious weeds" at the regional and provincial level. All of these species are non-native plants that can be problematic for agriculture and/or natural habitats. Private property owners and government agencies are required to control these species that occur on their property or jurisdiction. Contractors must verify that any invasive species that are identified are controlled and not allowed to spread. Information related to the control and management of invasive species can be found on the Invasive Plant Council of BC's website (http://www.invasiveplantcouncilbc.ca/).

Under the *Weed Control Act,* Schedule A of the Weed Control Regulation designates 39 plant species as noxious weeds within all regions of the province (Table 4-1) and a further 28 are classified as noxious within the boundaries of specific regional districts. This Project is located in the Peace River Regional District (PRRD). There are 11 additional noxious weeds identified for the PRRD (Table 4-2).

Table 4-1: Noxious Weeds Regulated in all Regions of Province

Annual Sow Thistle (*Sonchus oleraceus)*	Bohemian Knotweed (*Fallopia bohemica)*	Bur Chervil (*Anthriscus caucalis*)	Canada Thistle (*Cirsium arvense*)
Common Crupina (*Crupina vulgaris)*	Common Reed (*Phragmites australis subsp. Australis*)	Common Toadflax (*Linaria vulgaris)*	Dalmatian Toadflax (*Linaria dalmatica*)
Dense Flowered Cordgrass (*Spartina densiflora)*	Diffuse Knapweed (*Centaurea diffusa*)	Dodder (*Cuscuta spp.*)	English Cordgrass (*Spartina angelica)*
Flowering Rush (*Butomus umbellatus*)	Garlic Mustard (*Alliaria petiolata*)	Giant Hogweed (*Heracleum mantegazzianum*)	Giant Knotweed (*Fallopia sachalinensis*)
Giant Mannagrass/Reed Sweetgrass (*Glyceria maxima*)	Gorse (*Ulex europaeus*)	Himalayan Knotweed (*Polygonum polystachyum*)	Hound's-tongue (*Cynoglossum officinale*)
Japanese Knotweed (*Fallopia japonica*)	Jointed Goatgrass (*Aegilops cylindrica*)	Leafy Spurge (*Euphorbia esula*)	Milk Thistle (*Silybum marianum*)
North Africa Grass (*Ventenata dubia*)	Perennial Sow-thistle (*Sonchus arvensis*)	Purple Loosestrife (*Lythrum salicaria*)	Purple Nutsedge (*Cyperus rotundus*)
Rush Skeletonweed (*Chondrilla juncea*)	Saltmeadow Cordgrass (*Spartina patens*)	Scentless Chamomile (*Matricaria maritima*)	Smooth Cordgrass (*Spartina alterniflora)*
Spotted Knapweed (*Centaurea stoebe*)	Tansy Ragwort (*Senecio jacobaea*)	Velvetleaf (*Abutilon theophrasti*)	Wild Oats (*Avena fatua*)
Yellow Flag Iris (*Iris pseudacorus*)	Yellow Nutsedge (*Cyperus esculentus)*	Yellow Starthistle (*Centaurea solstitialis*)	

Table 4-2: Noxious Weeds Regulated in the Peace River Regional District

Burdock (*Arctium* spp.)	Cleavers (*Galium aparine*)	Green Foxtail (*Setaria viridis*)	Kochia (*Kochia scoparia*)
Night-flowering catchfly (*Silene noctiflora*)	Oxeye Daisy (*Chrysanthemum leucanthemum*)	Quackgrass (*Agropyron repens*)	Russian Thistle (*Salsola kali*)
Tartary Buckwheat (*Fagopyrum tataricum*)	White Cockle (*Lychnis alba*)	Wild Mustard (*Sinapsis arvensis*)	

4.1.4 BC Environmental Management Act

The BC *Environmental Management Act* (EMA) was enacted in July 2004 and combined the *Waste Management Act* and EMA. The EMA governs solid waste and manages the introduction of waste into the environment by providing an authorization framework and environmental management tools to protect human health and environmental quality.

Under the *Waste Discharge Regulations* of the EMA, certain industries, trades, businesses and operations require authorization to discharge waste into the environment. However, even if an industry, trade, business or operation does not require an authorization, waste discharge must not cause pollution (EMA, Section 6 (4)).

The *Spill Reporting Regulations* of the EMA establishes a protocol for reporting the unauthorized release of substances into the environment as well as a schedule detailing reportable amounts for certain substances.

The *Hazardous Waste Regulations* of the EMA ensures that the generators, carriers and receivers of hazardous waste handle, store, transport, treat and dispose of hazardous waste in a safe manner. Hazardous wastes must be disposed of properly to ensure human health and environmental protection.

4.1.5 BC Heritage Conservation Act

The BC *Heritage Conservation Act* confers automatic protection upon archaeological and historic heritage sites that meet the definitions within section 13(2) of the Act. These include:

- All sites pre-dating AD1846;
- All sites of unknown age or origin which may pre-date AD1846;
- All burial places and rock art sites of historical or archaeological value; and
- All vessels or aircraft wrecked for two or more years.

All areas within the boundaries of a heritage site are protected under the *Act*, including areas without archaeological deposits or other kinds of heritage remains (e.g., land without archaeological deposits between several culturally modified trees at one site, or between several storage pits at one site).

There is always a limited possibility for unknown archaeological sites to exist. Archaeological sites (both recorded and unrecorded) are protected under the *Heritage Conservation Act* and must not be altered or damaged without a site alteration permit from the Archaeology Branch. If an archaeological site is encountered during Project works, activities must be halted, a Chance Find Protocol enacted, and the BC Archaeology Branch contacted at **250-953-3334** for direction.

4.2 Federal

4.2.1 Fisheries Act

The *Fisheries Act* is the main federal legislation providing protection for all fish, fish habitat, and water quality. The Act is administered federally by Fisheries and Oceans Canada (DFO) and Environment Canada. The new Federal *Fisheries Act* came into force on August 28, 2019. It includes amendments to restore lost protections and incorporate modern safeguards. This Act provides protection against the ‘death of fish, other than by fishing’ and the ‘harmful alteration, disruption or destruction of fish habitat’ (HADD), unless authorized by DFO.

Fish habitat is defined as spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes. This definition indicates that a watercourse (which includes but is not limited to streams, ditches, ponds and wetlands), which provides water, food or nutrients to a fish-bearing stream, is considered fish habitat even if it does not contain fish and/or if it only has temporary or seasonal flows. The definition also indicates that not only the watercourse itself but also the vegetated stream side or riparian areas which provide nutrients and shade to the stream are considered fish habitat.

DFO encourages all project proponents to avoid and mitigate the impacts of projects to fish. A self-assessment process to be carried out by a Qualified Environmental Professional includes the documentation of measures and best practices to avoid or minimize impacts to fish and fish habitat. If impacts can be avoided or mitigated, the project does not require further review from DFO. If impacts cannot be mitigated, a Request for Review must be submitted to the Fisheries Protection Program office and DFO will work with the proponent to find additional ways to reduce those impacts. If the project cannot be designed to avoid a HADD, a *Fisheries Act* authorization would be required.

Based on Tetra Tech's understanding of the Project and based on our assessment of the proposed activities, it is unlikely that the Project will cause the death of fish or a HADD if, at a minimum, standard best management practices and mitigation as presented in Table 6-1 are implemented. The watercourse undergoing instream works will be treated as if it is fish-bearing and will undergo isolation of the work area and concurrent fish salvages if there is water/fish present within the channel. As such, a Request for Review to DFO will not be required for this Project.

4.2.2 Species at Risk Act

The *Species at Risk Act* (SARA) prohibits the killing, harming, harassing, capturing or taking of species at risk, or destruction of their critical habitats. Species are designated 'at risk' by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), an independent body of experts that assesses species according to a broad range of scientific data. The federal Cabinet then decides whether those species should receive legal protection under the *Act*.

The SARA protects listed mammals, reptiles, amphibians, molluscs, lepidopterans, and plants on federally managed areas, migratory songbirds (as listed under the *Migratory Birds Convention Act* [MBCA]) and fish in all areas in Canada. Species that are legally protected under SARA are those listed as Endangered or Threatened and are listed in Schedule 1 of the *Act*. Those species listed as Special Concern and all species listed in Schedule 3, regardless of their status, are not legally protected by SARA.

A permit is required when works either affect a migratory bird or aquatic species or its residence, that is listed as 'Endangered' or 'Threatened' or 'Extirpated' on Schedule 1 of SARA; or affect any Schedule 1 'Endangered' or 'Threatened' or 'Extirpated' species or its residence on federal land.

Several occurrences of species at risk (SAR) have been identified within 5 km of the Project location or have the potential to be found in the area (see Section 5.6 and Appendix B). Should a SARA-listed species or any other rare species be identified on site prior to or during works, the Canadian Wildlife Service and the BC MOE should be notified immediately for direction on appropriate action as measures employed would vary greatly with the species encountered, its sensitivity to the Project and its proximity to the works.

4.2.3 Migratory Birds Convention Act

The *Migratory Birds Convention Act* (MBCA) restricts the disturbance or destruction of migratory birds and their nests, eggs, and shelters, except in accordance with a permit. The Act (1994) prohibits the taking or killing of migratory bird nests and eggs, and the deposition of harmful substances in areas frequented by migratory birds. Vegetation removal that will affect trees used by all birds and other wildlife should be avoided while they are breeding, nesting, roosting or rearing young.

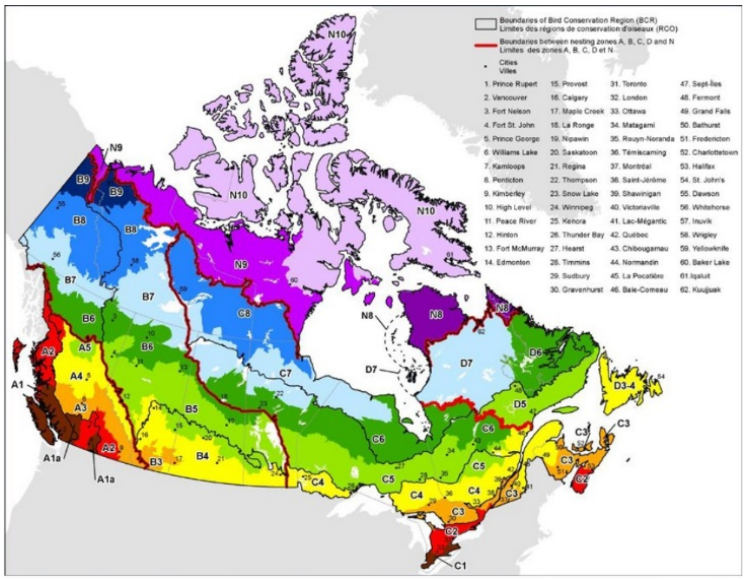

Figure 4-1. Map of Nesting Zones in Canada (ECCC 2018)

Vegetation removal/clearing should be conducted outside of the bird nesting season, which is considered April 19 to August 29 for the Project area (Zone B5) (ECCC 2018; Figure 4-1). If clearing is to occur within the bird nesting season (April 19 – August 29, Figure 4-2), a nest survey by the on-site EM will be required prior to clearing .

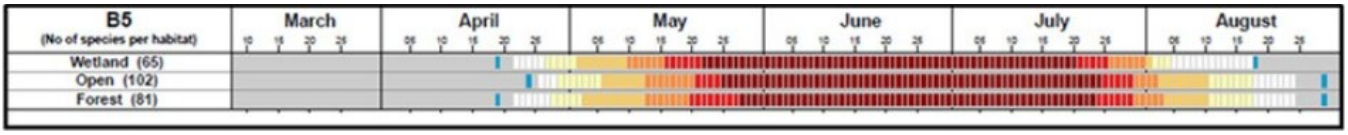

Figure 4-2. Nesting Calendars for Nesting Zone B5 (ECCC 2018)

5.0 EXISTING ENVIRONMENT

The existing environment at the Project site was characterized through a desktop study. Photos from previous engineering site visits and google earth street view are provided at the end of this document.

5.1 Air Quality and Noise

Air quality is typically determined by the concentrations of pollutants in the atmosphere, which are, in turn, affected by the dispersion of pollutants from emission sources. The Air Quality Health Index (AQHI) is an initiative of Environment Canada, Health Canada, the BC MOE, the BC Ministry of Healthy Living and Sport, the BC Ministry of Health Services and the BC Lung Association that identifies the level of health risk associated with local air quality. The nearest AQHI monitoring station is in Fort St. John where mean annual AQHI ratings rank towards the "low risk" end of the spectrum, however, sporadic, short-lived increases may occur.

The Project area is open to the outdoors and vehicles are the primary source of air emissions in the immediate vicinity. During summer months, forest fires are another primary contributor to air emissions in the region. Other potential emission sources at or near the Project area may include off-road traffic (e.g., ATVs), aviation (e.g., fixed wing and rotary-wing aircraft); and commercial or industrial sources. Intermittent sources such as fugitive dust from soil disturbances, paving or other construction activities may also contribute emissions. The Alaska Highway is a traffic corridor and is the primary source of noise in the Project area.

5.2 Soils

Soils in northern BC are variable and differ across the region. It should be noted that soils in road rights-of-ways are typically disturbed and often contain imported gravels. The following soil classification is derived from Luttmerding's (1995) "Soil Landscapes of Canada" map and the Soil Landscapes of Canada web map (Gov. of Canada 2017).

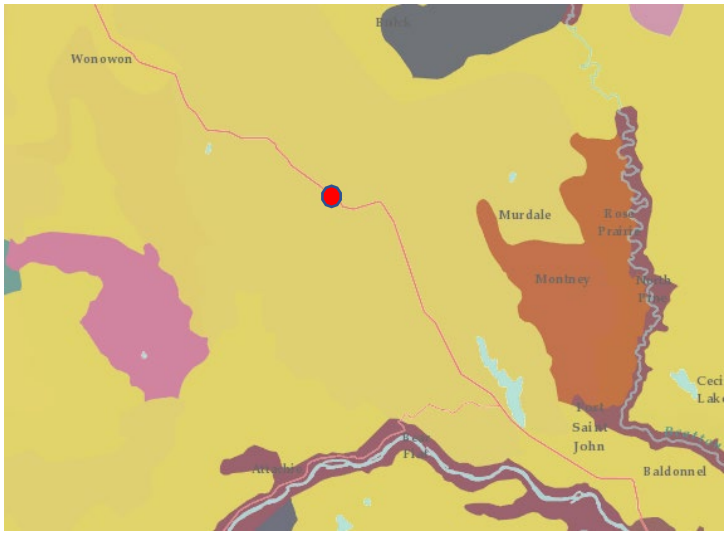

Figure 5-1: Soil Groups (Gov. of Canada 2017).

The Project is located along the Alaska Highway and soils are mainly luvisolic (yellow).

One main soil group is found within the Project area (illustrated in yellow in Figure 5-1). This soils in this area are a mixture of 55% Luvisolic soils, 40% Gleysolic soils and 5% Organic soils. The predominantly mineral soils are well and moderately well drained, and the dominant surface form is 'rolling'.

Luvisolic soils are the predominant forest soils of much of western Canada, occurring under coniferous, mixed-wood, and deciduous forests. Luvisols are well-developed soils that form on flat or gently sloping landscapes, have loamy or clay dominated soil textures, high nutrient content, and good drainage. Medium-textured till deposits are the most common parent material.

Gleysols develop under periodic or prolonged periods of saturation and are commonly found in wetland environments. These soils hold groundwater long enough to develop the characteristic "gley" (grey mottles). A wide range of unconsolidated fluvial and lacustrine sediments comprise the parent material of gleysols.

Organic soils occur in wetlands throughout the boreal forest and, in non-wetland positions, in upland sites where leaf litter accumulates. These soils are typically poorly drained.

5.3 Vegetation

The Biogeoclimatic Ecosystem Classification (BEC) is a land classification system that groups similar ecosystems based on climate, soils and vegetation. This classification system was developed in British Columbia and is widely used as a framework for resource management as well as for scientific research. Vegetation of mature ecosystems is emphasized in BEC as it is considered the best indicator of the combined influence of the environmental factors affecting a site.

The project is located within the moist warm unit of the Boreal White and Black Spruce (BWBSmw) zone. The BWBS zone covers approximately 16 million hectares of British Columbia and is part of the circumpolar boreal zone. Two main ecosystem types make up the BWBS, upland forests (common to the Alberta Plateau in the east and mountainous regions of the west), and extensive poorly drained muskeg of the northeastern lowlands (DeLong et al. 2011). Upland forests are dominated by trembling aspen (*Populus tremuloides*) and white spruce (*Picea glauca*). Poorly drained wetland areas consist of forests dominated by black spruce (*Picea mariana*) and tamarack (*Larix laricina*) and unforested areas with scrub birch (*Betula nana* ssp. *Exilis*) and sedges (*Carex* spp.) Other common species include balsam poplar (*Populus balsamifera)* and paper birch (*Betula papyrifera*) at moist and/or riverine locations and lodgepole pine (*Pinus contorta* var. *latifolia*) in drier areas (DeLong et al. 2011).

All construction work will be taking place within the maintained (i.e., regularly mowed) portion of the highway right-of-way (ROW). A review of site photos and previous field work conducted in the area in July 2019, suggests that the highway roadside vegetation communities are likely consistent across the three sites and are composed mainly of agronomic grasses and perennial herbs including vetch species, yellow rattle (*Rhinanthus minor*), common horsetail (*Equisetum arvense*) and fireweed (*Chamerion angustifolium*). Common invasive species that may be found along the highway ROW include alsike clover (*Trifolium hybridum*), yarrow (*Achillea millefolium*), alfalfa (*Medicago sativa*), white sweet clover (*Melilotus albus*), and yellow sweet clover (*Melilotus officinalis*). This vegetation community is frequently mowed for highway maintenance.

5.4 Wildlife

Common wildlife found within the BWBS biogeoclimatic zone, and potentially at the Project location, include American Black Bear (*Ursus americana*), Grey Wolf, Coyote (*Canis latrans*), Canada Lynx (*Lynx canadensis*), Moose (*Alces alces*), Rocky Mountain Elk (*Cervus elaphus nelsoni*), Woodland Caribou (*Rangifer tarandus*), and American Beaver (*Castor canadensis)*. Very few reptiles and amphibians are found in the BWBS zone due to the

northern latitude. Terrestrial Garter Snake (*Thamnophis elegans*) and Common Garter Snake (*Thamnophis sirtalis*) are found only in warmer valleys, and amphibians such as Wood Frog (*Lithobates sylvaticus*), and Western Toad (*Anaxyrus boreas*) are commonly found in wetlands and moist upland habitats. The forested areas provide habitat for numerous songbird species including the Black-throated Green Warbler (*Setophaga virens*), White-throated Sparrow (*Zonotrichia albicollis*), and Rose-breasted Grosbeak (*Pheucticus ludovicianus).* Nearby wetlands are important habitats for Sora (*Porzana carolina*), Red-winged Blackbird (*Agelaius phoeniceus*) and numerous waterfowl species. Raptors found in the area include the Broad-winged Hawk (*Buteo platypterus*), Northern Goshawk (*Accipiter gentilis*), and Great Horned Owl (*Bubo virginianus*) (DeLong et al. 1991).

5.5 Fish and Aquatic Habitat

Fish and aquatic habitat conditions at the Project site was evaluated using available information from provincial databases (Table 5-1).

Table 5-1: Desktop Information Summary for the Culverted Watercourses

Culvert ID	Stream Name/ Watershed Code	Stream Info	Documented Fish Presence[1]
Km 145+300 Culvert Extension under Alaska Highway	▪ Unnamed watercourse ▪ No 50K Watershed Code ▪ FWA Watershed Code: 200-948755-796981-260433-599394-748869	▪ 1st order stream ▪ Culvert is located at the headwaters/origin of the stream ▪ Tributary to Blueberry River (WC: 233-261300)	▪ No fish have been documented within the culverted watercourse. ▪ Eleven fish species documented downstream in Blueberry River (Table 5-2).
Km 145 + 800 Culvert replacement under Inga Lake Road north of the Highway	▪ Not located on a documented watercourse	▪ Roadside ditch ▪ This culvert conveys flow from road runoff via the roadside ditch underneath Inga Lake Road. ▪ This is not considered a watercourse under the WSA	▪ N/A
Km 145 +800 Culvert replacement under Inga Lake Road South of the Highway	▪ Not located on a documented watercourse	▪ Roadside ditch ▪ This culvert conveys flow from road runoff via the roadside ditch underneath Inga Lake Road. ▪ This is not considered a watercourse under the WSA	▪ N/A

[1]As documented in government databases such as Habitat Wizard and iMapBC.

The two culvert replacements at 145 + 800 are located underneath Inga Lake Road on either side of the Alaska Highway. These culverts are not located on a watercourse, but instead serve to maintain connectivity of the highway drainage ditches underneath Inga Lake Road and are not considered fish habitat. The culvert undergoing extension at KM 145 + 300 is located underneath the Alaska Highway at the headwaters of a small first order watercourse. This watercourse does not have documented occurrences of fish, and it is unlikely that fish would be present at the culvert location, but is a tributary to the Blueberry River (50K WC: 233-261300) which is a 5th order, known fish-bearing watercourse (Table 5-2). Since this unnamed tributary provides food and nutrients to downstream fish-bearing watercourses, it is considered to be fish habitat. Figure 2 show the location of each culvert along with the surrounding watercourse network and documented fish occurrences within 5 km of the culvert locations.

Table 5-2: Fish Species Documented downstream of the KM 145+300 Culvert in the Blueberry River

Common Name	Scientific Name
Flathead Chub	*Platygobio gracilis*
Lake Chub	*Couesius plumbeus*
Longnose Dace	*Rhinichthys cataractae*
Longnose Sucker	*Catostomus catostomus*
Northern Pearl Dace	*Margariscus nachtriebi*
Northern Pike	*Essox lucius*
Redside Shiner	*Richardsonius balteatus*
Slimy Sculpin	*Cottus cognatus*
Spoonhead Sculpin	*Cottus ricei*
Trout-Perch	*Percopsis omiscomaycus*
White Sucker	*Catostomus commersonii*

5.6 Species at Risk

For the purposes of this EOA, Species at Risk were considered any wildlife or vegetation element that met one or more of the following criteria:

- Present on the Red or Blue List in the provincial Species Ranking system (BC Conservation Data Centre [CDC] 2021a);
- Assessed as Special Concern, Threatened, or Endangered by the Committee on the Status of Endangered Species in Canada (COSEWIC; Government of Canada 2021); or
- Listed as Special Concern, Threatened, or Endangered in Schedule 1 of SARA.

Although species provincially ranked as Red or Blue are considered to be a conservation priority, there is no legislation providing formal protection, with the exception of those wildlife species specifically listed under the BC *Wildlife Act* or listed under Schedule 1 of the federal SARA.

Database search results are included as Appendix B and summarized below:

- BC CDC Internet Mapping tool (BC CDC 2021b):
  - Area search for known SAR occurrences within a 5 km radius of the Project site. Both non-sensitive and masked-sensitive occurrences were queried. Non-sensitive occurrences are observations whose exact locations are provided in the mapping service. Masked-sensitive occurrences are observations whose exact location is not provided in the mapping service, rather, a general area is provided. To obtain the exact location of an occurrence, a regional biologist at the BC MOE must be contacted.
  - Two non-sensitive SAR were mapped within 5 km of the Project area (Figure 2). These SAR and their habitat requirements are described below in Section 5.6.1.
  - No masked sensitive species occurrences were noted to occur within 5 km of the Project area.

- BC CDC Species and Ecosystems Explorer (BC CDC 2021a):
  - The search for SAR was conducted using the following search criteria: Ecosection: Halfway Plateau; Biogeoclimatic Zone: BWBS; Habitat Types: Anthropogenic, Forest, Riparian, Stream/River and Wetland.
  - Search was restricted to BC Conservation Status: Red (Extirpated, Endangered or Threatened) or Blue (Special Concern), and legally designated species; and
  - Based on the above search criteria, a total of 8 vascular plant species and 77 wildlife species were identified (Appendix B).

While a variety of species have the potential to occur within the region, the Project area itself does not necessarily support all SAR.

Based on distribution, known occurrences and habitat requirements, 29 SAR were identified with ***moderate or high potential to occur*** at the Project site. Species identified in the searches above *and* whose range and general habitat requirements are included at one or more Project site are listed in Table 5-3. Species with low potential of being found in the Project area are not presented in Table 5-3, but can be found in Appendix B.

Table 5-3: Species at Risk with Moderate to High Potential to Occur on Site

Scientific Name	English Name	BC List	COSEWIC	SARA	Habitat Requirements[1]	Likelihood Near Project[1]
Reptiles and Amphibians						
Anaxyrus boreas	Western Toad	Yellow	Special Concern	Special Concern	▪ Can be found in a variety of aquatic habitats including lakes, wetlands, and roadside ditches. ▪ Also found in wet terrestrial areas including a variety of forest types, shrubland, and riparian areas, grasslands, and fallow fields.	**Moderate - High** Suitable habitat is likely present at the Project site. Documented occurrences between Fort St. John and Fort Nelson.
Birds						
Asio flammeus	Short-eared Owl	Blue	Special Concern	Special Concern	▪ Found in open areas with low vegetation and include grassy plains, old fields, river valleys and marshes.	**Moderate** Suitable habitat is likely present at or near the more Project site. Project occurs within its range and there are occurrences of this species between Fort St. John and Fort Nelson.
Buteo lagopus	Rough Legged Hawk	Blue	-	-	▪ Typically nests on cliffs or in trees in arctic and subarctic, in tundra, mountain sides, forests with plenty of open ground. Sometimes nests on the ground or on man-made structures.	**Low-Moderate** Suitable habitat is likely present at or near the more Project site. Documented occurrence north of Project area at Sikanni Chief.
Buteo platypterus	Broad-winged Hawk	Blue	-	-	▪ Breed in dense, broad leaf or mixed-wood forests. Perches under or in tree canopy, forages at openings, edges, and wet areas. ▪ Generally, arrives in northern breeding areas mid-April through early May, departs by September-October.	**Moderate** Suitable habitat is likely present at or near the Project site. Project is within the known breeding range of this species. Documented occurrences near Fort St. John and Fort Nelson.
Cardellina canadensis	Canada Warbler	Blue	Threatened	Threatened	▪ Breed in deciduous and mixed-wood forests with a good shrub layer and abundant woody debris.	**Moderate** Suitable habitat is likely present present at or near the Project site. Abundant documented occurrences around Fort St. John, Fort Nelson and directly north and south of the Project site.

Scientific Name	English Name	BC List	COSEWIC	SARA	Habitat Requirements[1]	Likelihood Near Project[1]
Chordeiles minor	Common Nighthawk	Yellow	Special Concern	Threatened	▪ Associated with open areas with gravel/rock substrates such as old revegetated gravel bars, logged forest areas, clearings, and open forests.	**Low – Moderate** Although within its range, habitat at the Project location is likely not ideal. Known occurrences around Fort Nelson and Fort St. John.
Contopus cooperi	Olive-sided Flycatcher	Blue	Special Concern	Threatened	▪ Associated with open areas (forest openings/edges, bogs, swamps, burned or logged areas etc.) with tall trees or snags for perching.	**Moderate** Suitable habitat is likely present at or near one or more Project sites. Species recorded through most forested areas of BC.
Euphagus carolinus	Rusty Blackbird	Blue	Special Concern	Special Concern	▪ Breeding habitat includes moist woodland (primarily coniferous), bushy bogs and fens, and wooded edges of water courses and beaver ponds. ▪ Nests are in trees or shrubs, usually in or near water, frequently in a conifer to about 6 m above ground.	**Moderate** Suitable habitat is likely present at or near the Project site. Documented occurrences between Fort St. John and Fort Nelson along the Alaska Highway.
Falco peregrinus anatum	Peregrine Falcon, anatum suspecies	Red	-	Special Concern	▪ Breeds in a wide range of habitats, from Arctic tundra to coastal islands, and major urban centres. ▪ Usually nests on cliff ledges or crevices but is highly adaptable.	**Low-Moderate** Habitat is likely not ideal at Project site but documented occurrences north of Project area near Pink Mountain in similar habitats.
Hirundo rustica	Barn Swallow	Blue	Threatened	Threatened	▪ Breeding resident over most of BC. ▪ Prefers open habitats near water. ▪ Nests in caves, cliffs and often utilizes human-made structures such as buildings, bridges and even culverts.	**Low – Moderate** Habitat is likely not ideal at Project site but have been known to utilize culverts for nesting. Documented occurrences between Fort Nelson and Fort St. John.
Oporornis agilis	Connecticut Warbler	Blue	-	-	▪ Breeds in spruce and tamarack bogs, dry ridges, poplar and aspen woods, moist areas with low shrubby growth, thick undergrowth, or sapling thickets.	**Moderate-High** Suitable habitat is likely present at or near the Project site. Documented occurrences within Project area.

Scientific Name	English Name	BC List	COSEWIC	SARA	Habitat Requirements[1]	Likelihood Near Project[1]
Setophaga castanea	Bay-breasted Warbler	Red	-	-	▪ Breeding resident of northeastern BC that utilizes boreal coniferous forest and occasionally adjoining second growth or deciduous scrub.	**Moderate** Suitable habitat is likely present at or near the Project site. Documented occurrences in northeastern BC, around Fort Nelson and Fort. St. John.
Setophaga tigrina	Cape May Warbler	Blue	-	-	▪ Breed in mature (>50 yr) stands of spruce or fir.	**Moderate-High** Suitable habitat is likely present at or near the Project site. Documented occurrences within Project area.
Setophaga virens	Black-throated Green Warbler	Blue	-	-	▪ Breed in coniferous, mixed or deciduous forests in northern British Columbia.	**Moderate-High** Suitable habitat is likely present at or near the Project site. Documented occurrences within Project area.
Mammals						
Gulo gulo luscus	Wolverine, *luscus* subspecies	Blue	Special Concern	Special Concern	▪ Occur in remote wilderness habitats, particularly the boreal forests and arctic tundra of the north, but it also occurs in montane forests and alpine tundra in the southern portions of its range.	**Moderate** Suitable habitat is likely near the Project site, but this species would likely avoid spending much time near the highway. Known occurrences between Fort Nelson and Fort St. John.
Myotis lucifugus	Little Brown Myotis	Yellow	Endangered	Endangered	▪ Found in a variety of forests, including boreal and mixed-wood forests. ▪ Roost in trees or man-made structures. ▪ Hibernacula found in caves and mines.	**Moderate** Suitable roosting and hunting habitat is likely present at or near the Project site, however construction would not be taking place during times this species is most active (i.e., 2-3 hours after sunset). Documented occurrences between Fort Nelson and Fort St. John.

Scientific Name	English Name	BC List	COSEWIC	SARA	Habitat Requirements[1]	Likelihood Near Project[1]
Myotis septentrionalis	Northern Myotis	Blue	Endangered	Endangered	▪ Found in boreal forests with lakes, ponds, and wetlands. Often associated with old-growth forest. ▪ Roost in trees or man-made structures. ▪ Hibernacula found in caves and mines.	**Moderate** Suitable roosting and hunting habitat is likely present at or near the Project Site, however construction would not be taking place during times this species is most active (i.e., 2-3 hours after sunset). Documented occurrences near Fort Nelson and Fort St. John.
Rangifer tarandus pop. 1	Caribou (Southern Mountain Population)	Red	Endangered	Threatened	▪ Tend to remain at high elevations and do not migrate seasonally during the winter to valley bottoms. ▪ This ecotype will utilize subalpine forests during the winter where they can forage on arboreal lichens.	**Low** Habitat availability is likely limited at the Project site. The Project site is not located within mapped Caribou range. It is located 45 km east of the nearest Southern Mountain Caribou herd and is in an area where 'trace occurrences' of caribou are possible.
Rangifer tarandus pop. 14	Caribou (Boreal Population)	Red	Threatened	Threatened	▪ Boreal caribou are non-migratory and can be found at low elevations in muskegs, peatlands and black spruce forests. Female boreal caribou calve in undisturbed swamps and wetlands.	**Low** Habitat availability is likely limited at the Project site. The Project site is not located within mapped Caribou range. It is located 54 km west of the nearest Boreal Caribou herd and is in an area where 'trace occurrences' of caribou are possible.
Rangifer tarandus pop. 15	Caribou (Northern Mountain Population)	Blue	Special Concern	Special Concern	▪ This population generally migrates twice each year, descending to low elevations in fall or early winter and spend spring/summer in alpine areas. ▪ During the winter months they utilize low-elevation pine-lichen stands or high-elevation alpine habitats, where they rely primarily on terrestrial lichens for forage. ▪ During calving season, female northern mountain caribou will migrate long distances to subalpine ridges.	**Low** Habitat availability is likely limited at the Project site. The Project site is not located within mapped Caribou range. It is located 81 km south of the nearest Northern Mountain Caribou herd and is in an area where 'trace occurrences' of caribou are possible. Although unlikely at this location, individuals from this population may be found along the Alaska Highway in winter.

Scientific Name	English Name	BC List	COSEWIC	SARA	Habitat Requirements[1]	Likelihood Near Project[1]
Ursus arctos	Grizzly Bear	Blue	Special Concern	Special Concern	▪ Found mostly in the alpine tundra, subalpine mountain forests and boreal forests. Common only where food is abundant and concentrated (e.g., caribou calving grounds).	**High** Suitable habitat is likely present at the Project location. Project is within the known range and there are numerous occurrences along the Alaska Highway. Commonly seen along the highway during the spring and summer months. If construction is planned for the winter this species will be hibernating and dens are unlikely at the Project sites.
Invertebrates						
Carterocephalus palaemon mandan	Arctic Skipper, *mandan* subspecies	Red	-	-	▪ Found in swampy areas, grassy streams and along roadsides in northern forests.	**Moderate** Suitable habitat is likely present at or near the Project site. Occurrences near to the Alaska Highway between Fort Nelson and Fort St. John.
Cercyonis pegala nephele	Common Wood-nymph, *nephele* subspecies	Blue	-	-	▪ Found in open woodlands and grassy areas including along roads and streams.	**Low – Moderate** Suitable habitat is likely present at or near the Project site. Known occurrences are restricted to along the Peace River.
Coenonympha tullia benjamini	Common Ringlet, *benjamini* subspecies	Blue	-	-	▪ Low elevations in the Peace region ▪ Grassy meadows, roadsides, edges of transportation corridors, praries, bogs, woodland edges ▪ Aspen and spruce forests	**Moderate** Suitable habitat is likely present at or near the Project site. Known occurrences in the Peace River area.
Lycaena hyllus	Bronze Copper	Blue	-	-	▪ Marshes, sedge meadows, moist to wet grassy meadows, ditches, fens, streamsides, wetlands, or roads and right of ways through marshlands	**Moderate** Suitable habitat is likely present at or near the Project site. Documented occurrences near Fort St. John and just north of Fort Nelson.

Scientific Name	English Name	BC List	COSEWIC	SARA	Habitat Requirements[1]	Likelihood Near Project[1]
Vascular Plants						
Carex sprengelii	Sprengel's sedge	Blue	-	-	▪ Occurs on dry to mesic deciduous forests and forest openings, floodplain forests and riverbanks, lakeshores, limestone river bluffs, mixed conifer-hardwood forests, thickets, meadows, and roadsides,	**Low - Moderate** Suitable habitat is likely present at or near the Project site. Documented occurrences near Fort St. John.
Oxytropis campestris var. *davisii*	Davis' locoweed	Blue	-	-	▪ Dry to mesic sandy, gravelly or rocky sites, including river bars, terraces, rock outcrops, grassy slopes, meadows, clearings, roadsides, alpine tundra and heath, and open forests in the steppe, montane, subalpine and alpine zones.	**Moderate** Frequently found in northern BC. Suitable habitat is likely present at the Project site. Documented occurrences between Fort St. John and the Sikanni Chief River.
Ranunculus rhomboideus	prairie buttercup	Blue	-	-	▪ Dry grasslands and open forests in the montane zone.	**Low – Moderate** Suitable habitat is likely present at or near the Project site. Documented occurrences near Fort St. John and east of the Project site.
Salix petiolaris	meadow willow	Blue	-	-	▪ Wet thickets in the lower montane zone	**Moderate** Suitable habitat is likely present at or near the Project site. Documented occurrences north of the site along the Sikanni Chief River, and in Fort St. John.

[1] Habitat information and documented occurrence data gathered from the following sources: E-Fauna BC and E-Flora BC (Klinkenberg 2020a; Klinkenberg 2020b), and BC Species and Ecosystem Explorer (BC CDC 2021a)Should a SARA-listed species or any other rare species be identified on site prior to, or during works, the Canadian Wildlife Service and the BC MOE should be notified immediately for direction on appropriate action as measures employed would vary greatly with the species encountered, its sensitivity to the Project, and its proximity to the works.

5.6.1 Habitat Requirements of SAR with Mapped Occurrences within 5 kms of the Project Sites

5.6.1.1 Woodland Caribou

The populations and critical habitats of Woodland Caribou are protected under federal legislation. Northern Mountain Caribou (*Rangifer tarandus* pop. 15) are provincially blue-listed and designated as 'Special Concern' under the Federal SARA. Boreal Caribou (*Rangifer tarandus* pop. 14) and Southern Mountain Caribou (*Rangifer tarandus* pop. 1) are provincially red-listed and designated as 'Threatened" under the Federal SARA. The Project is not located within the mapped range of Woodland Caribou, and iMapBC indicates that only 'trace occurrences' of caribou may occur in the area (Figure 5-2). The Project site is located 81 km away from the Pink Mountain Herd (Northern Mountain ecotype), 45 km from the Graham Herd (Southern Mountain – Northern Group ecotype) and 54 km from the Chinchaga Herd (Boreal ecotype). Although the probability of encountering caribou in this area are low, caribou may occur infrequently along the highway, especially in winter when lower elevation habitats are used more for foraging (COSEWIC 2014).

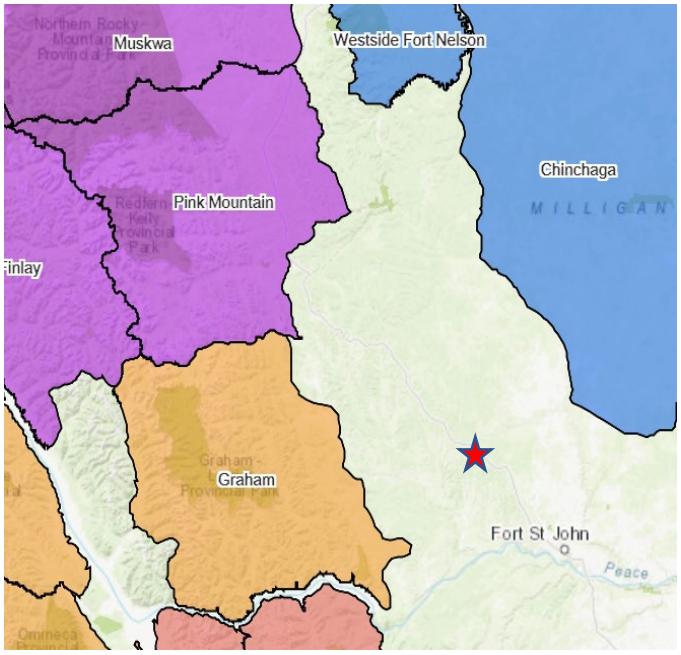

Figure 5-2: Core ranges of woodland caribou populations in the vicinity of the Project area
(Northern Mountain Ecotype - purple; Boreal Ecotype – blue; Southern Mountain Ecotype – orange). (Government of BC 2020)

Northern Mountain Caribou spend the winter months in low-elevation pine-lichen stands or high-elevation alpine habitats, where they rely primarily on terrestrial lichens for forage. During calving season, female northern mountain caribou will migrate long distances to subalpine ridges, where they give birth to their calves at high elevation to avoid the threat of predation (FLNRORD 2014). Boreal caribou are non-migratory and can be found at low elevations in muskegs, peatlands and black spruce forests. Female boreal caribou calve in undisturbed swamps and wetlands and disturbance to these calving habitats can be highly detrimental to population numbers due to the site fidelity shown by reproducing females (FLNRORD 2014). Southern Mountain Caribou tend to remain at high elevations and do not migrate seasonally during the winter to valley bottoms. This ecotype will utilize subalpine forests during the winter where they can forage on arboreal lichens (FLNRORD 2014).

Regardless of ecotype, caribou are most sensitive to disturbance during late winter (pre-calving season), due to the poor body condition of pregnant females, and the calving season in the spring. FLNRORD has identified this time period (January 15 to July 15) as a critical timing window for caribou and the fall rut (September 15 to January 14) has been identified as a cautionary timing window (FLNRORD 2014).

A more in-depth review of Woodland Caribou in British Columbia along with Best Management Practices (BMPs) specific to working within caribou habitat and a figure showing mapped caribou range within the Project area are provided in the appended Caribou Protection Plan (Appendix C).

5.6.1.2 Black-Throated Green Warbler

Several occurrences of the provincially blue-listed Black-throated Green Warbler (*Setophaga virens*) were identified within 5 km of the Project site (Figure 2). This warbler overwinters in various forest habitats in South America, migrating north to breed in coniferous, mixed or deciduous forests located between northeastern BC and Labrador. They construct relatively low nests (ground level to 25 m) in conifers, hardwoods or shrubs, and lay a clutch of 4-5 eggs in June. This warbler is mostly insectivorous and will forage high in trees within its breeding range (BC CDC 1996).

5.6.1.3 Canada Warbler

One occurrence of the Canada Warbler (*Cardellina canadensis*) was identified within 5 km of the Project (Figure 2). This species is provincially blue-listed and is considered threatened by both COSEWIC and SARA Schedule 1. This songbird is found primarily within the Peace River lowlands in the Boreal Plains and the Fort Nelson River lowlands within the Taiga Plains ecoprovinces, and in low-elevation valleys that drain the Rocky Mountain foothills. The Canada Warbler is usually found in mature deciduous forest with open canopy and a dense layer of tall shrubs. Younger forest and mixed spruce-aspen stands are also used, but a tall shrub thicket is always present (Phinney 2015a). Occupied sites tend to be moist and nutrient rich, but the species is not restricted to riparian areas or steep slopes.

6.0 POTENTIAL ENVIRONMENTAL IMPACTS

6.1 Valued Environmental Components

Following the review of existing environmental information, potential Valued Components (VCs) that could be affected were identified for this Project. Valued components are “environmental features that may be affected by a project and that have been identified to be of concern by the proponent, government agencies, Aboriginal peoples or the public. The value of a component not only relates to its role in the ecosystem, but also to the value people place on it” (CEAA 2012). The *Canadian Environmental Assessment Act*, which was repealed on August 28, 2019 and replaced with the *Impact Assessment Act (IAA),* further defines VCs as a “Fundamental element of the physical, biological or socio-economic environment, including the air, water, soil, terrain, vegetation, wildlife, fish, birds and land use that may be affected by a designated project, and may be assessed in an environmental assessment” (CEAA 2012).

The Government of Canada continues to refine and update guidance documents to reflect the requirements of the new *IAA*. However, ***the Project is not subject to an environmental assessment under the IAA or under the previous CEAA 2012.*** This EOA generally conforms to the format of assessments conducted under Section 67 of the CEAA 2012 (Government of Canada 2012) for non-designated projects and utilizes the methods and definitions provided in CEAA 2012 and its associated practitioner documents.

This EOA was limited to assessment of the natural environment and does not include components such as health, heritage, economic, aesthetics or other social factors.

Valued components for which there is potential for Project effects include:

- Air Quality and Noise
- Soil
- Surface Water Quality
- Terrestrial Flora and Fauna
- Fish and Fish Habitat

An Environmental Management Plan (EMP; Appendix D) has been prepared for the Project and includes a summary of Project-specific environmental considerations. Table 6-1 below and Section 5.0 of the EMP identify general measures and “industry standards” to protect the identified VCs. Engineering design drawings for culvert replacement can be found in Appendix E.

The selected contractor(s) will be required to prepare an Environmental Protection Plan (EPP) to protect VCs in accordance with BMPs and mitigation measures specific to their activities. While general mitigation recommendations are presented below, the EPP must provide specific measures to reduce potential Project related effects. The EPP must also be compliant with contract Special Provisions as detailed in the forthcoming Tender Package, the mitigation measures outlined in Table 6-1 below, and the EMP, along with any conditions that may result from regulatory permits and notifications.

Both the EMP and EPP should be treated as living documents. Effective environmental protection requires an adaptive management strategy to accommodate specific site conditions and unforeseen circumstances.

Table 6-1: Potential Effects Assessment and Associated Mitigation Measures Recommended for the Project

Potential Effect	Interaction	Suggested Mitigation	Residual Effect	Comment
Air Quality and Noise				
Decreased ambient air quality.	Mobilizing equipment and people to and from site and use of equipment (generators, vehicles, etc.) during Project will contribute to air emissions.	▪ Mobilization should be planned and managed to maximize efficiency. ▪ Utilize well-maintained equipment operated at optimum loads. ▪ No burning of oils, rubber, tires and any other material should take place. ▪ Stationary emission sources (e.g., portable diesel generators, compressors, etc.), equipment and vehicles should be turned off when not in use. ▪ Vehicles or equipment producing excessive exhaust pollution should be repaired or replaced prior to being used on the Project.	Equipment will produce air emissions that contribute to decreased air quality.	▪ Air emissions produced by equipment used for the Project are expected to be within the limits of typical construction activities. ▪ Increases in air emissions anticipated to be temporary.
	Project activities may result in decreased air quality due to dust/particulates created by soil disturbances, asphalt grinding and removal etc.	▪ Dust-generating activities should be minimized as much as possible during windy periods. ▪ If dust suppression is necessary, water should be used in a controlled manner (to avoid sediment mobilization).	Project activities cause temporary increases in airborne particulate matter.	▪ Increases in particulate matter are anticipated to be temporary and localized.
Increase ambient noise levels.	Mobilization to and from site, increased human presence, use of equipment and deactivation works contribute to increased noise.	▪ All equipment should be properly maintained to limit noise emissions and fitted with functioning exhaust and muffler systems. Machinery covers and equipment panels should be well fitted and remain in place to muffle noise. Bolts and fasteners should be tight to avoid rattling. ▪ Equipment should be operated at optimum loads. ▪ Engines and equipment should be turned off when not in use or reduced to idle. ▪ Personnel operating equipment or working in the vicinity of equipment will wear appropriate Personal Protective Equipment	Noise levels will be temporarily elevated during Project.	▪ Increased noise levels are expected to be temporary and within acceptable limits of typical equipment usage and construction activities. ▪ Noise levels are not expected to exceed *BC Occupational Health and Safety Regulations* for noise exposure levels. ▪ Because of the remote location of the Project area, noise exposure is not expected to affect the general population; noise impacts will primarily be limited to Project personnel.
Soils				
Disturbance to ground surface (e.g., compaction and/or erosion).	Project activities include ground disturbance (e.g., highway widening, excavations, pipe jacking, minor channel realignment). Exposed and loose soils may be subject to erosion. Ground surface may be compacted by equipment, material laydown or other Project activities.	▪ Limit equipment movement to existing access routes (e.g., current highway and ROW). ▪ Minimize the movement of equipment by planning work and situating in locations to maximize efficiency. ▪ Limit access and movement to only necessary personnel and equipment. ▪ Equipment and material laydown should be placed on a stable surface. ▪ The EPP should contain erosion and sediment control measures specific to each culvert site. General erosion and sediment control may include: – Halting works during periods of heavy precipitation. – Use of silt fencing – Temporarily stabilizing ground surface with plastic sheeting, straw mulch (from a clean, weed-free source), erosion control matting etc. ▪ Restore ground disturbances to pre-existing conditions at Project completion (e.g., recontour significant disturbances). ▪ Permanently stabilize disturbed surfaces with an appropriate seed mixture as soon as possible. ▪ Conduct works in dry weather and halting works during periods of inclement weather.	Temporary disturbances (compaction and/or erosion) to ground surface.	▪ Soil disturbances are required for the intersection improvements and culvert replacements. Disturbed soils will be seeded with an approved mixture to deter weed growth and allowed to naturally revegetate. ▪ Soil disturbances will be localized around the intersection and the inlet and outlets of each culvert and will be limited to the Alaska Highway ROW.
Soil contamination.	Accidental spill or release of deleterious substances: ▪ Equipment with engines and/or hydraulics have a potential for leaks and spills (may include: diesel/gas, hydraulic fluids, lubricating oil, glycols.)	▪ The contractor should have a Spill Response Plan in place as a component of their overall EPP. ▪ All equipment should be in good operating condition, power washed, and free of leaks, excess oil, and grease prior to arriving at the Project area. ▪ Appropriately stocked spill kits should be available in the staging area and on all mobile equipment. Trained personnel should be available to deploy spill kits. ▪ The refueling area (if one is required) should have a spill containment kit immediately accessible and personnel should be knowledgeable in its use.	Soils exposed to deleterious substances.	▪ Although an accidental spill or release would have a high impact, it is considered to be unlikely to occur and would be an isolated event. ▪ This potential effect would be localized and is considered reversible with remediation effort (e.g., soil removal).

Potential Effect	Interaction	Suggested Mitigation	Residual Effect	Comment
		▪ Two people should be present during refueling (one person conducting fueling/ready to stop spill source and one person ready to deploy spill containment). ▪ Equipment utilized should be placed within secondary containment capable of holding the full volume of fluids within the equipment in the event of a spill (e.g., place within a plastic or metal tray). Motorized equipment should be parked over a surface capable of containing leaks and minor spill (e.g., plywood, heavy plastic sheeting). ▪ Hydrocarbon and coolant storage, if required on site, should be within an impermeable containment facility capable of holding 110% of the storage tank contents. ▪ Small containers (e.g., jerry cans) should be stored in a secure location, protected from weather. These containers must be designed solely for the purpose of storing and pouring fuel and should not be more than 5 years old. Containers should not leak and should be sealed with a proper fitting cap or lid. ▪ If feasible, hydraulic fluids for on-site equipment should be biodegradable (e.g., vegetable based) in case of accidental loss of fluids. ▪ Hazardous materials should be labelled and disposed of according to the Workplace Hazardous Materials Information System criteria and the Transportation of Dangerous Goods (TDG) Regulations. ▪ Any spill to ground of a reportable quantity of a substance that is toxic, polluting, or deleterious to life must be immediately reported to Emergency Management BC (EMBC) 24-hour phone line at ***1-800-663-3456.***		
Surface Water Quality				
Changes to water quality because of accidental spill or release of deleterious substances.	Equipment with engines and/or hydraulics have a potential for leaks and spills (may include: diesel/gas, hydraulic fluids, lubricating oil, glycols).	▪ Measures to minimize the potential for an accidental spill or release of a harmful substance should be implemented (see “Soil Contamination” effect in *Soils*, above). ▪ Equipment re-fueling and servicing be undertaken greater than 30 m away from a watercourse or drainage. If a 30 m distance is not possible, a location as far as possible from the watercourse should be chosen and appropriate secondary containment established. Topographic features and slope must be considered. ▪ A spill of any quantity to water of a substance that is toxic, polluting, or deleterious to aquatic life must be immediately reported to the EMBC 24-hour phone line at ***1-800-663-3456***	Decreased water quality (e.g., contaminated water).	▪ Although an accidental spill or release would have a high impact and could spread beyond the immediate Project area, it is considered to be unlikely to occur and would be an isolated event. ▪ It is anticipated that the watercourses/drainages within the Project area will have low-flow or dry conditions during the culvert replacements which will limit the transport of deleterious substance to downstream habitats. ▪ This potential effect would be contained with appropriately and timely implementation of the Contractor’s Spill Response Plan and is considered partly reversible with remediation effort (e.g., sediment removal).
Decreases to water quality because of increased turbidity.	Project activities may disturb soils and sediments that could mobilize to watercourse(s).	▪ The contractor should have a Project specific Erosion and Sediment Control Plan in place as a component of their overall EPP. Recommended measures will be installed prior to starting Project work. ▪ Conduct works in dry weather and halt works during periods of inclement weather. ▪ Operate equipment from a stable surface above the high-water mark and situate machinery to minimize track movement. ▪ All instream work (e.g. culvert replacement) must occur “in-the-dry”. Given the proposed schedule, the watercourses may have very low-flow or be completely dry during Project works. However, if flows are present the work area must be isolated. ▪ If flows are present during instream activities, turbidity should be monitored to assess compliance with BC MOE *Approved Water Quality Guidelines* for turbidity and total suspended solids. If turbidity levels in excess of the guideline occur, all works must be halted and the source of the input addressed prior to re-initiation of the works.	Temporary increase of total suspended solids (increased turbidity) in surface water.	▪ Any turbidity increases are anticipated to be temporary and dissipate relatively quickly and would be a temporary impact.

Potential Effect	Interaction	Suggested Mitigation	Residual Effect	Comment
Terrestrial Flora and Fauna				
Introduction or spread of non-native or invasive plant species.	Non-native or invasive plant seeds/fragments may be transported to Project area, or spread off-site from the Project area, on vehicles and equipment.	▪ All vehicles and equipment arriving to and leaving from the Project should be inspected and cleaned so that soil and plant materials are not being transported. ▪ Where invasive plants are known to occur rig matting should be laid prior to equipment mobilization. Upon demobilization, the rig matting must be inspected and cleaned of soil and plant material.	Introduction or spread of non-native or invasive plants.	▪ Introduction of new non-native or invasive plants by Project activities considered unlikely. ▪ Disturbed areas will be seeded at an appropriate time (e.g., spring) with an approved mix to discourage weed growth and facilitate natural revegetation.
Disturbance or destruction of vegetation.	Project activities (e.g., equipment movement, material laydown, pipe jacking and channel realignment) may damage or destroy vegetation.	▪ Avoid vegetation removal where possible. ▪ Where vegetation removal is necessary, clearly delineate work areas to minimize accidental disturbances. ▪ Limit equipment movement to the Alaska Highway ROW. ▪ Use existing access routes to move equipment and existing cleared areas to store materials. Avoid situating equipment or materials on vegetated surfaces.	Individual specimens of vegetation may be disturbed or destroyed.	▪ Entirety of the Project occurs in previously disturbed transportation corridor with minimal vegetation clearing anticipated. ▪ Disturbed areas will be seeded at an appropriate time (e.g., spring) with an approved mix to discourage weed growth and facilitate natural revegetation. ▪ Disturbances are expected to be temporary and reversible.
Disturbance to wildlife (avoidance, harm, or mortality).	Mortality of individuals (e.g., vehicle collisions) during mobilization to or from site.	▪ Mobilization should occur in compliance with *BC Transportation Acts and Regulations.* Vehicles and equipment should be operated in a safe manner to reduce the potential for wildlife mortality. ▪ Measures to reduce noise from Project activities should be implemented (see *Air Quality and Noise* above). ▪ Food should not be made available to wildlife at any time. ▪ Food, food waste and packaging should be stored appropriately and disposed of daily so as not to attract wildlife. Such wildlife attractants shall not be stored in the Project area overnight. – Off-site disposal of food scraps, food wrappers, pop cans, domestic waste, and other potential wildlife attractants should be conducted regularly. ▪ The Project Manager and/or the Environmental Monitor (EM) should be notified if any nests, dens, burrows or wildlife interactions are encountered in the Project area. ▪ Report all *dangerous* human-wildlife interactions to the BC Conservation Officer Service via the Report All Poacher and Polluters (RAPP) hotline at **1-877-952-7277**. This includes incidents: – Accessing garbage or other human supplied food sources. – Instances where wildlife cannot be easily scared off. – When a bear, cougar or wolf is seen in an urban area. ▪ Feeding, harassment or destruction of any wildlife is strictly prohibited. Wildlife encountered at or near Project area should be allowed to passively disperse without undue harassment. ▪ For Project activities that occur within Caribou range, the contractor must implement the Caribou Protection Plan (Appendix C). ▪ Measures to reduce the potential for an accidental spill of a harmful substance should be implemented (see *Soils*, above).	Mortality of individuals.	▪ Although mortality of wildlife would have a high impact, it is considered unlikely to occur and would be an isolated event.
	Avoidance behaviors from local wildlife, including SAR, may occur as a result of increased noise and human presence from Project activities resulting in disruption or impediment to wildlife movement.		Wildlife exhibit avoidance behavior during Project.	▪ Project occurs in an area subject to frequent noise and human presence (e.g., traffic). ▪ Project activities are anticipated to be within acceptable limits of typical usage. ▪ Noise disturbances are limited spatially and temporally (e.g., occur in immediate area of the Project and infrequently for a short time). ▪ Human presence will be limited in number and time. ▪ Wildlife present will likely return to area once Project activities are completed.
	Garbage and waste generated by the Project activities may attract local wildlife and lead to human-wildlife interactions.		Human-wildlife interactions occur.	▪ The Project is not expected to generate significant amounts of wildlife attractants. ▪ Interactions would be localized and temporary.
Direct or indirect harm to wildlife by accidental spill or release of a deleterious substance.	Local wildlife may be harmed or killed by an accidental spill of a harmful substance in Project area.	▪ See measures recommended in *Soils* and *Surface Water Quality* above to minimize potential for an accidental spill.	Wildlife physically harmed by contact with a deleterious substance Wildlife habitat quality affected by spill.	▪ Although a spill interaction would have a high impact, it is considered to be unlikely to occur and would be an isolated event. Because the spill would be cleaned immediately, it may also be considered a temporary effect.

Potential Effect	Interaction	Suggested Mitigation	Residual Effect	Comment
Disturbance or destruction of habitat.	There is potential for loss or disturbance of bird nests, which are protected under the *Migratory Birds Convention Act* (MBCA), if vegetation clearing is required and occurs during the general bird nesting period. Unknown dens, burrows or nests may be encountered.	▪ Vegetation removal, if required, should be conducted outside the breeding bird nesting period. Environment and Climate Change Canada (ECCC) suggests that the least risk window for the region including the Project area, is approximately *August 20 to April 30*. Any vegetation to be removed during the breeding bird nesting period should be surveyed in advance by an appropriately Qualified Environmental Professional to identify any breeding, nesting, roosting or rearing birds and determine the appropriate BMPs. ▪ The Project Manager and/or the EM should be notified if any nests, dens, burrows or wildlife interactions are encountered in the Project area.	Undetected nests may be destroyed. Potential habitat or use of habitat may be altered.	▪ Vegetation disturbances are anticipated to be limited. The highway ROW consists mostly of grasses and shrubs. The ROW is mowed regularly. ▪ Project activities are temporary and are not anticipated to change the long-term habitat quality/potential use of the area.
Fish and Fish Habitat				
Direct or indirect harm to fish by accidental spill or release of a deleterious substance (e.g., hydrocarbons, uncured concrete).	Fish may be harmed or killed by physical contact with deleterious substance and/or because of habitat degradation.	▪ Measures to minimize the potential for an accidental spill of a harmful substance will be implemented (see *Soils* and *Surface Water Quality,* above).	Fish may be exposed to contamination from spills which may harm/kill fish or cause fish to leave area.	▪ Although a spill interaction would have a high impact, it is considered to be unlikely to occur and would be an isolated event. ▪ Only the KM 145.300 culvert is located on a watercourse that is considered to be fish habitat. ▪ Fish are unlikely at the culvert locations, and would be present only in downstream fish-bearing watercourses.
Direct or indirect harm to fish by increases in turbidity because of mobilized sediments from soil disturbances.	Increased sediments in water may harm or kill fish directly (e.g., gill abrasion, smothering of incubating eggs) or indirectly (e.g., reduced feeding/foraging).	▪ Erosion and sediment control measures will be implemented (see *Soils* and *Surface Water Quality,* above).	Fish may be exposed to increased total suspended solids in water which may harm/kill fish or cause fish to leave area.	▪ Project works are expected to be conducted during low flow periods or dry conditions which reduces potential for sediment contributions to the watercourse. If there is flow in the watercourse or the roadside ditches, the area will be isolated, fish salvaged (if present) from the area, and works will be conducted in the dry. ▪ Any turbidity increases are anticipated to be temporary and short term.
Disturbance or destruction of habitat.	Project activities conducted below the high-water mark may alter existing aquatic habitat.	▪ Conduct works in the dry. If flows are present, then work site isolation would be required. Isolation activities require fish salvage (at KM 145.300) and ongoing turbidity monitoring. Additional permitting would be required under this scenario. ▪ Works below the high-water mark at KM 145.300 are ideally conducted during the Reduced Risk Timing Windows for Fish and Wildlife for Northeast BC. Because both spring and fall spawners are potentially present downstream of the KM 145.300 culvert, the least risk window is July 15 to August 15. Tetra Tech understands that it is probable that some of the Project activities will occur outside of the Reduced Risk Timing Window during low flow conditions. It is unlikely that the Project would negatively impact fish or fish habitat if works are conducted outside the reduced risk window if the mitigation detailed above in the preceding sections is applied. ▪ Disturbances below the high-water mark will be remediated as soon as possible and should emulate pre-disturbance conditions as closely as possible.	Temporary disturbances below the high-water mark.	▪ Project works are not anticipated to result in permanent changes to habitat quality or quantity. ▪ Disturbances will be temporary and will likely occur during low flow or dry conditions. ▪ None of the watercourses at the culvert sites are documented to contain fish and Bull Trout have not been documented in the area.

7.0 CONCLUSION

The potential impacts of the Project were considered within the limits of typical, routine construction activities and are generally localized and temporary. It is anticipated that there will be ***no adverse residual environmental effects*** as a result of the Project activities provided industry standard BMPs and mitigation measures are applied, the mitigation recommended in this EOA and the attached EMP are implemented and that the contractor develops and effectively implements a Project specific EPP.

8.0 CLOSURE

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

Respectfully Submitted,
Tetra Tech Canada Inc.

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FIGURES

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LEGEND

- Culvert Location
- Construction Limits

Base Data

- Alaska Highway
- Other Road
- Watercourse

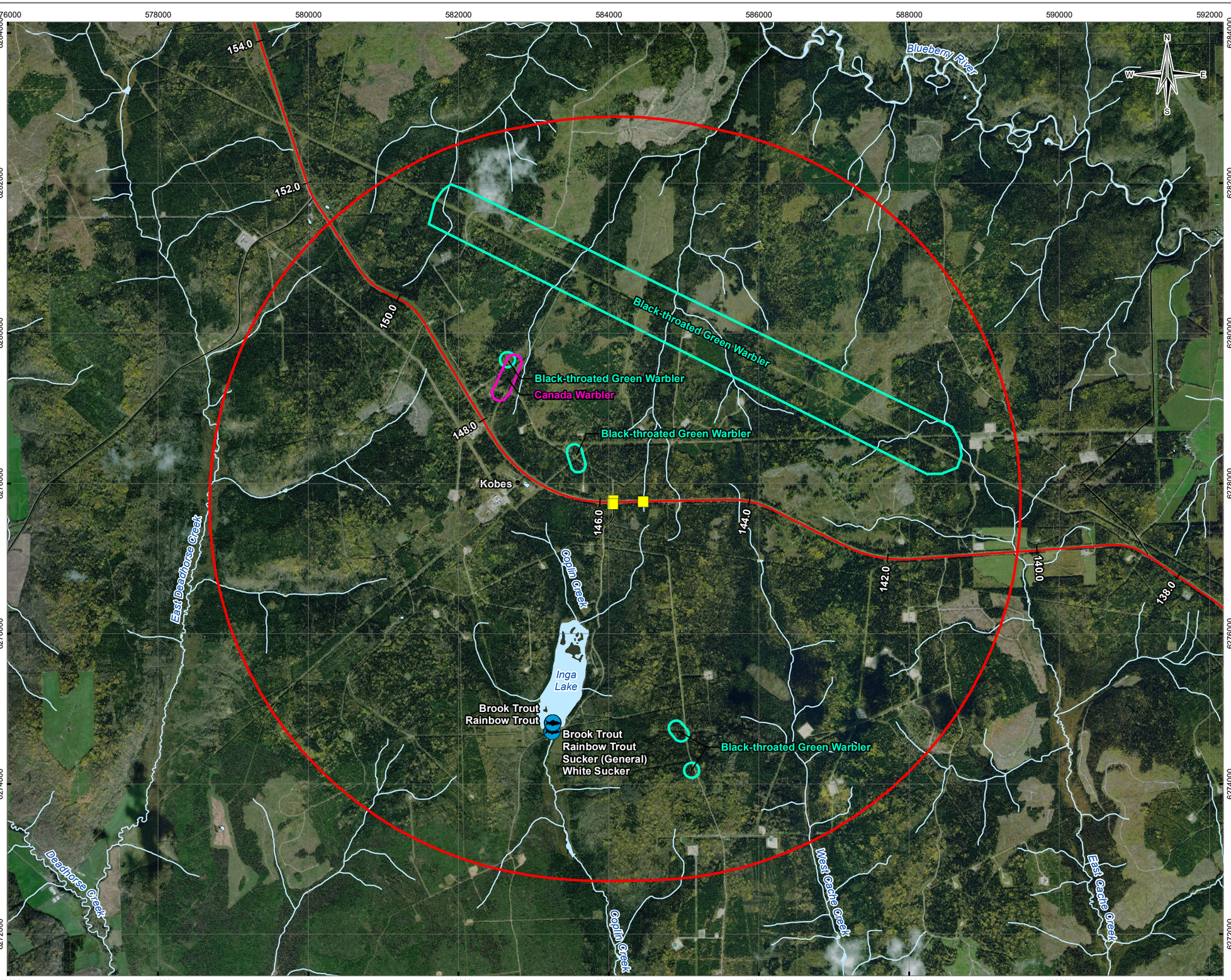
NOTES
Base data source: CanVec 1:50,000
Imagery provided by ESRI; Maxar (2016)

STATUS
ISSUED FOR USE

INGA LAKE INTERSECTION IMPROVEMENTS ALASKA HIGHWAY, BC

Project Location Overview

PROJECTION UTM Zone 10		**DATUM** NAD83		**CLIENT** Public Services and Procurement Canada
Scale: 1:3,000 (50 25 0 50 Metres)				TETRA TECH
FILE NO. VHWY03092-01_Figure01_PrjLocation.mxd				
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** EH	**REV** 0
DATE March 24, 2021	**PROJECT NO.** TRN.VHWY03092-01			**Figure 1**



LEGEND

- Culvert Location
- 5 km Search Area
- Fish Occurrence

CDC Species at Risk Occurrences

- Black-throated Green Warbler (Blue-listed)
- Canada Warbler (Blue-listed)

Base Data

- Populated Place
- Alaska Highway
- Other Road
- Watercourse
- Waterbody

NOTES

Base data source:
Fish Occurrences and CDC Species at Risk from DataBC
(accessed February 9, 2021)
CanVec 1:50,000
Imagery provided by ESRI; Maxar (2016)

STATUS
ISSUED FOR USE

INGA LAKE INTERSECTION IMPROVEMENTS ALASKA HIGHWAY, BC

Environmental Sensitivities

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** Public Services and Procurement Canada
Scale: 1:50,000 — 1 0.5 0 1 — Kilometres					TETRA TECH
FILE NO. VHWY03092-01_Figure02_EnvSens.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** EH	**REV** 0	**Figure 2**
DATE March 24, 2021	**PROJECT NO.** TRN.VHWY03092-01				

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PHOTOS

Photo 1: Inga Lake Intersection – View east along the Alaska Highway (Google Earth 2021).

Photo 2: Inga Lake Intersection – View west along the Alaska Highway (Google Earth 2021).

Photo 3: KM 145.80 (north) Culvert – Located under Inga Lake Road north of the Alaska Highway (Google Earth 2021). This culvert conveys the roadside ditch under the side road and is not considered to be a 'stream' under the WSA.

Photo 4: KM 145.80 (south) Culvert – Located under Inga Lake Road south of the Alaska Highway (Google Earth 2021). This culvert conveys the roadside ditch under the side road and is not considered to be a 'stream' under the WSA.

Photo 5: KM 145.30 Culvert Inlet / upstream – This culvert is located at the headwaters of a small 1st order watercourse and will be undergoing a culvert extension (Google Earth 2021).

Photo 6: KM 145.30 Culvert outlet / downstream – This culvert is located at the headwaters of a small 1st order watercourse and will be undergoing a culvert extension (Google Earth 2021).

Photo 7: Low flows through the KM 145.30 culvert in 2011.

APPENDIX A

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

NATURAL SCIENCES

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

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Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

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Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

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

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL ISSUES

The ability to rely upon and generalize from environmental baseline data is dependent on data collection activities occurring within biologically relevant survey windows.

It is incumbent upon the Client and any Authorized Party, to be knowledgeable of the level of risk that has been incorporated into the project design or scope, in consideration of the level of the environmental baseline information that was reasonably acquired to facilitate completion of the scope.

1.8 NOTIFICATION OF AUTHORITIES

TETRA TECH professionals are bound by their ethical commitments to act within the bounds of all pertinent regulations. In certain instances, observations by TETRA TECH of regulatory contravention may require that regulatory agencies and other persons be informed. The client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

APPENDIX B

SPECIES AT RISK SEARCH RESULTS

Search Results **85 records**

Modify Search (/pub/eswp/search.do?method=change) | New Search (/pub/eswp/search.do?method=reset) | Export Results | Help

Show 100 rows | Column Visibility | Sort Order | Scientific Name | Ascending

Scientific Name	English Name	Biogeoclimatic Units	Provincial	BC List	Global	COSEWIC	SARA	Provincial FRPA	Land Use Objectives	CDC Mapped Locations	Reports
Aechmophorus occidentalis (/pub/eswp/reports.do?elcode=ABNCA04010)	Western Grebe	BG BWBS CDF CWH ICH IDF MS PP SBPS SBS	S1B,S2N (2015)	Red	G5 (2016)	SC (2014)	1-SC (2017)			(/pub/eswp/eoMap.do?id=19726)	(/pub/eswp/reports.do?elcode=ABNCA04010)
Agriades glandon lacustris (/pub/eswp/reports.do?elcode=IILEPH0053)	Arctic Blue, *lacustris* subspecies	BWBS	S3 (2013)	Blue	G5TNR					(/pub/eswp/eoMap.do?id=13912)	(/pub/eswp/reports.do?elcode=IILEPH0053)
Agriades optilete (/pub/eswp/reports.do?elcode=IILEPG9010)	Cranberry Blue	BWBS MH SBPS SBS SWB	S3S4 (2020)	Blue	G5 (2016)						(/pub/eswp/reports.do?elcode=IILEPG9010)
Ammospiza nelsoni (/pub/eswp/reports.do?elcode=ABPBXA0070)	Nelson's Sparrow	BWBS CWH	S2B (2018)	Red	G5 (2016)	NAR (1998)		Y		(/pub/eswp/eoMap.do?id=17615)	(/pub/eswp/reports.do?elcode=ABPBXA0070)
Anaxyrus boreas (/pub/eswp/reports.do?elcode=AAABB01030)	Western Toad	BG BWBS CDF CWH ESSF ICH IDF PP SBS SWB	S4 (2016)	Yellow	G4 (2008)	SC (2012)	1-SC (2018)				(/pub/eswp/reports.do?elcode=AAABB01030)
Archilochus colubris (/pub/eswp/reports.do?elcode=ABNUC45010)	Ruby-throated Hummingbird		S3B (2015)	Blue	G5 (2016)						(/pub/eswp/reports.do?elcode=ABNUC45010)
Ardea herodias herodias (/pub/eswp/reports.do?elcode=ABNGA04012)	Great Blue Heron, *herodias* subspecies	BG ICH IDF MS PP SBS	S3? (2017)	Blue	G5T5 (2016)			Y		(/pub/eswp/eoMap.do?id=17626)	(/pub/eswp/reports.do?elcode=ABNGA04012)
Asio flammeus (/pub/eswp/reports.do?elcode=ABNSB13040)	Short-eared Owl	BG BWBS CDF CWH ICH IDF MS PP SBPS SBS SWB	S3B,S2N (2015)	Blue	G5 (2016)	SC (2008)	1-SC (2012)	Y		(/pub/eswp/eoMap.do?id=14271)	(/pub/eswp/reports.do?elcode=ABNSB13040)
Bartramia longicauda (/pub/eswp/reports.do?elcode=ABNNF06010)	Upland Sandpiper	BG BWBS CDF CWH ICH IDF SBPS SBS SWB	S2B (2015)	Red	G5 (2016)					(/pub/eswp/eoMap.do?id=15956)	(/pub/eswp/reports.do?elcode=ABNNF06010)
Bos bison athabascae (/pub/eswp/reports.do?elcode=AMALE01011)	Wood Bison	BWBS	S2 (2015)	Red	G4T3Q (2018)	SC (2013)	1-T (2003)			(/pub/eswp/eoMap.do?id=14422)	(/pub/eswp/reports.do?elcode=AMALE01011)
Bos bison bison (/pub/eswp/reports.do?elcode=AMALE01012)	Plains Bison	BWBS SWB	SX (2015)	Red	G4T4 (2016)	T (2013)					(/pub/eswp/reports.do?elcode=AMALE01012)

Scientific Name	English Name	Biogeoclimatic Units	Provincial	BC List	Global	COSEWIC	SARA	Provincial FRPA	Land Use Objectives	CDC Mapped Locations	Reports
Botaurus lentiginosus (/pub/eswp/reports.do?elcode=ABNGA01020)	American Bittern	BG BWBS CDF CWH ICH IDF MS PP SBPS SBS	S3B, SNRN (2015)	Blue	G5 (2016)					(/pub/eswp/eoMap.do?id=17185)	(/pub/eswp/reports.do?elcode=ABNGA01020)
Buteo lagopus (/pub/eswp/reports.do?elcode=ABNKC19130)	Rough-legged Hawk	BAFA BG BWBS CDF CWH ESSF ICH IDF IMA MS PP SBPS SBS SWB	S3N (2015)	Blue	G5 (2016)	NAR (1995)					(/pub/eswp/reports.do?elcode=ABNKC19130)
Buteo platypterus (/pub/eswp/reports.do?elcode=ABNKC19050)	Broad-winged Hawk	BWBS ICH IDF SBS	S3?B (2015)	Blue	G5 (2016)					(/pub/eswp/eoMap.do?id=14687)	(/pub/eswp/reports.do?elcode=ABNKC19050)
Buteo swainsoni (/pub/eswp/reports.do?elcode=ABNKC19070)	Swainson's Hawk	BG BWBS CDF ICH IDF MS PP SBS	S2B (2015)	Red	G5 (2016)					(/pub/eswp/eoMap.do?id=19230)	(/pub/eswp/reports.do?elcode=ABNKC19070)
Callophrys niphon (/pub/eswp/reports.do?elcode=IILEPE2240)	Eastern Pine Elfin	BWBS	S1S3 (2020)	Red	G5 (2016)						(/pub/eswp/reports.do?elcode=IILEPE2240)
Calopteryx aequabilis (/pub/eswp/reports.do?elcode=IIODO65010)	River Jewelwing	BWBS IDF	S3 (2015)	Blue	G5 (2016)					(/pub/eswp/eoMap.do?id=17372)	(/pub/eswp/reports.do?elcode=IIODO65010)
Cardellina canadensis (/pub/eswp/reports.do?elcode=ABPBX16030)	Canada Warbler	BWBS CDF CWH	S3S4B (2015)	Blue	G5 (2016)	SC (2020)	1-T (2010)			(/pub/eswp/eoMap.do?id=14627)	(/pub/eswp/reports.do?elcode=ABPBX16030)
Carex sprengelii (/pub/eswp/reports.do?elcode=PMCYP03CT0)	Sprengel's sedge	IDFxm SBSmh	S3 (2019)	Blue	G5 (2016)					(/pub/eswp/eoMap.do?id=19434)	(/pub/eswp/reports.do?elcode=PMCYP03CT0)
Carterocephalus palaemon mandan (/pub/eswp/reports.do?elcode=IILEP42011)	Arctic Skipper, *mandan* subspecies	BWBS	S2 (2013)	Red	G5T5 (2016)					(/pub/eswp/eoMap.do?id=19608)	(/pub/eswp/reports.do?elcode=IILEP42011)
Cercyonis pegala nephele (/pub/eswp/reports.do?elcode=IILEPN7012)	Common Wood-nymph, *nephele* subspecies	BWBS	S3 (2013)	Blue	G5T5 (2016)					(/pub/eswp/eoMap.do?id=17798)	(/pub/eswp/reports.do?elcode=IILEPN7012)
Chordeiles minor (/pub/eswp/reports.do?elcode=ABNTA02020)	Common Nighthawk	BG BWBS CDF CWH ESSF ICH IDF MH MS PP SBPS SBS SWB	S4B (2015)	Yellow	G5 (2016)	SC (2018)	1-T (2010)				(/pub/eswp/reports.do?elcode=ABNTA02020)
Coccothraustes vespertinus (/pub/eswp/reports.do?elcode=ABPBY09020)	Evening Grosbeak	BG BWBS CDF CWH ESSF ICH IDF MH MS PP SBPS SBS SWB	S5 (2015)	Yellow	G5 (2016)	SC (2016)	1-SC (2019)				(/pub/eswp/reports.do?elcode=ABPBY09020)

Scientific Name	English Name	Biogeoclimatic Units	Provincial	BC List	Global	COSEWIC	SARA	Provincial FRPA	Land Use Objectives	CDC Mapped Locations	Reports
Coenagrion angulatum (/pub/eswp/reports.do?elcode=IIODO70030)	Prairie Bluet	BWBS ESSF	S3S4 (2015)	Blue	G5 (2016)						(/pub/eswp/reports.do?elcode=IIODO70030)
Coenonympha tullia benjamini (/pub/eswp/reports.do?elcode=IILEPN6034)	Common Ringlet, *benjamini* subspecies	BWBS	S3 (2013)	Blue	G5T5 (2016)					(/pub/eswp/eoMap.do?id=16740)	(/pub/eswp/reports.do?elcode=IILEPN6034)
Contopus cooperi (/pub/eswp/reports.do?elcode=ABPAE32010)	Olive-sided Flycatcher	BWBS CDF CWH ESSF ICH IDF MH MS PP SBPS SBS SWB	S3S4B (2015)	Blue	G4 (2016)	SC (2018)	1-T (2010)				(/pub/eswp/reports.do?elcode=ABPAE32010)
Coturnicops noveboracensis (/pub/eswp/reports.do?elcode=ABNME01010)	Yellow Rail	BWBS MS	S2B (2015)	Red	G4 (2016)	SC (2009)	1-SC (2003)			(/pub/eswp/eoMap.do?id=14150)	(/pub/eswp/reports.do?elcode=ABNME01010)
Drosera linearis (/pub/eswp/reports.do?elcode=PDDRO02060)	slender-leaf sundew	SBSdh	S2S3 (2019)	Blue	G4G5 (2016)					(/pub/eswp/eoMap.do?id=22143)	(/pub/eswp/reports.do?elcode=PDDRO02060)
Erebia pawloskii (/pub/eswp/reports.do?elcode=IILEPN8070)	Yellow-dotted Alpine	BWBS SWB	S2? (2020)	Red	G5 (2016)						(/pub/eswp/reports.do?elcode=IILEPN8070)
Euphagus carolinus (/pub/eswp/reports.do?elcode=ABPBXB5010)	Rusty Blackbird	BG BWBS CDF CWH ESSF MS PP SBPS SBS SWB	S3S4B (2015)	Blue	G4 (2016)	SC (2017)	1-SC (2009)				(/pub/eswp/reports.do?elcode=ABPBXB5010)
Falco peregrinus anatum (/pub/eswp/reports.do?elcode=ABNKD06071)	Peregrine Falcon, *anatum* subspecies	BG BWBS CDF CWH IDF MS PP SBS	S2? (2011)	Red	G4T4 (2016)	NAR (2017)	1-SC (2012)			🔒	(/pub/eswp/reports.do?elcode=ABNKD06071)
Falco rusticolus (/pub/eswp/reports.do?elcode=ABNKD06080)	Gyrfalcon	BAFA BG BWBS CDF CWH ICH IDF SBPS SBS SWB	S3S4B, SNRN (2015)	Blue	G5 (2016)	NAR (1987)				🔒	(/pub/eswp/reports.do?elcode=ABNKD06080)
Gulo gulo luscus (/pub/eswp/reports.do?elcode=AMAJF03011)	Wolverine, *luscus* subspecies	BAFA BWBS CMA CWH ESSF ICH IDF IMA MH MS SBPS SBS SWB	S3 (2010)	Blue	G4T4 (2016)	SC (2014)	1-SC (2018)	Y			(/pub/eswp/reports.do?elcode=AMAJF03011)
Hesperia assiniboia (/pub/eswp/reports.do?elcode=IILEP65190)	Assiniboine Skipper	BWBS MSxv	S2 (2020)	Red	G5 (2020)					(/pub/eswp/eoMap.do?id=20101)	(/pub/eswp/reports.do?elcode=IILEP65190)

Scientific Name	English Name	Biogeoclimatic Units	Provincial	BC List	Global	COSEWIC	SARA	Provincial FRPA	Land Use Objectives	CDC Mapped Locations	Reports
Hirundo rustica (/pub/eswp/reports.do?elcode=ABPAU09030)	Barn Swallow	BAFA BG BWBS CDF CWH ESSF ICH IDF IMA MH MS PP SBPS SBS SWB	S3S4B (2015)	Blue	G5 (2016)	T (2011)	1-T (2017)				(/pub/eswp/reports.do?elcode=ABPAU09030)
Hydroprogne caspia (/pub/eswp/reports.do?elcode=ABNNM08020)	Caspian Tern	BG BWBS CDF CWH ICH IDF PP SBS	S3B (2015)	Blue	G5 (2016)	NAR (1999)					(/pub/eswp/reports.do?elcode=ABNNM08020)
Icteria virens (/pub/eswp/reports.do?elcode=ABPBX24010)	Yellow-breasted Chat	BG CDF CWH ICH IDF PP SBS	S2B (2018)	Red	G5 (2016)	E (2011)	1-E (2003)	Y		(/pub/eswp/eoMap.do?id=18365)	(/pub/eswp/reports.do?elcode=ABPBX24010)
Icterus galbula (/pub/eswp/reports.do?elcode=ABPBXB9190)	Baltimore Oriole	BAFA BWBS ESSF SBS	S3?B (2015)	Blue	G5 (2016)						(/pub/eswp/reports.do?elcode=ABPBXB9190)
Larus californicus (/pub/eswp/reports.do?elcode=ABNNM03110)	California Gull	BG BWBS CDF CWH ICH IDF MS PP SBS	S2S3B (2015)	Blue	G5 (2016)						(/pub/eswp/reports.do?elcode=ABNNM03110)
Limnodromus griseus (/pub/eswp/reports.do?elcode=ABNNF16010)	Short-billed Dowitcher	BG BWBS CDF CWH ICH IDF PP SWB	S2S3B (2015)	Blue	G5 (2016)					(/pub/eswp/eoMap.do?id=14983)	(/pub/eswp/reports.do?elcode=ABNNF16010)
Limosa haemastica (/pub/eswp/reports.do?elcode=ABNNF08020)	Hudsonian Godwit	BWBS CDF CWH IDF MS SWB	S1S2B (2015)	Red	G4 (2016)	T (2019)				(/pub/eswp/eoMap.do?id=17125)	(/pub/eswp/reports.do?elcode=ABNNF08020)
Lycaena hyllus (/pub/eswp/reports.do?elcode=IILEPC1070)	Bronze Copper	BWBS ESSF ICH MS	S3 (2020)	Blue	G5 (2013)					(/pub/eswp/eoMap.do?id=15420)	(/pub/eswp/reports.do?elcode=IILEPC1070)
Melanitta perspicillata (/pub/eswp/reports.do?elcode=ABNJB17020)	Surf Scoter	BG BWBS CDF CWH ICH IDF MS PP SBPS SBS SWB	S3B,S4N (2015)	Blue	G5 (2016)					(/pub/eswp/eoMap.do?id=14699)	(/pub/eswp/reports.do?elcode=ABNJB17020)
Myotis lucifugus (/pub/eswp/reports.do?elcode=AMACC01010)	Little Brown Myotis	BG BWBS CDF CWH ESSF ICH IDF MH MS PP SBPS SBS SWB	S4 (2015)	Yellow	G3 (2016)	E (2013)	1-E (2014)				(/pub/eswp/reports.do?elcode=AMACC01010)

Scientific Name	English Name	Biogeoclimatic Units	Provincial	BC List	Global	COSEWIC	SARA	Provincial FRPA	Land Use Objectives	CDC Mapped Locations	Reports
Myotis septentrionalis (/pub/eswp/reports.do?elcode=AMACC01150)	Northern Myotis	BWBS ICH MH SBS	S3S4 (2015)	Blue	G1G2 (2016)	E (2013)	1-E (2014)			(/pub/eswp/eoMap.do?id=16442)	(/pub/eswp/reports.do?elcode=AMACC01150)
Oeneis philipi (/pub/eswp/reports.do?elcode=IILEPP1140)	Philip's Arctic	BWBS SWB	S1S3 (2020)	Red	G3G5 (2020)						(/pub/eswp/reports.do?elcode=IILEPP1140)
Oporornis agilis (/pub/eswp/reports.do?elcode=ABPBX11020)	Connecticut Warbler	BWBS CWH	S3B (2015)	Blue	G4G5 (2016)			Y		(/pub/eswp/eoMap.do?id=15834)	(/pub/eswp/reports.do?elcode=ABPBX11020)
Oreamnos americanus (/pub/eswp/reports.do?elcode=AMALE02010)	Mountain Goat	BAFA BG BWBS CDF CMA CWH ESSF ICH IDF IMA MH MS PP SBPS SBS SWB	S3 (2015)	Blue	G5 (2016)						(/pub/eswp/reports.do?elcode=AMALE02010)
Ovis canadensis (/pub/eswp/reports.do?elcode=AMALE04010)	Bighorn Sheep	BAFA BG ESSF ICH IDF IMA MS PP	S3? (2015)	Blue	G4 (2016)			Y			(/pub/eswp/reports.do?elcode=AMALE04010)
Ovis dalli stonei (/pub/eswp/reports.do?elcode=AMALE04023)	Stone's Sheep		S3S4 (2017)	Blue	G5T4 (2016)						(/pub/eswp/reports.do?elcode=AMALE04023)
Oxytropis campestris var. *davisii* (/pub/eswp/reports.do?elcode=PDFAB2X04A)	Davis' locoweed	BAFA BWBSdk BWBSmw CMA IMA SBSmh SWBmk	S3? (2019)	Blue	G5T3 (2015)					(/pub/eswp/eoMap.do?id=18478)	(/pub/eswp/reports.do?elcode=PDFAB2X04A)
Papilio machaon hudsonianus (/pub/eswp/reports.do?elcode=IILEP94085)	Old World Swallowtail, *hudsonianus* subspecies	ESSF MS SBS	S1S3 (2013)	Red	G5T5 (2016)						(/pub/eswp/reports.do?elcode=IILEP94085)
Pelecanus erythrorhynchos (/pub/eswp/reports.do?elcode=ABNFC01010)	American White Pelican	BG BWBS CDF CWH ICH IDF MS PP SBPS SBS	S1B (2015)	Red	G4 (2016)	NAR (1987)		Y		(/pub/eswp/eoMap.do?id=16622)	(/pub/eswp/reports.do?elcode=ABNFC01010)
Phalacrocorax auritus (/pub/eswp/reports.do?elcode=ABNFD01020)	Double-crested Cormorant	BWBS CDF CWH ICH IDF PP SBPS SBS	S3S4 (2015)	Blue	G5 (2016)	NAR (1978)				(/pub/eswp/eoMap.do?id=15641)	(/pub/eswp/reports.do?elcode=ABNFD01020)
Phalaropus lobatus (/pub/eswp/reports.do?elcode=ABNNF20020)	Red-necked Phalarope	BG BWBS CDF CWH ICH IDF MS PP SBPS SBS SWB	S3S4B (2015)	Blue	G4G5 (2016)	SC (2014)					(/pub/eswp/reports.do?elcode=ABNNF20020)
Phyciodes batesii (/pub/eswp/reports.do?elcode=IILEPK3040)	Tawny Crescent	BWBS SWB	S3 (2020)	Blue	G5 (2017)					(/pub/eswp/eoMap.do?id=18794)	(/pub/eswp/reports.do?elcode=IILEPK3040)
Planorbula armigera (/pub/eswp/reports.do?elcode=IMGASN0020)	Thicklip Rams-horn	BWBS	S1S3 (2015)	Red	G5 (2017)						(/pub/eswp/reports.do?elcode=IMGASN0020)

Scientific Name	English Name	Biogeoclimatic Units	Provincial	BC List	Global	COSEWIC	SARA	Provincial FRPA	Land Use Objectives	CDC Mapped Locations	Reports
Pluvialis dominica (/pub/eswp/reports.do?elcode=ABNNB02030)	American Golden-Plover	BAFA BG BWBS CDF CWH ICH IDF MS PP SBS SWB	S3S4B (2015)	Blue	G5 (2016)						(/pub/eswp/reports.do?elcode=ABNNB02030)
Podiceps nigricollis (/pub/eswp/reports.do?elcode=ABNCA03030)	Eared Grebe	BAFA BG BWBS CMA CWH ESSF ICH IDF IMA MH MS PP SBPS SBS	S3B (2015)	Blue	G5 (2016)						(/pub/eswp/reports.do?elcode=ABNCA03030)
Progne subis (/pub/eswp/reports.do?elcode=ABPAU01010)	Purple Martin	BWBS CDF CWH ICH	S3S4B (2019)	Blue	G5 (2016)					(/pub/eswp/eoMap.do?id=17812)	(/pub/eswp/reports.do?elcode=ABPAU01010)
Rangifer tarandus pop. 1 (/pub/eswp/reports.do?elcode=AMALC04013)	Caribou (Southern Mountain Population)	BAFA ESSF ICH IMA	S1 (2017)	Red	G5TNR	E (2014)	1-T (2003)	Y		(/pub/eswp/eoMap.do?id=16822)	(/pub/eswp/reports.do?elcode=AMALC04013)
Rangifer tarandus pop. 14 (/pub/eswp/reports.do?elcode=AMALC0401E)	Caribou (Boreal Population)	BWBS	S2? (2017)	Red	G5TNR	T (2014)	1-T (2003)	Y		(/pub/eswp/eoMap.do?id=14385)	(/pub/eswp/reports.do?elcode=AMALC0401E)
Rangifer tarandus pop. 15 (/pub/eswp/reports.do?elcode=AMALC0401G)	Caribou (Northern Mountain Population)	BWBS ESSF MH SBS	S2S3 (2017)	Blue	G5T4T5 (2013)	SC (2014)	1-SC (2005)	Y		(/pub/eswp/eoMap.do?id=15648)	(/pub/eswp/reports.do?elcode=AMALC0401G)
Ranunculus rhomboideus (/pub/eswp/reports.do?elcode=PDRAN0L2D0)	prairie buttercup	BWBSmw	S2S3 (2019)	Blue	G5 (2016)					(/pub/eswp/eoMap.do?id=17157)	(/pub/eswp/reports.do?elcode=PDRAN0L2D0)
Recurvirostra americana (/pub/eswp/reports.do?elcode=ABNND02010)	American Avocet	BG BWBS CDF CWH ICH IDF MS PP SBPS	S2S3B (2015)	Blue	G5 (2016)					(/pub/eswp/eoMap.do?id=13908)	(/pub/eswp/reports.do?elcode=ABNND02010)
Salix petiolaris (/pub/eswp/reports.do?elcode=PDSAL02280)	meadow willow	BWBSdk BWBSmw SBSdh	S3 (2019)	Blue	G5 (2015)					(/pub/eswp/eoMap.do?id=14718)	(/pub/eswp/reports.do?elcode=PDSAL02280)
Sarracenia purpurea ssp. *purpurea* (/pub/eswp/reports.do?elcode=PDSAR020S1)	common pitcher-plant	BWBSmw	S2? (2019)	Red	G5T5 (2015)					(/pub/eswp/eoMap.do?id=14763)	(/pub/eswp/reports.do?elcode=PDSAR020S1)
Satyrium titus titus (/pub/eswp/reports.do?elcode=IILEPD4144)	Coral Hairstreak, *titus* subspecies	BWBS ESSF IMA	S2 (2013)	Red	G5T4T5 (2000)					(/pub/eswp/eoMap.do?id=17774)	(/pub/eswp/reports.do?elcode=IILEPD4144)
Setophaga castanea (/pub/eswp/reports.do?elcode=ABPBX03220)	Bay-breasted Warbler	BWBS CWH ICH MS SBS	S2B (2015)	Red	G5 (2016)			Y		(/pub/eswp/eoMap.do?id=18965)	(/pub/eswp/reports.do?elcode=ABPBX03220)
Setophaga tigrina (/pub/eswp/reports.do?elcode=ABPBX03040)	Cape May Warbler	BWBS MS SBS	S3S4B (2018)	Blue	G5 (2016)			Y		(/pub/eswp/eoMap.do?id=16727)	(/pub/eswp/reports.do?elcode=ABPBX03040)
Setophaga virens (/pub/eswp/reports.do?elcode=ABPBX03100)	Black-throated Green Warbler	BWBS CDF CWH ESSF ICH SBS	S3B (2015)	Blue	G5 (2016)			Y		(/pub/eswp/eoMap.do?id=13973)	(/pub/eswp/reports.do?elcode=ABPBX03100)
Somatochlora brevicincta (/pub/eswp/reports.do?elcode=IIODO32020)	Quebec Emerald	ESSF ICH MH MS	S3 (2015)	Blue	G4 (2006)						(/pub/eswp/reports.do?elcode=IIODO32020)

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Somatochlora forcipata (/pub/eswp/reports.do?elcode=IIODO32080)	Forcipate Emerald	ESSF MS SBPS SBS	S3? (2015)	Blue	G5 (2015)						(/pub/eswp/reports.do?elcode=IIODO32080)
Somatochlora kennedyi (/pub/eswp/reports.do?elcode=IIODO32140)	Kennedy's Emerald	BWBS ESSF MS SBPS SBS SWB	S3S4 (2015)	Blue	G5 (2015)						(/pub/eswp/reports.do?elcode=IIODO32140)
Speyeria aphrodite manitoba (/pub/eswp/reports.do?elcode=IILEPJ6033)	Aphrodite Fritillary, *manitoba* subspecies	BWBS ESSF MS	S3 (2013)	Blue	G5T5 (2016)					(/pub/eswp/eoMap.do?id=19755)	(/pub/eswp/reports.do?elcode=IILEPJ6033)
Speyeria cybele pseudocarpenteri (/pub/eswp/reports.do?elcode=IILEPJ6023)	Great Spangled Fritillary, *pseudocarpenteri* subspecies	BWBS	S2 (2013)	Red	G5T5 (2016)					(/pub/eswp/eoMap.do?id=19345)	(/pub/eswp/reports.do?elcode=IILEPJ6023)
Speyeria mormonia eurynome (/pub/eswp/reports.do?elcode=IILEPJ6136)	Mormon Fritillary, *eurynome* subspecies	ESSF IMA MS	S1S3 (2013)	Red	G5TNR						(/pub/eswp/reports.do?elcode=IILEPJ6136)
Sterna forsteri (/pub/eswp/reports.do?elcode=ABNNM08090)	Forster's Tern	BG BWBS CDF CWH ICH IDF PP	S1B (2015)	Red	G5 (2016)	DD (1996)				(/pub/eswp/eoMap.do?id=15407)	(/pub/eswp/reports.do?elcode=ABNNM08090)
Tephroseris palustris (/pub/eswp/reports.do?elcode=PDAST8H0U0)	marsh fleabane	BWBSdk BWBSmw	S3 (2019)	Blue	G5 (2016)					(/pub/eswp/eoMap.do?id=14078)	(/pub/eswp/reports.do?elcode=PDAST8H0U0)
Tringa incana (/pub/eswp/reports.do?elcode=ABNNF03010)	Wandering Tattler	BWBS CDF CWH IDF SBS SWB	S3B (2015)	Blue	G4G5 (2016)						(/pub/eswp/reports.do?elcode=ABNNF03010)
Tyto alba (/pub/eswp/reports.do?elcode=ABNSA01010)	Barn Owl	BG BWBS CDF CWH ICH IDF PP	S2? (2015)	Red	G5 (2016)	T (2010)	1-T (2018)				(/pub/eswp/reports.do?elcode=ABNSA01010)
Ursus arctos (/pub/eswp/reports.do?elcode=AMAJB01020)	Grizzly Bear	BAFA BWBS CMA CWH ESSF ICH IDF IMA MH MS SBPS SBS SWB	S3? (2015)	Blue	G4 (2016)	SC (2012)	1-SC (2018)	Y			(/pub/eswp/reports.do?elcode=AMAJB01020)
Utricularia ochroleuca (/pub/eswp/reports.do?elcode=PDLNT020E0)	ochroleucous bladderwort	BWBSdk CDFmm ESSFmv ICHmw	S2S3 (2019)	Blue	G4G5 (2016)					(/pub/eswp/eoMap.do?id=14086)	(/pub/eswp/reports.do?elcode=PDLNT020E0)
Valvata tricarinata (/pub/eswp/reports.do?elcode=IMGASE5080)	Threeridge Valvata	BAFA BWBS ESSF ICH IDF IMA MS SBS	S1S2 (2015)	Red	G5 (2015)						(/pub/eswp/reports.do?elcode=IMGASE5080)
Vertigo arthuri (/pub/eswp/reports.do?elcode=IMGAS20500)	Callused Vertigo	BWBS IDF	S3S4 (2015)	Blue	G5 (2010)						(/pub/eswp/reports.do?elcode=IMGAS20500)

Showing 1 to 85 of 85 entries

First Previous 1 Next Last

Search Criteria

Animals OR Plants
AND BC Conservation Status:Red (Extirpated, Endangered, or Threatened) OR Blue (Special Concern)

Notes

1. Citation: B.C. Conservation Data Centre. 2021. BC Species and Ecosystems Explorer. B.C. Minist. of Environ. Victoria, B.C. Available: https://a100.gov.bc.ca/pub/eswp/ (https://a100.gov.bc.ca/pub/eswp/)

OR SARA Schedule 1 Status:True
AND 'Ecosections':Halfway Plateau
AND Habitat Types: Anthropogenic,Forest,Riparian,Stream/River,Wetland
Sort Order:Scientific Name Ascending

(accessed Feb 5, 2021).

2. The data contained in the Results Export in BCSEE are provided under the Open Government License - BC (http://www.data.gov.bc.ca/local/dbc/docs/license/OGL-vbc2.0.pdf).

3. We welcome your comments at cdcdata@gov.bc.ca.

APPENDIX C

CARIBOU PROTECTION PLAN

Caribou Protection Plan
Inga Lake Intersection Improvements
Alaska Highway, BC



PRESENTED TO

Public Services and Procurement Canada

MARCH 24, 2021
ISSUED FOR USE
FILE: 704-TRN.VHWY03092-01

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TABLE OF CONTENTS

LIST OF TABLES IN TEXT

LIST OF FIGURES IN TEXT

APPENDIX SECTIONS

FIGURES

Figure 1 Project Location Overview

APPENDICES

Appendix 1 Tetra Tech's Limitations on the Use of this Document
Appendix 2 Map of Caribou Distribution in British Columbia by Ecotype

ACRONYMS & ABBREVIATIONS

Acronyms/Abbreviations	Definition
BMP	Best Management Practices
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPP	Caribou Protection Plan
ECCC	Environment and Climate Change Canada
EMP	Environmental Management Plan
FLNRORD	BC Ministry of Forests, Lands and Natural Resource Operations and Rural Development
FRPA	*Forest, Range and Practices Act*
GWM	General Wildlife Measures
km	kilometre
m	metre
MOE	BC Ministry of Environment and Climate Change Strategy
PSPC	Public Services and Procurement Canada
SARA	*Species at Risk Act*
SAR	*Species at Risk*
UWR	Ungulate Winter Range
WHA	Wildlife Habitat Area

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Public Services and Procurement Canada (PSPC) and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than PSPC or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech Canada Inc.'s Services Agreement. Tetra Tech's Limitations on the Use of this Document are provided in Appendix 1 of this report.

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained by Public Services and Procurement Canada (PSPC) to prepare this Caribou Protection Plan (CPP) for the Inga Lake Intersection Improvement Project, located between Wonowon and Fort St. John at KM 145+800 of the Alaska Highway (herein referred to as the "Project").

Woodland caribou (*Rangifer tarandus*) are federally designated as Species at Risk (SAR) under the *Species at Risk Act* (SARA), and as such, their populations and critical habitats are legally protected. Although the Project does not fall within the range of the Woodland Caribou, there may be potential for trace occurrences of Caribou to be present in the Project area (Figure 1). Caribou likely occur infrequently along the highway, especially in winter when lower elevation habitats are used more for foraging (COSEWIC 2014).

The CPP objectives are to provide strategies and best management practices to:

1. Avoid, where practical, and reduce potential Project-related effects on caribou and caribou habitat;
2. Support provincial caribou conservation objectives; and
3. Provide a practical construction planning and mitigation checklist.

This CPP includes the project overview, a description of proposed work, a summary of caribou management in British Columbia, mitigation measures to protect caribou and caribou habitat, and a map of the Project location in relation to known caribou habitat. Mitigation considers reducing sources of human-related caribou mortality, reducing excessive predation on both calves and adults, limiting habitat loss, and reducing potential increases to alternate prey species abundance and distribution.

2.0 CARIBOU AND CARIBOU HABITAT PROTECTION

British Columbia is home to 54 herds of Woodland Caribou, which have been separated into four ecotypes, or populations, based on range and habitat use (Gov. of British Columbia 2018). The four ecotypes are as follows:

1. Southern mountain population (*Rangifer tarandus* pop. 1);
2. Boreal population (*Rangifer tarandus* pop. 14);
3. Northern mountain population (*Rangifer tarandus* pop. 15); and
4. Central mountain population (*Rangifer tarandus* pop. 18).

A map showing the distribution of each woodland caribou ecotype is presented in Appendix 2 (FLNRORD 2018a).

2.1 Conservation Status

Woodland Caribou (*Rangifer tarandus*) are federally designated under the SARA as either as 'Threatened' (boreal, southern mountain, and central mountain populations) or 'Special Concern' (northern mountain population) and as such, their populations and critical habitat are legally protected from harm. In 2012, the federal government released the *Recovery Strategy for the Woodland Caribou (Rangifer tarandus), Boreal Mountain Population in Canada* and the *Management Plan for the Northern Mountain Population of Woodland Caribou (Rangifer tarandus caribou)*

in Canada. These documents aim to recover, maintain, and or increase the size and distribution of self-sustaining local populations (ECCC 2012a; ECCC 2012b).

Provincially in British Columbia, the southern mountain, central mountain, and boreal caribou ecotypes are red-listed, and the northern mountain ecotype is blue-listed. The British Columbia Government is currently preparing a Caribou Recovery Program to meet the requirements outlined by the federal government (under the authority of the SARA) in the Federal Recovery Strategy for Woodland Caribou (FLNRORD 2018b).

Table 1: The Conservation Status of the Four Caribou Ecotypes in British Columbia

Ecotype	Population	BC List	COSEWIC	SARA
Southern mountain	Pop. 1	Red	Endangered	Threatened
Boreal	Pop. 14	Red	Threatened	Threatened
Northern mountain	Pop. 15	Blue	Special Concern	Special Concern
Central mountain	Pop. 18	Red	Endangered	Threatened

By definition, woodland caribou are likely to become endangered if factors leading to their decline are not reversed. Natural and human-related habitat loss and alteration (e.g., fragmentation, degradation) leading to an increase in predation is the primary factor contributing to caribou population declines (ECCC 2012a, GOA 2016).

2.2 Habitat Use and Distribution

The Project is not located within the mapped range of Woodland Caribou, and iMapBC indicates that only 'trace occurrences' of caribou may occur in the area. The Project site is located 81 km away from the Pink Mountain Herd (Northern Mountain ecotype), 45 km from the Graham Herd (Southern Mountain – Northern Group ecotype) and 54 km from the Chinchaga Herd (Boreal ecotype). Although the probability of encountering caribou in this area are low, caribou may occur infrequently along the highway.

Northern mountain caribou spend the winter months in low-elevation pine-lichen stands or high-elevation alpine habitats, where they rely primarily on terrestrial lichens for forage. During calving season, female northern mountain caribou will migrate long distances to sub-alpine ridges, where they give birth to their calves at high elevation to avoid the threat of predation (FLNRORD 2014).

Boreal caribou are non-migratory and can be found at low-elevations in muskegs, peatlands and black spruce forests. Female boreal caribou calve in undisturbed swamps and wetlands and disturbance to these calving habitats can be highly detrimental to population numbers due to the site fidelity shown by reproducing females (FLNRORD 2014).

Southern Mountain Caribou tend to remain at high elevations and do not migrate seasonally during the winter to valley bottoms. This ecotype will utilize subalpine forests during the winter where they can forage on arboreal lichens (FLNRORD 2014).

Caribou are most sensitive to disturbance during late winter (pre-calving season), due to the poor body condition of pregnant females, and during the calving season in the spring. FLNRORD has identified the period between January 15 and July 15 as a critical timing window for caribou. The fall rut, typically from September 15 to January 14, has been identified as a cautionary timing window.

2.3 Caribou Habitat Management in British Columbia

2.3.1 Critical Habitat Areas

Under SARA, critical habitat is defined as habitat that is "necessary for the survival or recovery of a listed wildlife species" and has been identified as such in the recovery strategy for that species (SARA 2002). Environment and Climate Change Canada (ECCC) has determined that on federal lands managed outside of the jurisdiction of Parks Canada Agency "existing federal laws and regulations do not currently provide for mandatory, enforceable prohibitions against the destruction of boreal caribou critical habitat" (ECCC 2018). The Project is not located within critical caribou habitat (Figure 1).

2.3.2 Ungulate Winter Range

Ungulate Winter Ranges (UWR) are established under the *Forest and Range Practices Act* (FRPA) with the objective of meeting the winter habitat requirements of an ungulate species (BC MOE 2018a). Work that is to occur within a UWR must follow the General Wildlife Measures (GWM) outlined in the UWR order (FLNRORD 2011a). The Project is not located within UWR.

2.3.3 Wildlife Habitat Areas

As Species at Risk, Woodland Caribou are considered "Identified Wildlife" under the FRPA. Wildlife Habitat Areas (WHAs) are designated areas that the British Columbia Government considers critical habitat (i.e., necessary to fulfill the habitat requirements) of Identified Wildlife. To protect critical habitat within the WHAs, certain activities such as forestry and industrial developments are limited and/or prohibited within these areas (BC MOE 2018b). No WHAs for Woodland Caribou are located within the Project area.

3.0 PROJECT DESCRIPTION

Since 1964, PSPC has been the federal custodian for the Alaska Highway and is responsible for the maintenance of the current highway. PSPC's current operational jurisdiction of the Alaska Highway extends from KM 133 (north of Fort St. John) to the British Columbia-Yukon border at KM 968.

Tetra Tech conducted an in service safety review of the Alaska Highway in 2010 and 2017 which identified safety issues at the existing intersection of the Alaska Highway and Inga Lake Road. The safety issues include limited stopping sight distance due to the sharp crest curve just west of the Inga Lake Intersection, lack of left turn, right turn and acceleration lanes on the highway for turning traffic, geometry deficiencies due to the intersection offset and limited highway signage. Given the anticipated increase in vehicle activity from oil and gas industries in the area, safety improvements will be completed at this intersection.

3.1 Project Activities

Project activities will be restricted entirely within the Alaska Highway right-of-way. In general, habitat located immediately adjacent to roads is effectively lost to many species (Jalkotzy and Nasserden 1997), including caribou. Anticipated Project-related effects on caribou and caribou habitat are expected to be limited due to the Project's location immediately adjacent to the Alaska Highway. Nonetheless PSPC is committed to mitigating Project-related effects to caribou and caribou habitat.

The proposed construction works at the Inga Lake Intersection will include:

- Construct auxiliary lanes for both northbound and southbound traffic, including left turn, right turn and acceleration lanes;
- Realigning the cross road on the north side of the Alaska Highway to align with Inga Lake Road and placing additional surfacing gravel;
- Extending the existing 600 mm diameter Corrugated Steel Pipe (CSP) culvert under the Alaska Highway at KM 145+300 to facilitate the highway widening. Culvert extensions generally include:
  - Isolate and dewater work area (install fish stop nets, conduct salvage, install check dams and pumps, dewater) if there is flow at the time of construction;
  - Localized excavations around the culvert inlet and outlet to prepare the work site;
  - Adding a length of 600 mm diameter CSP culvert using a coupler to extend the culvert inlet and outlet;
  - Placing and compacting culvert bedding material and backfill material (e.g. crushed base gravel) around the new length of culvert;
  - Placing erosion protection (e.g., rip rap) around culvert inlet and outlet;
- Remove and dispose of the two existing 600 mm diameter CSP drainage culverts at the intersection underneath Inga Lake Road (both the north and south sides of the Alaska Highway), and install two new 600 mm diameter CSP culverts under Inga Lake Road;
- Regrading roadside ditches to accommodate the widened highway;
- Relocating and adding advanced information signs; and,
- Hydraulically seed all disturbed areas at the conclusion of construction.

3.2 Culvert Proximity to Caribou Range

The Project is not located within the mapped range of Woodland Caribou, and iMapBC indicates that only ‘trace occurrences’ of caribou may occur in the area (Figure A). The Project site is located 81 km away from the Pink Mountain Herd (Northern Mountain ecotype), 45 km from the Graham Herd (Southern Mountain – Northern Group ecotype) and 54 km from the Chinchaga Herd (Boreal ecotype).

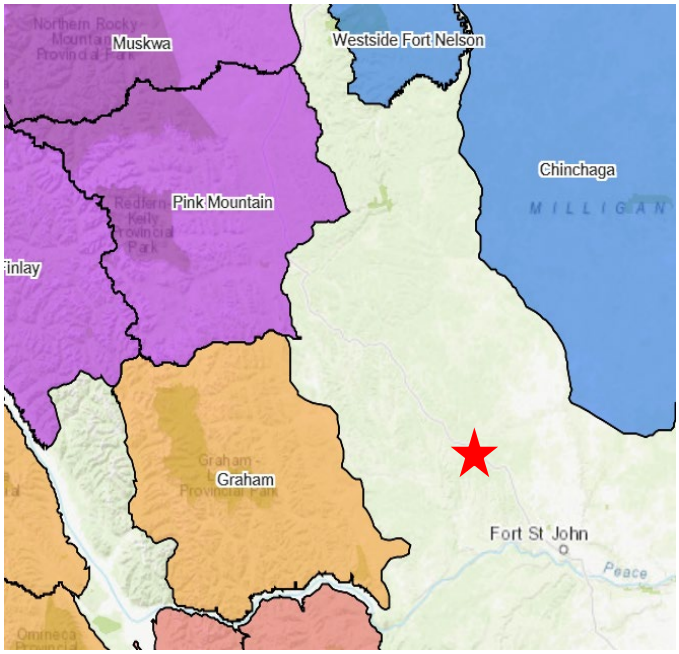

Figure A: Core ranges of woodland caribou populations in the vicinity of the Project area
(Northern Mountain Ecotype - purple; Boreal Ecotype – blue; Southern Mountain Ecotype – orange).
(Government of BC 2020)

3.3 Project Schedule

The Project is scheduled to occur between late-May and September, 2021 which is partially within the critical risk period for Woodland Caribou (see CPP #1.3 in Section 4.0). Special care should be taken for construction activities conducted during these times.

4.0 CARIBOU-RELATED MITIGATION COMMITMENTS

Caribou may be directly and indirectly affected by the proposed Project and its activities. There is the potential that some individuals from the surrounding caribou populations may be present near the Alaska Highway during the timing of proposed Project activities (February and March 2021). During this time, caribou may be directly or indirectly affected or disturbed to the point of avoiding the area as a result of Project activities such as sustained or repeated noise or light disturbances. Behavioral responses to Project activities may vary depending on the frequency, timing, and severity of the disturbing activity, as well as the receptor (e.g., bull vs. pregnant female). Caribou, especially pregnant cows and young calves are particularly sensitive to disturbances that might occur during late winter to early summer.

The Project might also indirectly affect caribou by changing habitat quality (e.g., through changes to local hydrology and increasing habitat fragmentation), quantity (through direct loss of habitat from disturbance), availability/ accessibility to habitat, and potentially altering predator-prey dynamics. The localized nature of the activities associated with this Project, and their restriction to the existing highway right-of-way, however, make these potential effects unlikely to occur.

Effects to caribou may include the following:

- Permanent habitat loss and/or alteration as a result of the Project footprint;
- Direct mortality from collisions with Project-related traffic (including equipment);
- Indirect mortality from increased predation risk if the following occur along linear corridors:
  - Caribou visibility to predators is enhanced;
  - Predator mobility is enhanced; or
  - Forage for other ungulate prey species is enhanced in revegetated areas.
- Sensory disturbance and restricted movement from equipment operation (i.e., noise and light disturbance) and human presence during all project activities.

4.1 Caribou Protection Plan

To mitigate potential caribou habitat, mortality, disturbance, and movement effects, various strategies in the form of best management practices (BMPs) should be implemented throughout the duration of the Project. Mitigations considered for this CPP follow those outlined the following documents:

- A Compendium of Wildlife Guidelines for Industrial Development Projects in the North Area, British Columbia (FLNRO 2014);
- Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population in Canada (EC 2014);
- Interim Operating Practices for Oil and Gas Activities in Identified Boreal Caribou Habitat in British Columbia (FLNRORD 2011b); and
- A Caribou Protection Plan that Tetra Tech prepared for a Project along Highway 40 in Alberta, following the caribou management guidelines and BMPs developed by the Alberta Government (Tetra Tech 2017).

Caribou-specific mitigation commitments that should be followed and implemented throughout the duration of the Project are summarized in Table 2.

Table 2: Best Management Practices for Working in Woodland Caribou Habitat

CPP #	Mitigation Measures
1.0 General Measures	
1.1	▪ Adhere to approved Environmental Management Plan (EMP) for the Project. This includes requiring all contractors working within the caribou range to be responsible for retaining an Environmental Monitor and to provide adequate education and training to their employees of the mitigation commitments to address caribou and caribou habitat conservation (i.e., training and orientation programs, kickoff, and tailgate meetings).
1.2	▪ Follow the BMPs for working in Woodland Caribou habitat that are outlined in the Compendium of Wildlife Guidelines for Industrial Development Projects in the North Area, British Columbia (FLNRORD 2014).
1.3	▪ Be aware of the risk periods for Woodland Caribou and try to work outside of the critical-use periods. The late winter and calving period, occurring from mid-January to mid-July, is identified as critical for both northern and mountain caribou. The winter/rut period is identified as a cautionary timing window.

CPP #	Mitigation Measures
	▪ The risk periods for Woodland Caribou in northern BC are as follows: – Low risk: July 16 – September 14 – Caution: September 15 – January 14 – Critical: January 15 – July 15
1.4	▪ Ensure caribou and caribou habitat mitigations are implemented throughout the Project by retaining an Environmental Monitor to be on-call during construction activities and to train the Contractor in caribou identification and mitigation.
2.0 Measures to Protect Caribou	
2.1	▪ Monitor for caribou presence during construction activities and report all caribou observed and worker/wildlife conflicts and incidents to the EM and PSPC.
2.2	▪ If caribou are observed within the Project area, a stop-work order must be issued until the individual has left the area.
2.3	▪ Limit collision related mortality by obeying speed restrictions and signage.
2.4	▪ Equipment and truck traffic to yield the right-of-way to wildlife.
2.5	▪ Sequence to avoid/reduce repeat operations or multiple entries in caribou range.
2.6	▪ Prohibit workers feeding, harassing, and approaching wildlife.
2.7	▪ Prohibit temporary work camps inside caribou range to minimize predator attraction.
2.8	▪ Prohibit firearms or hunting and fishing by workers.
2.9	▪ Avoid idling equipment and trucks.
2.10	▪ Ensure all exhaust systems have mufflers and all equipment operates as per specifications.
3.0 Measures to Protect Caribou Habitat	
3.1	▪ Limit all Project-related footprints and activities to existing disturbances within the current Alaska High-way right-of-way.
3.2	▪ Avoid constructing new linear features (i.e., roads) to facilitate access to the construction sites. Use existing access whenever possible. If needed, use helicopter access to avoid the creation of new access corridors.
3.3	▪ If working in winter, avoid plowing or packing snow in caribou habitat.
3.4	▪ Reduce the risk of wildfire by properly maintaining equipment and vehicles and regularly cleaning flammable material from the exhaust system. Similarly, have approved firefighting equipment (i.e., fire extinguishers and shovels) on hand.
3.5	▪ Brief on-site personnel on proper cigarette (and match) field handling procedures.
3.6	▪ Clean all construction equipment prior to on-site arrival to minimize the risk of weed or disease introduction.
3.7	▪ Maintain proper waste handling and removal practices to minimize predator attraction and contaminating caribou habitat.
3.8	▪ Avoid use of road salts or chemical dust control chemicals to prevent impacts to the water quality of surrounding watercourses.
3.9	▪ Avoid or minimize vegetation clearing and wherever possible. Minimize the amount of physical disturbance to soil and vegetation.
3.10	▪ Fell trees in a manner to avoid adjacent timber damage. No trees will be felled into watercourses or waterbodies.
3.11	▪ Maintain the integrity of the root layer (i.e., avoid grubbing), to the extent possible.
3.12	▪ Support the rapid natural revegetation of temporary disturbances immediately after Project completion.

5.0 CLOSURE

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

Respectfully Submitted,
Tetra Tech Canada Inc.

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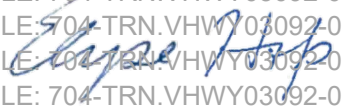

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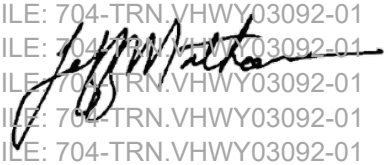

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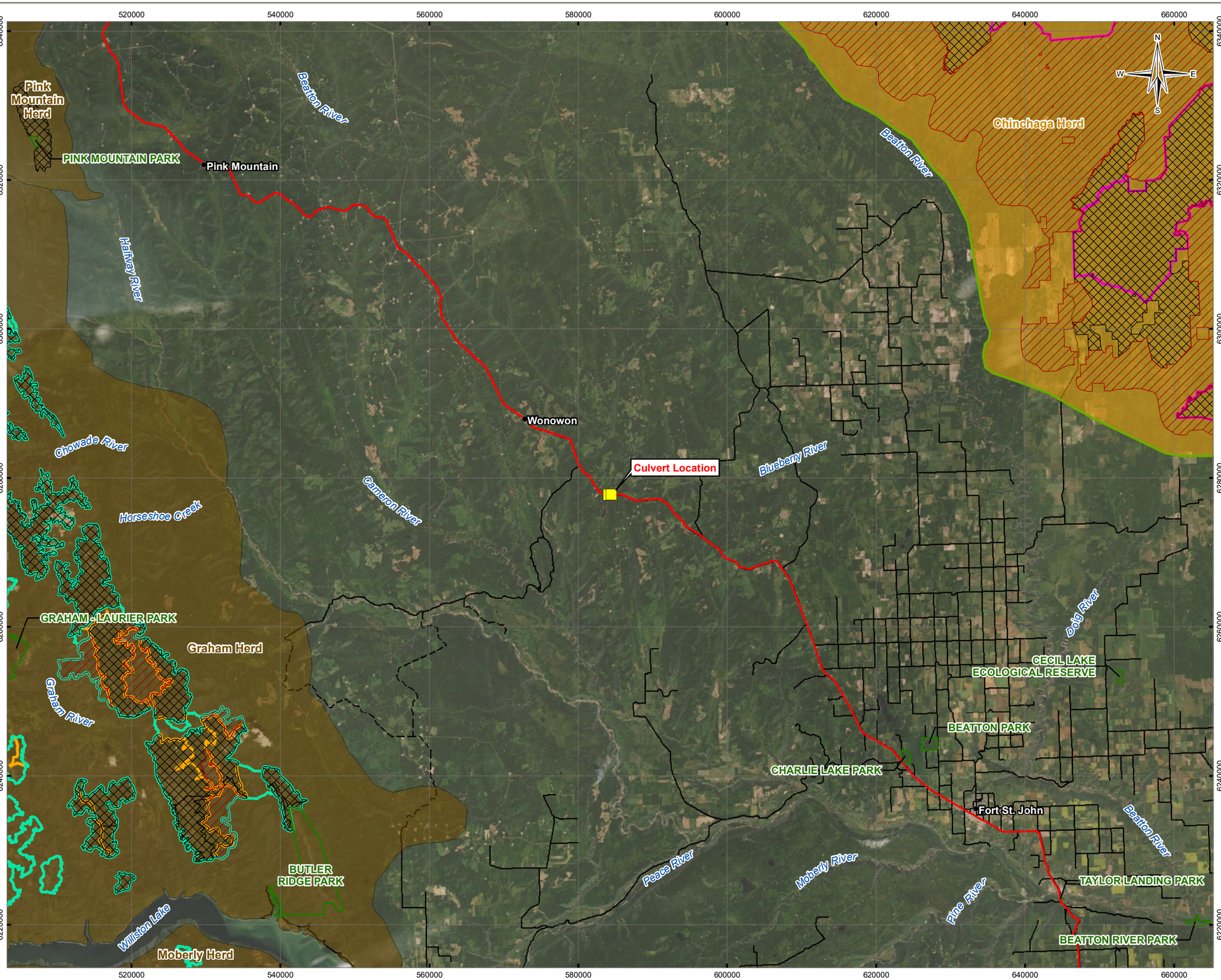
FIGURES



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LEGEND

- Culvert Location
- Populated Place
- Alaska Highway
- Other Road
- Resource/Recreational Road
- Park or Protected Area

Ungulate Winter Range

- No Harvest Zone
- Conditional Harvest Zone

Critical Habitat for Species at Risk

- Boreal Caribou
- Mountain Caribou

Wildlife Habitat Area (WHA) for Caribou Species at Risk

- Boreal Caribou WHA Core
- Northern Mountain Caribou WHA Core
- Northern Mountain Caribou WHA Buffer

Caribou Distribution

- Boreal Caribou Herd
- Northern Mountain Caribou Herd

NOTES
Base data source:
Caribou data from from DataBC
CanVec 1:250,000
Imagery provided by ESRI; Maxar (2012-2018)

STATUS
ISSUED FOR USE

INGA LAKE INTERSECTION IMPROVEMENTS ALASKA HIGHWAY, BC

Project Location Overview

PROJECTION UTM Zone 10			**DATUM** NAD83		**CLIENT** Public Services and Procurement Canada
Scale: 1:500,000 — 10 5 0 10 — Kilometres					TETRA TECH
FILE NO. VHWY03092-01_CPP_Figure01_Overview.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** EH	**REV** 0	**Figure 1**
DATE March 24, 2021	**PROJECT NO.** TRN.VHWY03092-01				

APPENDIX 1

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

NATURAL SCIENCES

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

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Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

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

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL ISSUES

The ability to rely upon and generalize from environmental baseline data is dependent on data collection activities occurring within biologically relevant survey windows.

It is incumbent upon the Client and any Authorized Party, to be knowledgeable of the level of risk that has been incorporated into the project design or scope, in consideration of the level of the environmental baseline information that was reasonably acquired to facilitate completion of the scope.

1.8 NOTIFICATION OF AUTHORITIES

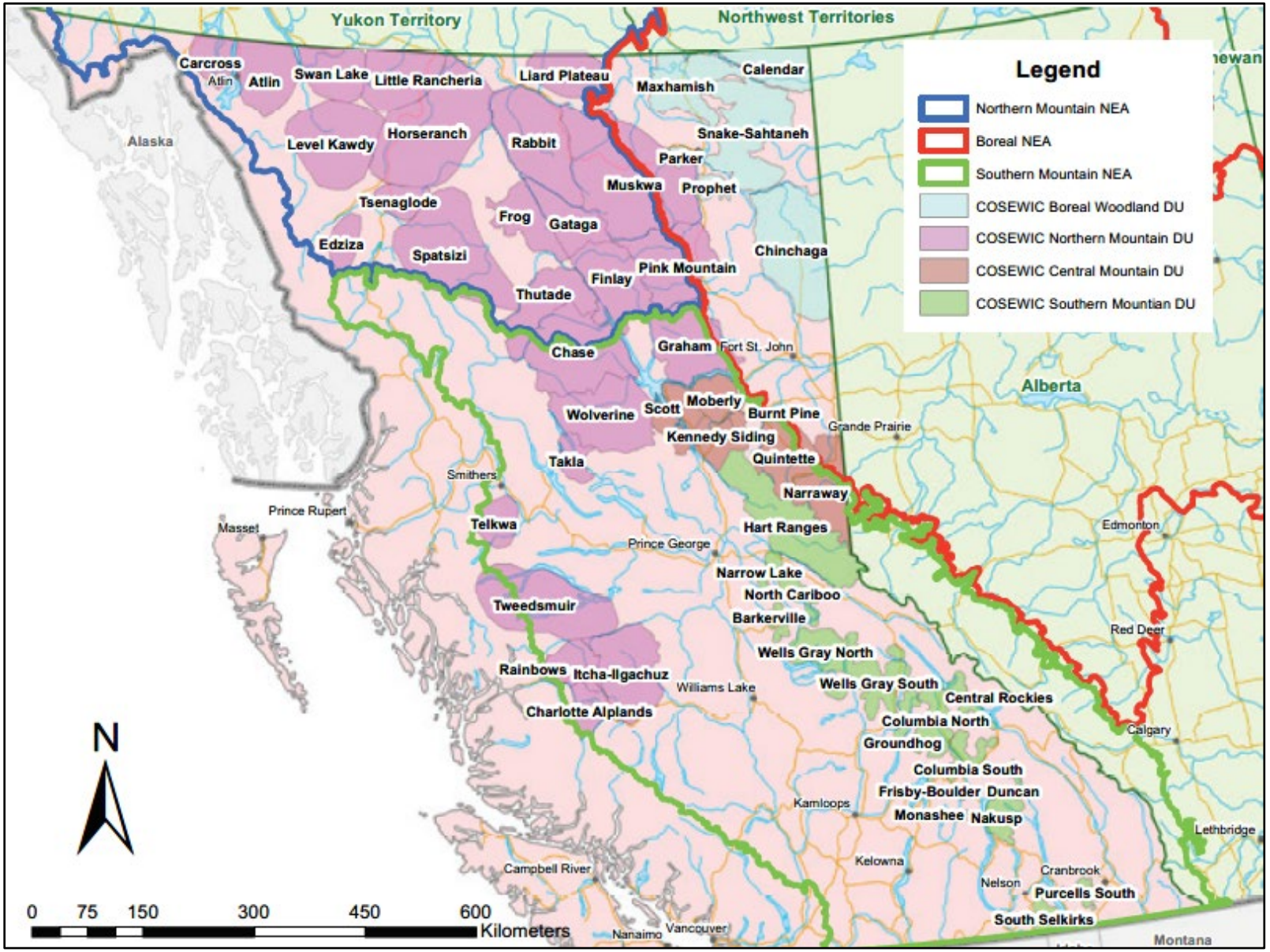
TETRA TECH professionals are bound by their ethical commitments to act within the bounds of all pertinent regulations. In certain instances, observations by TETRA TECH of regulatory contravention may require that regulatory agencies and other persons be informed. The client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

APPENDIX 2

MAP OF CARIBOU DISTRIBUTION IN BRITISH COLUMBIA BY ECOTYPE

Source:

BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development [FLNRORD]. 2018. Provincial Caribou Recovery Program – 2017/2018 Annual Report. Province of British Columbia. Available at: https://www.for.gov.bc.ca/ftp/HTH/external/!publish/Caribou%20Recovery%20Program/Reports/17_18_Caribou%20Annual%20Report.pdf



Distribution of Caribou in British Columbia

APPENDIX D

ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Plan
Inga Lake Intersection Improvements
Alaska Highway, BC



PRESENTED TO

Public Services and Procurement Canada

MARCH 24, 2021
ISSUED FOR USE
FILE: 704-TRN.VHWY03092-01

Tetra Tech Canada Inc.
Suite 1000 – 10th Floor, 885 Dunsmuir Street
Vancouver, BC V6C 1N5 CANADA
Tel 604.685.0275 Fax 604.684.6241

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TABLE OF CONTENTS

LIST OF TABLES IN TEXT

LIST OF FIGURES IN TEXT

APPENDIX SECTIONS

APPENDICES

ACRONYMS & ABBREVIATIONS

Acronyms/Abbreviations	Definition
BCAWQG	BC Aquatic Water Quality Guidelines
BC ENV	Ministry of Environment and Climate Change Strategy
BMP	Best Management Practices
CFP	Chance Find Protocol
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Fisheries and Oceans Canada
EC	Environmental Coordinator
ECCC	Environment and Climate Change Canada
EIR	Environmental Incident Report
EM	Environmental Monitor
EMA	*Environmental Management Act*
EMBC	Emergency Management BC
EMP	Environmental Management Plan
EPP	Environmental Protection Plan
EOA	Environmental Overview Assessment
ESC	Erosion and Sediment Control
FLNRORD	BC Ministry of Forests, Lands and Natural Resource Operations and Rural Development
HADD	Harmful Alternation, Disturbance or Destruction of Fish Habitat
km	kilometre
m	metre
MBCA	*Migratory Birds Convention Act*
MSDS	Material Safety Data Sheet
PSPC	Public Services and Procurement Canada
QEP	Qualified Environmental Professional
SAR	Species at Risk
SARA	*Species at Risk Act*
TDG	Transport of Dangerous Goods
WHMIS	Workplace Hazardous Materials Information System
WSA	*Water Sustainability Act*

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Public Services and Procurement Canada and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Public Services and Procurement Canada or for any Project other than the proposed work at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix 1 or Contractual Terms and Conditions executed by both parties.

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) has been retained by Public Services and Procurement Canada (PSPC) to prepare an Environmental Management Plan (EMP) for the Inga Lake Intersection Improvement Project, located between Wonowon and Fort St. John at KM 145+800 of the Alaska Highway (herein referred to as the "Project").

The EMP is the primary document that guides overall environmental management practices that are to be implemented by the Contractor during all phases of the Project. Developed from federal, provincial, and industry standards and regulations, EMPs provide guidance, general mitigation measures and best management practices (BMPs) to protect the receiving environment. They are based on the known environmental conditions along the Alaska Highway and the nature of the Project; and make recommendations to mitigate Project-related effects to the receiving environment during construction.

It will be the responsibility of the successful Contractor to develop activity-specific mitigation measures in an Environmental Protection Plan (EPP). That is, the EMP identifies the features that must be protected during the Project and provides recommendations for how to protect them in terms of "industry standards," while the Contractor's EPP will detail exactly how the recommendations will be implemented based on the specific designs and construction methodology/equipment used. For example, an EMP may recommend that refuelling occurs more than 30 m from a watercourse and the EPP will identify exactly where the refuelling will occur for the project, while meeting that recommendation.

It is recommended that the successful contractor read this EMP in full, to ensure that they will meet the environmental requirements of this Project and that the EMP requirements are met in the EPP.

2.0 PROJECT INFORMATION

The following subsections include relevant Project information as it relates to this EMP.

2.1 Project Location

Since 1964, PSPC has been the federal custodian for the Alaska Highway and is responsible for the maintenance of the current highway. PSPC's current operational jurisdiction of the Alaska Highway extends from KM 133 (north of Fort St. John) to the British Columbia-Yukon border at KM 968.

Tetra Tech conducted an in-service safety review of the Alaska Highway in 2010 and 2017 which identified safety issues at the existing intersection of the Alaska Highway and Inga Lake Road. The safety issues include limited stopping sight distance due to the sharp crest curve just west of the Inga Lake Intersection, lack of left turn, right turn and acceleration lanes on the highway for turning traffic, geometry deficiencies due to the intersection offset and limited highway signage. Given the anticipated increase in vehicle activity from oil and gas industries in the area, safety improvements will be completed at this intersection.

2.2 Project Activities

The proposed construction works at the Inga Lake Intersection will include:

- Construct auxiliary lanes for both northbound and southbound traffic, including left turn, right turn and acceleration lanes;

- Realigning the cross road on the north side of the Alaska Highway to align with Inga Lake Road and placing additional surfacing gravel;
- Extending the existing 600 mm diameter Corrugated Steel Pipe (CSP) culvert under the Alaska Highway at KM 145+300 to facilitate the highway widening (Table 2-1). Culvert extensions generally include:
  - Isolate and dewater work area (install fish stop nets, conduct salvage, install check dams and pumps, dewater) if there is flow at the time of construction;
  - Localized excavations around the culvert inlet and outlet to prepare the work site;
  - Adding a length of 600 mm diameter CSP culvert using a coupler to extend the culvert inlet and outlet;
  - Placing and compacting culvert bedding material and backfill material (e.g. crushed base gravel) around the new length of culvert;
  - Placing erosion protection (e.g., rip rap) around culvert inlet and outlet;
- Remove and dispose of the two existing 600 mm diameter CSP drainage culverts at the intersection underneath Inga Lake Road (both the north and south sides of the Alaska Highway), and install two new 600 mm diameter CSP culverts under Inga Lake Road (Table 2-1);
- Regrading roadside ditches to accommodate the widened highway;
- Relocating and adding advanced information signs; and,
- Hydraulically seed all disturbed areas at the conclusion of construction.

Table 2-1: Culverts to be Replaced or Extended as Part of the Inga Lake Intersection Project

Culvert ID	UTM Coordinates (at Inlet)		Existing Culvert Diameter (mm)	Proposed Culvert Diameter (mm)	Construction Footprint (m^2)
	Easting	Northing			
Km 145+300 Culvert Extension	**584452**	**6277749**	600	600	50
Km 145 + 800 Culvert replacement under Inga Lake Road north of the Highway	**584063**	**6277760**	600	600	100
Km 145 +800 Culvert replacement under Inga Lake Road south of the Highway	**584056**	**6277730**	600	600	100

2.3 Project Schedule

Construction of the Inga Lake Intersection Improvements project is anticipated to commence in late-May 2021 and be completed by September 2021.

3.0 ENVIRONMENTAL SENSITIVITIES

This Project entails work within environmentally sensitive areas, including watercourses, and riparian areas. In particular, the culvert replacements will require instream works and may pose a risk to fish or fish habitat. In addition, there is the potential that Species at Risk (SAR) will be encountered during construction. As such, it is important that the Contractor is aware of these sensitivities and is diligent in regard to environmental planning and mitigation to avoid deleterious effects to the environment. The most likely environmental concerns and potential impacts related to the Project are summarized in Table 3-1.

A full review of the existing environment at the Project location can be found in Tetra Tech's (2021) Environmental Overview Assessment (EOA) report: *Environmental Overview Assessment, Inga Lake Intersection Improvements, Alaska Highway, BC.*

Table 3-1: Project-specific Environmental Considerations

Environmental Concern	Project-Specific Considerations	Mitigation Summary*
Wildlife and Wildlife Habitat		
Woodland Caribou	The populations and critical habitats of Woodland Caribou are protected under federal legislation. Boreal Caribou (*Rangifer tarandus* pop. 14) and Southern Mountain Caribou (*Rangifer tarandus* pop. 1) are provincially red-listed and designated as 'Threatened" under the Federal SARA. The Project is not located within the mapped range of Woodland Caribou, and only 'trace occurrences' of caribou may occur in the area. The Project site is located 81 km away from the Pink Mountain Herd (Northern Mountain ecotype), 45 km from the Graham Herd (Southern Mountain – Northern Group ecotype) and 54 km from the Chinchaga Herd (Boreal ecotype). Although the probability of encountering caribou in this area are low, caribou may occur infrequently along the highway, especially in winter when lower elevation habitats are used more for foraging Best Management Practices specific to working within caribou habitat and a figure showing mapped caribou range within the Project area are provided in the Caribou Protection Plan (Appendix C of the Environmental Overview Assessment [EOA]).	▪ Implement the mitigation measures outlined in the Caribou Protection Plan. ▪ Retain an Environmental Monitor (EM) to monitor for Caribou within the Project area during construction. ▪ If Caribou are observed within the Project area, cease all Project activities until they have left the area. ▪ **See Section 5.4 and the Caribou Protection Plan for further mitigation strategies.**
Wildlife and Species at Risk (SAR)	The British Columbia (BC) Conservation Data Centre (CDC) iMap search revealed two documented occurrences of wildlife SAR within 5 km of the Project. An additional 29 SAR were identified as having potential to be present at or near one of more of the Project locations based on their habitat requirements and range (See Section 5.6 of the EOA for more details). If the Project is conducted in non-frozen conditions, instream works may negatively impact amphibians that utilize these habitats for part or all of their life cycle, such as Western Toad. As such, prior to instream works, the impacted area should be isolated and amphibians should be salvaged and relocated by the contractor's EM. A General Wildlife Permit will have to be obtained from FrontCounter under the *Wildlife Act.*	▪ Inspect culverts for wildlife (especially for bats and birds) prior to their removal. ▪ Wildlife salvages should be conducted prior to conducting instream works in non-frozen conditions. ▪ Should a rare or sensitive species be identified at the site at any time during the Project, the EM should be notified immediately for further direction. ▪ **See Section 5.4 for further mitigation strategies.**

Environmental Concern	Project-Specific Considerations	Mitigation Summary*
Birds and their Nests	Section 34 of the BC *Wildlife Act* protects nests when occupied by a bird or an egg and the nests of Eagles, Peregrine Falcons, Gyrfalcons, Osprey, Herons, and Burrowing Owls year-round, regardless of whether they are active. The *Migratory Bird Convention Act* (MBCA) prohibits the disturbance or destruction of migratory birds and their nests or eggs. If vegetation removal is required during construction, it is important that these clearing activities do not disturb birds or their nests.	▪ Minimize vegetation clearing ▪ When possible, clear vegetation outside of the breeding bird nesting period for the region which extends from April 19 until August 29. If this is not possible, a QEP-led nest survey will be required prior to clearing. ▪ **See Section 5.4 for further mitigation strategies.**
Fish and Fish Habitat		
Instream Works	This Project will require instream works including two culvert replacements and one culvert extension. The two culvert replacements at 145 + 800 are located underneath Inga Lake Road on either side of the Alaska Highway. These culverts are not located on a watercourse, but instead serve to maintain connectivity of the highway drainage ditches underneath Inga Lake Road and convey road runoff during periods of precipitation. These ditches are manmade and do not meet the definition of a 'stream' under the *Water Sustainability Act* (WSA). However, when replacing these drainage culverts, Best Management Practices outlined below in Section 5.0 (i.e., erosion and sediment control (ESC) measures; isolation of the work area; wildlife salvage etc.) must still be applied during construction. The culvert undergoing extension at KM 145 + 300 is located underneath the Alaska Highway at the headwaters of a small first order watercourse. This watercourse does not have documented occurrences of fish, and it is unlikely that fish would be present at the culvert location, but is a tributary to the Blueberry River which is a known fish-bearing watercourse. Since this unnamed tributary provides food and nutrients to downstream fish-bearing watercourses, it is considered to be fish habitat. Based on the Project activities, Tetra Tech anticipates that a Notification under the WSA will have to be submitted by PSPC for this culvert extension. If there is water within the watercourse at the time of construction, the work area must be isolated from flowing water and fish and wildlife must be salvaged from the work area before instream works can begin. If there is no water in the watercourse at the time of instream works, no isolation will be required. To avoid deleterious effects to the affected watercourses within the Project area, the mitigation measures outlined in this EMP must be followed.	▪ Any work within 30 m of water requires the close oversight of the Environmental Monitor (EM). ▪ Two drainage culvert replacements: – Proper ESC measures should be implemented during construction; – If there is flow through the culvert at the time of construction, the work area must be isolated from flow under the oversight of the EM; – If necessary, amphibians must be salvaged from the work zone by the EM. ▪ KM 145. 300 Culvert Extension – Proper ESC measures should be implemented during construction; – Any work conducted below the high-water mark of streams containing water must occur in isolation of flow. – If there is water within the watercourse during the instream works (i.e., it is not frozen or dry), a qualified EM must conduct fish and amphibian salvage operations as necessary. ▪ **See Section 5.3, 5.6 and 5.7 for further mitigation strategies.**

Environmental Concern	Project-Specific Considerations	Mitigation Summary*
Disturbance to Fish	The two drainage culverts underneath Inga Lake Road are not located on fish-bearing watercourses and likely do not have connectivity to downstream fish-bearing watercourses. As such, disturbance to fish is not anticipated and fish salvage is not required for these replacements. The watercourse at KM 145.300 does not have documented occurrences of fish but is a tributary to known fish-bearing watercourses downstream and must be treated as if there is the potential for fish to be present. As such, this watercourse is considered "Fish Habitat" under the *Fisheries Act*. If there is flowing water within this watercourses at the time of construction (i.e., it is not dry or frozen to the stream bed), the work area must be isolated, and a concurrent fish salvage must be conducted to avoid potential harm to fish prior to dewatering. To perform fish salvages, a scientific fish collection permit will be required from FLNRORD.	▪ Ideally, instream work should be timed to occur within the window of least risk for fish in the Project Area (July 15 – August 15) or when the watercourse is frozen, dry, or at its lowest levels. ▪ Tetra Tech understands that the Project activities are proposed to potentially occur outside of the Reduced Risk Timing Window. It is unlikely that the Project would negatively impact fish or fish habitat if works are conducted outside the reduced risk windows as long as the mitigation detailed within this EMP is applied. ▪ In the unlikely event that fish are present at KM 145.300, fish salvages must be conducted after isolation of the work site and before dewatering (if water is present or not frozen to the stream bed). An EM must be on-site to conduct the fish salvage operations. ▪ **See Section 5.3, 5.6 and 5.7 for further mitigation strategies.**
Erosion and Sediment Control	This Project has the potential to create sediment-laden runoff which if introduced into a stream, could harm fish or fish habitat. The contractor must complete the Project works in such a manner that the risk of releasing sediment-laden water into nearby streams is minimized.	▪ ESC measures should be implemented during all three culvert replacements ▪ Avoid construction during periods of poor weather and phase work appropriately. ▪ The Contractor should prepare an Erosion and Sediment Control (ESC) Plan and ensure proper installation of ESC structures (i.e., silt fences). ▪ In the event flow is occurring at the time of the culvert replacements, frequent field water quality monitoring is required at pre-determined stations or as required by weather conditions. ▪ **See Section 5. 6 and 5.7 for further mitigation strategies.**

Environmental Concern	Project-Specific Considerations	Mitigation Summary*
Accidental spills	There is potential for accidental spills or releases of deleterious substances to occur as a result of the Project. Equipment with engines and/or hydraulics have a potential for leaks and spills (May include: diesel/gas, hydraulic fluids, lubricating oil, glycols). If released to water, these substances can cause harm to fish and fish habitat.	▪ Any work conducted below the high-water mark of streams containing water must occur in isolation of flow and under the supervision of an EM. ▪ Machinery and equipment should be clean and in good operating condition. ▪ The Contractor is responsible for ensuring that a project-specific Spill Response Plan is prepared and that it is on-site at all times. ▪ **See Section 5.9 for further mitigation strategies.**
Vegetation and Invasive Species Management		
Vegetation	The EOA identified four vegetation SAR that have potential to occur near or at the Project location; however, due to the disturbed nature of the highway ROW, it is unlikely that these species will be found at the Project area. Minimal vegetation removal is expected as a result of this project since the construction will be contained within the existing highway ROW. The majority of vegetation along the sides of the highway are grasses, herbs and small shrubs. After construction is complete, any disturbed and exposed soils will be seeded with a native grass mixture.	▪ Limit vegetation removal. ▪ Contain construction activities within the existing highway right-of-way (ROW) ▪ Machinery and vehicles should be restricted to defined travel routes to avoid excess trampling/compaction of vegetation. ▪ Disturbed vegetated areas should be restored through seeding or planting as soon as possible. ▪ Implement standard ESC measures and dust-suppression measures during construction to minimize impacts to surrounding vegetation. ▪ **See Section 5.5 for further mitigation strategies.**
Non-native or invasive plant spread.	Many invasive species grow well in disturbed areas, and can be spread through vehicle traffic, making them commonly found along roadways. Therefore, there is potential for invasive species to be found along the highway at the Project location. Measures must be taken to prevent spread of invasive species between sites.	▪ Vehicles and equipment must be inspected prior to arriving on site to ensure they are free of soil and plant material. ▪ In areas of known invasive plant infestations, matting should be laid down prior to mobilization of machinery to the work area. **See Section 5.5 for further mitigation strategies.**

Environmental Concern	Project-Specific Considerations	Mitigation Summary*
Soil Management		
Erosion and Sediment Control	This Project has the potential to disturb soils which could result in erosion and/or sediment mobilization. The contractor must complete the culvert maintenance work in such a manner that minimizes disturbances during construction and remediates exposed soils post-construction.	▪ Avoid construction during periods of poor weather (i.e., heavy rainfall) and phase work appropriately. ▪ The Contractor should prepare an ESC Plan and ensure proper installation of ESC structures (i.e., silt fences). ▪ **See Section 5. 6 for further mitigation strategies.**
Accidental spills	There is potential for accidental spills or releases of deleterious substances to occur as a result of the Project. Equipment with engines and/or hydraulics have a potential for leaks and spills (May include: diesel/gas, hydraulic fluids, lubricating oil, glycols, uncured concrete). Release of these substances could result in soil contamination.	▪ Machinery and equipment should be clean and in good operating condition. ▪ The Contractor is responsible for ensuring that a project-specific Spill Response Plan is prepared and that it is on-site at all times. ▪ **See Section 5.9 for further mitigation strategies.**
Archaeological Resources		
Damage to historical or archaeological artifacts.	There is potential to encounter archaeological sites and artifacts during project activities (i.e. excavations and culvert removals) which are protected under the *Heritage Conservation Act*.	▪ Follow the Chance Find Protocol (CFP) included in Appendix 2. ▪ **See Section 5.12 for further mitigation strategies.**
*This summary of mitigation measures is not comprehensive. For a full list of mitigation measures, please refer to Environmental Mitigation Measures in Section 5.0.		

4.0 ENVIRONMENTAL REGULATORY REQUIREMENTS

The Project will be subject to the terms and conditions of any regulatory permit or approval obtained. At the time this EMP was prepared, all permits/approvals for the Project were in the process of being secured from the applicable regulatory agencies. The Project is subject to various environmental legislation, as described in the subsections below.

4.1 Provincial

4.1.1 BC Wildlife Act

The British Columbia (BC) *Wildlife Act* protects most vertebrate animals from direct harm or harassment except as allowed by regulation (e.g., hunting or trapping). Section 34 of the BC *Wildlife Act* specifically protects the nests of Eagles, Peregrine Falcons, Gyrfalcons, Osprey, Herons, and Burrowing owls year-round. This means that a tree or other structure containing such a nest must not be felled, even outside of the breeding season. Section 34 of the *Wildlife Act* also protects the nests of all species of birds when birds or eggs are present in the nest.

The Project will require construction works to be conducted within watercourses, which may provide habitat for fish and wildlife. To avoid undue harm to fish and wildlife under the *Wildlife Act,* fish and wildlife salvages must be completed to remove animals, from the construction area. As such, a General *Wildlife Act* Permit will have to be obtained through FrontCounter BC to allow for the capture and relocation of numerous potential wildlife species. In addition, a Fish Collection Permit must be obtained through FrontCounter BC for the capture and relocation of all potential fish species in watercourses affected by construction activities. Acquisition of this permit will be pursuant to the Angling and Scientific Collection Regulations of the *Wildlife Act.* For both of these permits, at minimum, 30 days should be allowed for permit processing.

4.1.2 BC Water Sustainability Act

Previously known as the *Water Act,* the BC *Water Sustainability Act* (WSA) was brought into force on February 29, 2016. The WSA is the main provincial statute regulating water resources in British Columbia. Under the WSA, it is an offence to divert or use water, or alter a stream, without formal approval from the Province. The WSA defines “stream” as a natural watercourse or source of water supply, whether usually containing water or not, and a lake, river, creek, spring, ravine, swamp or gulch. “Stream” is used to describe any watercourse that is considered to be fish habitat, including channelized streams, and ditches that provide fish habitat. Under the WSA, the *Water Sustainability Regulation* addresses the requirements to allocate both ground and surface water and identifies the requirements for using water or making changes to a stream.

Change Approvals, issued under Section 11 of the WSA, are written authorization required for complex works with substantial impacts. *Notifications* are typically used for low-risk works that do not include permanent water diversion, can be completed in a short period of time, and have minimal impacts. Submitted notifications are subject to a 45-day review period. If there is no response from the assigned habitat officer within this time period, the proponent may proceed with the project. Notifications must meet the requirements of the Water Sustainability Regulation and comply with any additional conditions set out by a habitat officer.

This Project will require the replacement of three culverts, only one of which (at KM 145+300) is on a watercourse that meets the definition of a ‘stream’ under the WSA. Installation, removal and maintenance of a culvert is considered a *Notification*. Armouring culvert inlet and outlet with rip rap has, in some cases, required a *Change*

Approval application. However, based on recent experience with the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) and past experience, only a *Notification* will likely be required.

4.1.3 BC Weed Control Act

The BC *Weed Control Act* identifies invasive plant species defined as "noxious weeds" at the regional and provincial level. All of these species are non-native plants that can be problematic for agriculture and/or natural habitats. Private property owners and government agencies are required to control these species that occur on their property or jurisdiction. Contractors must verify that any invasive species that are identified are controlled and not allowed to spread. Information related to the control and management of invasive species can be found on the Invasive Plant Council of BC's website (http://www.invasiveplantcouncilbc.ca/).

Under the *Weed Control Act,* Schedule A of the Weed Control Regulation designates 39 plant species as noxious weeds within all regions of the province (Table 4-1) and a further 28 are classified as noxious within the boundaries of specific regional districts. This Project is located in the Peace River Regional District (PRRD). There are 11 additional noxious weeds identified for the PRRD (Table 4-2).

Table 4-1: Noxious Weeds Regulated in all Regions of Province

Annual Sow Thistle (*Sonchus oleraceus)*	Bohemian Knotweed (*Fallopia bohemica)*	Bur Chervil (*Anthriscus caucalis*)	Canada Thistle (*Cirsium arvense*)
Common Crupina (*Crupina vulgaris)*	Common Reed (*Phragmites australis subsp. Australis*)	Common Toadflax (*Linaria vulgaris)*	Dalmatian Toadflax (*Linaria dalmatica*)
Dense Flowered Cordgrass (*Spartina densiflora)*	Diffuse Knapweed (*Centaurea diffusa*)	Dodder (*Cuscuta spp.*)	English Cordgrass (*Spartina angelica)*
Flowering Rush (*Butomus umbellatus*)	Garlic Mustard (*Alliaria petiolata*)	Giant Hogweed (*Heracleum mantegazzianum*)	Giant Knotweed (*Fallopia sachalinensis*)
Giant Mannagrass/Reed Sweetgrass (*Glyceria maxima*)	Gorse (*Ulex europaeus*)	Himalayan Knotweed (*Polygonum polystachyum*)	Hound's-tongue (*Cynoglossum officinale*)
Japanese Knotweed (*Fallopia japonica*)	Jointed Goatgrass (*Aegilops cylindrica*)	Leafy Spurge (*Euphorbia esula*)	Milk Thistle (*Silybum marianum*)
North Africa Grass (*Ventenata dubia*)	Perennial Sow-thistle (*Sonchus arvensis*)	Purple Loosestrife (*Lythrum salicaria*)	Purple Nutsedge (*Cyperus rotundus*)
Rush Skeletonweed (*Chondrilla juncea*)	Saltmeadow Cordgrass (*Spartina patens*)	Scentless Chamomile (*Matricaria maritima*)	Smooth Cordgrass (*Spartina alterniflora)*
Spotted Knapweed (*Centaurea stoebe*)	Tansy Ragwort (*Senecio jacobaea*)	Velvetleaf (*Abutilon theophrasti*)	Wild Oats (*Avena fatua*)
Yellow Flag Iris (*Iris pseudacorus*)	Yellow Nutsedge (*Cyperus esculentus)*	Yellow Starthistle (*Centaurea solstitialis*)	

Table 4-2: Noxious Weeds Regulated in the Peace River Regional District

Burdock (*Arctium* spp.)	Cleavers (*Galium aparine*)	Green Foxtail (*Setaria viridis*)	Kochia (*Kochia scoparia*)
Night-flowering catchfly (*Silene noctiflora*)	Oxeye Daisy (*Chrysanthemum leucanthemum*)	Quackgrass (*Agropyron repens*)	Russian Thistle (*Salsola kali*)
Tartary Buckwheat (*Fagopyrum tataricum*)	White Cockle (*Lychnis alba*)	Wild Mustard (*Sinapsis arvensis*)	

4.1.4 BC Environmental Management Act

The BC *Environmental Management Act* (EMA) was enacted in July 2004 and combined the *Waste Management Act* and EMA. The EMA governs solid waste and manages the introduction of waste into the environment by providing an authorization framework and environmental management tools to protect human health and environmental quality.

Under the *Waste Discharge Regulations* of the EMA, certain industries, trades, businesses and operations require authorization to discharge waste into the environment. However, even if an industry, trade, business or operation does not require an authorization, waste discharge must not cause pollution (EMA, Section 6 (4)).

The *Spill Reporting Regulations* of the EMA establishes a protocol for reporting the unauthorized release of substances into the environment as well as a schedule detailing reportable amounts for certain substances.

The *Hazardous Waste Regulations* of the EMA ensures that the generators, carriers and receivers of hazardous waste handle, store, transport, treat and dispose of hazardous waste in a safe manner. Hazardous wastes must be disposed of properly to ensure human health and environmental protection.

4.1.5 BC Heritage Conservation Act

The BC *Heritage Conservation Act* confers automatic protection upon archaeological and historic heritage sites that meet the definitions within section 13(2) of the Act. These include:

- All sites pre-dating AD1846;
- All sites of unknown age or origin which may pre-date AD1846;
- All burial places and rock art sites of historical or archaeological value; and
- All vessels or aircraft wrecked for two or more years.

All areas within the boundaries of a heritage site are protected under the *Act*, including areas without archaeological deposits or other kinds of heritage remains (e.g., land without archaeological deposits between several culturally modified trees at one site, or between several storage pits at one site).

There is always a limited possibility for unknown archaeological sites to exist. Archaeological sites (both recorded and unrecorded) are protected under the *Heritage Conservation Act* and must not be altered or damaged without a site alteration permit from the Archaeology Branch. If an archaeological site is encountered during Project works, activities must be halted, a Chance Find Protocol enacted, and the BC Archaeology Branch contacted at **1.250.953.3334** for direction.

4.2 Federal

4.2.1 Fisheries Act

The *Fisheries Act* is the main federal legislation providing protection for all fish, fish habitat, and water quality. The Act is administered federally by Fisheries and Oceans Canada (DFO) and Environment Canada. The new Federal Fisheries Act came into force on August 28, 2019. It includes amendments to restore lost protections and incorporate modern safeguards. This Act provides protection against the ‘death of fish, other than by fishing’ and the ‘harmful alteration, disruption or destruction of fish habitat’ (HADD), unless authorized by DFO.

Fish habitat is defined as spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes. This definition indicates that a watercourse (which includes but is not limited to streams, ditches, ponds and wetlands), which provides water, food or nutrients to a fish-bearing stream, is considered fish habitat even if it does not contain fish and/or if it only has temporary or seasonal flows. The definition also indicates that not only the watercourse itself but also the vegetated stream side or riparian areas which provide nutrients and shade to the stream are considered fish habitat.

DFO encourages all project proponents to avoid and mitigate the impacts of projects to fish. A self-assessment process to be carried out by a Qualified Environmental Professional includes the documentation of measures and best practices to avoid or minimize impacts to fish and fish habitat. If impacts can be avoided or mitigated the project does not require further review from DFO. If impacts cannot be mitigated, a Request for Review must be submitted to the Fisheries Protection Program office and DFO will work with the proponent to find additional ways to reduce those impacts. If the project cannot be designed to avoid a HADD, a *Fisheries Act* authorization is required.

Based on Tetra Tech's understanding of the Project and based on our assessment of the proposed activities, it is unlikely that the Project will cause the death of fish or a HADD if, at a minimum, standard best management practices and mitigation as presented in Section 5.0 are implemented. The watercourse undergoing instream works will be treated as if it is fish-bearing and will undergo isolation of the work area and concurrent fish salvages if there is water/fish present within the channel. As such, a Request for Review to DFO will not be required for this Project.

4.2.2 Species at Risk Act

The *Species at Risk Act* (SARA) prohibits the killing, harming, harassing, capturing or taking of species at risk, or destruction of their critical habitats. Species are designated 'at risk' by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), an independent body of experts that assesses species according to a broad range of scientific data. The federal Cabinet then decides whether those species should receive legal protection under the *Act*.

The SARA protects listed mammals, reptiles, amphibians, molluscs, lepidopterans, and plants on federally managed areas, migratory songbirds (as listed under the *Migratory Birds Convention Act* [MBCA]) and fish in all areas in Canada. Species that are legally protected under SARA are those listed as Endangered or Threatened and are listed in Schedule 1 of the *Act*. Those species listed as Special Concern and all species listed in Schedule 3, regardless of their status, are not legally protected by SARA.

A permit is required when works either affect a migratory bird or aquatic species or its residence, that is listed as 'Endangered' or 'Threatened' or 'Extirpated' on Schedule 1 of SARA; or affect any Schedule 1 'Endangered' or 'Threatened' or 'Extirpated' species or its residence on federal land.

Several occurrences of species at risk (SAR) have been identified within 5 km of the Project location or have the potential to be found in the area (see Section 5.6 and Appendix B). Should a SARA-listed species or any other rare species be identified on site prior to or during works, the Canadian Wildlife Service and the BC MOE should be notified immediately for direction on appropriate action as measures employed would vary greatly with the species encountered, its sensitivity to the Project and its proximity to the works.

4.2.3 Migratory Birds Convention Act

The *Migratory Birds Convention Act* (MBCA) restricts the disturbance or destruction of migratory birds and their nests, eggs, and shelters, except in accordance with a permit. The *Act* (1994) prohibits the taking or killing of migratory bird nests and eggs, and the deposition of harmful substances in areas frequented by migratory birds. Vegetation removal that will affect trees used by all birds and other wildlife should be avoided while they are breeding, nesting, roosting or rearing young.

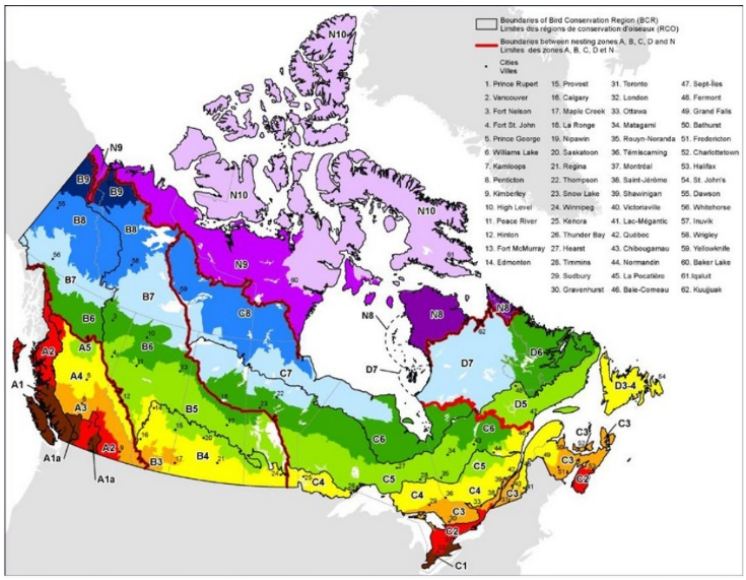


Figure 1-1. Map of Nesting Zones in Canada (ECCC 2018)

Vegetation removal/clearing should be conducted outside of the bird nesting season, which is considered April 19 to August 29 for the Project area (Zone B5) (Figure 1-1; Figure 1-2). If clearing is to occur within the bird nesting season (April 19 – August 29), a nest survey by the on-site EM will be required prior to clearing.

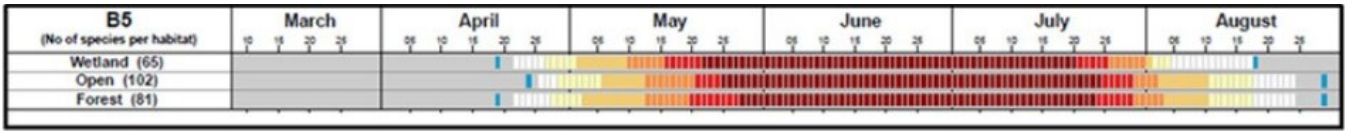


Figure 1-1. Nesting Calendars for Nesting Zone B5 (ECCC 2018)

5.0 ENVIRONMENTAL MITIGATION MEASURES

The BMPs and mitigation measures included in the EMP provide general instructions for managing Project activities to minimize potential environmental effects by limiting their duration, frequency, and intensity. Throughout all phases of the Project, the Contractors are expected to comply with all federal, provincial, and municipal regulations, conditions, and agreements with respect to environmental protection. Additional guidance for project-related environmental management practices and activities will be determined by the terms and conditions of relevant permits, licenses and approvals as they are acquired. It should be recognized that the employment of site personnel experienced in implementation of BMPs, particularly at the Site Superintendent level, is integral to the successful implementation of the Project EPP.

This EMP, in its current form, has been prepared in advance of a Contractor being identified. Therefore, following selection of the successful Contractor, the Contractor should prepare an EPP to meet all legislative requirements detailed above. Additionally, the EPP should specifically, in relation to the work methods proposed and equipment used during construction, incorporate DFO's measures to avoid causing the death of fish or a HADD, and detail the measures that will be taken to protect Woodland Caribou and other Species at Risk.

General requirements of applicable environmental legislation, regulations, standards, guidelines, and BMPs will be adhered to throughout the duration of the Project. Supplementary environmental standards, guidelines, and BMPs are also contained in the following documents:

- DFO. 1992. Land Development Guidelines for the Protection of Aquatic Habitat.
- DFO. 2018. Measures to Avoid Causing Harm to Fish and Fish Habitat.
- FLNRORD. 2014. A Compendium of Wildlife Guidelines for Industrial Development Projects in the North Area, British Columbia – Interim Guidance.
- FLNRORD. 2019. Terms and Conditions for Water Sustainability Act Changes in and about a Stream as specified by the Ministry of Forests, Lands & Natural Resource Operations (FLNRORD) Habitat Officers, Northeast Region.
- BC MOE. 2014. Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia.
- BC MOE. 2005. A User's Guide to Working In and Around Water: Understanding the Regulation under British Columbia's *Water Act*. Water Management Branch.
- BC MOE. 2004. Standards and Best Management Practices for Instream Works.
- BC MOE. 2016. Best Management Practices for Bats in British Columbia.
- Northwest Response Ltd. 2018. BC Fuel Guidelines (8th Edition).
- Tetra Tech. 2020b. Caribou Protection Plan (Appendix C of the EOA).

It is the responsibility of the Contractor to acquire and familiarize themselves with the requirements of the guideline documents and of the legislation discussed in Section 4.0.

The following sections outline general best management practices and mitigation measures that should be implemented to minimize the potential environmental impacts discussed in Section 3.0.

5.1 General

5.1.01	The successful contractor must review this EMP and the applicable guidelines prior to starting construction
5.1.02	The Contractor is responsible for ensuring that a Qualified Environmental Professional (QEP) prepares an EPP following the provisions outlined in this EMP.
5.1.03	All relevant federal and provincial acts, regulations, guidelines, and BMPs will apply to all work and activities associated with the Project.
5.1.04	The Contractor must be aware of and implement all permitting and approval requirements/conditions. No work should commence until all permits have been obtained for the projects (e.g., WSA Notification acknowledgement or following review period of 45 days).
5.1.05	Contractors must hold a pre-construction meeting that includes the EM and all persons undertaking work on site to facilitate a common understanding of the contents of this EMP, the EPP and all BMPs for the Project.
5.1.06	Daily tailboard meetings should make reference to environmental issues that may arise and inform new employees about environmental compliance on site.
5.1.07	Plan and schedule project activities for dry weather whenever possible to minimize potential ESC issues.
5.1.08	Ensure Contractor employees know how to properly install any protection measure and understand BMPs used on the Project. Improperly installed measures/BMPs do not perform their intended functions and will not achieve desired environmental protection outcomes.
5.1.09	Adopt an “adaptive management” management strategy for the Project. Adaptive management evaluates and adjusts management decisions (i.e., mitigation measures) to reflect the actual interactions. Contractors should be prepared to change existing measures and BMPs should they fail or in the event additional measures are warranted. The EM should be notified of any changes to assess that they are adequate and installed properly.
5.1.10	All construction will be maintained within the existing Alaska Highway right-of-way. Upon completion of activities, all equipment, supplies, materials and waste will be removed from the work site.
5.1.11	All environmental incidents must be reported to the EM, the Contractor Site Superintendent, and PSPC’s Project Manager and Environmental Coordinator as soon as possible.
5.1.12	The work area should be established and clearly marked. Orange construction (snow) fence installed on rebar stakes or highly visible flagging can be used to delineate the active work area. Ensure all Contractor employees are familiar with the marking system and are given clear instructions/training before work begins. Augment and replace field markers as needed.

5.2 Site Access, Mobilization, and Laydown Areas

5.2.01	Mobilization should be planned to minimize the number of trips to and from the site.
5.2.02	A laydown area for storage of equipment and materials must be established. It should be located on a flat, stable area at least 30 m from the top of bank any nearby watercourses.
5.2.03	Ensure all equipment is brought to site clean (power washed) and in good working order free of sediment, oil and grease staining/leaks, weeds/seeds. Equipment servicing with environmentally sensitive hydraulic fluids is recommended.

5.3 Protection of Fish, Fish Habitat and Aquatic Resources

All the aquatic mitigation measures detailed in the section below need to be considered when working in and around the KM 145.300 culvert. Only when indicated in the text below, do these mitigation measures apply to all three sites, including the two drainage culverts under Inga Lake Road.

5.3.01	The Contractor is responsible for implementing the terms and conditions outlined in the forthcoming WSA Notification documentation (should FLNRORD provide such documentation). No work can occur before securing the permits, or after the permits expire.
5.3.02	Ideally, instream work should be timed to occur within the window of least risk for fish in the Project Area (July 15 to August 15) or when the watercourse is frozen or at its lowest water levels. The current plan is to undertake the work between late-May and September 2021 when the watercourses may be experiencing low flows. If work is planned to occur outside the window of least risk for fish, the Contractor must work with a QEP to develop proper mitigation to avoid harm to fish. If the streams are dry (i.e. no flow) at the time of the construction, instream work can occur outside of the least risk window for fish without consultation of a QEP.
5.3.03	The EM must be on-site when work is occurring within 30 m of water, during site isolation and implementation of ESC measures, during instream works, and during fish/wildlife salvage operations.
5.3.04	Any work conducted below the high-water mark must occur in isolation of flow (including at the two drainage locations). Flow isolation can be achieved by constructing temporary dams upstream and downstream of the work area, and then pumping or temporarily redirecting the stream around this isolation area. Flow must be maintained upstream and downstream of the work area at all times. Flow isolation can only occur **after** fish salvage activities are complete. Additional guidance for stream diversion can be found in DFO's (2020a) "Interim Code of Practice: Temporary Cofferdams and Diversion Channels".
5.3.05	If a "dam and pump" system is used to isolate instream work areas, all water intakes must be screened according to DFO's (2019) "Interim Code of Practice: End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater" to prevent entrainment or impingement of fish and other aquatic organisms. (Available at: https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html)
5.3.06	Follow the applicable BMPs outlined in DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat (Available at: https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html) and; BC MOE's (2004) Standards and Best Management Practices for Instream Works (Available at: https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/iswstdsbpsmarch2004.pdf).
5.3.07	All fish must be salvaged (i.e., captured and relocated to appropriate upstream habitat) by QEPs **prior** to dewatering. A Scientific Fish Collection Permit must be obtained from FLNRORD prior to conducting salvage activities.
5.3.08	Equipment and vehicles should avoid crossing watercourses (including the two drainage locations). If crossing is unavoidable, every effort should be made to limit machinery crossing to a one-time event (i.e., over and back). If crossings are necessary, a temporary crossing structure will have to be built to facilitate these movements. All temporary stream crossings must be conducted according to DFO's (2020b) "Interim Code of Practice: Temporary Stream Crossings".
5.3.09	Equipment should operate above the high-water mark of any watercourse. While working instream, equipment should work from a dry location, such as above the bank or from an area that has been isolated. Minimize the area of disturbance below the high-water mark as much as possible. Limit equipment movement and ensure it is situated on stable surfaces (e.g., coarse substrates or rig mats).
5.3.10	Refuelling and maintenance of equipment as well as the storage of any excess fuels, oils, lubricants or other petrochemical products should occur at least 30 m from water (including the two drainages).

5.3.11	Equipment and machinery used in or near a watercourse (including the two drainage locations) should be inspected daily to ensure they are in good operating condition and free of leaks, excess oil, grease and invasive or noxious weeds and seeds (power wash off site if necessary).
5.3.12	If feasible, machinery used in proximity to any watercourse should use environmentally friendly fluids (i.e., non-toxic, biodegradable or vegetable oil based).
5.3.13	No water should be extracted from any watercourse for Project use (including the two drainages locations).
5.3.14	The Project involves activities, such as soil disturbance and excavation, that have potential to contribute sediments to nearby watercourses (including the two drainage locations), which may either contain fish or drain into streams that contain fish. Transportation of sediments or sediment-laden runoff downstream should be prevented by implementing the appropriate ESC measures as discussed below (see Section 5.6) and detailed more fully within the Contractor's ESC Plan.
5.3.15	If flow is occurring at the time of the culvert works (including the two drainage locations), water quality will be frequently monitored by the Contractor's EM to ensure TSS/turbidity are maintained at an acceptable level (see Section 5.7 for additional details).
5.3.16	No deleterious materials or Project-related debris are allowed to enter any watercourse (including the two drainage locations). Debris generated from the Project must be contained, collected and disposed of properly off-site.
5.3.17	In the event of any fluid spills or leaks into water (including the two drainage locations), the Spill Response Plan (Appendix 3) must be enacted and notifications are to begin immediately.

5.4 Protection of Wildlife and Wildlife Habitat

5.4.01	The SARA protects rare and sensitive wildlife species. Should a rare or sensitive species be identified at the site at any time during the Project, the EM should be notified immediately for further direction. The BMPs to be employed to mitigate the potential effects would vary greatly depending on the identified species, its sensitivity to the activities, and its proximity of habitat to the Project footprint.
5.4.02	To avoid and minimize impacts to Woodland Caribou, it is recommended that caribou mitigation efforts follow the guidelines presented in FLNRORD's *Compendium of Wildlife Guidelines for Industrial Development Projects in the North Area, British Columbia* (2014). (Available at: http://a100.gov.bc.ca/pub/eirs/finishDownloadDocument.do?subdocumentId=9921)
5.4.03	For construction occurring within known Caribou ranges, the Contractor is responsible for implementing the provisions outlined in the Caribou Protection Plan (Appendix C of the EOA).
5.4.04	An EM should be on site to give a stop work order if caribou, or any other SARA-listed species are observed nearby during construction.
5.4.05	The MBCA (1994) prohibits the taking or killing of migratory bird nests and eggs, and the deposition of harmful substances in areas frequented by migratory birds. Likewise, the Wildlife Act also prohibits the possession, taking, injury, molestation or destruction of a bird or its eggs. No vegetation removal or disturbance is anticipated to occur within the breeding bird nesting period (generally April 19 to August 29 for the region). If vegetation clearing occurs in this period, pre-clearing bird nest surveys will be required to minimize the potential that active nests are destroyed. If an active nest of any bird species is found, a no-disturbance zone will be established, and the area will remain undisturbed until young have fledged.
5.4.06	Any active nests or roosts of species protected by the SARA or the MBCA detected on-site must not be disturbed and consultation with the EM will occur to determine appropriate mitigation. Under the *Wildlife Act*, heron and raptor nests are protected all year round, regardless of whether they are active or inactive, and must not be disturbed.
5.4.07	Wildlife species have been known to roost/den in culverts and structures. Prior to removal, all culverts and collapsed structures should be inspected (both inside and outside) for denning wildlife. If any denning, roosting or nesting wildlife is detected on-site, work should be stopped until a QEP can be consulted.

5.4.08	All food waste and other materials that may attract wildlife are to be removed from the site daily. Lunches, coolers, and food products, including waste food products should be securely stored to prevent access by animals.
5.4.09	Notify the EM immediately if dens, burrows, or nests, are detected within the Project area or if there are encounters with bears, coyotes, cougars, or any species at risk. The following should be reported to the EM: (i) aggressive encounters involving any species, (ii) nuisance wildlife, (iii) sightings of large carnivores, (iv) wildlife deaths or (v) observations of carcasses.
5.4.10	Feeding, harassment, or destruction of any wildlife is strictly prohibited. Wildlife encountered at or near the Project should be allowed to passively disperse without undue harassment.
5.4.11	If works occur in non-frozen conditions, all wildlife (e.g., amphibians) must be salvaged (i.e., captured and relocated to appropriate upstream habitat) from the work area by QEPs **prior** to dewatering. Wildlife salvage must be done at all three culvert locations. A General Wildlife Permit must be obtained from FLNRORD prior to conducting salvage activities.

5.5 Vegetation and Soil Management

5.5.01	Any vegetation to be removed should be surveyed by the EM, or other QEP, to identify any breeding, nesting, roosting or rearing birds and determine the appropriate BMPs.
5.5.02	Vegetation removal that will affect trees, low shrubs and aquatic plants used by all birds and other wildlife should be avoided while they are breeding, nesting, roosting, or rearing young. Adherence to the nesting windows for clearing activities is required (see Section 5.4).
5.5.03	To prevent the spread of invasive plant species, vehicles and equipment must be inspected prior to arriving on site to ensure they are free of soil and plant material (power washed if necessary).
5.5.04	In areas of invasive plant infestations identified by the EM, rig matting should be laid down prior to mobilization of machinery to the work area. The bottom of the rig mats should be fully inspected and cleaned of any vegetative matter or soils before being moved from each location.
5.5.05	Machinery and vehicles should be restricted to defined travel routes to avoid excess trampling/compaction of vegetation and soil. Construction should be contained within the existing Alaska Highway ROW.
5.5.06	To minimize the establishment and spread of invasive plants, a post-construction vegetation monitoring and control program should be developed as part of the EPP.
5.5.07	Vegetated areas disturbed by Project related works (including laydown sites, temporary work sites, and material stockpile sites) should be restored as quickly as possible. Disturbed areas should be restored by replacing any excavated topsoil, recontouring and seeding with an approved seed mix appropriate to the site and following approval by PSPC. A revegetation and site restoration plan should be included in the Contractor's EPP.
5.5.08	To prevent soil compaction around the root zone, avoid storing machinery within the drip-line of trees.
5.5.09	Minimize use of equipment on exposed soils and when possible, restrict vehicle traffic to existing roadways or disturbed areas to avoid unnecessary soil compaction.
5.5.10	A fire prevention plan should be developed as part of the EPP. The fire prevention plan should comply with applicable fire prevention policies.

5.6 Erosion and Sediment Control

The following Erosion and Sediment Control measures are applicable at all three culvert locations and should be implemented throughout the entirety of the intersection improvement works.

5.6.01	The Contractor is responsible for developing an Erosion and Sediment Control Plan as part of their EPP prior to starting construction.
5.6.02	ESC devices (such as, but not limited to, silt fencing, geotextiles, polyethylene sheeting, straw, mulch, approved grass seed, gravel for check dams, etc.) should be available for use on-site. The Site should be prepared to quickly install devices and Project members should be trained in the installation and use of the devices. The EM should confirm appropriate use and location of ESC measures prior to start of Project activities.
5.6.03	Sediments must not be tracked off site. Contractors should ensure that materials tracked onto public roadways adjacent to the Project area are swept at the end of each workday. Tracked materials should be removed by sweeping, shoveling, or vacuuming; materials should not be removed by hosing or sweeping sediments into drainage channels.
5.6.04	All instream works must occur in the dry, isolated from flowing water. Erodible materials should not be used in construction of the isolation structure.
5.6.05	Prior to starting work, appropriate ESC measures should be implemented to prevent sediment from entering into any surface water feature or watercourse within the Project area.
5.6.06	If construction works are anticipated to occur during frozen conditions, excavated soils should be placed above the top of bank in a location such that sediments will not runoff into a watercourse during the spring melt. Soils should not be placed on top of ice surface at any time.
5.6.07	Periods of heavy precipitation are unlikely during the proposed construction schedule but could occur. As much as possible, earthworks should be scheduled to be conducted and completed during dry weather. Excavation activities should be halted during heavy or prolonged rainfall events resulting in evident sediment mobilization such as sloughing of exposed soils or overland flow of sediment-laden water. Work may be stopped completely or works may require the implementation of additional ESC measures to permit work to continue. *A rainfall event is considered significant when 25 mm or greater falls within a 24-hour period, or when 10 mm or greater falls within a one-hour period.*
5.6.08	All ESC measures should be routinely inspected, especially during or after intense or prolonged rainfall events, to ensure proper function. A quick response to assess and correct damages of the controls is required, especially before subsequent precipitation events. The integrity of the structural components should be verified, and the accumulated sediment be measured. Generally, if sediment levels exceed half the volume or one-third the height of a sediment barrier, the sediments should be removed to ensure continued operating effectiveness. Any structural failures should be repaired, and any major defective sections replaced upon detection.
5.6.09	Soil stockpiling, if necessary, will occur within designated areas that are a reasonable distance (i.e., > 30 m) from high-water mark of any flowing watercourse. The designated location(s) should be approved by the EM. Stockpile volume and area should be minimized where possible and should not be placed on sloped terrain.
5.6.10	Stockpiles required to remain in place for an extended period will be protected by covering them with polyethylene sheeting and a sediment barrier, such as silt fencing or a lined, sandbag berm, should be installed within 1 m around the perimeter.
5.6.11	All ESC structures will be decommissioned once the Project area has been reclaimed to a level where surface erosion and sedimentation have been stabilized, and potential adverse effects to receiving aquatic systems during peak precipitation events are deemed unlikely by the EM. Non-degradable materials will be removed and disposed of off-site.
5.6.12	Vegetation outside of the work area should be protected. Surface disturbance should be kept to within the limits of work area and the amount of time surfaces are exposed should be minimized.
5.6.13	Any exposed soils created as a result of the Project must be protected from erosion by implementing the appropriate ESC measures (i.e., ESC blanket, straw etc.).

5.7 Water Quality

5.7.01	In the event flow is present at the time of the culvert works, water quality should be frequently monitored downstream of the work area during instream works to ensure turbidity is at an acceptable level. When turbidity exceeds the established acceptable levels outlined in BC MOE's (2018) Approved Water Quality Guidelines (BCAWQG) for Aquatic Life, the EM must direct activities, such as requiring additional sediment control measures be installed or halting work.
5.7.02	Establishing a background level of turbidity in the affected watercourses is necessary to ensure that guidelines are not exceeded. According to BC MOE's Technical Appendix Addendum Sampling Strategy for Turbidity, Suspended and Benthic Sediment baseline (or background) conditions can be established before project activities commence or by establishing appropriate upstream sites that can be referenced throughout the Project.
5.7.03	The BCAWQG for Turbidity state that turbidity should not increase from background levels by more than 8 NTU at any one time in a 24-hour period during low/clear flows (i.e., dry weather).
5.7.04	The BCAWQG state that turbidity should not increase from background levels by more than 5 NTU at any one time when background is 8 to 50 NTU during high/turbid flows (i.e., wet weather).
5.7.05	The BCAWQG state that turbidity should not increase from background levels by greater than 10% at any one time when background is over 50 NTU during high/turbid flows (i.e., wet weather).
5.7.06	Proper ESC measures should be installed prior to starting construction to protect adjacent watercourses from sediment runoff. If sediment-laden runoff is observed entering nearby watercourses, the EM should be notified and water quality measurements (i.e., turbidity) obtained.
5.7.07	Debris from the Project must not enter adjacent watercourses. Generated debris must be contained, collected and disposed of properly off site.
5.7.08	Any spill into or nearby a watercourse, of a substance that is toxic, polluting, or deleterious to aquatic life must immediately be reported to Emergency Management BC (EMBC) 24-hour phone line at 1-800-663-3456. For proper spill response procedures, refer to the Spill Response Plan (Appendix 3).

5.8 Waste Management (Including Hazardous Wastes and Potentially Contaminated Soils)

5.8.01	The Contractor is expected to adhere to all applicable legislation with respect to the handling, transportation, and/or disposal of all materials related to this Project (waste or otherwise). This legislation may include (but not be limited to) the BC Environmental Management Act, BC Hazardous Waste Regulations (HWR), Spill Reporting Regulations, Workers Compensation Board Regulations, TDG Regulations, BC Contaminated Site Regulation (CSR) in the event contaminated soil is generated or encountered, etc.
5.8.02	The Contractor is expected to abide by the general 'leave no trace' rule. All Project personnel are responsible for removing all litter, domestic garbage, recyclables and organic wastes that are brought to site for appropriate off-site disposal. General housekeeping should be monitored by the EM.
5.8.03	Should garbage containers be required on site, they should be made inaccessible to wildlife, including bear-proof lids.
5.8.04	Non-hazardous construction waste should be collected at designated areas on the site and removed to appropriate facilities on a regular basis.
5.8.05	Maintain a tidy work area to minimize loose waste from leaving the site. The site should be cleaned upon the completion of work daily.
5.8.06	Recycle materials whenever possible.
5.8.07	Waste materials must not be buried or burned.
5.8.08	Sanitary facilities must be utilized by all personnel on-site, located 30 m from any watercourse, stable and secured to avoid tipping, and emptied on a regular basis.

5.8.09	Hazardous wastes generated could include waste petroleum products (engine oils, lubricants) from machinery and equipment, spent batteries, solvents and cleaning agents, etc. The Contractor should provide labelled separate container(s) for potentially hazardous waste such as oily rags and hydrocarbon absorbent pads.
5.8.10	All hydrocarbon products and other hazardous wastes potentially present during project activities should be identified and the associated Workplace Hazardous Materials Information System (WHMIS) and Materials Safety Data Sheets (MSDS) made available to all Project members.
5.8.11	If hazardous or contaminated material (including suspect soils) is encountered, stop work immediately and report it to the Site Superintendent and EM who will determine appropriate BMPs. Hazardous materials should only be handled by appropriately trained personnel.
5.8.12	Any waste considered to be hazardous will be labelled and disposed of off-site according to the WHMIS criteria and the *BC Environmental Management Act* and TDG Regulations.
5.8.13	All work sites must have emergency spill kits (stocked with pads and sorbent booms) available on site. The kits should be suitable for the quantities and types of material in use and stored at the site. All mobile equipment must contain fully stocked, dedicated spill kits. Contractors must be trained in the proper use of the kits in case of a spill.
5.8.14	Soils suspected of contamination, should be sampled in accordance with accepted soil sampling procedures. The sample(s) should be submitted via Chain of Custody protocol to an accredited analytical laboratory to confirm it is not contaminated. If parameter concentrations exceed applicable standard(s), the contaminated soil should be remediated in accordance with the applicable standards and/ or guidelines under the supervision of an appropriately Qualified Environmental Professional or disposed of at a licensed facility in accordance with the CSR and/or HWR.

5.9 Fuel Storage and Spill Response

5.9.01	Handle, store and transfer fuel in accordance with the BC Fuel Guidelines (Available at: http://www.northwestresponse.ca/resources/2018%20BC%20Fuel%20Guidelines.pdf)
5.9.02	Equipment and machinery should be inspected on a daily basis to ensure that they are in good operating condition, free of leaks, and excess oil and grease.
5.9.03	If feasible, machinery used in proximity to watercourses should use environmentally friendly hydraulic fluids (i.e., biodegradable or vegetable oil based).
5.9.04	When vehicles and equipment are not in use and/or left on site overnight, place drip trays or absorbent pads should be placed beneath the vehicle/equipment to capture any drips or leaks.
5.9.05	Refuelling and maintenance of equipment as well as the storage of any excess fuels, oils, lubricants or other petrochemical products should occur at least 30 m from any watercourse and/or drainage system. Topographic features and slope should be considered; flat surfaces are recommended.
5.9.06	Hydrocarbon and coolant storage, if required on site, should be within a secondary impermeable containment facility capable of holding 110% of the storage tank contents. This may be achieved through the use of double-walled storage tanks. These containment basins should be inspected daily for leaks and wear points, kept clean and any measurable rainwater removed and disposed of appropriately. If practical, the containment area should be covered to prevent infilling with rainwater. Where leaks and/or wear points are found, they should be repaired promptly to restore full containment.
5.9.07	Tanks, hoses, and connections should be inspected before fuel transfers. All hose connections should be wrapped and secured with absorbent pads during fuel/oil transfers and remain wrapped, contained, and in an upright orientation during all other times. All hoses, valves, and equipment should be kept in a containment area whenever possible. Minimize hose length and the number of connections - use dripless connections if possible. Drain hoses when finished.

5.9.08	Contractors should ensure that small containers (i.e., jerry cans) will be stored within secondary containment in a secure location, protected from weather. These containers must be designed solely for the purpose of storing and pouring fuel and should not be more than 5 years old. Containers must not leak and must be sealed with a proper fitting cap or lid.
5.9.09	The Contract is responsible for ensuring that site-specific Spill Response Plan is prepared and on-site at all times (see Appendix 3 which presents an Example Spill Response Plan).
5.9.10	All spill containment kits should be readily accessible both on-site and on each piece of equipment in the event of a release of a deleterious substance to the environment. Spill kits should be capable of dealing with 110% of the largest potential spill.
5.9.11	All Project personnel should be trained in the use of spill kit materials and supplies and be aware of their location. Any spill to water of a substance that is toxic, polluting, or deleterious to aquatic life must immediately be reported to the EMBC 24-hour phone line at 1-800-663-3456 (see Spill Response Plan, Appendix 3). A spill to ground of reportable quantities (as detailed in Appendix 3) of a substance that is toxic, polluting, or deleterious to life must immediately be reported to the EMBC 24-hour phone line.
5.9.12	A pre-construction meeting should be held to identify all materials of a deleterious nature that could be spilled. The Contractor's EPP should provide a list of all materials that may be hazardous or of a deleterious nature and include the WHMIS paperwork.
5.9.13	Hazardous materials and wastes should be stored in covered containers and in secondary containment.
5.9.14	Minimize the potential for spills through proper use, handling, storage, and disposal of products. If a spill occurs, stop work immediately to respond and follow the protocol outlined in the Spill Response Plan (Appendix 3). Action should be taken to contain the spill and then, if necessary, reported.

5.10 Air Quality

5.10.01	All equipment, vehicles and stationary emission sources should be well-maintained and operated at optimum rated loads and be turned off when not in use to minimize exhaust emissions.
5.10.02	Vehicles or equipment producing excessive exhaust pollution should be repaired or replaced.
5.10.03	Dust-generating activities will be minimized as much as possible, especially during windy periods and dry weather, to minimize airborne dust emissions. Given the habitat sensitivity of the area, water is considered the only appropriate dust suppressant (e.g., a sprinkler system) and should be used as needed. Unless PSPC holds a permit that allows water extraction from certain locations, water must not be withdrawn from surrounding watercourses for this purpose. Only that amount of water necessary to suppress dust must be utilized so as to avoid causing overland flow of sediment-laden water.
5.10.04	When hauling materials with the potential to generate dust, loads should be tarped to avoid blow-off.
5.10.05	The burning of oils, rubber, tires and any other material is **not** permitted to take place at the site.
5.10.06	Stationary emission sources (e.g., portable diesel generators, compressors, etc.) should be used only as necessary and turned off when not in use.
5.10.07	Equipment and vehicles should be turned off when not in active use so to reduce idling.

5.11 Noise and Vibration

5.11.01	Noise exposure levels should comply with Part 7, Division 1 of the Occupational Health and Safety Regulation. WorkSafeBC has several publications regarding noise in the workplace and are available at: ▪ http://www.worksafebc.com/publications/health_and_safety/by_topic/assets/pdf/basic_noise_calculations.pdf ▪ http://www.worksafebc.com/publications/health_and_safety/by_topic/assets/pdf/occupational_noise_surveys.pdf
5.11.02	All equipment should be properly maintained to limit noise emissions and fitted with functioning exhaust and muffler systems. Machinery covers and equipment panels should be well fitted and remain in place to muffle noise. Bolts and fasteners should be tight to avoid rattling.
5.11.03	Engines should be turned off when not in use or reduced to idle, and equipment operators should avoid unnecessary revving and use of engine breaks.

5.12 Archaeological Resources and Historical Sites

5.12.01	A Chance Find Procedure (CFP) has been developed by Tetra Tech and should be part of the Contractor's EPP, in the event that cultural artifacts or anthropogenic deposits (e.g., remains of hearths, dwellings, storage pits) are uncovered during construction (Appendix 2).
5.12.02	If an archaeological site is encountered during construction, activities must be halted within 30 m of the find, and the Contractor must follow the CFP. The Archaeology Branch should be contacted at 1.250.953.3334 for direction.

6.0 ENVIRONMENTAL MANAGEMENT ROLES AND RESPONSIBILITIES

The effective environmental management of this Project requires a coordinated effort from all individuals involved. The following sections outline the responsibilities of key personnel involved with the Project.

6.1 Key Project Personnel

The Project contact list (Table 6-1) for the works proposed in this EMP should be completed as soon as the information is known and made available to all parties. The successful contractor should provide details to complete and update this list as part of their EPP.

Table 6-1: Project Contact List

Name	Role	Phone Number	Email
TBD	Contractor Site Superintendent	TBD	TBD
TBD	Contractor's Environmental Monitor (EM)	TBD	TBD
TBD	Construction Inspector	TBD	TBD
Alex Taheri	PSPC Project Manager	(778) 939-6704	Alex.Taheri@pwgsc-tpsgc.gc.ca
Laurie Crawford	PSPC Environmental Coordinator	(780) 497-3892	Laurie.Crawford@pwgsc-tpsgc.gc.ca
Matt Keleher	Tetra Tech Project Manager	(778) 608-8615	Matt.Keleher@tetratech.com

6.2 Contractor Responsibilities

The successful contractor will review Tender Specifications for environmental compliance and this EMP with their staff and subcontractors and prepare an EPP prior to undertaking any work. The Contractor is responsible for ensuring that all the activities related to the Project are conducted in such a way that impacts to the environment are either avoided or minimized.

- Contractors will comply with all laws, orders, rules, regulations, and codes of any provincial or federal environmental agency or like authority, which are applicable to the Project.
- Contractors are responsible for implementing the BMPs and mitigation measures outlined in the EMP.
- Contractors will cooperate with the EM appointed for the work. They must comply with written or verbal instructions with respect to execution of the proposed work in compliance with the mitigation measures outlined in the Tender Specifications, this EMP and their EPP, which are at a minimum, consistent with the regulatory agencies having jurisdiction over the area of the Project.
- Contractors must complete their work in such a fashion that all watercourses, including any ditches and swales, where works are to occur, are effectively isolated from downstream habitat. The Contractor will coordinate with the EM prior to and during the installation of the isolation measures in order that the EM can arrange for the concurrent salvage of fish and other aquatic wildlife (if the watercourses are not frozen or dry) within the isolated work areas.
- Contractors will correct deficiencies and any non-compliance upon direction from the EM whether written or verbal. Corrections should be made as soon as reasonably possible, ideally within 24 hours of directions.
- Contractors will arrange provision of appropriate on-site waste containers, if required.
- Contractors are responsible for the restoration of all disturbed areas resulting from any of the works they undertake. The Contractor is responsible for reinstatement of the Project area after construction, to the satisfaction of the Project Manager and the EM.
- If an archaeological site is detected, the Contractor is responsible for following the Chance Find Protocol (Appendix 2).

6.3 Environmental Monitor Responsibilities

On-site monitoring is a key component of ensuring that the mitigation measures recommended in the EMP (and ultimately the EPP) are implemented properly (e.g., appropriate location and correct installation) and function as intended. The Contractor should retain a full-time QEP as the EM to provide guidance on implementing the recommended measures and, if necessary, to develop additional mitigation measures if the need arises.

The key monitoring stages the EM is responsible for include:

- During start-up of the Project and installation of erosion and sediment control measures;
- During work that occurs within 30 m of water or within 30 m of the high-water mark of any watercourse. *For this Project, the EM is expected to be on-site full time during any work conducted within 30 m of the KM 145.300 culvert. For the two drainage culverts under Inga Lake Road, close oversight of the EM will only be required if there is flow through the culvert at the time of construction;*
- During worksite isolation from flow, when fish and wildlife salvage operations are required, and during instream works (i.e., work below the high-water mark);

- During any accidents or malfunctions that affect the Project and following any significant rainfall events. It is equally important to take corrective action prior to inclement weather events rather than to react during or after the event; and
- During completion of the Project and decommissioning/removal of mitigation measures.

The primary responsibility of the EM is to confirm that the environmental protection objectives of the Project are met and that the requirements of this EMP and contractor's EPP are enacted. EM responsibilities include:

- Monitor compliance with the EMP, EPP, permits and other legal requirements.
- Securing Fish Collection Permits and General Wildlife Permits, as necessary, prior to conducting salvage work.
- Communicate the requirements of the EMP and EPP to the contractors and their respective employees during pre-job and tailboard meetings.
- Be on site as per the schedule established between parties prior to Project start and remain on-call (via phone or email) during non-critical work periods to respond to emerging environmental issues or emergencies.
- Review the contractors work procedures to assess functionality and compliance with the EMP, the EPP and applicable regulations, standards and BMPs.
- Have the authority to modify and/or halt any construction activity at any time if deemed necessary for the protection of the environment or if SAR (e.g., Woodland Caribou) are observed in the Project area.
- Advise Project personnel if Project activities have caused or are likely to cause an environmental incident and make recommendations for corrective action.
- Liaise directly with Project personnel and provide technical advice to resolve situations that may impact the environment as they arise.
- Monitor all works conducted within watercourses to ensure downstream habitat is effectively isolated.
- In the event flow is occurring at the time of construction, conduct routine field water quality data collection (turbidity, pH, temperature, conductivity) using portable water quality meters prior to (baseline) and during construction activity within watercourses. Results will be compared to the British Columbia Approved Water Quality Guidelines for Aquatic Life. If a Guideline is exceeded, the EM will direct the contractor to undertake corrective measures or, as necessary, halt works until the EM deems the issue that caused the turbidity or pH non-compliance is effectively resolved.
- Maintain complete records of activities related to the implementation of the EPP. This should include any readings or measurements taken, photographs and incident reports.
- Complete and submit a monitoring report to PSPC and report any unanticipated adverse effects to the environment within 24 hours of occurrence. Such reports should include the nature of the effect, its cause, mitigation and/or remediation implemented, and whether a work stoppage was ordered, as well photographs, analyses, and measurements, if applicable.

6.4 Public Services and Procurement Canada Responsibilities

PSPC will delegate a Departmental Representative / Environmental Coordinator (EC) to oversee the Project to completion and to coordinate project activities between all parties involved. Throughout the duration of the Project, PSPC is committed to undertake the following:

- Require that the successful Contractor has an appropriate Environmental Protection Plan, and an EM in place prior to starting work.
- A Project-specific Environmental Protection Plan (EPP) will be prepared by the successful Contractor as part of the Tender requirements for the Project and provided to the PSPC EC for review prior to work commencing. The PSPC EC will review the Contractor's EPP for accuracy against the this EMP, appropriate Project specifications, and contract requirements. Work related to the EPP submittal (as determined by the PSPC EC) shall not proceed until acceptance of the EPP by the PSPC EC.
- Upon PSPC EC acceptance of the Contractor's EPP, the PSPC EC may submit the EPP as part of the environmental notification/permitting process.
- The PSPC EC monitors compliance with the contract specifications.
- The PSPC EC has the responsibility to notify Contractor verbally and in writing of observed non-compliance with environmental Project specifications and/or Federal, Provincial or Municipal environmental laws or regulations, permits, etc.
- The PSPC EC has the authority to issue a stop work order when an existing or potential environmental non-compliance is observed until satisfactory corrective action has been taken.
- The PSPC EC ensures that environmental incidents are reported.
- The PSPC EC liaises with regulatory agencies as required.

6.5 Environmental Auditor (Tetra Tech) Responsibilities

Tetra Tech will provide environmental oversight on behalf of PSCP for the Project. The role of Tetra Tech includes the following tasks:

- Prepare and update the Environmental Overview Assessment, Environmental Management Plan, Caribou Protection Plan and Chance Find Protocol;
- Confirm that the Contractor understands all requirements of the Chance Find Protocol;
- Apply for environmental permits on behalf of PSPC required for Project activities (with the exception of the Fish Collection and General Wildlife Act permits which are the responsibility of the Contractor's EM);
- Liaise with PSPC's Environmental Coordinator to meet Project objectives; and
- Prepare project design details, drawings, and specifications on PSPC's behalf.

7.0 ENVIRONMENTAL COMMUNICATION / REPORTING REQUIREMENTS

7.1 Environmental Protection Plan

A Project-specific EPP will be prepared by the successful Contractor as part of the Tender requirements for the Project and provided to the PSPC Environmental Coordinator for comment and review prior to work commencing. An appropriately qualified EM will be designated by the Contractor before the commencement of the Project to oversee the execution of the EPP. The EPP will:

- Be available to all staff during Project activities. The Contractor will be required to keep a copy of the EPP on-site during construction.
- Include an access plan including access routes, traffic safety, type of equipment used for various construction phases, and location of lay down areas in order to prevent/minimize disturbance to vegetation and soils. Lay down areas will occur on paved and/or hardened surfaces, where possible.
- Include spill response procedures and hazardous materials plan (e.g., fuels, lubricants, concrete etc.), including appropriate containment, storage, security, handling, and transportation of applicable materials/substances, spill kit requirements, and emergency response contacts. The Material Safety Data Sheets (MSDS) for all chemicals used will be made available on site.
- Include an Emergency Response Plan that outlines procedures to follow in case of emergency (e.g., wildlife encounter, equipment malfunction/failure, fire, avalanche).
- Details of environmental monitoring and rehabilitation.
- Includes an Erosion and Sediment Control Plan.
- Include provisions to reduce human-wildlife interactions.
- Integrate fully with the Traffic Management Plan, Quality Management Plan and Site-Specific Health and Safety Plan.

7.2 Environmental Monitoring Reports

The EM is responsible for completing and submitting environmental monitoring reports at a frequency acceptable to PSPC, detailing the construction activities that occurred during the days the EM was on-site and any observations of environmental non-compliance with the EMP or EPP. EM reports should include the following information:

- The name of the EM and the date, time and duration the EM was on site;
- A description of the weather during the site visit;
- A list of personnel on site;
- A summary and photo documentation of the construction activities that were taking place during the site visit, or that took place since the last site visit; and
- Water turbidity measurements and/or fish salvage results if works were being conducted in or around a watercourse (other than if the watercourse was dry at the time of the works).

- In cases where environmental non-compliance or environmental incidents are observed, the EM report should include:
  - The nature of the effect and its cause;
  - Whether a work stoppage was ordered;
  - Photographs;
  - Analyses, and measurements, if applicable;
  - Mitigation and/or remediation measures that were implemented or recommended; and
  - In subsequent site visits, the EM should document if non-compliances identified during previous EM visits had been resolved and/or addressed.

7.3 Emergency Response and Environmental Incident Reporting

All environmental incidents/emergencies should be reported to the EM, the Contractor Site Superintendent, and PSPC as soon as possible, so that appropriate notifications can be made, and Project management can ensure that incidents are handled appropriately. In the case of any environmental concern and/or incident, Project personnel are responsible for informing their Site Superintendent, who must then report to the EM. Contractors are responsible to ensure that all crew are adequately trained and equipped to deal with potential environmental incidents related to their work. Any concerns about preparedness for environmental incidents should be brought to the attention of the Site Superintendent or the EM.

The Emergency Contacts List (Table 7-1) should be updated as part of the EPP, as necessary.

Table 7-1: Emergency Contact List

Agency	Phone Number
Emergency Services	911
Fort St John – Local Police (Non-emergency)	1.250.787.8140
Fort St John Fire Department (Non-emergency)	1.250.785.4333
BC Wildfire Reporting Line	1.800.663.5555 or *5555 on cell
Emergency Management BC	1.800.663.3456
Conservation Officer Service (wildlife issues)	1.877.952.7277
DFO (aquatic habitat/fisheries issues, Record and Report 24-hour Hotline)	1.800.465.4336
FLNRORD – Dawson Creek Office (Peace Natural Resource District)	1.250.784.0413

An Environmental Incident Report (EIR) should be prepared as soon as possible following an incident. The Contractor is responsible for completing the EIR and the EM should follow-up with the Contractor to ensure it is filed. The target for reporting is within one (1) working day from the time of the incident. A sample EIR is included as Appendix 4. All significant emergencies (as determined by the EM) should be reported to Emergency Management BC (EMBC) at 1-800-663-3456.

Any incidents that result in non-compliance with a permit or environmental legislation such as the *Fisheries Act* must be reported within 12 hours to the BC MOE, DFO, and Emergency Management BC (EMBC) [formerly the Provincial Emergency Program (PEP); if reportable spill quantity].

If the incident results in severe environmental impact or involvement of the public, the media, or government representatives, PSPC must be notified immediately. The target for this type of notification is within one hour of the incident or its escalation to severe status.

An environmental incident is one that has caused, or has the potential to cause, one or more of the following:

- Deleterious effects to the environment including those affecting the air quality, aquatic resources, wildlife, including SAR or other environmental resources;
- Unauthorized discharge of deleterious substances into a watercourse;
- Disturbance or damage of heritage resources or archaeological sites
- Adverse publicity with respect to environment; and
- Legal action with respect to violation of legislation, regulation, policy or environmental damage.

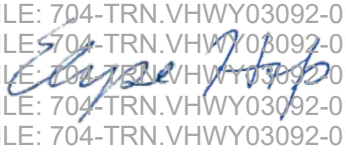
Examples of Environmental Incidents include, but are not limited to:

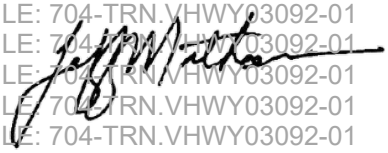
- Spills of oil, fuel, hydraulic fluids, PCBs or chemicals;
- Discharge of deleterious substances (sediment, spills, concrete) into fish-bearing water;
- Mass wasting, landslides, erosion, or floods as they affect environmental or water quality;
- Activities that affect fish or fish habitat, wildlife or recreation;
- Violation of environmental regulations, permits, or approvals;
- Negative wildlife interactions;
- Forest fires related to activities; and
- Work and/or removal of vegetation in or near water bodies without regulatory approval.

8.0 CLOSURE

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

Respectfully Submitted,
Tetra Tech Canada Inc.





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APPENDIX 1

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

NATURAL SCIENCES

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

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

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL ISSUES

The ability to rely upon and generalize from environmental baseline data is dependent on data collection activities occurring within biologically relevant survey windows.

It is incumbent upon the Client and any Authorized Party, to be knowledgeable of the level of risk that has been incorporated into the project design or scope, in consideration of the level of the environmental baseline information that was reasonably acquired to facilitate completion of the scope.

1.8 NOTIFICATION OF AUTHORITIES

TETRA TECH professionals are bound by their ethical commitments to act within the bounds of all pertinent regulations. In certain instances, observations by TETRA TECH of regulatory contravention may require that regulatory agencies and other persons be informed. The client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

APPENDIX 2

ARCHAEOLOGY CHANCE FIND PROTOCOL

TETRA TECH

TECHNICAL MEMO

ISSUED FOR USE

To:	Public Services and Procurement Canada	**Date:**	March 24, 2021
c:		**Memo No.:**	
From:	Elyse Hofs, B.Sc., Dipl.T. Andrew Horwood, B.Tech., AScT	**File:**	704-TRN.VHWY03092-01
Subject:	Archaeological Site Chance Find Protocol Alaska Highway – Inga Lake Intersection Improvements		

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) has been retained by Public Services and Procurement Canada (PSPC) to provide engineering and environmental for the planned improvement of Inga Lake intersection, located at KM 145.80 of the Alaska Highway (herein referred to as the "Project").

Throughout the Project, there is potential to encounter archaeological sites and artifacts that are protected under the *Heritage Conservation Act*. As such, Tetra Tech has been asked to provide archaeological services for the Project, including the preparation of a site-specific Chance Find Protocol (CFP).

The purpose of this Archaeological Site CFP is to provide guidance to PSPC employees and contractors on what to do if they come across or expose an archaeological site while conducting ground disturbing operations. This document provides a framework for recognizing archaeological artifacts and avoiding unforeseen disturbance to them. The Protocol, consisting of two parts, (1) informs employees and contractors about the legislation that protect archaeological sites from disturbance and what archaeological sites look like, and (2) what procedural steps to follow if a suspected archaeological or heritage resource is encountered during ground disturbing activities.

1.1 Project Contacts

Name	Role	Phone Number	Email
Alex Taheri	PSPC Project Manager / Representative	778.939.6704	Alex.Taheri@pwgsc-tpsgc.gc.ca
Charla Arnott	Archaeologist, Soriak Consulting & Research Ltd.	780.995.4859	Charla@soriakconsulting.com
Matt Keleher	Project Manager, Tetra Tech Inc.	778.608.8615	Matt.Keleher@tetratech.com

Tetra Tech Canada Inc.
Suite 1000 – 10th Floor, 885 Dunsmuir Street
Vancouver, BC V6C 1N5 CANADA
Tel 604.685.0275 Fax 604.684.6241

2.0 EDUCATION

This section informs Project personnel that archaeological sites are protected by law, provides examples of what archaeological sites look like and how they can be identified.

2.1 Heritage Conservation Act

The British Columbia (BC) *Heritage Conservation Act* confers automatic protection upon archaeological and historic heritage sites that meet the definitions within Section 13(2) of the Act. These include:

- All sites pre-dating AD1846;
- All sites of unknown age or origin which may pre-date AD1846;
- All burial places and rock art sites of historical or archaeological value; and
- All vessels or aircraft wrecked for two or more years.

All areas within the boundaries of a heritage site are protected under the Act, including areas without archaeological deposits or other kinds of heritage remains (e.g., land without archaeological deposits between several culturally modified trees at one site, or between several storage pits at one site).

There is always a limited possibility for unknown archaeological sites to exist, particularly in proximity to water sources; therefore, it is necessary that a CFP be developed in advance of construction, in the event that cultural artifacts or anthropogenic deposits (e.g., remains of hearths, dwellings, storage pits) are uncovered during Project-related activities.

Archaeological sites (both recorded and unrecorded) in British Columbia are protected under the Act and must not be altered or damaged without a site alteration permit issued by BC's Archaeology Branch, Ministry of Forests, Lands, Natural Resource Operations and Rural Development. If an archaeological site is encountered during development, activities must be halted, the discovery protocol provided in Section 3.0 should be followed, and the BC Archaeology Branch is to be contacted at 250.953.3334 for direction.

2.2 Artifact Identification

In northeast British Columbia, cultural material can widely range depending on location. Material is generally found in areas that were favorable to the needs of the area's earliest inhabitants. Examples of possible artifacts in the region may include, but are not limited to, the following:

Type:	Description
Stone Tools	These were made for hunting or fishing, can be formed from a variety of materials, and can come in many different colours. Examples include projectile points, hide scrapers, as well as the material cast off when they are manufactured (lithic debitage):   
Culturally Modified Trees (CMTs): Trails:	Trees were modified in different ways and for different purposes, including bark stripping and trail marking. Trees with blazes on either side of them sometimes marked trails. These trails may also warrant protection. 
Historic Structures	Historic objects identified during construction should be inspected/documented; however, depending on their antiquity, they may or may not be protected under the *Heritage Conservation Act.* 
Burials:	The BC government's *Found Human Remains* mandate details procedures to follow in the event human remains are identified. Burials traditionally occurred in elevated areas overlooking water. Unusual rock piles or soil depressions may be indicative that a burial is present. 

3.0 DISCOVERY PROTOCOL

This section describes the necessary steps required when a suspected archaeological site is identified by an employee or contractor in the field. Section 6.3 of the Government of Canada's General Provisions for Construction Services outlines the responsibilities of the Contractor in the event that human remains, archaeological remains or items of historical or scientific interest are discovered (GOC 2018). These provisions have been incorporated into this protocol.

If materials are encountered during development that could be archaeological or heritage resources, the following steps will be taken:

1. Cease all forms of ground disturbance in the immediate vicinity of the find and leave all possible archaeological or heritage materials in place.
2. Establish a protective buffer of at least 30 m around the extent of the find area and demarcate the buffer in a highly visible and clear manner (e.g., with "No Work Zone" flagging).
3. Record the GPS location of the found materials, take photos and fill out the attached form.
4. Inform the Archaeological Monitor and the Project Manager of the possible archaeological site and submit the associated form and photos.
5. The Project Manager will contact PSPC and all personnel will await further instruction.
6. After consulting with PSPC, the Archaeological Monitor is to notify the BC Archaeology Branch at 250-953-3334 for direction.

3.1 Form

General Information		
Date of Discovery:		
Discovery Made By:		
Other Parties Present:		
Location (UTM):		
Site Description		
What is the closest waterbody (or other identifying feature – KM marker etc.)?		
Describe the site characteristics:		
Provide a sketch of the site with appropriate measurements:		
Photograph Summary		
Picture #:	Direction:	Description:
Picture #:	Direction:	Description:
Picture #:	Direction:	Description:
Picture #:	Direction:	Description:
Picture #:	Direction:	Description:
Picture #:	Direction:	Description:
Forward all information, pictures, maps and communications to the Project Manager:		☐Yes ☐No Date:
Forward all information, pictures, maps and communications to Archaeological Monitor:		☐Yes ☐No Date:
Forward all information, pictures, maps and communications to PSPC:		☐Yes ☐No Date:

4.0 CLOSURE

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

Respectfully submitted,
Tetra Tech Canada Inc.

FILE: 704-TRN.VHWY03092-01
FILE: 704-TRN.VHWY03092-01
FILE: 704-TRN.VHWY03092-01

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/sy

REFERENCES

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APPENDIX 3

EXAMPLE SPILL RESPONSE PLAN

EXAMPLE SPILL RESPONSE PLAN

The Contractor should ensure that the information provided in this Example Spill Response Plan is included within their prepared EPP.

The Contractor must be familiar with the Spill Response Plan and must ensure that the entire Project personnel understands it. Each member of the Project personnel should know what constitutes a "significant" spill which needs to be reported. In the case of any environmental concern and/or incident, the Project personnel is responsible for informing the Site Superintendent, who must then report to the EM and PSPC. The Site Superintendent is responsible to ensure that all Project personnel are adequately trained and equipped to deal with potential environmental incidents related to their work. Any concerns regarding preparedness for environmental incidents will be brought to the attention of the Site Superintendent or the EM.

1.0 KEY CONTACTS

Key contacts in the event of spill are presented in Table A1, which should be updated when information is available.

Table A1: Key Project Emergency Contacts

Contact	Name	Phone #	Contact Details
PSPC Project Manager	Alex Taheri	(778) 939-6704	Report all incidents to contact
PSPC Site Manager	TBD	TBD	Report all incidents to contact
PSPC Environmental Manager	Laurie Crawford	(780) 497-3892	Report all incidents to contact
Contractor Site Superintendent	TBD	TBD	Report all incidents to contact
Environmental Monitor (EM)	TBD	TBD	Report all incidents to contact
Fire, ambulance, police service		911	Emergency Assistance. Please note that there is no 911 service in the NRRD.
Emergency Management BC		1.800.663.3456	Report as required
Conservation Officer Service (wildlife issues)		1.877.952.7277	Wildlife issues
DFO (aquatic habitat/fisheries issues, Record and Report 24-hour Hotline)		1.800.465.4336	Aquatic habitat/ fisheries issues

2.0 BEST PRACTICES

The following measures/best practices should be implemented as part of the **Spill Response Plan**:

- The Contractor's EPP should provide a list of all materials that may be hazardous or of a deleterious nature and include the Workplace Hazardous Materials Information System (WHMIS) paperwork.
- A pre-construction meeting should be held to identify all materials of a deleterious nature that could be spilled.
- Hazardous materials and wastes should be stored in covered containers and in secondary containment.
- Appropriate spill cleanup materials should be readily available and easily accessible. Project personnel should be aware of the specific materials required to cleanup various spills.
- Minimize the potential for spills through proper use, handling, storage, and disposal of products.

- Work should be undertaken and completed in such a manner as to prevent the release of silt, sediment-laden water, fuels or lubricants, uncured concrete or any other deleterious substance.
- All waste fuel, oil, petroleum products, other hydrocarbons and their storage containers must be disposed of off-site at an approved disposal site.
- Contractors should ensure that all construction machinery is to arrive on site in a clean, washed condition, in good operating condition and is to be maintained free of fluid leaks, excess oil, and grease.
- Hydraulic fluids for machinery used within around watercourses should be biodegradable in case of accidental loss of fluid.
- Contractors should ensure vehicles and equipment are not serviced or refuelled within 30 m of any watercourse or catch basins. Tanks, hoses, and connections should be inspected before use. All hose connections should be wrapped and secured with absorbent pads during fuel/oil transfers and remain wrapped, contained, and in an upright orientation during all other times. All hoses, valves, and equipment should be kept in a containment area whenever possible. Minimize hose length and the number of connections - use dripless connections if possible. Drain hoses when finished.
- Hazardous materials must be labelled and disposed of according to the WHMIS criteria and the TDG Regulations.
- Hydrocarbon and coolant storage, if required on site, should be within a secondary impermeable containment facility capable of holding 110% of the storage tank contents. This may be achieved through the use of double-walled storage tanks. These containment basins should be inspected daily for leaks and wear points, kept clean and any measurable rainwater removed and disposed of appropriately. If practical, the containment area should be covered to prevent infilling with rainwater. Where leaks and/or wear points are found, they should be repaired promptly to restore full containment.
- Contractors should ensure that small containers (i.e., jerry cans) will be stored in a secure location, protected from weather. These containers must be designed solely for the purpose of storing and pouring fuel and should not be more than 5 years old. Containers must not leak and must be sealed with a proper fitting cap or lid.
- All work sites must have emergency spill kits (stocked with pads and sorbent booms) available on site. The kits should be suitable for the quantities and types of material in use and stored at the site. All mobile equipment must contain fully stocked, dedicated spill kits. Contractors must be trained in the proper use of the kits in case of a spill.
- If a spill occurs, stop work immediately to respond. Action should be taken to contain the spill and then, if necessary, reported. When cleaning up the spill:
  - Use appropriate absorbent pads or other materials based on the type of substance spilled. The method of disposing of the waste is dependent on the amount and type of deleterious substance that was spilled.
  - Technical assistance is available from the EM on cleanup procedures and residue sampling.
  - All equipment and/or material used in cleanup (e.g. used sorbent, oil containment materials, etc.) must be disposed of properly.
  - Accidental spills may produce hazardous wastes (e.g., material with > 3% oil) and contaminated soil. All waste disposal must comply with the Environmental Management Act and Regulations.
  - Contaminated soil must be treated and dealt with as required on a site-specific basis.

3.0 SPILL RESPONSE PROCEDURES

1. **Assess/Ensure Safety**
   - Ensure personal/public, electrical, and environmental safety.
   - Ensure that people with proper training and equipment deal with the spill and unnecessary people are kept clear of the area.
   - Wear appropriate Personal Protective Equipment (PPE) and consult Material Safety Data Sheets.
   - Never rush in, always determine the product spilled before taking action.
   - Warn people in the immediate vicinity.
   - Ensure no ignition sources if spill is of a flammable material.
2. **Stop the Source (When Possible)**
   - If required, and when it is safe to do so, stop the spill at its source. This may simply be righting an overturned container or sealing a hole.
   - Act quickly to reduce the risk of environmental impacts.
   - Close valves, shut off pumps or plug holes/leaks, set containers upright.
   - Stop the flow of the spill at its source.
3. **Secure the Area**
   - Limit access to the spill area.
   - Prevent unauthorized entry onto the site.
4. **Contain and Control the Spill**
   - The spill should be prevented from infiltrating into the ground or entering a watercourse.
   - If the spill occurs to water, booms should be deployed to prevent its spread.
   - Block off and protect drains and culverts.
   - Prevent spilled material from entering drainage structures (ditches, culverts, drains).
   - Use spill sorbent material to contain spill.
   - If necessary, use a dyke or any other method to prevent any discharge off-site.
   - Make every effort to minimize contamination.
   - Contain as close to the source as possible.
5. **Notify/Report Incident to Appropriate Authority**

4.0 ENVIRONMENTAL INCIDENT REPORTING

All environmental incidents, including spills, must be reported to the EM, the Site Superintendent and PSPC as soon as possible by phone so that appropriate notifications can be made, and the incident is handled appropriately. Spills must be promptly cleaned up and subsequently reported. Make a note of what, how, and where the incident happened. An EIR should be prepared as soon as possible following an incident (Appendix 4). The target for reporting is within one (1) working day from the time of the incident occurs. All personnel on-site have a responsibility to report all environmental concerns or incidents regardless of magnitude. The Contractor will be responsible for completing and filing the EIR.

A. External Reporting:

For all spills in amounts requiring external notification/reporting or of any substance toxic to aquatic life, the person who had possession, charge or control of a substance immediately before its spill, or the person that discovers a spill, will report the spill to EMBC 24-hour phone line at **1800-663-3456.** This same person must also immediately report the spill details to the Site Superintendent and EM who will report the spill internally.

When reporting a spill, the caller should be prepared to provide the dispatcher the following information, if possible:

- Name and phone number of person reporting the spill;
- Name and phone number of person involved with the spill;
- Location, time, and date of spill;
- Type and quantity of material spilled;
- Cause and effect of the spill;
- Details of action taken or proposed to contain the spill and minimize its effect;
- Duration of occurrence;
- Weather conditions;
- Description of the spill location and surrounding area;
- Names of government agencies on scene, if any;
- Names of other persons or agencies advised or to be advised concerning the spill; and
- Planned follow-up.

*****ALL SPILLS TO WATER ARE REPORTABLE TO Emergency Management BC AND DFO*****

*****If in doubt as to whether or not to report a spill, err on the side of caution and report the spill*****

B. Reportable Spill Quantities

Table A2 outlines specific substances and reportable quantities according to the EMA Spill Reporting Regulation (includes amendments up to BC Reg. 376/2008, December 9, 2008):

Table A2: Reportable Spill Quantities

Item	Substance Spilled	Specific Amount
1	Class 1, Explosives as defined in Section 2.9 of the Federal Regulations*	Any quantity that could pose a danger to public safety or 50 kg
2	Class 2.1, Flammable Gases, other than natural gas, as defined in Section 2.14 (a) of the Federal Regulations	10 kg
3	Class 2.2 Non-Flammable and Non-Toxic Gases as defined in Section 2.14 (b) of the Federal Regulations	10 kg
4	Class 2.3, Toxic Gases as defined in Section 2.14 (c) of the Federal Regulations	5 kg
5	Class 3, Flammable Liquids as defined in Section 2.18 of the Federal Regulations	100 L
6	Class 4, Flammable Solids as defined in Section 2.20 of the Federal Regulations	25 kg
7	Class 5.1, Oxidizing Substances as defined in Section 2.24 (a) of the Federal Regulations	50 kg or 50 L
8	Class 5.2, Organic Peroxides as defined in Section 2.24 (b) of the Federal Regulations	1 kg or 1 L
9	Class 6.1, Toxic Substances as defined in Section 2.27 (a) of the Federal Regulations	5 kg or 5 L
10	Class 6.2, Infectious Substances as defined in Section 2.27 (b) of the Federal Regulations	1 kg or 1 L, or less if the waste poses a danger to public safety or the environment
11	Class 7, Radioactive Materials as defined in Section 2.37 of the Federal Regulations	Any quantity that could pose a danger to public safety and an emission level greater than the emission level established in Section 20 of the "Packaging and Transport of Nuclear Substances Regulations"
12	Class 8, Corrosives as defined in Section 2.40 of the Federal Regulations	5 kg or 5 L
13	Class 9, Miscellaneous Products, Substances or Organisms as defined in Section 2.43 of the Federal Regulations	25 kg or 25 L
14	Waste containing dioxin as defined in Section 1 of the Hazardous Waste Regulation	1 kg or 1 L, or less if the waste poses a danger to public safety or the environment
15	Leachable toxic waste as defined in Section 1 of the Hazardous Waste Regulation	25 kg or 25 L
16	Waste containing polycyclic aromatic hydrocarbons as defined in section 1 of the Hazardous Waste Regulation	5 kg or 5 L
17	Waste asbestos as defined in Section 1 of the Hazardous Waste Regulation	50 kg
18	Waste oil as defined in Section 1 of the Hazardous Waste Regulation	100 L
19	Waste containing a pest control product as defined in Section 1 of the Hazardous Waste Regulation	5 kg or 5 L
20	PCB Wastes as defined in Section 1 of the Hazardous Waste Regulation	25 kg or 25 L
21	Waste containing tetrachloroethylene as defined in Section 1 of the Hazardous Waste Regulation	50 kg or 50 L

Table A2: Reportable Spill Quantities

Item	Substance Spilled	Specific Amount
22	Biomedical waste as defined in Section 1 of the Hazardous Waste Regulation	1 kg or 1 L, or less if the waste poses a danger to public safety or the environment
23	A hazardous waste as defined in Section 1 of the Hazardous Waste Regulation and not covered under items 1 – 22	25 kg or 25 L
24	A substance, not covered by items 1 to 23, that can cause pollution	200 kg or 200 L
25	Natural gas	10 kg, if there is a breakage in a pipeline or fitting operated above 100 psi that results in a sudden and uncontrolled release of natural gas

*"Federal Regulations" means the Transportation of Dangerous Goods Regulations made under the Transportation of Dangerous Goods Act (Canada)

APPENDIX 4

ENVIRONMENTAL INCIDENT REPORT FORM

Environmental Incident Reporting (EIR) Form

Project Name _____ Project No. _____

Location _____

Date and Time of Spill _____

SEE guidelines on the reverse page for reporting protocols.

Person	Name	Number
Reporting Spill		
Involved in Spill		
Spill Cleanup		

Type and quantity of material spilled

Cause of spill

Action taken to contain and minimize effects

Notification to:

PSPC Project Manager ☐	Phone/cell:		EM ☐	Phone/cell:	
PSPC Environmental Coordinator ☐	Phone/cell:		EMBC ☐	Phone/cell:	
Site Superintendent ☐	Phone/cell:		DFO ☐	Phone/cell:	
☐	Phone/cell:			Phone/cell:	

What Incidents are Reportable?

All incidents must be reported to the Project team, in accordance with the EIR Communications Plan Section described in Section 7.0 of the EMP. Any environmental incidents of reportable quantities will be reported immediately to EMBC, according to the guidelines of the Spill Reporting Notification Chart (Below).

ALL SPILLS TO WATER ARE REPORTABLE TO THE EMERGENCY MANAGEMENT BC (EMBC) AND FISHERIES AND OCEANS CANADA (DFO).

If in doubt as to whether or not to report a spill, err on the side of caution and report the spill.

The following information must be reported to the project team and appropriate government agencies:

- Name and phone number of person reporting the spill.
- Name and phone number of person who witnessed or was involved with the spill.
- Location and time of the spill.
- Type and quantity of material spilled.
- Area or habitat effected.
- Cause, nature, and effect of spill.
- Details of action taken or proposed to contain the spill and minimize its effect or limit the activity causing the incident.
- Names of other persons or agencies advised.
- Aquatic, terrestrial and/or cultural resources affected.
- Mitigation measures taken to control.
- Additional recommended remedial or corrective actions.
- Communications held with Project personnel.
- Communications with regulatory agencies.