



Public Works and Government Services Canada

Requisition No. _____

SPECIFICATIONS

For
Km 266 - 315 Pavement Replacement and
Miscellaneous Works, Alaska Highway, BC

Project No. R.017173.344 January, 2018

APPROVED BY:

_____ _____
Alaska Hwy Program Manager, IAM Date

_____ _____
Construction Safety Coordinator Date

TENDER:

_____ _____
Project Manager Date

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APPENDICES

Appendix	Description
A	Preliminary Hazard Assessment Form <i>Note: The Preliminary Hazard Assessment Form is provided for the Contractor's general information and reference only. PWGSC takes no responsibility for the completeness or any misrepresentation by the Contractor of the on-site hazards based on the information provided in the Preliminary Hazard Assessment Form. The Contractor shall remain responsible for the identifying and mitigating against all hazards on the project.</i>
B	Confirmation of Prime Contractor's Main Responsibilities Under the WorkSafeBC Occupational Health and Safety Regulations and Worker's Compensation Act
C	Written Communication / Document Management Protocol
D	Environmental Protection Plan (EPP) – Checklist.
E	Responsibility Checklist For Authorizations/Approvals/Notifications/Permitting
F	Relevant Environmental Publications
G	Finished Grading Table Km 266+180 – Km 315+000
H	PWGSC Environmental Effects Evaluation (EEE) Report <i>Note: To be provided via amendment during the tendering process</i>
I	British Columbia Ministry of Forests, Lands, and Natural Resource Operations (FLNRO) Section 11 Approval for Instream Work, By TBD – Date TBD. <i>Note: To be provided via amendment during the tendering process</i>

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>

BC Ministry of Transportation and Infrastructure, 2015 Interim Traffic Management Manual for Work on
Roadways 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/2015trafficmanagementmanual>

2016 Standard Specifications for Highway Construction, BC Ministry of Transportation and Infrastructure –
July 1, 2016 – 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 Works and Government Services 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>

LIST OF CONTRACT DRAWINGS

Sheet No.	Title	Drawing Number	Revision Number
1	Cover Page		
2	Project Location Plan, Key Plan, Drawing Index	C001	0
3	Legend and Control Monument Locations	C002	0
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11	Barrier Flare & Riprap Spillway Details – Buckinghamhorse River Bridge	C207	0
12	Culvert Details	C208	0
13	Km 183 Rest Stop Plan / Profile, Typical Sections, & Cross Sections	C301 – C303	0
14	Km 233 Rest Stop Plan & Typical Sections	C311	0
15	Km 267 & Km 273 Ditch & Slope Re-establishment Typical Sections & Cross Sections	C321 – C325	0
16	Km 270 Full Pavement Reconstruction Cross Sections	C331	0
17	Km 271 Sight Line Improvement Plan & Typical Section	C341	0
18	Km 277 Polk A Dot Creek Culvert Plan & Profile, Details, Typical Sections	C351 – C353	0
19	Km 282 Rest Stop Plan / Profile, Typical Sections, & Cross Sections	C361 – C363	0

20	Km 293 Rest Stop Plan / Profile, Typical Sections & Cross Sections	C371 – C375	0
21	Km 294.5 Culvert Details Plan	C381	0
22	Km 308.2 Culvert Details Plan	C391	0
23	Km 309.2 Culvert Details Plan	C401	0
24	Km 309.4 Culvert Details Plan	C411	0
25	Km 311.7 Culvert Details Plan	C421	0
26	Km 334.7 Culvert Details Plan	C431	0
27	Colour Coded Grading Plan	C501 – C575	0

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Order of Precedence.
- 1.2 Work Covered by Contract Documents.
- 1.3 Codes.
- 1.4 Contractor's Use of Site.
- 1.5 Owner Supplied Materials (Outside Limits of Work).
- 1.6 Use of Owner Maintenance Yards and Quarries.

PART 2:

- 2.1 Site Inspection.
- 2.2 Work Completion.
- 2.3 Special Precautions.
- 2.4 Survey.
- 2.5 Contract Drawings.
- 2.6 Electronic Contract Drawings.
- 2.7 Contract Submittals.
- 2.8 Supervisory Personnel.
- 2.9 Work by Others.
- 2.10 Departmental Representative's Lab and Office Trailer.

1.1 Order of Precedence

- .1 In the event of any discrepancy or conflict, order of precedence shall be in accordance with GC1.2.2 – 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.

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- .3 If conflict arises between an item in the main body of these Specifications (Division 1 – Division 34) and an item found in one of the Appendices (Reference Documents), the main body of the Specifications (Division 1 – Division 34) 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 The project includes work at the various sites from Km 183.5 to Km 334.7 on the Alaska Highway between Fort St. John and Fort Nelson, BC. For reference, Dawson Creek is at Km 0, Fort St. John is at approximately Km 75, and Fort Nelson is at approximately Km 455 on the Alaska Highway. The locations and description of primary work (but not limited to) includes:
- .1 Km 183 Rest Stop: Full Depth Reclamation, pavement structure improvements / re-profiling, and Hot Mix Asphalt Concrete Pavement.
- .2 Km 233 Rest Stop: Milling and Hot Mix Asphalt Concrete Pavement overlay.
- .3 Km 267.2, Km 267.4, & 273.8: Ditch and slope re-establishment via excavation of slumped material, ditching, installation of steel pipe, and grading of cut slope.
- .4 Km 270: Full Pavement Reconstruction via excavation and placement of Sub-base Course and Crushed Base Gravel.
- .5 Km 271: Clearing and grubbing and sight line improvements via excavation.
- .6 Culvert replacement / install: Polk A Dot Creek (Km 277.40), Km 277.45, Km 284.76, Km 288.02, Km 300.40, Km 309.0 (Optional Work), Km 314.0 (Optional Work), Km 314.1 (Optional Work).
- .7 Km 278 Buckinghorse River Bridge: Temporary removal of existing Precast Concrete Barriers, barrier flare widening, install of spillways, reinstall of existing and new Precast Concrete Barriers.
- .8 Km 282 & Km 293 Rest Stop: Excavation, and placement of Sub-base Course and Crushed Base Gravel, reshaping of existing gravels, and Hot Mix Asphalt Concrete Pavement.

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- .9 Culvert repairs: Km 294.50, Km 334.7, Km 308.2 (Optional Work), Km 309.2 (Optional Work), Km 309.4 (Optional Work), Km 311.7 (Optional Work).
 - .10 Km 266.18 – Km 305, Km 305 – Km 315 (Optional Work): Full Depth Reclamation, Hot Mix Asphalt Concrete Pavement, Rumble Strips, Gravel Shouldering, Line Painting, and related works.
 - .2 The work under this contract generally comprises of the following but is not limited to:
 - .1 Contract submittals (using SharePoint) prior to and during the work (see Item 2.7 – Contract Submittals of Contract Specification Section 01 11 10 – Summary of Work).
 - .2 Supply and maintain of all traffic control for the duration of the works.
 - .3 Surveys (construction layout, payment quantities, survey monitoring, as-built survey, and others as required).
 - .4 Quality Management.
 - .5 Environmental protection, onsite environmental monitoring and reporting, and bird nest survey.
 - .6 Clearing and removal through burning or chipping of trees, brush, and other vegetation within the designated construction footprint.
 - .7 Grubbing of stumps within the designated construction footprint.
 - .8 Stripping of topsoil material, temporary stockpile, and reuse as topsoil.
 - .9 Excavation, transport, dispose excess material (waste) offsite, place, and compact material for roadway embankment.
 - .10 Supply, manufacture, hauling, and placement of aggregate materials for highway widening, full pavement reconstruction, pavement structure improvements / re-profiling, Gravel Shouldering, and Asphalt Mix.
 - .11 Removal and disposal or decommissioning of existing culverts.

- .12 Supply and installation of new culverts using trenchless or open cut method (method to be chosen by the Contractor).
- .13 Repairs to existing culverts.
- .14 Remove and temporarily stockpile for later re-use, precast concrete barriers.
- .15 Supply and install precast concrete barriers.
- .16 Supply of Asphalt Cement and other additives (if necessary).
- .17 Milling, and removal of asphalt for asphalt pavement overlays and lap joints. Transport and placement of asphalt millings at access road / letdown locations.
- .18 Completion of Full Depth Reclamation including the pulverization of existing Bituminous Surface Treatment (BST) / Asphalt (select locations) and mixing with existing base gravels, regrading, and compaction.
- .19 Reshaping and grading of existing gravel rest stops in preparation for paving.
- .20 Supply, manufacture, transport, and placement of Asphalt Prime, Asphalt Tack Coat, and Hot Mix Asphalt Concrete Pavement.
- .21 Transport, placement (using a purpose built shouldering machine or other equipment as necessary to achieve grades), grading, and compaction of Gravel Shouldering.
- .22 Installation of Rumble Strips and Pavement Markings.
- .23 Restoration to preconstruction conditions of all disturbed areas, placement of Topsoil (if disturbed or available), and Hydraulic Seeding of disturbed areas.
- .24 Work complete by Change Order (if required and approved by Departmental Representative).

1.3 Codes

- .1 Meet or exceed requirements of:
 - .1 Contract Documents;
 - .2 Specified standards, applicable legislation, codes, and

- referenced documents; and,
- .3 Other codes of Local, Provincial, or Federal application (in the case of conflict or discrepancy, the more stringent requirements shall apply).
- 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.
- 1.5 Owner Supplied Materials (Outside Limits of Work) .1 PWGSC is providing ~ 11 m long x 914 mm diameter steel pipe for use by the Contractor for the repairs to the Km 334.7 culvert. The steel pipe is available for pick-up by the Contractor from PWGSC's Maintenance Yard adjacent to the Airport in Fort Nelson. The pick-up time shall be coordinated with the Departmental Representative a minimum of 3 days in advance of the planned pick-up date.
- .2 PWGSC is providing access to previously manufactured riprap and in-situ materials from the Trutch Quarry (Km 310, 8 Km haul from highway). Various sizes of rock are available for use by the Contractor as riprap. The Contractor will be responsible for sorting through the stockpiled rock and selecting the appropriate rock size (see Section 31 37 00 – Riprap for more details).
- 1.6 Use of Owner Maintenance Yards and Quarries .1 The Contractor's use of PWGSC's maintenance yards and quarries as listed elsewhere within the specifications for the purposes of material storage and extraction / manufacture of rock shall be subject to the following:
- .1 Other Contractors may be working in the maintenance yards and quarries completing similar or different types of work. Coordination with these other Contractors may be required.
- .2 Laydown areas for equipment and stockpiles may be restricted due to other works ongoing or the existing size of the gravel pits and maintenance yards.

- .3 The Contractor is responsible to provide all equipment required to excavate, manufacture (as necessary), load, and haul the material from PWGSC's quarries and maintenance yards.
- .4 The security of equipment parked and material manufactured and stockpiled in the maintenance yard and quarries along with the safety of the contractors personnel remains the Contractors responsibility.
- .5 The Contractor shall be responsible for maintaining access roads into the quarry and for haul roads required to access the aggregate sources for the duration of the project. At a minimum maintaining and developing access may include grading and snow removal. At the conclusion of the works all access roads and haul roads shall be left in an equal to or better condition than when work started.

PART 2 – EXECUTION

2.1 Site Inspection

- .1 Submission of tender is deemed to be confirmation that the Contractor has inspected the site and is conversant with all conditions affecting execution and completion of the work.

2.2 Work Completion

- .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).
- .2 Achieve Substantial Performance by August 24, 2018.
- .3 Achieve Completion by August 31, 2018.
- .4 Complete the work in accordance with the staging requirements detailed in Item 1.8 – Construction Staging, Section 01 14 00 – Work Restrictions, Access Development, Construction Staging, and Restoration.
- .5 Works may need to be temporally shut down during heavy rain events or other 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 poor weather conditions adversely affect the Contractor's 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 possible to

- achieve the environmental requirements due to the high flows or adverse weather conditions.
- .3 The Departmental Representative in conjunction with British Columbia Ministry of Environment and Climate Change Strategy (MoE) may suspend instream works should they feel that it is not possible to achieve the environmental requirements or the contract specifications for quality of work due to the high water flows or 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 high flows or adverse weather conditions in the construction schedule and in the unit prices. No payment for temporary work stoppages due to high flows or adverse weather conditions will be made.
- 2.3 Special Precautions
- .1 The Contractor's attention is drawn to the possibility of impacting utilities, within the limits of work. The Contractor shall confirm the locations of all utilities. All costs for utility locates 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 they conflict with the construction, and await instructions from the Departmental Representative before proceeding with work in the vicinity of such encountered services and utilities.
- .2 Existing structures, signs, utilities, asphalt, Bituminous Surface Treatment (BST), culverts, bridges, and all others 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 as a result of the operations of the Contractor shall be repaired and made good at the Contractor's expense to the satisfaction of the Departmental Representative.
- 2.4 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 PWGSC'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 preapproved 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 this 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 Report any discrepancies between project survey control monuments, Contract Drawings, and existing conditions to the Departmental Representative as soon as they are discovered. Should a discrepancy be found, await written approval from the Departmental Representative prior to proceeding.
 - .5 Establish working control points based on survey control monuments provided (others 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.
 - .6 Establish / layout the proposed alignment(s) and grades using paint lines and survey stakes based on working control points and survey control monuments provided.
 - .7 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.
 - .8 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.

- .9 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.
- .10 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.
- .11 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.
- .12 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.

2.5 Contract Drawings

- .1 Upon award of the project, PWGSC will at the request of the successful Contractor provide the successful Contractor with up to 4 x 609.6 mm x 914.4 mm (24" x 36") and 6 x 279.4 mm x 431.8 mm (11" x 17") "Issued for Construction" or "Issued for Tender" hard copy Contract Drawing sets. Preparation and plotting of the hard copy drawing sets may take up to 14 days to prepare (excluding shipping). The 4 x 609.6 mm x 914.4 mm (24" x 36") drawings provided will exclude the colour coded grading plans (C501-C575) of the paving.
- .2 Upon award of the project, PWGSC 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.

2.6 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 Representative’s 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 hard copy Contract Drawings be discovered (at any time during the work), the hard copy 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 hard copy Contract Drawings. The Departmental Representative shall not be responsible for updating or correcting any discrepancies between the electronic Contract Drawings and the hard copy Contract Drawings identified by the Contractor.

2.7 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

Project Schedule (see Section 01 32 16).

.2

Cash Flow Forecasting (see Section 01 31 00).

.3

Traffic Management Plan (see Section 01 35 00).

.4

Health and Safety Plan (see Section 01 35 33).

.5

Environmental Protection Plan (see Section 01 35 43).

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- .6 Quality Management Plan and related Quality Management documentation (see Section 01 45 00).
 - .7 As-built Survey, and As-built Drawing mark-ups, and if applicable, Shop Drawing mark-ups (see Section 01 78 00).
 - .8 Shop Drawings (if applicable, including professional seal for design work required).
 - .9 Construction Staging Drawings (management of traffic during culvert replacement, only required if Open Cut Method of culvert installation is chosen as per Section 33 42 13) (see Section 01 14 00).
 - .10 Asphalt Mix Design (see Section 32 12 16).
 - .11 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).
 - .12 Aggregate materials quality and property test results.
 - .13 Preliminary Hazard Assessment Form (Appendix A).
 - .14 Confirmation of Prime Contractor's Main Responsibilities Under the WorkSafeBC Occupational Health and Safety Regulations and Worker's Compensation Act form (Appendix B).
- 2.8 Supervisory Personnel
- .1 Within five days of contract 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 each and every work day that Work is being performed, from the commencement of work to Substantial Performance and Completion of the Work.

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- .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, dedicated to quality matters from commencement of work until Substantial Performance and Completion of the Work, and remain onsite at all times the Contractor is performing work which must be tested or inspected in-process (see Section 01 45 00 – Quality Management for further requirements).
- .5 Environmental Monitors: shall be a P.Biol, RPBio or Qualified Environmental Professional (QEP) (see Section 01 35 43 – Environmental Protection for further requirements).
- 2.9 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 Contractors shall coordinate his operations with the other Contractors, including traffic management.
- 2.10 Departmental Representative's Lab and Office Trailer .1 Lab Trailer: Provide power and laydown area in vicinity of Contractor's asphalt plant or other location (if desired by the Departmental Representative) suitable for the Departmental Representative's lab testing trailer. Ensure Departmental Representative has vehicle access to the lab and power source as requested by Departmental Representative.
- .2 Office Trailer: See Item 1.11 – Departmental Representative's Office Trailer of 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

PART 1 – GENERAL

Section Includes

PART 1:

- 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 Staging.
- 1.9 Restoration.

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.
- .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 the Contractor's expense.

- .7 The contractor may complete onsite highway work during daylight hours only, seven days per week with the following restrictions.
- .1 Work in excess of 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 as a result of the extended work hours.
 - .2 Request for approval to work in excess of 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.
- 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 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 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.
 - .5 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.
 - .6 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.

- .7 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 the 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 which 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 BST outside the limits of the work or BST 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. Hauling units on Alaska Highway are not to exceed legal highway load limits or dimensions. 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, PWGSC 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 – Special Procedures – Traffic Control 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.
 - .5 If requested by the Departmental Representative, the Contractor shall install and remove at the completion of the project, one PWGSC-supplied Government of Canada “Accelerated Infrastructure Program” sign (approximately 1.2 m x 2.4 m in size) at each end of the primary project work (~ Km 266 and ~ Km 315) in a location approved by the Departmental Representative and in accordance with the Contractor’s Traffic Management Plan. The wooden posts holding the sign shall be supplied by the Contractor.
- 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. Any access roads or trails extending outside the limits of the work shall be submitted to the Departmental Representative for approval on the Construction Staging / Traffic Management Drawings. 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.
- 1.8 Construction Staging
- .1 The Contractor shall stage the work ensuring that:
 - .1 All design requirements as specified in the Contract Drawings, Contractor prepared Shop Drawings (if applicable), and contract specifications are achieved.
 - .2 All requirements of Section 01 35 00 – Special

Procedures – Traffic Control are achieved.

- .3 The work is completed in accordance with the Contractor prepared, submitted for review, and accepted construction staging drawings as outlined in Item 1.8 – Construction Staging, Subsection .2 of Contract Specification Section 01 14 00 – Work Restrictions, Access Development, Construction Staging, and Restoration (if using open cut method for culvert replacement).
- .4 All requirements of the Section 01 35 43 – Environmental Protection and the Contractor’s Environmental Protection Plan are achieved.
- .5 The work is completed in accordance with scheduling requirements outlined in Item 1.8 – Construction Staging, Subsection .3 of Contract Specification Section 01 14 00 – Work Restrictions, Access Development, Construction Staging, and Restoration, and the Substantial Performance and Completion Dates provided in Section 01 11 00 – Summary of Work.

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

- .2 Should the Contractor choose to install the culvert using the Open Cut Method (see Section 33 42 13 – Pipe Culverts), the following shall be submitted (not required for the Trenchless Method):
 - .1 Prior to undertaking the work, construction staging and detour drawings shall be prepared by the Contractor and submitted to the Departmental Representative for review and acceptance a minimum of Ten (10) days prior to undertaking the work (see Section 01 33 00 – Submittal Procedures). The drawings shall be sealed by a professional engineer qualified to undertake the design work. The construction staging drawings shall cover each construction staging scenario required for the replacement of culverts on the project and shall.
 - .1 Describe and show graphically the proposed stages of construction to complete the work.
 - .2 Describe and show graphically how vehicle traffic will be accommodated throughout all stages of the construction work (including vertical and horizontal alignments and representative sections).

- .3 Show details of cut and fill slopes and provide details of the lengths of culvert which will be installed during each stage of the work.

See Section 01 35 00 – Special Procedures – Traffic Control for the vehicle operational requirements necessary during each stage of the culvert work.

- .3 Stage the work such that the following is achieved:
 - .1 The replacement / installation of all new culverts and repairs to existing culverts called for in the design (either open trench method or trenchless method) shall be completed prior to the placement of the Hot Mix Asphalt Concrete Pavement within 100 m in each direction from the culvert.
 - .2 All instream works for the replacement of Km 277.40 (Polk A Dot Creek) Culvert and repairs to Km 334.7 Culvert are completed during the fish work window July 15 – August 31.
 - .3 The Contractor’s EPP is provided to the Departmental Representative for review and acceptance within 6 weeks of the date of Contract Award (see Item 1.4 – Submittals, Subsection .1, .2, and .4 of Contract Specification Section 01 35 43 – Environmental Protection for further details).

1.9 Restoration

- .1 Remove access points, roads, detours, laydowns 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 or damaged during access development or other works).
 - .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 Hydraulically Seed all disturbed areas and areas designated for Hydraulic Seeding, per Section 32 93 21 – Hydraulic Seeding.

END OF SECTION

PART 1 – GENERAL

Section Includes	PART 1:
	1.1 Definitions.
	1.2 Measurement and Payment Procedures.
1.1 Definitions	.1 Mobilization and Demobilization: Consists of preparatory work and operations, including but not limited to: <ol style="list-style-type: none">.1 Preparation and acceptance of submittals (Construction Schedule, Traffic Management Plan, Quality Management Plan, Environmental Protection Plan, Construction Staging Plans (if applicable), Site Specific 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 Installation and removal (if requested) of one PWGSC-supplied Government of Canada “Accelerated Infrastructure Program” signs at each end of the primary project work (~ Km 266 and ~ Km 315). The signs will be approximately 1.2 m x 2.4 m in size and required two (2) posts to secure in place. The wooden posts shall be supplied by the Contractor..5 Work and costs incurred in the completion of clean-up and project completion..6 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 & 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. <ol style="list-style-type: none">.2 Measurement for Payment for 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 required submittals (including Construction Schedule, Traffic Management Plan, Quality Management Plan, Environmental Protection Plan, Construction Staging Plans (if required), and any other submittals noted in the specifications as being required prior to starting work) have been submitted for review, accepted, 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.
- .3 Payment for Mobilization and Demobilization (Optional Work) will be made on the basis of the Price per Unit Bid for Mobilization & Demobilization (Optional Work) in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs associated with mobilization and demobilization type work listed in 1.1 Definitions above (excluding .1.4) but related strictly to the optional work items listed in the Unit Price Table (Optional Work) of Appendix 1, Invitation to Tender).
- .4 The Lump Sum arrangement for Mobilization and Demobilization (Optional Work) will be made by Lump Sum based on the percentage of optional work (Item No. 30 – 46 of the Unit Price Table (Optional Work)) undertaken by PWGSC and accepted by the Departmental Representative. For example, should 3 km of the 13 km of optional work be completed (limit of paving Km 305+000) with total costs (quantities x unit rates) for Item No. 30 – 46 equaling 23.08% of estimated costs, 23.08% of the Lump Sum payment item for Mobilization & Demobilization (Optional Work) will be paid.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

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|----------------------|---|
| 1.1 Terms of Payment | <p>1.1 Terms of Payment.</p> <p>1.2 Basis of Payment.</p> <p>1.3 Survey.</p> <p>.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 on a monthly basis unless accepted otherwise by the Departmental Representative. The progress payment shall use PWGSC's Request for Progress Payment – Construction Contracts form: PWGSC-TPSGC 1792, found online (see link to Public Works and Government Services – Acquisition Forms within the Reference Documentation section of the Table of Contents for link).</p> <p>With each progress payment, provide to the Departmental Representative:</p> <p>.1 Documentation required by General Conditions (GC) 5 – Terms of Payment.</p> <p>.2 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).</p> <p>.3 Updated project schedule (see Section 01 32 16 – Construction Progress Schedules – Bar (Gantt) Chart.</p> <p>.4 Updated cash flow forecast (see Section 01 31 00 – Project Management and Coordination.</p> |
| 1.2 Basis of Payment | <p>.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.</p> <p>.2 Payment for work shall be made per the Price per Unit as shown in the Unit Price Table.</p> |

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- .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. Provide to the Departmental Representative for each progress claim, survey data at each stage of construction to support progress claim quantities for each unit price item.
 - .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 1.2 of Section 01 25 20).
 - .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.
 - .6 Any work called for in the specifications or shown on the 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.

1.3 Survey

.1 Surveys shall be undertaken by the Contractor to verify quantities for payment purposes. Survey shall be considered incidental to the work and not measured for payment.

.2 All quantity 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 this 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.

.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 10 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 Clearing and Grubbing after the Clearing and Grubbing has been completed to the satisfaction of the Departmental Representative. The survey shall be provided to the Departmental Representative for review and acceptance. Additionally, 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.

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- .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 PWGSC's monument / coordinate system as shown on the Contract Drawings.
 - .6 Survey data shall be provided to the Departmental Representative in digital xyz format with an appropriate descriptor code as to the type of material surface or feature being surveyed. If requested by the Departmental Representative the survey data shall also be provided in a digital CADD model with complete triangulated surfaces created from the survey points and breaklines for each quantity / payment line item in the unit price table.
 - .7 The Contractor shall provide 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.
 - .8 Surveys may be subject to verification by the Departmental Representative. In case of discrepancy, the Departmental Representative's survey will govern.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Pre-Construction Meeting.
- 1.2 On-Site Documents.
- 1.3 Schedules.
- 1.4 Cash Flow Forecasting.
- 1.5 Construction Progress Meetings.
- 1.6 Written Communication / Document Management.
- 1.7 Submittals.
- 1.8 Close-Out Procedures.

1.1 Pre-construction Meeting

- .1 Following award of the contract and prior to the Contractor mobilizing to the site, 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, Quality Control Manager, 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,

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- and fences.
- .5 Permitting and Environmental requirements.
 - .6 Site security in accordance with Section 01 52 00 – Construction Facilities.
 - .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 Site-Specific Health and Safety Plan.
 - .14 Other business as required by the Departmental Representative or Contractor.
- .5 Within 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.

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- .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 by the Contractor).
 - .11 Meeting minutes.
 - .12 Contractor's Site-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, if applicable, 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, revise and resubmit as directed by Departmental Representative.
- 1.4 Cash Flow Forecasting
- .1 Provide detailed cash flow forecasting derived from the project schedule and agreed upon by project payment schedule. The cash flow forecast shall be broken out by line item to coincide with the project schedule. Submit cash flow forecast to the Departmental Representative within fifteen days after award of Contract but in all cases prior to starting onsite work.
 - .2 Update project cash flow forecasting on a monthly basis or for each submission of a progress payment reflecting changes to the schedule until project completion. Submit updated forecast to the Departmental Representative.

1.5 Construction Progress Meetings

- .1 During the course of work the Departmental Representative may schedule construction progress meetings approximately 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, 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 PWGSC's office in Fort Nelson. If held on site, the Contractor shall provide physical space and make arrangements for the meetings.
- .5 Agenda to include following:
 - .1 Review and approval of minutes of previous meeting.
 - .2 Review of work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules (if applicable).
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule and project submittals.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Cash flow forecasting including monthly updates.
 - .11 Maintenance of quality standards.

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- .12 Review proposed changes for effect on construction schedule and on completion date.
- .13 Other business.
- .6 Within 14 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 5 working days.
- 1.6 Written Communication / Document Management
- .1 Written communication & 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 C.
- 1.7 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 PWGSC’s cloud based document filling system “SharePoint”. Support claims for payment with survey data and other evidence as required by the Departmental Representative.
- .3 Submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative. If required by the Departmental Representative, provide supporting documents for proposed substitutions via PWGSC’s cloud based document filling system “SharePoint”.
- .4 Process substitutions through Departmental Representative. If required by the Departmental Representative, provide supporting documents for proposed substitutions via PWGSC’s cloud based document filling system “SharePoint”.
- .5 Process change orders through Departmental Representative via PWGSC’s cloud based document filling system “SharePoint”.
- .6 Deliver closeout submittals for review and preliminary inspections, for transmittal to Departmental Representative via PWGSC’s cloud based document filling system

“SharePoint”.

1.8 Close-Out Procedures

- .1 Notify Departmental Representative when work is considered ready for Substantial Performance.
- .2 Accompany Departmental Representative on preliminary inspection to determine items listed for completion or correction.
- .3 Comply with Departmental Representative’s instructions for correction of items of work listed in executed certificate of Substantial Performance.
- .4 Notify Departmental Representative of instructions for completion of items of work determined in Departmental Representative’s final inspection.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Project Schedule
 - 1.2 Schedule Format.
 - 1.3 Submission of Schedules.
 - 1.4 Project Schedule Reporting During the Work.
- 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.
 - .4 Construction Staging Plan (if applicable).
 - .5 Quality Management Plan.
 - .6 Site-Specific Health and Safety Plan, including MSDS sheets.
 - .7 Shop Drawings and Product Samples (if applicable).
 - .8 As-built Survey and As-Built Drawing Mark-ups.
 - .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 work day 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 (15) days after award of Contract but in all cases prior to starting onsite work.
 - .2 Submit schedules in electronic format via PWGSC's cloud based document filling system "SharePoint" (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.

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- .3 If requested submit two (2) hard copies to be retained by the Departmental Representative.
 - .4 The Departmental Representative will review the schedule and return any comments within ten 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 Job site office.
 - .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 on a monthly basis 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. Indicate progress of each activity to date of schedule submission.
 - .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 other 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 the bring the project back on schedule.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 General Requirements.
 - 1.2 Shop Drawings and Product Data.
 - 1.3 Samples.
- 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 so as 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 PWGSC’s cloud based document filling system “SharePoint” (login details to be provided by Departmental Representative at time of submission following contract award). Submittals shall be named and filed on “SharePoint” in accordance with the Written Communication / Document Management Protocol (see template Appendix C). 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.

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. If adjustments affect the value of work, 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.

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- .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 hard copies 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 and resubmission of corrected Shop Drawings, through same procedure 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 that the Departmental Representative approves the detail design inherent in Shop Drawings, responsibility for which shall remain with the Contractor submitting same, and such review 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

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 References.
- 1.3 Definitions.
- 1.4 Submittals.

PART 2:

- 2.1 Temporary Traffic Control Devices.

PART 3:

- 3.1 General.
- 3.2 Traffic Management.
- 3.3 Protection of Public Traffic.

1.1 Measurement and Payment Procedures

- .1 Payment for the cost of Traffic Control will be made on the basis of the Price per Unit Bid for Traffic Control 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 Control will be made by Lump Sum based on the percentage of the work completed and accepted by the Departmental Representative.
- .3 Payment for the cost of Traffic Control (Optional Work) will be made on the basis of the Price per Unit Bid for Traffic Control (Optional Work) in the Bid and Acceptance Form. The Price per Unit Bid shall include traffic control tasks related strictly to the optional work items listed in the Unit Price Table (Optional Work) including any amendments to 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.
- .4 Measurement for Payment for completion of the Traffic Control (Optional Work) will be made by Lump Sum based on the percentage of optional work (Item No. 30 – 46 of the Unit Price Table (Optional Work)) undertaken by PWGSC and accepted by the Departmental Representative. For example, should 3 km of the 13 km of optional work be completed (limit of paving Km 305+000) with total costs (quantities x unit rates) for Item No. 30 – 46 equaling 23.08% of estimated costs, 23.08% of the Lump Sum payment item for Traffic Control (Optional Work) will be paid.
- 1.2 References
- .1 British Columbia Ministry of Transportation and Highways.
- .1 Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim).
- .2 Supplement to TAC Geometric Design Guide (latest edition).
- .2 Transportation Association Canada.
- .1 Geometric Design Guide for Canadian Roads (latest edition).
- 1.3 Definitions
- .1 Delay – The total amount of time vehicles are stopped by all flaggers or automated traffic control devices due to the contractors 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 (15 minutes).
- .2 Limits of Work – The limits of work for this project are defined as the various “Limits of Construction” locations identified on Project Key Plan and Project Location Plan found in the Contract Drawings.
- 1.4 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 Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim), excluding Sections 3.4.1 and 3.4.2.
- .4 Developed and conform with 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 – 2015 Office Edition (Interim). 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.
- .5 Shall at a minimum include all headings and details as provided in the Template for Category 2 and 3 Traffic Management Plans found in Appendix C: Templates for Traffic Management Plan in the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim). PWGSC 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 Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim).
- .7 Shall include traffic signage to be used on side access roads within the limits of the work.
- .8 DMS messages 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 – 2015 Office Edition (Interim). Additional messages required or anticipated to be required on the project not provided tables listed above shall be outlined in Traffic Management Plan.
- .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 – 2015 Office Edition (Interim) 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.
- .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 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 “SharePoint” 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 Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim) and the following requirements.
- .1 Supply and maintain a total of two (2) portable dynamic message signs (DMS) for the duration of the work at the following sites Km 266.18 – Km 315 and Km 334.7 (only two DMS signs required, see Item 3.2.1.5.2.3 of Contract Specification Section 01 35 00 – Special Procedures Traffic Control for details of how the signs are to be moved). The DMS shall have a minimum of 3 lines with 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 Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim), 100 cm tubular markers shall be used.
 - .3 Automated Flagger Assistance Devices (AFADs) shall not be used on the project.
- .2 Sign sizes used shall conform with the requirements of Appendix B.2: Sizes and Applications of Individual Signs of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim).

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 Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim).
- .2 Responsibilities for traffic control shall be undertaken in accordance with Section 1.2.3 – Traffic Control Responsibilities of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2015 Office

Edition (Interim) and as follows.

- .1 Road Authority shall be Public Works and Government Services Canada (PWGSC).
- .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; and
 - .3 Traffic Control Supervisors and Traffic Control Persons.

- .3 PWGSC will assist the Contractor with the Public Information Plan by notifying DriveBC of the work and posting notice of the project on PWGSC'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 Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim) shall be included in the Traffic Management Plan and by undertaken / implemented by the Contractor prior to commencing work.

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 Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim) and as follows.
 - .1 Section 2.5.3 – Road Authority Acceptance shall be replaced with the requirements of Section 1.4 – Submittals within this specification.
 - .2 References to Ministry shall be replaced with PWGSC.
 - .3 Section 5: Traffic Control Persons (TCP's) of the BC Ministry of Transportation Traffic Management

Manual for Work on Roadways – 2015 Office Edition (Interim).

- .4 Section 6: Traffic Control Layouts – General Instructions of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim). Note: per section 6.3, with respect to construction signage, work zones greater than 1 km in distance from each other shall be managed as separate work zones.
- .5 Section 7: Traffic Control Layouts – Two-Lane, Two-Way Roadways of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim) and as follows.
 - .1 Traffic control layouts as described in the following sections shall not be used on this project.
 - .1 7.3 – Emergent Work (<5 Minutes) – Two-Lane, Two Way Roadway.
 - .2 7.4 – Brief-Duration Work (<15 Minutes) – Two-Lane, Two-Way Roadway.
 - .3 7.5 – Work On Shoulder – Short and Long Duration.
 - .4 7.6 – Work in Parking Lane – Urban Area.
 - .5 7.7 – Roadside Work – Encroachment into Travel Lane – Short Duration.
 - .6 7.9 – Lane Closure with AFADs – Short and Long Duration.
 - .7 7.11 – Work on Low Volume Roadway – No Centerline – Short Duration.
 - .8 7.12 – Work on Low-Volume Roadway – No Centerline – Long Duration.
 - .9 7.13 – Two-Way Left-Turn Lane Closed – Short and Long Duration.

.10 7.15 – One-Lane Bridge or Roadway
– Short and Long Duration

.2 Signage as described in Section 7.2 - Typical Construction Speed Zone Signing – Two-Lane, Two-Way Roadway shall be used on the project in conjunction with other acceptable signage/traffic control layouts as described in Section 7 and with the following revisions.

.1 Sign C-035 shall be replaced with the PWGSC supplied Government of Canada “Accelerated Infrastructure Program” signs at the ends of the primary project work (~ Km 266 and ~ Km 315). If not supplied by PWGSC, the “Accelerated Infrastructure Program” signs are not needed and shall be removed from the Contractor’s Traffic Management Plan.

.2 If a PWGSC Government of Canada “Accelerated Infrastructure Program” (C-035) sign is used or warranted (per the criteria outline in the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim)), The C-086-1 sign shall be replaced with C-086-2 sign.

.3 A DMS and signs C-035-C, C-035-CT, and C-082 shall be added to the signage outside the Limits of Construction in both directions. The DMS shall be positioned approximately 300 m prior to the sign C-018-2A. The signs C-035-C, C-035-CT, and C-082 shall be positioned following sign C-035 and shall be appropriately spaced within the 2 km zone provided. The two DMS shall be moved by the Contractor at various times throughout construction as agreed with the Departmental Representative to provide maximum effectiveness /

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- accommodate the active work zones at Km 266 – Km 315 and Km 334.7.
- .4 Any duplicate signage resulting from the use of other layouts as provided in Section 7 and the Typical Construction Speed Zone Signing layout shown in Section 7.2 shall be removed.
- .3 Single lane alternating traffic temporary traffic signals as described in Section 7.10 – Lane Closure with Temporary Signals – Single Lane Alternating – Short and Long Duration can be used subject to the following.
- .1 Temporary traffic signals shall only be used during non-working hours. During work hours, Traffic Control Persons and applicable signage as described in Section 7.8 – Lane Closure with TCPs – Single Lane Alternating – Short and Long Duration shall be used.
- .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 A stop bar from removable pavement markings shall be used in conjunction with the R-025-R sign.
- .4 Pilot cars with the signage layout as described in Section 7.16 – Pilot Cars shall be used when the length of the single lane alternating traffic exceeds 300 m or where access through the work would be otherwise dangerous. The use of pilot cars and this signage layout shall be subject to the following.
- .1 Temporary traffic signals shall not replace traffic control persons.
- .6 Section 14: Traffic Control Layouts – Pavement Marking of the BC Ministry of Transportation Traffic

Management Manual for Work on Roadways – 2015 Office Edition (Interim). The following shall be used.

- .1 Section 14: Legend, Table A, and Table B.
 - .2 14.1 General Information – Pavement Marking.
 - .3 14.7: Conventional Long-Line Centerline and White Line Marking – Two-Lane, Two-Way Roadway – Short and Long Duration.
- .7 Section 15: Traffic Control Layouts – Surveying of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim). 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.
- .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.
- .9 Existing conditions for traffic may be restricted for the following work as follows:
- .1 Work including full depth reclamation, regrading, paving, shouldering, line painting, rumble strip installation, or others works as preapproved by the Departmental Representative may be restricted to single lane alternating traffic (4.5 m wide lane with 0.5 m shoulder each side) with a speed limit reduced to during these times to 30 km/h (or 50 km/h, at the Contractor’s discretion).
 - .2 Work including culvert installation (when Open Cut method of culvert installation is used) may be restricted to:

- .1 Single lane alternating traffic with horizontal and vertical geometrics in conformance with the requirements as defined in Table 01 35 00 - 01.

Table 01 35 00 - 01: Single Lane Alternating Traffic	
Criteria ⁽¹⁾	Value
Design Speed	30 km/h
Design Vehicle	WB-20
Max Grade	8%
Maximum Superelevation	6%
Minimum Lane Width	3.3 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) ⁽²⁾	1.0 m

Note:

1. Other geometric requirements (not listed, ex off tracking and barrier flare requirements) shall be in conformance with the BC MoT Supplement to TAC Geometric Design Guide (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. All slopes shall be in conformance with WorkSafeBC regulations.

- .2 Traffic management for culvert installation (if Open Cut method of culvert installation is used) shall be at all times consistent with the plan outlined on the accepted Construction Staging drawings.

- .3 Work including full depth reclamation, grade work, reshaping, and paving within the rest stops at Km 183, Km 233, Km 282, and Km 293 shall be scheduled in an effort to minimize closure time of the rest stop areas. When necessary the Contractor may close the Km 183, Km 233, and Km 293 rest stops to public vehicles. The Km 282 rest stop shall remain open to public vehicles via single lane alternating traffic with the maximum allowable delay to any individual motorist travelling through the rest stop equal to 15

minutes.

- .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 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.
- .12 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 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.
 - .2 Protect passing vehicles from damage caused by

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- extraneous materials from construction activities at the site.
- .3 Keep travelled way and detours graded, free of pot holes, and of sufficient width for required number of lanes of traffic.
 - .4 Provide well graded, signed, and maintained temporary traffic lanes and detours to facilitate passage of vehicles through limits of construction.
 - .5 Provide dust control, (if necessary).
 - .6 Complete new grade as soon as practical after disturbing existing roadway surface.
 - .7 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.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 References.
- 1.2 Workers' Compensation Coverage.
- 1.3 Compliance with Regulations.
- 1.4 Submittals.
- 1.5 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.

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- 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 Fire Protection Engineering Services, HRSDC:
 - .1 FCC No. 301, Standard for Construction Operations.
 - .2 FCC No. 302, Standard for Welding and Cutting.
 - .5 American National Standards Institute (ANSI):
 - .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
 - .6 Province of British Columbia:
 - .1 Workers Compensation Act Part 3-Occupational Health and Safety.
 - .2 Occupational Health and Safety Regulation.
 - .7 Preliminary Hazard Assessment Form (Appendix A).
 - .8 Confirmation of Prime Contractor’s Main Responsibilities Under the WorkSafeBC Occupational Health and Safety Regulations and Worker’s Compensation Act form (Appendix B).

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| 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 | PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations. |
| | .2 | It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations. |
| 1.4 Submittals | .1 | The Contractor's 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: <ul style="list-style-type: none">.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 Preliminary Hazard Assessment Form (Appendix A).
 - .2 Confirmation of Prime Contractor's Main Responsibilities Under the WorkSafeBC Occupational Health and Safety Regulations and Worker's Compensation Act form (Appendix B).
 - .3 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
 - .4 Copies of incident and accident reports.
 - .5 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .6 Emergency Procedures.
 - .7 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.
- .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 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 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 Health and Safety Plan to ensure the correction of any deficiencies.

1.5 Health and Safety Plan

- .1 The Contractor shall prepare and comply with the Site-Specific Health and Safety Plan. The preparation and details of the Site-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 Site-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 including, but not limited to, the following:

- .1 Primary requirements:
- .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 General safety rules for project.
 - .5 Job-specific safe work procedures.
 - .6 Inspection policy and procedures.
 - .7 Incident reporting and investigation policy and procedures.
 - .8 Occupational Health and Safety Committee/Representative procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and record keeping procedures.
 - .11 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

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- an emergency.
- .12 Blank copy of Contractor's daily toolbox meeting form.
 - .13 Emergency contact information including PWGSC personnel (including Consultants) and Contractor office and field staff.
- .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
 - .3 List hazardous materials to be brought on site as required by work.
 - .4 Indicate engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
 - .5 Identify personal protective equipment (PPE) to be used by workers.
 - .6 Identify personnel and alternates responsible for site safety and health.
 - .7 Identify personnel training requirements and training plan, including site orientation for new workers and personnel designated by the Departmental Representative as needing to visit the site.
 - .8 Identify wildlife management plans for large mammal safety and other animals.
 - .9 Identify employee training plans for wildlife encounters and prevention.
 - .10 Identify fire safety, fire reporting, and fire evacuation procedures.
- .2 Include with the Health and Safety plan, resume(s) or certification(s) of Health and Safety Coordinator(s) responsible for site safety.
 - .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.

- .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
- .5 Departmental Representative's review: the review of Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract Documents.
- 1.6 Contractor's Responsibility
- .1 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.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and ordinances, and with Site-Specific Health and Safety Plan.
- .3 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 that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.
- .2 Be responsible for implementing, daily enforcing, and monitoring the Site-Specific 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 personnel, and temporary lighting as required.
 - .2 Secure site during non-work at night time 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 a 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 SharePoint on a weekly or more frequent basis.
- 1.9 Project / Site Conditions
- .1 Work at the site may, at a minimum, involve contact with:
 - .1 Utilities.
 - .2 General public (including large transport trucks) and PWGSC maintenance personnel travelling the highway.
 - .3 Local wildlife.
 - .4 Unpredictable and adverse weather conditions.
- 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.

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| 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: <ul style="list-style-type: none"> .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: <ul style="list-style-type: none"> .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: <ul style="list-style-type: none"> .1 Work at high angles. |

- .2 Work in confined spaces or where there is a risk of entrapment.
- .3 Work with hazardous substances.
- .4 Underground work.
- .5 Work on, over, under and adjacent to water.
- .6 Workplaces where there are persons who require physical assistance to be moved.
- .4 Design and mark emergency exit routes to provide quick and unimpeded exit.
- .5 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) 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. Submit applicable MSDS and WHMIS documents as per Section 01 33 00 – Submittal Procedures.
 - .2 Provide adequate means of ventilation acceptable to the Departmental Representative and suitable for the hazard.
- 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

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- 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 Health and Safety Plan.
- .2 Sequence of work.
- .3 Emergency procedures.
- .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshaling station, and the emergency transportation provisions.
- .5 Notice of Project.
- .6 Floor plans or site plans.
- .7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
- .8 Workplace Hazardous Materials Information System (WHMIS) documents.
- .9 Material Safety Data Sheets (MSDS).
- .10 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

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- 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.

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- .2 Locate sufficient blankets and towels, stretcher,; and 1 hand held emergency siren in all confined access locations.
 - .3 Provide a minimum of 1 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.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 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 Environmental Site Inspection Memo.
- 1.8 Environmental Monitoring Report.
- 1.9 Environmental Effects Evaluation (EEE).
- 1.10 Notification.

PART 2:

- 2.1 Products.

PART 3:

- 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.

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- 3.11 Relics and Antiquities.
 - 3.12 Waste Materials Storage and Removal.
 - 3.13 Wastewater Discharge Criteria.
 - 3.14 Drainage.
 - 3.15 Environmental Protection Supplies.
- 1.1 Definitions
- .1 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.
 - .2 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.
 - .3 Wetted Perimeter: area of stream where water is currently running or pooled.
 - .4 In-stream Work: any work performed below the high water mark, either within or above the Wetted Perimeter of any Fisheries Sensitive Zone.
 - .5 Fisheries Sensitive Zone: in-stream aquatic habitats and out of stream habitat features such as side channels, wetlands, and riparian areas.
 - .6 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.
 - .7 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.
www.agf.gov.bc.ca/cropprot/noxious.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 D).
 - .4 Responsibility Checklist For Authorizations /Approvals / Notifications / Permitting (Appendix E).
 - .5 Relevant Environmental Publications (Appendix F).
 - .6 PWGSC Environmental Effects Evaluation (EEE) Report (Appendix H).
 - .7 British Columbia Ministry of Forests, Lands, and Natural Resource Operations (FLNRO) Section 11 Approval for Instream Work (Appendix I).
- 1.3 Regulatory Overview
- .1 The Departmental Representative will complete the environmental notification / permitting required under provincial regulations (Ministry of Forests, Lands, and Natural Resource Operations (FLNRO) and or British Columbia Ministry of Environment and Climate Change Strategy (MoE)), prior to the start of the project. The Contractor shall be aware that submission of the Contractor's Environmental Protection Plan (EPP) may be required for this notification and a response to the notification from FLNRO / MoE will take a minimum of 45 days. Work by the Contractor within 30 m of any fisheries sensitive zone cannot commence until the notification response from FLNRO / MoE is received.
 - .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.
 - .2 Comply with and be subject to those permits and approvals obtained from the Departmental Representative to conduct the Work.
 - .3 Pay specific attention to the provincial BC Land Use Permit, Water License and Quarry Permit.
 - .4 Pay specific attention to the Migratory Birds Convention

Act, as amended in 1994.

- .5 Pay specific attention to the provincial BC guidelines under Peace Region Least Risk Timing Windows: Biological Rational (2009).
 - .6 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.
- 1.4 Submittals
- .1 The Contractor's EPP, Breeding Bird and Bird Nest Survey Memo, Environmental Site Inspection Memos, and Environmental Monitoring Report shall be submitted to the Departmental Representative within 6 weeks of the date of Contract Award. Each report/ 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, Environmental Site Inspection Memos, and Environmental Monitoring Report (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 FLNRO / MoE.
- .5 The review of the EPP, Breeding Bird and Bird Nest Survey memo, Environmental Site Inspection Memo, 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 .1 (EPP)

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 D) and as identified in this Section of the specifications. The review of the PWGSC Environmental Effects Evaluation (EEE), (Appendix H) will assist in completing this document. 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 completed by a P.Biol or RPBio, or other qualified professional, and shall, at a minimum include the following:

- .1 The specifics of a detailed monitoring program (to be completed by the contractor). This includes details and rationale concerning sampling locations, timing, duration, and methods, and identification of the person(s) who will be carrying out the monitoring program. Include resumes of proposed environmental monitors and personnel responsible for the preparation of the EPP.
- .2 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.
- .3 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 (FLNRO / MoE) approval or notification for instream work or under FLNRO / MoE guidelines, and all other applicable regulations including the requirements of these specifications.
 - .4 Drawings should show 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.
 - .5 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.
 - .6 Spill Control Plan: including procedures, instructions, and reports to be used in the event of unforeseen spill of regulated substance.
 - .7 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .8 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.
 - .9 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 FLNRO Approval or Notifications for Instream Work, NWPFA Approval for Instream Work, DFO Fisheries Act requirements etc.) and these contract specifications.
- .10 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.
- .11 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 clearing and grubbing at Km 271.1. 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 7 days of the commencement of the clearing and grubbing. Should the clearing and grubbing work stop for any reason longer than 24 hrs 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 clearing and grubbing. Details of the concerns shall be described and itemized in the memo by the QEP, P.Biol, or RPBio.

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- 1.7 Environmental Site Inspection Memo .1 The Contractor shall submit an Environmental Site Inspection Memo within 3 weekdays of each site visit or week of full time site inspections. The Environmental Site Inspection Memo shall include the following:
- .1 Date and times when environmental monitor onsite.
 - .2 General site conditions / construction activities ongoing at the time of the inspection.
 - .3 Findings, non-conformances with EPP, and items requiring correction by the Contractor from the environmental monitors review and inspection of environmentally sensitive activities including but not limited to:
 - .1 Fuel and Oil Storage and Fueling Practices
 - .2 Care and Maintenance of Construction Equipment
 - .3 Spill Response Preparedness
 - .4 Construction Activities and Construction Site Management
 - .5 Erosion and Sediment Issues
 - .6 Wildlife Observations/Mitigation and Sensitive Habitat
 - .7 Culvert/In-stream Work
 - .8 Other/Comments.
 - .4 Photos of any concerns, nonconformances with EPP, or items requiring attention.
- 1.8 Environmental Monitoring Report .1 The Contractor shall submit an Environmental Monitoring Report within 60 days of project completion. The report shall be completed for MoE / FLNRO but submitted first to the Departmental Representative for review and acceptance.
- .2 The Environmental Monitoring Report shall use the recommended format as outlined in Section 8 – Monitoring and Reporting of the BC MoE Standards and Best Practices for Instream Works and summarized below as follows:
- .1 Project Description: project name; site location; type of works; and person or organization undertaking the

- works.
- .2 Site Inspections: frequency of monitoring; staff member(s) conducting the inspection; dates and times of inspection; extent of inspection; summary description of each inspection visit; and weather on the day of inspection and during the period immediately preceding the inspection.
 - .3 Construction Stage: a brief description of the construction activities completed; and a brief description of planned construction activities for the period following the site inspections.
 - .4 Mitigation Measures/Structures: recommended mitigation measures, including the maintenance of previously constructed measures, and the construction, installation or implementation of new measures; and review of previously recommended mitigation measures.
 - .5 Salvage Results: results of fish and amphibian salvages conducted prior to works, including, at a minimum, a specific site location, list of species, and numbers salvaged.
 - .6 Comments/Other: description of any incidents related to environmental issues or emergencies that occurred on the site and how they were monitored, mitigated and remediated; and description of any outstanding mitigative measures or monitoring programs needed for until the completion of site restoration.
 - .7 Photographs: representative date stamped photographs should be taken during each site inspection, and during and after all incidents.
- 1.9 Environmental Effects Evaluation (EEE)
- .1 Execution of the work is subject to the provisions within the Environmental Effects Evaluation (EEE) completed by a PWGSC Environmental Services Representative for the project (Appendix H).
 - .2 Pursuant to the expectations of the EEE, EPPs are the next step to achieve the desired results of minimal adverse environmental effect, as the project is constructed.
 - .3 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the work being suspended pending rectification of the

problems.

- 1.10 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 environmental monitoring shall be completed by P.Biol, RPBio, or Qualified Environmental Professional (QEP). If a QEP completes the monitoring, the QEP must work under the direction of the P.Biol or RPBio who completes the Environmental Protection Plan.
 - .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. At a minimum, the environmental monitor shall be onsite and visit all areas of active construction as follows:
 - .1 Fulltime onsite presence during all instream works and all works within 30 m of a waterway. This includes all culvert replacement work and earthworks at Polk A Dot Creek and all culvert repair work at Km 334.7 culvert.

- .2 Once every 14 days from commencement of construction to the date substantial performance is achieved.
- 3.2 Site Access and Parking .1 The Contractor shall review both short and long 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.
- .2 If necessary, 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 be in compliance with 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 meters 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 meters 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.

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- .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.
- .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 meters 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 meters 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 use 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 on site 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 hire a security person employed to prevent vandalism.

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. 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 top soils) in the trees bordering the right-of-way or into surface water.
- .3 When, in the opinion of PWGSC, 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.

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- .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.
- 3.9 Fires and Fire Prevention and Control .1 If burning timber and other organic material resulting from clearing operations comply with the Open Burning Smoke Control Regulation within the British Columbia Environmental Management Act. Onsite fires only permitted when approved by Departmental Representative. The burning of other waste products or materials generated as a result of the construction not permitted.
- .2 If disposal by burning is used and if required by the British Columbia Open Burning Smoke Control Regulation, submit burning permit to Departmental Representative prior to commencement of burning operations.
- .3 If burning prevent staining or smoke damage to structures, materials or vegetation which is to be preserved. Restore, clean, and return to new condition stained or damaged work.
- .4 A fire extinguisher shall be carried and available for use on each machine and at locations within the quarry in the event of fire. Should the contractor choose to burn timber and organic materials resulting from clearing operations, firefighting equipment including a water truck; minimum 2000 Liters with 150 meters of fire hose and a pump capable

of producing 300 kPa water pressure at the nozzle, three shovels, two Pulaski's, and two 20 liter backpack pumps shall be maintained at the construction site at a location known and easily accessible to all Contractors' staff. The Contractor's staff shall receive basic training in early response to wildfire events during the "environmental briefing" presented by the Contractor.

- .5 Construction equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.
- .6 Care shall be taken while smoking on the construction site to ensure that the accidental ignition of any flammable material is prevented.
- .7 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 start-up pre-construction meeting.
- .8 Where fires or burning is permitted, prevent staining or smoke damage to structures, materials or vegetation which is to be preserved. Restore, clean and return to new condition stained or damaged Work.
- .9 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, 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 shall be reported to the Departmental

- Representative immediately. The Contractor and workers shall wait for instruction before proceeding with their work.
- .2 All historical or archaeological objects found in the rock quarry 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.
- .3 Human remains must be reported immediately to the local RCMP.
- 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 meters from natural drainage courses and 100 meters from fish bearing waters, and will conform to the discharge requirements set out in the provincial Water Act Permit:
- .2 Contractor must obtain approval from the provincial Water Act Officer prior to discharging any treated wastewater.
- 3.14 Drainage .1 Provide temporary drainage and pumping as necessary to

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- 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 are in compliance with 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 silt fencing, 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 meters from natural drainage courses and 100 meters from fish bearing waters.

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- .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.
- 3.15 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 or more and as required of polypropylene silt fence (typical height of 0.9 m) and the necessary stakes for installation. This will be used as necessary to prevent sediment transport into water bodies.
- .3 Provide a minimum of 50 lineal meters 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 silt fence(s) 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

PART 1 – GENERAL

Section Includes

PART 1:

- 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.
- 1.11 Non-Conformance Reports.
- 1.12 Departmental Representative Inspection and Audits.

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 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.
- .3 Payment for the cost of Quality Management (Optional Work) will be made on the basis of the Price per Unit Bid for Quality Management (Optional Work) in the Bid and Acceptance Form. The Price per Unit Bid shall include quality management tasks related strictly to the optional work items listed in the Unit Price Table (Optional Work) including 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.

- .4 Measurement for Payment for completion of the Quality Management (Optional Work) will be made by Lump Sum based on the percentage of optional work (Item No. 30 – 46 of the Unit Price Table (Optional Work)) undertaken by PWGSC and accepted by the Departmental Representative. For example, should 3 km of the 13 km of optional work be completed (limit of paving Km 305+000) with total costs (quantities x unit rates) for Item No. 30 – 46 equaling 23.08% of estimated costs, 23.08% of the Lump Sum payment item for Quality Management (Optional Work) will be paid.

1.2 References

- .1 British Columbia MoTI – 2016 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/ft³ (600 kN-m/m³)).
- .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- μ m (No. 200) Sieve in Mineral Aggregates by Washing.
- .8 ASTM D5821, Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.

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- .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.
- .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 plans 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.
- 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

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- 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 Contractor'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 Lists of the testing and survey checks, including minimum frequencies, to be completed by the

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- 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 completed by the Quality Control Personnel (ex. check sheets, test forms, daily reports, NCR's, etc.).
 - .6 Resumes of Quality Control Manager and designated replacement (if applicable) detailing the Quality Control Manager(s) past experience performing similar roles on similar projects.
 - .7 Details of the anticipated work schedule (onsite and breaks) for the Quality Control Manager and designate replacement Quality Control Manager.
 - .8 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.
 - .9 Details of the QC procedures and processes which will be undertaken during the preparation of the Mix design(s).
 - .10 Details of the asphalt plant mixing procedures (cold feed, sampling, AC flow rate, temperature control, records, weigh scale, etc.).
 - .11 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.
 - .12 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.

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- .13 Details of 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 will include the following information:
 - .1 The name 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 project's 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 independent 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 Personnel (including 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 Contractor'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 PWGSC 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 PWGSC's cloud based document filling system "SharePoint" within 24 hrs. of the completion. Submit to the Departmental Representative hard copies of the same documents, forms, and test results if requested.
- 1.10 QC Testing
- .1 Testing required to provide Quality Control to assure that the work strictly complies with the Contract requirements shall be completed by the Contractor using a fully equipped, operational, and staffed onsite field laboratory (except for tests noted otherwise in Table 01 45 00 – 01) during times of construction activity and gravel manufacturing and at a minimum include:
 - .1 All testing required to confirm aggregate properties, aggregate gradation, compaction and asphalt mix properties where specified.
 - .2 All testing specified in the Contract Documents.
 - .3 Any other testing required as a condition for deviation from the specified Contract procedures.
 - .2 The frequency of testing shall be outlined in the Quality Management Plan. At a minimum the Contractor shall achieve the most stringent Quality Control testing frequencies as follows:
 - .1 The specific frequencies defined elsewhere in these specifications.
 - .2 The minimum QC testing frequencies as defined in Table 01 45 00 – 01.

Table 01 45 00 - 01: Minimum QC Testing Frequencies		
Activity	Test / Inspection	Frequency / Submission Date ⁽¹⁾

Manufacture – Gravel Shouldering, Culvert Bedding, Crushed Base Gravel, Sub-base Course, Drain Rock	Gradation (ASTM C136)	The more stringent of: 1 test per 3000 m ³ or 1 test for every 2 hours of manufacturing
Screening / sorting - Riprap	Gradation (ASTM D5519)	1 Test per every 1 day of production
Placement / Site Tolerance – Crushed Base Gravel, BST / Base Material (following Full Depth Reclamation)	Survey	Final Lift, 5 survey shots along each cross section at 20 m stations
Placement / Site Tolerance – Sub-base Course	Survey	Final Lift, 3 survey shots along each cross section at 20 m stations
Placement / Site Tolerance – Highway Embankment and Drain Rock	Survey	Final Lift, 1 survey shot every 5 m measured along each cross section at 20 m stations
Placement / Site Tolerance – Gravel Shouldering	Survey	2 survey shots every 20 Stations on each side of road
Placement / Site Tolerance – Culverts	Survey	1 survey shot (invert or top of culvert) every 5 m length of culvert section installed using open cut method
Placement / Site Tolerance – Culvert Bedding Material & Crushed Base Gravel	Survey	1 survey shot every 3 m ² of placed material when using open cut method
Placement / Site Tolerance – Riprap	Survey	4 survey shots for each end of every Riprap Culvert End Protection installation
Placement / Site Tolerance – Precast Concrete Barrier	Survey	1 survey shots for every 5 m of precast concrete barrier placed
Compaction – Crushed Base Gravel, Sub-base Course	In-Place Density (ASTM D698)	3 randomly located tests over the full width of material placed every 20 m stations, per each lift of material placed
Compaction – BST / Base Material (following Full Depth Reclamation)	In-place Density (Proof Roll)	Proof Roll over full width and length of each lift of material placed
Compaction – Embankment	In-Place Density (ASTM D698, Proof Rolling)	1 test per 200 m ² of placed material per lift or Proof Roll over full width and length of each lift of material placed if 30% or more of the Embankment Material is oversized (> 19 mm)
Compaction – Culvert Bedding Material	In-Place Density (ASTM D698)	4 randomly located tests over the full length of the culvert per each lift of material placed if using open cut method
Manufacture - Cast-in-place Flowable Fill (only to be used if Trenchless Method is chosen by the Contractor)	Compressive Strength (ASTM C1019)	1 set of 4 (one 7 day and three 28 day) cubes for every culvert filled with flowable fill if using culvert jacking method

Manufacture – Precast Concrete Barrier	Concrete Slump (ASTM C143)	As per CSA Certified Manufacturing Plant QC Requirements
Manufacture – Precast Concrete Barrier	Air Content (ASTM C173)	As per CSA Certified Manufacturing Plant QC Requirements
Manufacture – Precast Concrete Barrier	Compressive Strength (ASTM C39)	As per CSA Certified Manufacturing Plant QC Requirements
Manufacture – Asphalt Mix Aggregate	Gradation (ASTM C136, ASTM C117)	As per Contractor's desired frequency to satisfy Contractor's QC requirements and QA payment adjustments and rejection limits
Manufacture – Asphalt Mix Aggregate	Fracture (ASTM D5821)	As per Contractor's desired frequency to satisfy Contractor's QC requirements and QA payment adjustments and rejection limits
Manufacture – Asphalt Mix Aggregate (Coarse Aggregates)	Relative Density (Specific Gravity), and Absorption (ASTM C127) ⁽¹⁾	The more stringent of: - 1 for each coarse aggregate gravel pit source (test shall have been completed within 1 year of the mix design submission date) - 1 for any change in nature or source of aggregates within a gravel pit Submission date the more stringent of: - Within 2 weeks of commencement of crushing - 7 days prior to the start of paving
Manufacture – Asphalt Mix Aggregate (Coarse Aggregates)	Clay Lumps and Friable Particles (ASTM C142) ⁽²⁾	1 per every 3,000t of coarse aggregate manufactured
Manufacture – Asphalt Mix Aggregate (Coarse Aggregates)	Degradation (ASTM D6928) ⁽²⁾	The more stringent of: - 1 for each aggregate gravel pit source (test shall have been completed within 1 year of the mix design submission date) - 1 for any change in nature or source of aggregates within a gravel pit Submission date the more stringent of: - Within 2 weeks of commencement of crushing - 7 days prior to the start of paving

Manufacture – Asphalt Mix Aggregate (Coarse Aggregates)	Flat Particles, Elongated Particles (ASTM D4791) ⁽²⁾	The more stringent of: - 1 for each coarse aggregate gravel pit source (test shall have been completed within 1 year of the mix design submission date) - 1 for any change in nature or source of aggregates within a gravel pit Submission date the more stringent of: - Within 2 weeks of commencement of crushing - 7 days prior to the start of paving
Manufacture – Asphalt Mix Aggregate (Mineral Filler)	Plasticity (ASTM D4318) ⁽²⁾	The more stringent of: - 1 for each mineral filler aggregate gravel pit source (test shall have been completed within 1 year of the mix design submission date) - 1 for any change in nature or source of aggregates within a gravel pit
Manufacture – Asphalt Mix Aggregate (Mineral Filler and Mineral Dust)	Organic Matter	The more stringent of: - 1 for each mineral filler aggregate gravel pit source (test shall have been completed within 1 year of the mix design submission date) - 1 for any change in nature or source of aggregates within a gravel pit
Manufacture – Asphalt Mix Aggregate (Fine Aggregates)	Sand Equivalent (ASTM D2419) ⁽²⁾	The more stringent of: - 1 for each fine aggregate gravel pit source (test shall have been completed within 1 year of the mix design submission date) - 1 for any change in nature or source of aggregates within a gravel pit
Manufacture – Asphalt Mix Aggregate (Fine Aggregates)	Uncompacted Void Content (AASHTO T 304 Method “A”) ⁽²⁾	The more stringent of: - 1 for each fine aggregate gravel pit source (test shall have been completed within 1 year of the mix design submission date) - 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 Mix Design	Tensile Strength Ratio (AASHTO T283)	1 per each Asphalt Mix Design prepared and submitted
Tests During Asphalt Plant Mixing	Moisture Content (ASTM C566 & D2216)	Aggregate: 2 tests/Lot Asphalt Mix: 1 on first Sub-lot and every second day

Tests During Asphalt Plant Mixing	Gradation (ASTM C117)	1 per shift on reduced sample obtained from combined samples from the plant cold feed
Tests During Asphalt Plant Mixing	Marshall (ASTM D5581)	1 set of three briquettes per Lot
Tests During Asphalt Plant Mixing	Asphalt Content (ASTM D6307)	1 per Lot
Tests During Asphalt Plant Mixing	Viscosity (ASTM D2171)	Contractor's Option
Test During / Following Asphalt Paving for Density Testing	Core Samples (ASTM D2726)	At start, 2 cores for each Sub-Lot. After rolling pattern established, one core for each Sub-Lot. All cores to be a minimum of 100 mm diameter
Test During Asphalt Paving for Density Testing	Resistance to Plastic Flow (AASHTO T 245)	One 15 kg sample for every sub-lot or minimum 1/day

Note:

- (1) The test result shall be provided to the Departmental Representative for review and acceptance per the submission date requirements when noted.
- (2) Should the contractor choose, tests noted may be completed by a CCIL compliant offsite laboratory rather than an onsite laboratory. Any additional offsite testing shall be pre-approved by the Departmental Representative.

.3 As defined in the BC MoTI 2016 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 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 of this

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- 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 (hard copy if requested) and in electronic format via PWGSC's cloud based document filling system "SharePoint".
 - .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 will issue to the Contractor a NCR with a required response time.

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

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment.
- 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.

1.1 Measurement and Payment

- .1 Payment for the cost of 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 completion of the Departmental Representative's Office Trailer will be made by Lump Sum based on the percentage of the work completed and accepted by the Departmental Representative.
- .3 Payment for the cost of Departmental Representative's Office

Trailer (Optional Work) will be made on the basis of the Price per Unit Bid for Departmental Representative's Office Trailer (Optional Work) in the Bid and Acceptance Form. The Price per Unit Bid shall include the Departmental Representative's Office Trailer tasks related strictly to the optional work items listed in the Unit Price Table (Optional Work) including supply, installation, and maintenance of the Departmental Representative's Office Trailer and related washroom facilities for the duration of the optional work and all other items necessary for the successful completion of the task. Note the office trailer shall be the same office trailer already mobilized under the work (Item No 4), i.e. a second another office trailer is not required.

- .4 Measurement for Payment for completion of the Departmental Representative's Office Trailer (Optional Work) will be made by Lump Sum based on the percentage of optional work (Item No. 30 – 46 of the Unit Price Table (Optional Work)) undertaken by PWGSC and accepted by the Departmental Representative. For example, should 3 km of the 13 km of optional work be completed (limit of paving Km 305+000) with total costs (quantities x unit rates) for Item No. 30 – 46 equaling 23.08% of estimated costs, 23.08% of the Lump Sum payment item for Departmental Representative's Office Trailer (Optional Work) will be paid.
- 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.

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| 1.7 Equipment, Tool, and Materials Storage | .1 | If required by the Contractor provide and maintain, in a clean and orderly condition, lockable weather proof 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 – Special Procedures – Traffic Control, 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 portion of the highway, and outside the highway clear zone. |
| | .2 | Other areas as pre-approved by the Departmental Representative. |
| 1.11 Departmental Representative's Office Trailer | .1 | Provide Departmental Representative with office trailer positioned in a location on or near highway right-of-way selected by the Departmental Representative between Km 266 and Km 305. |
| | .2 | Departmental Representative's Office Trailer shall have: |
| | .1 | Inside dimensions measuring a minimum 3.6 m long x 3 m wide x 2.4 m high, with floor 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 | Power for the on-site trailer shall be available at all times by means of a generator, supplied and maintained by the Contractor, or by other hook-ups as |

- accepted by the Departmental Representative.
- .4 Finished inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.
- .5 Equip office with 1 x 2 m table, 4 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, and one coat rack and shelf.
- .6 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10 % upward light component.
- .7 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, and maintain supply of paper towels and toilet tissue.
- 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

PART 1 – GENERAL

Section Includes

PART 1:

- 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.
- 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

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 General Requirements.
- 1.2 Requirements of Regulatory Agencies.

PART 2:

- 2.1 Products.

PART 3:

- 3.1 Mobilization.
- 3.2 Maintenance.
- 3.3 Demobilization.

1.1 General Requirements

- .1 The Contractor to provide its own construction camp and office as necessary. The construction camp shall not be located within PWGSC right-of-way. Obtain approval from land owner should Contractor choose to setup construction camp outside right-of-way.
- .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 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

PART 1 – GENERAL

Section Includes

PART 1:

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| | 1.1 | Project Cleanliness. |
| | 1.2 | Final Cleaning. |
| 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. |
| 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. Reinststate 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 or BST finished areas. |
| | .9 | Clean drainage systems. |

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Submissions.
 - 1.2 Recording As-built Conditions (As-Built Drawings).
 - 1.3 As-Built Survey.
- 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 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 by the Contractor up 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 incl. cut and fill slopes, embankment and gravels placed).
 - .2 Culverts (inverts at inlet and outlet).
 - .3 Concrete barriers.
 - .4 Edge of asphalt.
 - .5 Pavement markings and signage (new or modified).
 - .6 Riprap.
 - .7 Gravel shoulder.
 - .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 PWGSC's monument / coordinate system as shown on the Contract Drawings.
 - .4 Survey data shall be provided to the Departmental Representative in digital xyz format with an appropriate descriptor code as to the type of material surface or feature being surveyed. If requested by the Departmental Representative the survey data shall also be provided in a digital CADD model with triangulated surfaces created from the survey points and breaklines.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Definitions.
- 1.2 Submittals.
- 1.3 Storage and Handling.
- 1.4 Transportation.

PART 2:

- 2.1 Materials.

PART 3:

- 3.1 Disposal.

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 Submit to the Departmental Representative a current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.

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- .3 If requested by the Departmental Representative, submit a 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

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 General.
- 1.2 Measurement and Payment.
- 1.3 References.
- 1.4 Definitions.
- 1.5 Submittals.
- 1.6 Quality Management.

PART 2:

- 2.1 Flowable Fill.
- 2.2 Flowable Fill Mix.

PART 3:

- 3.1 General.
- 3.2 Site Preparation.
- 3.3 Delivery, Storage, and Handling.
- 3.4 Placement.
- 3.5 Curing and Finishing.

1.1 General

- .1 Should the Contractor choose to install the 600 mm, 800 mm, 900 mm, and 1000 mm diameter culverts using the Trenchless Method, the existing abandoned pipe culvert shall be filled with Flowable Fill as per this specification.
- .2 Should the Contractor choose to install the 600 mm, 800 mm, 900 mm, and 1000 mm diameter culverts using the Open Cut Method, Flowable Fill is not required.

1.2 Measurement and Payment

- .1 Payment for the completion of Flowable Fill shall not be made and shall be considered incidental to Section 33 42 13 - Pipe Culverts.

1.3 References

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

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- .1 ASTM C1019, Standard Test Methods for Sampling and Testing Grout.
 - .2 ASTM C940, Standard Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory.
- .1 Canadian Standards Association (CSA International), latest edition.
 - .1 CSA 23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- 1.4 Definitions
- .1 Flowable Fill: Ready-mix controlled low strength material used as an alternative to compacted soil, and is also known as controlled density fill, and several other names, some of which are trademark names of material suppliers. Flowable Fill differs from Portland cement concrete as it contains a low cementitious content to reduce strength development for possible future removal.
- 1.5 Submittals
- .1 Undertake the Flowable Fill mix design and pay for all costs associated with the development, testing, and submissions of the mix design. Additional requirements of the mix design:
 - .1 Expected method of batching, transporting, and placing concrete.
 - .2 Distance and expected travel time from batch plant location to project site.
 - .2 The Contractor's Flowable Fill mix design 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 mix design (first submission and if required all subsequent re-submissions) within 7 days of submission. Upon review of the mix design the Departmental Representative will do one of the following:
 - .1 Accept the mix design.
 - .2 Accept portions of the mix design 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.

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

.4 No Flowable Fill shall be placed prior to receiving Departmental Representative's acceptance of the Flowable Fill mix design.

.5 Acceptance of the Flowable Fill mix design by the Departmental Representative does not constitute acceptance of the Flowable Fill. Acceptance of the Flowable Fill will be based upon the test results and the performance and quality of the Flowable Fill and concrete components placed on the project.

1.6 Quality Management

.1 Quality Control and Quality Assurance in accordance with Section 01 45 00 – Quality Management.

.2 Quality Control testing frequency: Minimum test frequency as described in Table 01 45 00 – 01 unless advised otherwise by the Departmental Representative following a review of the Flowable Fill Mix Design but in advance of the work.

PART 2 – PRODUCTS

2.1 Flowable Fill

.1 Provide Flowable Fill containing, at minimum, cementitious materials and water. Cementitious materials shall be Portland cement, pozzolanic materials, or other self-cementing materials, or combinations thereof, at the Contractor's option. The Flowable Fill mix design may also contain, fine aggregate or filler provided the final product meets the strength, flow consistency, and shrinkage requirements included in this specification.

.2 Portland cement: to CAN3-A23.1-M

.3 Water: to CAN3-A23.1-M

.4 Aggregates: to CAN3-A23.1-M

.5 Air entraining Admixtures: to CAN3-A266.1-M

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- .6 In no case will batch adjustment relieve the Contractor of the responsibility for the durability, strength, or acceptability of Flowable Fill concerned. The Departmental Representative reserves the right to reject any batch in case of confirmed unacceptability and to require immediate removal of any Flowable Fill from this batch from the work.
- 2.2 Flowable Fill Mix
- .1 Proportion Flowable Fill to yield the following properties.
- .1 Maximum cementitious content of 90 kg/m³.
- .2 Minimum compressive strength at 28 days: 2.1 MPa.
- .3 Maximum compressive strength at 28 days: 5 MPa.
- .4 Consistency that will result in a flowable product at the time of placement which does not require manual means to move it into place.
- .5 Maximum evaporation of bleed water shall not result in shrinkage of more than 10.4 mm per m of Flowable Fill depth. Measurement of a final bleeding shall be as measured in Section 10 of ASTM C940.
- .2 Do not change Flowable Fill Mix without prior approval of the Departmental Representative. Should change in material source be proposed, a new Flowable Fill mix design to be submitted to the Departmental Representative for compliance acceptance.

PART 3 – EXECUTION

- 3.1 General
- .1 Provide 24 hours' notice and Obtain the Departmental Representative's approval before placing Flowable Fill.
- .2 Prior to placing Flowable Fill obtain approval from the Departmental Representative of proposed method of protection of Flowable Fill during placing and curing in adverse weather or when air temperatures are less than 5 degrees Celsius or greater than 30 degrees Celsius.
- 3.2 Site Preparation
- .1 Backfill ends of the existing culvert or use other means to ensure Flowable Fill does not escape the existing culvert.
- .2 Use pumps and other means to ensure the existing culvert is clear of standing water and other debris until the Flowable Fill is placed.

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- 3.3 Delivery, Storage, and Handling
- .1 Flowable Fill shall be fully discharged and placed within 3 hours after water and cement have been combined. Any proposed deviation from this requirement must be pre-approved by the Departmental Representative. To obtain pre-approval the contractor shall submit in writing the proposed methodology to ensure all concrete strength and other requirements are achieved. Regardless of the proposed methodology submitted, the Departmental Representative is under no obligation to deviate from this requirement.
 - .2 Flowable Fill delivery: ensure that continuous Flowable Fill delivery from plant meets CSA A23.1/A23.2.
 - .3 Waste Management and Disposal:
 - .1 Divert unused Flowable Fill materials to a local landfill facility approved by the Departmental Representative.
 - .2 Provide an appropriate area on the job site where concrete trucks can be safely washed.
 - .3 Unused admixtures and additive materials must not be disposed of into sewer systems, into lakes, streams, onto ground, or in other locations where it could pose a health or environmental hazard.
 - .4 Prevent admixtures and additive materials from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with inert, non-combustible material and remove for disposal. Dispose of waste in accordance with applicable local, provincial/territorial, and national regulations.
- 3.4 Placement
- .1 Comply with hot/cold weather Flowable Fill fabrication, placement, and curing requirements as per CSA-23.1-09.
 - .2 Convey the Flowable Fill at the site utilizing equipment of the design, size, and condition to deposit a continuous and adequate supply of Flowable Fill of the specified mix and consistency without segregation at the required locations.
 - .3 Ensure Flowable Fill has filled all areas of the existing culvert. If required use manual means to move Flowable Fill into areas of the culverts void of Flowable Fill.
- 3.5 Curing and Finishing
- .1 Protect exposed surfaces of Flowable Fill from premature drying, wash by rain or running water, wind, mechanical

injury, and excessively hot or cold temperatures. Curing method shall be subject to approval by the Departmental Representative.

- .2 Ensure ends of existing culvert and Flowable Fill are encased with minimum 0.3 m of embankment through the import and placement of embankment over each culvert end or the shortening of the culvert into the embankment and then replacement of embankment.
- .3 Re-establish existing ditch width and grades. Ensure positive drainage to new culvert.
- .4 Hydraulic Seeding of all disturbed areas per Section 32 93 21 – Hydraulic Seeding.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 References.
- 1.3 Definitions.
- 1.4 Submittals.
- 1.5 Quality Management.

PART 2:

- 2.1 Aggregate Source.
- 2.2 Aggregates General.
- 2.3 Crushed Base Gravel.
- 2.4 Sub-base Course.
- 2.5 Asphalt Mix Aggregate.
- 2.6 Riprap.
- 2.7 75 mm Clear Crush Culvert Bedding.

PART 3:

- 3.1 Preparation.
- 3.2 Processing.
- 3.3 Handling and Transportation.
- 3.4 Stockpiling.
- 3.5 Cleaning.

1.1 Measurement and
Payment Procedures

- .1 Measurement and Payment for Aggregate Materials shall not be paid separately. Measurement and Payment for Aggregate Materials shall be per the applicable work included in Section 31 14 11 – Gravel Shouldering, Section 31 24 14 – Roadway Excavation and Embankment, Section 32 11 19 – Sub-base Course, Section 32 11 24 – Crushed Base Gravel, Section 32 12 16 – Hot Mix Asphalt Concrete Pavement, Section 33 42 13 – Pipe Culverts, and any other section as required by these

specifications.

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|------------------------|----|---|
| 1.2 References | .1 | American Society for Testing and Materials (ASTM), latest edition. |
| | .1 | ASTM C127, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate. |
| | .2 | ASTM D6928, Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus. |
| | .3 | ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate. |
| | .4 | ASTM C136/C136M, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates. |
| | .5 | ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils. |
| | .6 | ASTM C131/C131M, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine. |
| | .7 | ASTM C142, Standard Test Method for Clay Lumps and Friable Particles in Aggregates. |
| | .8 | ASTM D5821, Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate. |
| | .2 | British Columbia Motor Vehicle Act, Motor Vehicle Act Regulations, Division 19 – Miscellaneous, latest edition. |
| 1.3 Definitions | .1 | Asphalt Mix Aggregate: the processed crushed aggregate just prior to the addition of the asphalt cement. |
| 1.4 Submittals | .1 | Submittals in accordance with Section 01 33 00 – Submittal Procedures. |
| 1.5 Quality Management | .1 | Quality Control and Quality Assurance in accordance with Section 01 45 00 – Quality Management. |
| | .2 | The Contractor shall not produce aggregate until the Contractor's Quality Management Plan has been reviewed and accepted per Section 01 45 00 – Quality Management by the |

Departmental Representative and has in place testing facilities for aggregate production that are in accordance with the accepted Quality Control Plan.

- .3 In addition to the Quality Control undertaken by the Contractor, the Departmental Representative may undertake, through an independent testing firm, random sampling, inspection, and testing for the purpose of Quality Assurance.
- .4 Provide access to all portions of the work for sampling by the Departmental Representative.
- .5 If requested, install sampling facilities at discharge end of production conveyor to allow Departmental Representative to obtain representative samples of items being produced. Stop or slow conveyor belt when directed by the Departmental Representative to permit full cross section sampling.
- .6 Aggregates that do not meet specified tolerance or quality for intended use are subject to rejection by the Quality Control and Quality Assurance processes.

PART 2 – PRODUCTS

2.1 Aggregate Source

- .1 The Contractor shall provide his own source(s) for all aggregates materials for this project. The Contractor will be solely responsible for ensuring that the aggregate source(s) selected by the Contractor continuously achieves all aggregate material properties, quality, and gradation requirements as outlined in this contract specification for the materials intended use.
- .2 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.
 - .2 If the material source has been used in the past as a source of Asphalt Mix Aggregate material for the production of Asphalt Concrete Pavement, the approximate number of past projects and the names / locations of past paving projects most similar in size to this project. Provide as well the following for each project:
 - .1 Type of asphalt mix provided and tonnage.

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- .2 Name, phone number of client site representative for the project.
 - .3 For Asphalt Mix Aggregate, provide test results for the following tests listed in Table 32 12 16 – 01: Requirements for Course Aggregates. The frequency and schedule for the submission of test results shall be per the requirements of Table 01 45 00 – 01.
- 2.2 Aggregates General
- .1 All aggregate materials on the project shall at a minimum achieve the following requirements. Should more stringent requirements for a specific aggregate be provided elsewhere in this contract specification, the more stringent shall apply.
 - .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals or other substances that would act in deleterious manner for use intended.
 - .2 Flat and elongated particles of coarse aggregate (ASTM D4791) to:
 - .1 Flat and elongated particles are those whose greatest dimension exceeds five times their least dimension.
 - .3 Fine aggregates to be one or blend of the following.
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
 - .4 Coarse aggregates to be one or blend of following.
 - .1 Crushed rock.
 - .2 Gravel composed of naturally formed particles of stone.
 - .3 Light weight aggregate, including slag.
- 2.3 Crushed Base Gravel
- .1 Crushed Base Gravel shall be manufactured by the Contractor to ensure the material conforms 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/C136M, 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
19	100
12.5	70 – 100
4.75	40 - 70
2.00	23 - 50
0.425	7 - 25
0.075	3 - 8

- .3 Liquid limit when tested in accordance to ASTM D4318, maximum 25.
- .4 Plasticity index when tested in accordance to ASTM D4318, maximum 6.
- .5 Los Angeles degradation when tested in accordance to ASTM C131/C131M, 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.

2.4 Sub-base Course

- .1 Sub-base Course shall be manufactured by the Contractor to ensure the material conforms 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/C136M, the material shall have a gradation conforming to the following gradation limits:

Table 31 05 16 – 02: Gradation Limits: Sub-Base Course	
Sieve Designation (mm)	Percent Passing by Weight
100	100
4.75	20 - 65
0.075	0 - 8

- .3 Grading of material shall not show marked fluctuations from opposite extremes of the limits given in the above Table, and the curve plotted from the sieve analysis shall flow in a manner free 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, maximum 25.
- .6 Plasticity index when tested in accordance to ASTM D4318, 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.

2.5 Asphalt Mix Aggregate .1 Asphalt Mix Aggregate shall be in conformance with Item 2.1 – Aggregate (and other sections which may be applicable) of Section 32 12 16 – Hot Mix Asphalt Concrete Pavement.

2.6 Riprap .1 Riprap shall be in conformance with Section 31 37 00 – Riprap.

2.7 75 mm Clear Crush Culvert Bedding .1 The 75 mm Clear Crush Culvert Bedding shall conform with the following requirements:

- .1 When tested in accordance to ASTM C136/C136M, the material shall have a gradation conforming to the following gradation limits:

Table 31 05 16 – 03: 75 mm Clear Crush Culvert Bedding	
Sieve Designation (mm)	Percent Passing by Weight
75	100
50	0 - 10

- .2 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.

PART 3 – EXECUTION

- 3.1 Preparation
- .1 Prior to excavating materials for aggregate production, strip off and stockpile unsuitable surface material.
 - .2 Strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious material.
- 3.2 Processing
- .1 Process aggregate uniformly using methods that prevent contamination, segregation, and degradation.
 - .2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Departmental Representative.
 - .3 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.
- 3.3 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 Motor Vehicle Act pertaining to registered weight limits and vehicle size.
 - .3 The Contractor shall be responsible for all haul roads required to access aggregate sources. All haul roads used shall be maintained at the Contractor's expense and at the conclusion of the works, left in a condition acceptable to the haul road owner.
- 3.4 Stockpiling
- .1 Should stockpiles on highway right-of-way or on PWGSC property be required, stockpile aggregates in locations directed by Departmental Representative. Do not stockpile on completed pavement surfaces.
 - .2 Stockpile aggregates in sufficient quantities to meet project schedules. With respect to Asphalt Mix Aggregates, the Contractor shall be responsible to ensure the volume of Asphalt Mix Aggregate material stockpiled at the asphalt plant meets or exceeds the volume of aggregate required to place the bottom lift of Hot Mix Asphalt Concrete Pavement over the entire area of active Full Depth Reclamation at all times throughout the project. The active area of Full Depth Reclamation shall include all highway lanes which the BST has been pulverized but not yet received a bottom lift of Hot Mix

Asphalt Concrete Pavement.

- .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 Base Gravel not less than 300 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 Prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.5 Cleaning

- .1 Any stockpiles temporarily placed on the highway right-of-way or on PWGSC 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

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 Definitions.
- 1.3 References.
- 1.4 Submittals.
- 1.5 Protection.

PART 2:

- 2.1 Products.

PART 3:

- 3.1 Preparation.
- 3.2 Clearing.
- 3.3 Grubbing.
- 3.4 Removal and Disposal.
- 3.5 Finished Surface.

1.1 Measurement and Payment Procedures

- .1 Payment for Clearing and Grubbing will be made on the basis of the Price per Unit Bid for Clearing and Grubbing in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for clearing of trees and brush, removal of all stumps and roots, disposal, and all other items necessary for successful completion of the work.
- .2 Measurement for Payment for completion of Clearing and Grubbing will be made on the total area within the limits of Clearing and Grubbing shown in the Contract Drawings, surveyed in square meters, 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 Grubbing: excavating and disposing stumps and roots to 150mm below existing ground surface.

- .3 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 References
- .1 British Columbia Forest Act, Part 3, Division 1 – Forms of Rights to Crown Timber, latest edition.
- .2 British Columbia Environmental Management Act, Open Burning Smoke Control Regulation, latest edition.
- 1.4 Submittals
- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 If disposal by burning is used and if required by the British Columbia Open Burning Smoke Control Regulation, submit burning permit to Departmental Representative prior to commencement of burning operations.
- 1.5 Protection
- .1 Prevent damage to natural features and man-made structures which are to remain.
- .2 Repair any damaged caused by clearing and grubbing operations and if damaged, replace any tress 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 clearing and grubbing 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 Clearing
- .1 Clear trees, brush, and other vegetation designated for removal within the limits of Clearing and Grubbing shown on the contract drawings and as direct by the Departmental Representative.
- .2 Cut off branches and cut down trees overhanding area cleared.
- 3.3 Grubbing
- .1 Grub out stumps and wood debris including roots and embedded logs not less than 200 mm below ground surface.

- 3.4 Removal and Disposal
- .1 Dispose of cleared and grubbed materials by chipping or burning.
 - .2 Chip or mulch and spread cleared and grubbed vegetative materials that is on site as directed by the Departmental Representative.
 - .3 Burning:
 - .1 Burning shall be completed inside clearing limits.
 - .2 Comply with the Open Burning Smoke Control Regulation within the British Columbia Environmental Management Act when burning and all requirements of Section 01 35 43 – Environmental Protection.
- 3.5 Finished Surface
- .1 Leave ground surface in a condition suitable for stripping of topsoil / excavation.
 - .2 In areas of flush cutting, leave stumps cut flush with ground elevation and root structure undisturbed.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 References.
- 1.3 Submittals.
- 1.4 Quality Management.

PART 2:

- 2.1 Materials.

PART 3:

- 3.1 Preparation.
- 3.2 Placement.
- 3.3 Asphalt Repairs Following Gravel Shouldering.

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/ft³ (600 kN-m/m³)).

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 BST/Granular Material from Full Depth Reclamation process 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 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

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 References.

PART 2:

- 2.1 Asphalt Millings.
- 2.2 Milling Machine Equipment.

PART 3:

- 3.1 Asphalt Milling.
- 3.2 Protection.

1.1 Measurement and Payment Procedures

- .1 Payment for reshaping of gravel rest stops prior to paving will be made on the basis of the Price per Unit Bid for Roadway Reshaping (Gravel Rest Stops) in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for equipment, labour, and all other items necessary for successful completion of the work.
- .2 Measurement for Payment for completion of Roadway Reshaping (Gravel Rest Stops) will be made on the area of existing gravel rest stops to receive hot mix asphalt concrete pavement 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 C136/C136M, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

PART 2 – PRODUCTS

2.1 Crushed Base Gravel

- .1 Crushed Base Gravel shall in accordance with Section 32 11 24 – Crushed Base Gravel.

2.2 Sub-base Course

- .1 Sub-base Course shall in accordance with Section 32 11 19 – Sub-base Course.

PART 3 – EXECUTION

3.1 Reshaping

- .1 Complete excavation of existing materials in the locations and to the depths indicated on the Contract Drawings.

Dispose of excavated material in an offsite location pre-approved by the Departmental Representative.

- .2 Supply, transport, place and compact Sub-base Course in the locations and thicknesses shown on the Contract Drawings and in accordance with Section 32 11 19 – Sub-base Course.
- .3 Supply, transport, place and compact Crushed Base Gravel in the locations and thicknesses shown on the Contract Drawings and in accordance with Section 32 11 24 – Crushed Base Gravel.
- .4 Regrade existing and imported gravels within the area proposed for Hot Mix Asphalt Concrete Pavement to achieve the design lines and grades as shown on the Contract Drawings.
- .5 Should any excess granular material result from the regrading process, grade the excess material onto the shoulder / embankment. Ensure positive drainage from the proposed Hot Mix Asphalt Concrete Pavement surface will be maintained.
- .6 The finished grading elevations may be subject to verification and adjustments by the Departmental Representative at regular intervals. Ensure grading ties into Hot Mix Asphalt Concrete Pavement on highway while maintaining positive drainage in all directions.

3.2 Compaction

- .1 Shape and roll alternately to obtain smooth, even, and uniformly compacted subgrade surface.
- .2 Compact the entire width granular material proposed for Hot Mix Asphalt Concrete Pavement.
- .3 Test compaction of the granular materials 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.
- .4 When testing the compaction of the granular materials using proof rolling, the material shall be considered compacted when upon completing a pass over the granular material, the granular material exhibits no observed deflections or rutting.
- .5 Apply water as necessary or dry material as necessary during compaction process to obtain specified compaction.

- 3.3 Surface Tolerances
- .1 Reshaped compacted surface to be within plus or minus 20 mm of design lines and grades as indicated on Contract Drawings, but not uniformly high or low.
 - .2 Correct surface irregularities by moving existing materials through the grading process until the surface is within the specified tolerance.
- 3.4 Protection and Clean-up
- .1 Maintain reshaped surface in condition conforming to this section until succeeding material is applied.
 - .2 Following placement of Hot Mix Asphalt Concrete Pavement place Gravel Shouldering around the outside edges of the Hot Mix Asphalt Concrete Pavement per the requirements Section 31 14 11 – Gravel Shouldering
 - .3 Regrade and clean ditches to the satisfaction of the Departmental Representative should any material have been transported into the ditches during the regrading process.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 Definitions.
- 1.3 References.

PART 2:

- 2.1 Embankment.
- 2.2 Topsoil.
- 2.3 Hydraulic Seeding.

PART 3:

- 3.1 Stripping.
- 3.2 Excavation.
- 3.3 Excavation (Optional Work)
- 3.4 Embankment.
- 3.5 Topsoil.
- 3.6 Hydraulic Seeding.

1.1 Measurement and Payment
Procedures

- .1 Payment for Excavation will be made on the basis of the Price per Unit Bid for Excavation in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for excavation of stripping, highway gravels, embankment, and natural ground as shown on the Contract Drawings, temporary stockpile of the stripping material, transport of the highway gravels, embankment, and natural ground material for disposal or re-use as Embankment, and all other items necessary for successful completion of the work. Incidental to the price of excavation is the completion of the Ditch Regrading Fill at Ditch and Slope Re-establishment areas (Km 267 and Km 273) to achieve design lines and grades as shown on contract drawings.
- .2 Measurement for Payment for completion of Excavation will be made on the volume of material surveyed in cubic metres, excavated from the limits of the work, and accepted by the Departmental Representative. No separate

measurement or payment for hauling of the material will be made. Any stripping shown on the Contract Drawings shall be measured and included in the excavation quantity. Excavation completed then used to complete Ditch Regrading Fill at Ditch and Slope Re-establishment areas (Km 267 and Km 273) will be measured as Excavation with no separate payment for the placement of material as Ditch Regrading Fill. Excavation reused as Embankment will be measured as Excavation and shall also be measured separately as Embankment upon placement and compaction as Embankment.

- .3 Payment for Embankment will be made on the basis of the Price per Unit Bid for Embankment in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for supply, transport, placement (including completion of terraces (benches) in existing ground (if required)), compaction of Embankment and all other items necessary for successful completion of the work. The volume of Embankment measured for payment shall exclude Embankment used in the backfill of culverts as shown on the Contract Drawings.
- .4 Measurement for Payment for completion of Embankment 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.
- .5 Payment for Topsoil will be made on the basis of the Price per Unit Bid for Topsoil 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. The transport of stripping / Topsoil between work areas (i.e. from Km 270 to other areas) is not anticipated and thus is not included in the cost of Topsoil.
- .6 Measurement for Payment for completion of Topsoil will be made on the area of material surveyed in square metres incorporated into the works and accepted by the Departmental Representative.

1.2 Definitions

- .1 Stripping: excavation of organic material covering the original ground.
- .2 Organic Material: soil in which plants can grow, comprising

primarily of mineral particles mixed with decayed organic matter and having the capability of retaining water. Typically dark brown or black in colour.

.3 Excavation: removal of materials that are not rock excavation or stripping.

.4 Embankment: gravels and rock material containing no more than 3% organic matter by mass and free from weeds, sod, roots, logs, stumps, frozen lumps, snow, ice, or any other unsuitable material as determined by the Departmental Representative. The maximum size of embankment rock placed within 300 mm of final grade of embankment material shall be 200 mm in diameter.

.4 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.

.5 Topsoil: Organic material derived from stripping free of rocks > 150 mm in diameter and other debris hindering good vegetative growth.

1.3 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/ft³) (600 kN-m/m³).

PART 2 – PRODUCTS

2.1 Embankment

.1 Material meeting the definition of Embankment derived from excavations on the project or from other sources outside the right-of-way.

2.2 Topsoil

.1 Material meeting the definition of Topsoil derived from stripping on the project. The need to import of Topsoil from other sources outside the right-of-way is not anticipated on the project.

- 2.3 Hydraulic Seeding .1 The supply of Hydraulic Seeding shall be in accordance with Section 32 93 21 – Hydraulic Seeding.

PART 3 – EXECUTION

- 3.1 Stripping .1 When shown on the Contract Drawings, complete stripping of Organic Material and Topsoil to the depths as indicated on the Contract drawings and as directed by Departmental Representative.

- .2 Stockpile suitable stripped material within the limits of the work for re-use later as Topsoil. The Contractor shall be responsible for selecting a suitable temporary stockpile location, re-handling of the material shall be at the Contractor's cost.

- 3.2 Excavation .1 Complete Excavation to the design lines and grades shown on the Contract Drawings. If excavated material meets the requirements for Embankment or Sub-base Course, the Contractor may temporarily stockpile and transport (as necessary) excavation for reuse on the project. Dispose of excess excavation material not being reused 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.

- .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.

- .4 During excavation at Ditch and Slope Re-establishment (Km 267 and Km 273) place excavated material in areas requiring Ditch Regrading Fill to achieve design lines and grades as shown on contract drawings.

- 3.3 Excavation (Optional Work) .1 Complete Excavation (Optional Work) to the widths, depths, and lengths directed in the field by the Departmental Representative. Excavation (Optional Work) may include but will not necessarily be limited to the excavation of existing road structure which has exhibited poor performance in the past or excavation in ditches. The location, size and extents of these areas (if any) are unknown and will be determined during the work. If excavated material achieves requirements for Embankment, or Sub-base Course and if desired by the Contractor,

- temporary stockpile and transport (if necessary) excavation for reuse. Dispose of excess excavation material not being reused in an offsite location pre-approved by the Departmental Representative.
- 3.4 Embankment
- .2 During Excavation (Optional Work) maintain profiles, crowns and cross slopes to provide good surface drainage. Provide ditches as work progresses to provide drainage.
 - .1 Place excavated material as Embankment following stripping to the design lines and grades, cross sections and dimensions as shown on the Contract Drawings.
 - .2 When embankments are made on hillsides or existing embankments steeper than 1.5V:5H, the slopes of the embankment shall be terraced in a continuous series of steps a minimum of 1.5 m wide.
 - .3 If suitable, the material excavated to generate the terraced / steps on hillsides shall be spread and compacted into the adjoining embankment. No additional payment will be made for excavation of terraces / steps or for placing step material in the adjoining fill.
 - .4 Do not place material which is frozen nor place material on frozen surfaces except in areas authorized.
 - .5 Maintain crowned surface during construction to ensure ready run-off of surface water.
 - .6 Drain low areas before placing materials.
 - .7 Place and compact to full width in layers not exceeding 200 mm loose thickness. Departmental Representative may authorize thicker lifts after Contractor has shown that specified compaction can be achieved at 200 mm lift thickness and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.
 - .8 Where material consists primarily or all 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.
- .9 Break material down to sizes that enable required compaction and mix for uniform moisture to full depth of layer. Embankment 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.
- .10 Compact each layer to a density not less than 95% of the standard maximum dry density in accordance with ASTM D698, except for the top 300 mm of embankment which shall be compacted to a density not less than 98% of the standard maximum dry density in accordance with ASTM D698. If more than 30% of the Embankment material is oversized (retained on a 19 mm sieve), test compaction of the Embankment using proof rolling as follows.
 - .1 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.
 - .2 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.
- .11 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.
- .12 Shape entire Embankment to within 100 mm of design lines and grades but not uniformly high or low. Finish slopes and ditch bottoms to neat condition, true to lines, grades and drawings where applicable.
- .13 Remove rocks over 150 mm in any dimension from finished slopes and ditch bottoms.
- .14 Hand finish slopes that cannot be finished satisfactorily by machine.
- .15 Run dozer tracks over slopes exceeding 3 m in height and

leave dozer tracks parallel to centerline of highway.

- .16 Maintain finished surfaces in condition conforming to this Section until acceptance by Departmental Representative.
- 3.5 Topsoil
- .1 Commence placement of Topsoil following finished Embankment slopes and ditches which have been accepted by the Departmental Representative and surveyed.
- .2 Spread temporarily stockpiled stripping material as Topsoil on finished Embankment slopes and ditches in locations shown on the Contract Drawings and as approved by the Departmental Representative. Place Topsoil to a thickness of 150 mm +/- 50 mm, but not uniformly high or low or to a thickness directed by the Departmental Representative. Neatly shape outside limits of Topsoil material to eliminate sharp changes in lines and grades. Ensure ready run-off of surface water. Reduce thickness or area of Topsoil placement as directed by Departmental Representative should the volume of Topsoil available from stripping be less than required for the area of Topsoil shown on the Contract Drawings.
- .3 Remove rocks > 150 mm in diameter and other debris hindering good vegetative growth from the placed Topsoil.
- .4 Finish surface even, free of large openings and neat in appearance.
- .5 Maintain finished surfaces in condition conforming to this Section until acceptance by Departmental Representative.
- .6 Dispose excess stripping not required for re-use as Topsoil at an offsite disposal facility pre-approved by the Departmental Representative.
- 3.6 Hydraulic Seeding
- .1 Complete Hydraulic Seeding on all Topsoil, Embankment, and all other disturbed areas within the construction limits per the requirements of 32 93 21 – Hydraulic Seeding.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 References.

PART 2:

- 2.1 Riprap.

PART 3:

- 3.1 General.
- 3.2 Placement.

1.1 Measurement and Payment Procedures

- .1 Measurement and Payment for riprap shall be as per the applicable work included in Section 33 42 13 – Pipe Culverts and Section 34 71 13.01 – Precast Concrete Barrier.

1.2 References

- .1 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.

PART 2 – PRODUCTS

2.1 Riprap

- .1 The Contractor may choose to use PWGSC's Trutch Quarry (Km 310, 8 Km haul from highway) as a riprap source. Various sizes of previously manufactured rock are available for use by the Contractor as riprap. The Contractor will be responsible for sorting through the stockpiled rock and selecting the appropriate rock size. Alternatively the Contractor may choose to supply the riprap from other sources.
- .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 10 Kg Class Riprap:

Table 31 37 00 – 01: 10 Kg Class Riprap		
Mass (kg)	Nominal Diameter (mm) @ 2650 kg/m ³	Percent Larger Than
40	330	0
25	280	15
10	200	50
1	95	85
0.1	45	100

.1 50 Kg Class Riprap:

Table 31 37 00 – 02: 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 or 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 Riprap extraction, processing, handling and transportation, stockpiling, and cleanup shall in accordance with the requirements of Item 3.1 – 3.5 of Section 31 05 16 – Aggregates: General.

3.2 Placement

- .1 Placement of Riprap, shall be in accordance with Section 33 42 13 – Pipe Culverts and Section 34 71 13.01 – Precast Concrete Barriers.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 References.

PART 2:

- 2.1 Asphalt Millings.
- 2.2 Milling Machine Equipment.

PART 3:

- 3.1 Asphalt Milling.
- 3.2 Protection.

1.1 Measurement and Payment Procedures

- .1 Payment for Reshaping Asphalt Pavement (Milling) 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 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 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 C136/C136M, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

PART 2 – PRODUCTS

2.1 Asphalt Millings

- .1 Pulverize asphalt millings to well graded mix with a 25 mm maximum particle size when tested in accordance with ASTM C136.

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 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 maximum slope of 25:1, 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, centreline 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 maximum slope of 25:1 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 the location specified in the Contract Specifications, on the Contract Drawings or as directed 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

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 References.

PART 2:

- 2.1 Materials.

PART 3:

- 3.1 Inspection and Survey of Underlying Surface.
- 3.2 Placing.
- 3.3 Compaction.
- 3.4 Tolerances.
- 3.5 Protection.

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 the supply, manufacture, stockpiling, loading, transport, placing, shaping, watering and/or drying and compaction of the Sub-base Course material, the completion of terraces (benches) prior to placement (if necessary), 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 (to the design grades) 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 D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))

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 in the locations and to lines and grades shown on the contract drawings and in the case of the optional work to the widths, depths, and lengths directed in the field by the Departmental Representative.

.2 Ensure no frozen material 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) after Contractor has shown that specified compaction at 200 mm lift thickness 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 a density not less than 98% of the standard maximum dry density in accordance with ASTM D698.

.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.

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|----------------|----|--|
| | .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 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

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 References.

PART 2:

- 2.1 Materials.

PART 3:

- 3.1 Inspection and Survey of Underlying Surface.
- 3.2 Placing.
- 3.3 Compaction.
- 3.4 Tolerances.
- 3.5 Protection.

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, the completion of terraces (benches) prior to placement (if necessary), 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 (to the design grades) 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 placed during the Full Depth Reclamation process (Km 290+500 – Km 290+660) and other locations where Crushed Base Gravel is indicated on the Contract Drawings. The volume of Crushed Base Gravel measured for payment shall exclude Crushed Base Gravel used as Culvert Bedding Material as shown on the Contract Drawings.

The Crushed Base Gravel placed during the Full Depth Reclamation process in the area Km 290+500 – Km

290+660 shall be scaled by the Contractor and converted to cubic meter volume for payment purposes using a unit weight of 2.15 tonne/m³.

- 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/ft³ (600 kN-m/m³))

PART 2 – PRODUCTS

- 2.1 Materials .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 in the locations and to lines and grades shown on the contract drawings and in the case of the optional work to the widths, depths, and lengths directed in the field by the Departmental Representative.
- .2 Ensure no frozen material 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) after Contractor has shown that specified compaction at 150 mm lift thickness 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.

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- .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 a density not less than 100% of the standard maximum dry density in accordance with ASTM D698.
- .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.
- .2 Complete dust control using water as required succeeding material is applied (see Section 32 15 60 – Roadway Dust Control).

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 Definitions.

PART 2:

- 2.1 Equipment.

PART 3:

- 3.1 Winter Sand.
- 3.2 Base Preparation.
- 3.3 Regrading.
- 3.4 Compaction.
- 3.5 Surface Tolerances.
- 3.6 Protection and Cleanup.

1.1 Measurement and Payment Procedures

- .1 Payment for Full Depth Reclamation will be made on the basis of the Price per Unit for Full Depth Reclamation in the Bid and Acceptance Form. The Price per Unit shall include all costs associated with the grading of winter sand / organic, scarifying, mixing, regrading to the design lines and grades, grading of excess materials onto shoulder / embankment, adding water and/or drying material for compaction, compaction, grading of driveways at intersections prior to Hot Mix Asphalt Concrete Pavement, and all other items necessary for successful completion of the work.

- .2 Measurement and Payment for completion of Full Depth Reclamation will be made on the area of material surveyed in square metres, incorporated into the works, and accepted by the Departmental Representative.

The limits of Full Depth Reclamation measured for payment is defined as 0.5 m beyond the edge of existing Bituminous Surface Treatment (BST) or 0.5 m from proposed edge of Asphalt Concrete Pavement (whichever location is furthest from the centerline). Any grading required beyond this limit (including grading at driveways at intersections) to achieve design lines and grades / positive drainage and

grading of winter sand or excess materials will not be measured for payment.

Note that the area of full pavement reconstruction (Km 270+330 to Km 270+520), the area of highway requiring Crushed Base Gravel to achieve design crossfall and superelevation (Km 290+500 to Km 290+660), and the Km 183 Rest Stop will be included in the area measured for Full Depth Reclamation payment. The Km 282 and Km 293 Rest Stops will not be included in the area measured for Full Depth Reclamation payment (see Section 31 22 16.13 – Roadway Reshaping).

1.2 Definitions

- .1 Full Depth Reclamation: in-place reclamation procedure in which the existing BST / Asphalt and a predetermined portion of the underlying granular materials are scarified, mixed, and blended into a homogeneous material and incorporated into the road base, reshaped by grading, and compacted.
- .2 Winter Sand: sand and gravel placed on the highway during winter weather and has been conveyed to the highway shoulder.

PART 2 – PRODUCTS

2.1 Equipment

- .1 The Full Depth Reclamation process shall be completed using a pulvi-mixer or other preapproved equipment. In all cases the equipment selected by the Contractor shall be capable of scarifying the existing BST (including asphalt at Km 183 Rest Stop) and granular materials into constituent particles and mixing the existing BST and granular materials into a single homogeneous material.

PART 3 – EXECUTION

3.1 Winter Sand

- .1 Grade away winter sand and any organics on the highway shoulder to ensure base gravels resulting from the Full Depth Reclamation process are not contaminated. Place and spread winter sand and any organics on highway embankment beyond limit of base preparation such that positive drainage from the highway driving surface is maintained at all times.

3.2 Base Preparation

- .1 Complete base preparation such that Full Depth Reclamation is completed over a maximum of 10 lane kilometers within the project limits prior to the application of Hot Mix Asphalt Concrete Pavement unless a larger area is preapproved by the Departmental Representative. In all instances the active area of Full Depth Reclamation (area

which has not yet received a bottom lift of Hot Mix Asphalt Concrete Pavement) shall not exceed the equivalent volume of asphalt mix aggregate material stockpiled at the asphalt plant which would be required to place the bottom lift of Hot Mix Asphalt Concrete Pavement over the entire area of active Full Depth Reclamation.

- .2 Confirm limits of Full Depth Reclamation and Hot Mix Asphalt Concrete Pavement with Departmental Representative prior to starting Full Depth Reclamation works. Locate limit of existing asphalt concrete pavement through examination of the asphalt / BST along the shoulder or as otherwise as needed. Use hand shovel as required and remove surfacing in select shoulder locations as required.
- .3 Scarify and mix existing BST / asphalt and granular materials to the widths indicated on the Contract Drawings and depth as follows:
 - .1 Existing driving surface BST: 100 mm (measured from the top of existing BST).
 - .2 Existing driving surface asphalt: 250 mm (measured from the top of existing asphalt).
- .4 Reduce existing BST, asphalt, and granular materials to a 50 mm maximum particle size.
- .5 Scarify and mix existing BST, asphalt (where applicable), and granular materials such that the material is mixed and blended into a homogeneous material.
- .6 Complete base preparation prior to the import of Crushed Base Gravel in select locations identified on the Contract Drawings.

3.3 Regrading

- .1 Regrade and move BST/granular material within the highway driving surface to achieve the design lines and grades as shown on the Contract Drawings and to the grades and elevations shown on the Finished Grading Table (Appendix G). Note, achieving the design lines and grades and grades shown in the Finished Grading Table will require the reshaping and repositioning (cut high areas and fill low areas) of BST/granular material resulting from base preparation process (see Colour Coded Grading Plan with Representative Cross Sections within the Contract Drawings for the reshaping and repositioning requirements for the BST/granular material). The design grades have been prepared such that the import of granular material from offsite are not anticipated except for Km 290+500 – Km

- 290+660 where 70 m³ of Crushed Base Gravel is required (see Section 32 11 24 – Crushed Base Gravel). The Crushed Base Gravel placed in this area (Km 290+500 – Km 290+660) shall be scaled by the Contractor and converted to cubic meter volume for payment purposes using a unit weight of 2.15 tonne/ m³.
- .2 Should any excess BST/granular material result from the regrading process, grade the excess material onto the shoulder / embankment. Ensure positive drainage from the highway driving surface is maintained.
- .3 The finished reclamation grading / elevations may be subject to verification by the Departmental Representative at regular intervals.
- 3.4 Compaction
- .1 Shape and roll alternately to obtain smooth, even, and uniformly compacted subgrade surface.
- .2 Compact the entire width of BST/granular material and all regrading within the limits of the Full Depth Reclamation. Place lifts a maximum of 200 mm thick and complete necessary compaction. Complete proof rolling to confirm compaction before placement of additional material through regrading.
- .3 Test compaction of the final Full Depth Reclamation and each lift 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.
- .4 When testing the compaction of the BST/granular material using proof rolling, the material shall be considered compacted when upon completing a pass over the BST/granular material, the BST/granular material exhibits no observed deflections or rutting.
- .5 Apply water as necessary or dry material as necessary during compaction process to obtain specified compaction.
- 3.5 Surface Tolerances
- .1 Reshaped compacted surface to be within plus or minus 20 mm of design lines and grades as indicated on Contract Drawings and to the grades and elevations shown on the Finished Grading Table (Appendix G), but not uniformly high or low.
- .2 Correct surface irregularities by moving existing materials through the grading process until the surface is within the

specified tolerance.

3.6 Protection and Clean-up

- .1 Maintain reshaped surface in condition conforming to this section until succeeding material is applied.
- .2 Following placement of Hot Mix Asphalt Concrete Pavement but prior to Gravel Shouldering, regrade material which has spilled onto embankment shoulder from Full Depth Reclamation process. Ensure embankment shoulder has consistent and smooth grades to the satisfaction of the Departmental Representative.
- .3 Regrade and clean ditches to the satisfaction of the Departmental Representative should any material have been transported into the ditches from the Full Depth Reclamation process.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 References.
- 1.3 Definitions.
- 1.4 Submittals.
- 1.5 Quality Management.

PART 2:

- 2.1 Asphalt Cement.

PART 3:

- 3.1 Delivery of Asphalt Cement.
- 3.2 Storage.
- 3.3 Execution.

1.1 Measurement and Payment Procedures

- .1 Payment for Asphalt Cement will be made on the basis of the Price per Unit for Asphalt Cement (Supply) in the Bid and Acceptance Form. The Price per Unit shall include all costs associated with the supply, scheduling, delivery, storage, heating, handling, sampling, testing, and use of the Asphalt Cement.

- .2 Measurement and Payment for supply of Asphalt Cement will be made by the mass of material measured in tonnes incorporated into the Hot Mix Asphalt Concrete Pavement, scaled, and accepted by the Departmental Representative. Provide a copy of each weigh scale ticket to the Departmental Representative upon delivery of the Asphalt Cement to the site or at the end of each workday as required by the Departmental Representative.

If at Contract Completion the mean average Asphalt Cement content, as determined from weight and tank measurements, exceeds the Job Mix Formula by more than 0.3%, the mass of Asphalt Cement exceeding Job Mix Formula by more than +0.3% will be deducted from the mass paid to Contractor for Asphalt Cement.

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|------------------------|----|--|
| 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, 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) 52-34 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.

PART 3 – EXECUTION

- 3.1 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 °C.
 - .6 PG specification information.
 - .7 Temperature of product at delivery point.
- 3.2 Storage
- .1 The Contractor is responsible for properly storing and heating the Asphalt Cement until use.
- 3.3 Execution
- .1 As required in the production of Hot Mix Asphalt Concrete Pavement as specified in Section 32 12 16.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 References.
- 1.3 Definitions.
- 1.4 Submittals.

PART 2:

- 2.1 Materials.

PART 3:

- 3.1 Equipment.
- 3.2 Application.

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).
 - .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 on EAP-2, EP 2000, or preapproved equivalent as determined by the Departmental Representative.
- .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.

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- .3 Applied at readily determined and controlled rates from 0.2 L/m² and greater with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m².
 - .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 surface.
 - .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/m² and 0.4 L/m² 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 on same day.
- .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 hand held devices is consistent in appearance with adjacent areas of machine applied material.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 References.
- 1.3 Definitions.
- 1.4 Submittals.

PART 2:

- 2.1 Materials.

PART 3:

- 3.1 Equipment.
- 3.2 Application.

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 Full Depth Reclamation surface or 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 on EAP-2, EP 2000, or preapproved equivalent.
- .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/m² and greater with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m².
- .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 only after the Full Depth Reclamation process or 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/m² and 1.5 L/m² 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 on same day.
- .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

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures.
- 1.2 Definitions.
- 1.3 References.
- 1.4 Submittals.
- 1.5 Quality Management.

PART 2:

- 2.1 Aggregate.
- 2.2 Asphalt Cement.
- 2.3 Anti-Stripping Agent.
- 2.4 Asphalt Concrete Mix and Job Mix Formula.

PART 3:

- 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:

- 4.1 General.
- 4.2 Pavement Density.
- 4.3 Asphalt Content.
- 4.4 Aggregate Gradation.

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- 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.
- 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, 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, PWGSC is under no obligation to make any payment for such work.

If requested by the Contractor, a partial payment of \$8.00/tonne will be made for aggregates crushed or screened in stockpile (excludes natural sand) but not yet used as Asphalt Mix Aggregate. The partial payment will be made on the line item Hot Mix Asphalt Concrete Pavement. Recovery of the partial payment will be made on each progress estimate as the respective aggregate is

subsequently withdrawn from the stockpile, with an additional adjustment on the final progress estimate for any material remaining in stockpile such that the entire partial payment is recovered.

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.

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- .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 7 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.
- .4 Change in paving location between Km 183 Rest Stop, Km 233 Rest Stop i.e. Km 183 Rest Stop, Km 233 Rest Stop shall each be a new lot.

A change in any of the above criteria may require a new Lot designation.

- .2 With the exception of paving at Km 183 Rest Stop and Km 233 Rest Stop, one day's production of less than 7 hours will be dealt with as follows:
 - .1 Material will be added to next Lot with same criteria, except if test indicates production is subject to Payment Adjustments or rejection, or if no further material will be produced with same criteria, this production will be designated as a separate Lot.
 - .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 Smoothness: is a measure of the longitudinal profile of the pavement surface. The unit for measurement is the International Roughness Index (IRI).
- .20 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 metre Sub-Lots.
- .21 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.
- .22 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.
- .23 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 Manual for Work on Roadways – 2015 Office Edition (Interim).
 - .3 2016 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- μ m (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.

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- .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 anti-stripping agent (if necessary) and other 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, Anti-stripping Agents, 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 sledge hammer 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 requested by the Departmental Representative. The volume of each samples shall be 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 2016 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 2016 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: Asphalt Mix Aggregate Gradation Limits	
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 Unless shown otherwise per the requirements of 2.4 – Asphalt Concrete Mix and Job Mix Formula of these specifications, the Contractor shall select, supply, and incorporate into the Asphalt Concrete Mix an antistrip additive from the “Accepted Products” and “Accepted Manufactures / Suppliers” as indicated in the Anti-stripping Agents section of the British Columbia Ministry of Transportation and Infrastructure Recognized Product List. “Trial use only” products shall not be used.
- 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.

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°C	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 have tensile strength ratio (TSR) of 75 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 Should the Contractor provide documentation showing a TSR ratio of 75 can be achieved without the use of an anti-stripping agent, upon approval of the Departmental Representative, the requirement for an anti-stripping agent can be withdrawn.

- .5 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, 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 Ministry Representative.
- .6 Field Adjustment of Job Mix Formula.
- .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 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.
 - .3 The Contractor's field adjustment to the Job Mix Formula must comply with the Asphalt Mix Design requirements of Item 2.4 - Asphalt Concrete Mix and Job Mix Formula, Subsection .1 through .4 inclusive of Contract Specification Section 32 12 16 – Hot Mix Asphalt Concrete Pavement. The Contractor shall provide all supporting verification data.
 - .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 liquid anti-stripping agent or other additives (if necessary). If liquid anti-stripping agent is required it shall be added in-line with liquid asphalt when it is being pumped into the storage tank.
- .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.

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- .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 have 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 11°C 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.

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- .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 is 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. To accomplish this, the existing pavement shall be milled per the requirements of Section 32 01 16.13 – Reshaping Asphalt Pavement per the requirements of the details on the Contract Drawings. All asphalt millings shall be hauled and placed to assist with letdown grading at access road / letdown locations within the limits of the work per the direction of the Departmental Representative. In longitudinal section, minimum slope of milled area shall be 200:1. In plan, Contractor shall cut the joint in any of the following ways:
- .1 Joint shall be cut at 30° – 45° to centreline of

roadway across full width of the mat; or

- .2 Joint shall be cut at 30° – 45° to roadway centreline across travel lanes and contiguously at 90° to roadway centreline elsewhere: or
- .3 Joint shall be composed of segments parallel to and at 90° to roadway centreline. Each mat shall contain a segment, 1.5 to 2 meters long, parallel to centreline of roadway and located on centreline of travel lane. All other segments shall be contiguous and at 90° to roadway centreline. When existing pavement has been removed in advance of paving of the joint area, Contractor shall construct a smooth taper at joint area to a slope of at least 50:1. Tapers may be placed on tar paper and shall be removed when paving is resumed. Traverse joints shall be straight and have a vertical face.
- .4 Contact edges of existing asphalt mats and contact faces of curbs, gutters, manholes, sidewalks and bridge structures shall be coated with Asphalt Tack Coat in accordance with Section 32 12 13.16 before placing Hot Mix Asphalt Concrete Pavement.
- .5 When paving bottom lift of asphalt, apply and let set Asphalt Prime in accordance with Section 32 12 13.23 - Asphalt Prime.

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.

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- .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 a 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 Driving Lanes, Shoulder, and Rest Stops: In two or three lifts when placing an equal to or greater than 110 mm of compacted total thickness. The lift thicknesses shall be as follows.
- .1 Top lift: 40 mm – 60 mm.
- .2 Lower lift (when needed): Thickness to suit required total lift thickness.
- .3 Bottom lift: 50 mm - 90 mm.
- .2 Access Road Letdowns: In one or two lifts. The lift thicknesses shall be as follows:
- .1 Top Lift: 60 – 110 mm.
- .2 Bottom Lift (when required): 60 mm – 110 mm.
- .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 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.
- .16 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.
- .17 Asphalt Tack Coast shall be allowed to cure prior to placing subsequent lift of 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 – 2015 Office Edition (Interim).

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. PWGSC'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, except Hot Mix Asphalt Concrete Pavement in Rest Stops (Km 183, Km 233, Km 282, and Km 293) where only Rejection Limits shall apply).
 - .5 Surface Segregation (Rejection Limits only).
 - .6 Smoothness (Unit Price Adjustments and Rejection Limits, except Hot Mix Asphalt Concrete Pavement in Rest Stops (Km 183, Km 233, Km 282, and Km 293) where only Rejection Limits shall apply).
 - .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 three (3) 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 four (4) briquettes from one randomly selected loose sample from the samples available from each Sub-Lot. The test results will be averages (with one (1) outlier discarded and not used in the calculated average) 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 is 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 (excluding Hot Mix Asphalt Concrete Pavement placed at Km 183, Km 233, Km 282, and Km 293 Rest Stop areas) 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 (excluding Hot Mix Asphalt Concrete Pavement placed at Km 183, Km 233, Km 282, and Km 293 Rest Stop areas).

Actual Application Rate Expressed as % of Specified Application Rate	Payment Adjustment \$ Per Tonne of Material in the Lot	
	Bottom Lift or Single Lift	Top Lift or Multiple Lifts
≥ 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	-\$5.00
≥ 105.0 to < 106.0		
≥ 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

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- .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 - Top Lift Only - Remediation Methodology		
Segregation Severity	Visual Appearance	Repair Procedures
None	Uniform surface texture	N/A
Slight	Matrix of asphalt binder, coarse and fine aggregate exists, visually increased presence of stone sizes.	Sand, asphalt emulsion slurry
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
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

4.7 Smoothness

- .1 Payment Adjustments: Payment Adjustments for smoothness will be made by the International Roughness Index (IRI) in each driving lane for each Lot (excluding Hot Mix Asphalt Concrete Pavement placed at Km 183, Km 233, Km 282, and Km 293 Rest Stop areas) as follows.
 - .1 The smoothness testing will be undertaken by the Departmental Representative following substantial completion of the work. The Contractor shall provide a desired date for the smoothness testing a minimum of 2 weeks in advance of desired date.

The Departmental Representative will endeavor to complete the smoothness testing on the desired date but cannot guarantee the smoothness testing will be completed on the Contractor's desired date. Once a date for smoothness testing has been determined by the Departmental Representative the Contractor will be provided with a minimum of 3 days' notice. The contractor shall be responsible for sweeping and any other preparation work required for smoothness testing.

- .2 The finished pavement surface shall be tested using a Class 1 precision rolling profile measuring instrument, to determine the longitudinal profile and compute the International Roughness Index (IRI) in each driving lane. Profiles shall be measured and the IRI calculated in the traffic wheel-paths for each Sub-Lot.
- .3 For any Sub-Lot between 50 m and 100 m in length, the IRI value shall be considered representative of a complete Sub-Lot. For any Sub-Lot less than 50 m in length, the IRI value will be combined with the proceeding Sub-Lot IRI value.
- .4 The profile shall be measured over the entire length of the pavement exclusive of structures and shoulder areas. Acceleration, deceleration and turning lanes are considered part of the driving lanes and shall be tested in accordance with this provision. For the measuring process, the Contractor shall provide the Departmental Representative a chalk guide line in the traffic wheel paths immediately prior to measurement.
- .5 Auxiliary Lanes: For smoothness testing, sections of the driving lanes that do not fall within the continuous through lanes, such as acceleration lanes, deceleration lanes and turning lanes, and lanes which are less than 1 km in length, shall be treated as follows.
 - .1 The ratio of the section length to the standard Lot length of 1 km shall be determined and the Payment Adjustment shall be prorated on this basis as in the following example:

Length of segment, i.e. 565 m = 0.565 times the Standard Lot length of 1000 m.

- .2 Hence the applicable Payment Adjustment is 0.565 times the payment adjustment for a 1 km Lot as determined from Table 32 12 16 – 09.
- .6 Payment Adjustments for smoothness shall apply to the top lift only and shall be the applicable amount shown in Table 32 12 16 – 09 and those described in 4.7.3 – Smoothness Deficiencies. Payment adjustment for Hot Mix Asphalt Concrete Pavement placed at Km 183, Km 233, Km 282, and Km 293 Rest Stop areas shall not be made.

Table 32 12 16 – 09: Lot Assessment and Payment Adjustments for Smoothness. For the final surface course only, the following Payment Adjustments shall apply to each Lot.	
Lot IRI (m/km) ⁽¹⁾	Payment Adjustment
≤ 0.80	+\$2,000
> 0.80 to ≤ 0.90	+\$1,000
> 0.90 to ≤ 1.00	+\$500
> 1.00 to ≤ 1.10	+\$200
> 1.10 to ≤ 1.20	\$0
> 1.20 to ≤ 1.30	-\$100
> 1.30 to ≤ 1.40	-\$250
> 1.40 to ≤ 1.50	-\$600
> 1.50 to ≤ 1.60	-\$1,400
> 1.60 to ≤ 1.70	-\$2,000
> 1.70 to ≤ 1.80	-\$3,000
> 1.80	Reject

- .2 Rejection limits: The reject limit for smoothness is the limiting value as shown in Table 32 12 16 – 09, beyond which corrective work is required. The IRI value, calculated for each Sub-Lot, will be used to determine if the Lot will be accepted, and if so whether it will be subject to any Payment Adjustment. The Lot IRI is the average IRI value calculated for the Sub-Lots within the Lot. A Lot is rejected for smoothness if any Sub-Lot is rejected. A Sub-Lot is rejected (subject to remedial work) if:

- .1 It has an IRI within the reject zone shown in Table 32 12 16 – 09.

- .2 There are obvious defects or it has unrepaired smoothness deficiencies which require remediation in accordance with 4.6 – Surface Segregation or 4.10 – Asphalt Concrete Overlays as a Corrective Measure).
- .3 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.
- .4 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.
- .5 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.
- .2 Areas of excess or insufficient asphalt.

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- .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 subsequent to 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 PWGSC/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 Ministry 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 PWGSC.

- .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 PWGSC.

.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 PWGSC.

.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 PWGSC 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 PWGSC.

.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 PWGSC.
 - .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

PART 1 – GENERAL

Section Includes

PART 1:

1.1 Measurement and Payment Procedures.

PART 2:

2.1 Products.

PART 3:

3.1 Equipment.

3.2 Installation.

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, 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

PART 1 – GENERAL

Section Includes

PART 1:

1.1 Measurement and Payment Procedures.

PART 2:

2.1 Water.

PART 3:

3.1 Dust Control Using Water.

1.1 Measurement and Payment
Procedures

.1 Payment for the completion of Roadway 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, extract water from local sources ensuring extraction methods and locations conform with PWGSC's permit requirements (PWGSC permit available upon request). If extracting water under PWGSC's permit, the Contractor will be responsible to report water extraction volumes on a weekly basis to PWGSC using the supplied tracking sheet.

PART 3 – EXECUTION

3.1 Dust Control Using Water

.1 Complete Roadway Dust Control using water over the full width of all driving lanes undergoing Full Depth Reclamation whenever:

.1 Dust from travelling vehicles impairs driver's vision such that objects greater than 150 m in the distance are obscured.

.2 As deemed necessary by the Departmental Representative.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1

- 1.1 Measurement and Payment Procedures.
- 1.2 Submittals.
- 1.3 References.

PART 2:

- 2.1 Paint.

PART 3:

- 3.1 Traffic Management.
- 3.2 Equipment.
- 3.3 Application.

1.1 Measurement and Payment
Procedures

- .1 Payment for line painting will be made on the basis of the Price per Unit Bid for Pavement Markings, Solid and Dashed Yellow Line and Solid Single White Line in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with the layout (by survey), supply and installation of the line painting, 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 length of line painting surveyed in kilometers (measured per line km), measured parallel to the direction of the centerline of the proposed highway, and accepted by the Departmental Representative. Double lines (or simultaneous and broken lines) shall be counted as one single line for quantity calculation. Gaps between broken lines and gaps for intersections will be considered as a line with the gap distance counted in the line quantity.

1.2 Submittals

- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Unless advised otherwise in advance of the work by the Departmental Representative, 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 paint materials meet the requirements of

contract specification Section 32 17 23 – Pavement Markings.

.3 Provide access as requested by the Departmental Representative to sample paint line products throughout the work.

.4 For each application / line type, submit written summary report to Departmental Representative within 24 hrs of application and include information as follows.

.1 Total line painted (station start and end and line lane location).

.2 Quantity of paint and glass beads used and mean application rate. Carry out measurements in presence of Departmental Representative upon request.

1.3 References

.1 British Columbia Ministry of Transportation and Highways.

.1 Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim).

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 Traffic Management

.1 Traffic management for the completion of line painting shall be in accordance with the Contractor's accepted Traffic Management Plan (see Section 01 35 00 – Special Procedures – Traffic Control) and the following as minimum requirements:

.1 Equipment and signage including but not limited to

painting truck, escort vehicle as required by Section 14.7 - Conventional Long-Line Centerline and White Line Marking – Two-Lane, Two-Way Roadway – Short and Long Duration of the BC Ministry of Transportation Traffic Management Manual for Work on Roadways – 2015 Office Edition (Interim).

3.2 Equipment

- .1 Paint applicator to be an approved pressure type mobile distributor capable of applying paint in a single, double and dashed lines. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shutoff.
- .2 Distributor to be capable of applying reflective glass beads as an overlay on freshly applied paint.
- .3 Eradicator to remove incorrectly placed lines or lines placed with an incorrect paint / glass bead application rate. Should the use of an eradicator be necessary, all costs shall be incidental to the work and no separate payment will be made.

3.3 Application

- .1 Paint Pavement Markings as per the details, dimension, and locations shown on Contract Drawings. The Contractor shall be responsible for all pre-marking using survey to properly apply Pavement Markings within the tolerances.
- .2 Apply paint only when air temperature is above 10°C, wind speed is less than 60 km/h and no rain is forecast within the next 4 hours.
- .3 Contractor is to insure that pavement surface is free from surface water, frost, ice, dust, oil, grease and other foreign materials as required before painting.
- .4 Ensure traffic control per Section 01 35 00 – Special Procedures – Traffic Control is in place for the duration of the paint application and drying process.
- .5 Apply traffic paint evenly at a wet film thickness of 400 micrometers, or 45 litre/km of solid 110 mm line.
- .6 Do not thin paint.
- .7 Paint lines to be of uniform colour and density with sharp edges.
- .8 Apply glass beads at rate of 700 g/litre of painted area immediately after application of paint.

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- .9 Thoroughly clean distributor tank before refilling with paint or different colour.
 - .10 Tolerances.
 - .1 Paint markings to be within +/- 12 mm of design lines indicated on Contract Drawings.
 - .2 Paint thickness shall be within +/- 10% of specified thickness or volume.
 - .3 Application of glass beads to be within 25 grams/litre of paint.
 - .11 Remove lines placed outside of tolerance or lines placed with application rate outside tolerance.
 - .12 Protect pavement marking until dry.

END OF SECTION

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 Measurement and Payment Procedures
- 1.2 Product Data.
- 1.3 Scheduling.
- 1.4 Product Handling and Storage.

PART 2:

- 2.1 Materials.
- 2.2 Equipment.

PART 3:

- 3.1 Workmanship.
- 3.2 Protection of Surfaces.
- 3.3 Preparation of Slurry.
- 3.4 Slurry Application.
- 3.5 Warranty and Maintenance.

1.1 Measurement and Payment Procedures

- .1 Payment for the completion of 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, and maintenance of the Hydraulic Seeding in all areas of, topsoil, cut slopes, excavation, 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 by Lump Sum based on the percentage of the work completed 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 Mulch.

.1 Shipping Bill: issued by supplier of material, identifying manufacturer and supplier, material, and net dry-air mass in each container.

.3 Tackifier.

.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 other related works on which the hydraulic seeding shall be applied.

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 Wood Fiber Mulch shall be specifically manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with the following properties:
 - .1 Made from wood cellulose fibre.
 - .2 Organic matter content: 95% +/- 0.5%
 - .3 Value of pH: 6.0
 - .4 Potential water absorption: 900%
- .3 Tackifier shall be powder produced from natural plant gum or acceptable equivalent and with the following properties:

- .1 Free flowing.
- .2 Non-corrosive.
- .3 Biodegradable.
- .4 Water dilutable.
- .5 Liquid dispersion.
- .4 Water: free of impurities that would inhibit germination and growth.
- .5 Fertilizer:
 - .1 To Canada Fertilizers Act and Regulations.
 - .2 Complete synthetic, 50% slow release sulfur coated urea. 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 and appropriate nozzles.

PART 3 – EXECUTION

- 3.1 Workmanship
 - .1 Apply Hydraulic Seeding in all areas of decommissioned

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- highway, topsoil, cut slopes and other disturbed areas as detailed in these specifications or as directed by the Departmental Representative.
- .2 Do not spray onto structures, signs, guiderails, 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 over 10 km/h, 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 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 mulch and charge slowly into seeder. Use optimum carrying capacity of water relative to mulch as follows:
 - .1 Spray mulch 55kg/1000 L.
 - .2 Silva-Fiber 43kg/1000 L.
 - .3 Verdyol Standard 38kg/1000 L.
 - .4 Fibramulch 47kg/1000 L.
 - .4 After all other material is in the seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

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- 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 and appropriate nozzles.
- .2 Slurry mixture applied per hectare:
- .1 Seed mixture: 125kg.
 - .2 Fall rye: 110kg.
 - .3 Mulch: 1500 kg/ha.
 - .4 Tackifier: 45 kg on slopes 3H:1V or steeper.
 - .5 Water: Minimum 30,000 L.
 - .6 Fertilizer: 360kg.
- .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

PART 1 – GENERAL

Section Includes

PART 1:

- 1.1 General.
- 1.2 Measurement and Payment Procedures.
- 1.3 References.
- 1.4 Definitions.
- 1.5 Submittals.
- 1.6 Environmental.
- 1.7 Delivery, Storage, and Handling.

PART 2:

Part 2a: PRODUCTS (Open Cut Method).

- 2.1a Aluminized CSP Culvert.
- 2.2a Zinc-Rich Paint.
- 2.3a Culvert Bedding Material.
- 2.4a Nonwoven Geotextile.
- 2.5a Riprap.
- 2.6a Embankment.
- 2.7a Bentonite.
- 2.8a Steel Pipe Culvert.

PART 2b: PRODUCTS (Trenchless Method).

- 2.1b Steel Pipe Culvert.
- 2.2b Welding.
- 2.3b Flowable Fill
- 2.4b Nonwoven Geotextile.
- 2.5b Riprap.

PART 3:

Part 3a: EXECUTION (Open Cut Method).

- 3.1a Culvert Removal.
- 3.2a Culvert Bedding.
- 3.3a Culvert Placement.
- 3.4a Culvert Joints.
- 3.5a Embankment.
- 3.6a Crushed Base Gravel.
- 3.7a Culvert Inlet and Outlet Protection.
- 3.8a Clean-up.

PART 3b: EXECUTION (Trenchless Method).

- 3.1a Equipment.
- 3.2b Installation.
- 3.3b Flowable Fill.
- 3.4b Culvert Inlet and Outlet Protection.
- 3.5b Ditch Realignment.
- 3.6b Clean-up.

1.1 General

.1 The replacement / install of 600 mm (Km 277.45, Km 284.8), 800 mm (Km 309.0, Km 314.0, & Km 314.1), 900 mm (Km 288.0), and 1000 mm (Km 300.4) diameter culvert replacements shall be installed by the Contractor using either method below at his discretion:

- .1 Open Cut Method: An Aluminized CSP Culvert shall be installed by excavation, removal/disposal of existing culvert, placement of new culvert, followed by backfill and compaction as per Part 1, Part 2a and Part 3a of these specifications.
- .2 Trenchless Method: A Steel Pipe Culvert of required diameter shall be hydraulically installed adjacent to the existing culvert, followed by decommissioning of existing culvert and drainage works necessary to

divert water flow into the new location as per Part 1, Part 2b and Part 3b of these specifications.

- .2 The install of the 600 mm Ditch and Slope Reestablishment Culvert shall be installed by the Contractor using the open cut method by excavation, placement of the new steel pipe culvert, followed by backfill and compaction as per Part 1, Part 2a and Part 3a of these specifications.
 - .3 The repairs to the 800 mm (Km 309.4, & Km 311.7), 900 mm (Km 294.5), 1000 mm (308.2 & 309.2), and 1200 mm (Km 334.7) diameter culverts shall be completed by the Contractor using the cut and cover method by excavation, replacement / repair to the damaged existing culvert, followed by backfill and compaction as per Part 1, Part 2a and Part 3a of these specifications.
 - .4 The replacement of the Polk A DoT Creek Culvert (Km 277.4) shall be installed by the Contractor using the open cut method by diverting flows as necessary, excavation, placement of new culvert, backfill, compaction, and removal/disposal of existing culvert, as per Part 1, Part 2a and Part 3a of these specifications.
- 1.2 Measurement and Payment Procedures
- .1 Payment for the supply and install of varying sizes of replacement and new culverts will be made on the basis of the Price per Unit Bid for Culvert Replacement / Install (Varying Sizes) in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with the work, including:
 - .1 If Open Cut Method is chosen: excavation, dewatering (as required), removal, and disposal of the existing culvert and the supply, transport, install of an Aluminized CSP Culvert and culvert bedding material (Crushed Base Gravel), Embankment, and Crushed Base Gravel, and all other items (couplings, fittings, and hardware) for the Aluminized CSP Culvert and all other items necessary for the successful completion of the work.
 - .2 If trenchless method is chosen: supply, transport, install trenchless equipment, supply and setup excavation for working gravel pad or jacking pit to accommodate equipment and length of Steel Pipe Culvert, removal and disposal of earth material inside the steel pipe culvert, welding, Flowable Fill, regrading of the ditch, restoration, and all other items necessary for successful completion of the work. If an obstruction is encountered during the

installation process, the contractor shall be responsible for the removal costs or shall complete the work using the open cut method.

- .2 Measurement for Payment for completion of Culvert Replacement / Install (Varying Sizes) will be made on the length of culvert surveyed in lineal metres, measured parallel to the direction of the culvert along the invert of the culvert, and accepted by the Departmental Representative.
- .3 Payment for the supply and install of the Ditch and Slope Reestablishment Culverts – 600 mm will be made on the basis of the Price per Unit Bid for 600 mm Ditch and Slope Reestablishment Culvert in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with the excavation, dewatering (as required), removal, and disposal of the existing culvert and the supply, transport, install of new steel pipe culvert and culvert bedding material and all other items (couplings, fittings, and hardware) for the steel pipe culvert and all other items necessary for the successful completion of the work. Excavation of slope and ditch to design lines and grades shall be completed and paid per Excavation (see Section 31 24 14 – Roadway Excavation and Embankment). Payment for the reestablishment of any existing ground designated to remain but disturbed during the install of the 600 mm Ditch and Slope Reestablishment Culverts (and thus replaced as embankment) will not be made.
- .4 Measurement for Payment for completion of the Ditch and Slope Reestablishment Culverts – 600 mm will be made on the length of culvert surveyed in lineal metres, measured parallel to the direction of the culvert along the invert of the culvert, and accepted by the Departmental Representative.
- .5 Payment for the supply and install of Polk A Dot Creek replacement culvert will be made on the basis of the Price per Unit Bid for Polk A Dot Creek Culvert Replacement in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with the excavation, dewatering (as required), removal, and disposal of the existing culvert and the supply, transport, install of culvert bedding material (75 mm Clear Crush Culvert Bedding Material and Crushed Base Gravel), bentonite, and all other items (couplings, fittings, and hardware) for the Aluminized CSP Culvert and all other items necessary for the successful completion of the work.
- .6 Measurement for Payment for completion of Polk A Dot Creek Culvert Replacement will be made by Lump Sum

based on the percentage of the work completed and accepted by the Departmental Representative.

- .7 Payment for the completion of culvert repairs will be made on the basis of the Price per Unit Bid for Culvert Repairs (Varying Sizes) in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs included with the excavation, dewatering (as required), removal, and disposal of the existing culvert segment, and the supply, transport, install of a new culvert segment and culvert bedding material and all other items (couplings, fittings, and hardware) required to repair the culvert and all other items necessary for the successful completion of the work. The replacement of BST removed during repairs to Km 334.7 culvert will be by others at the completion of the work.
- .8 Measurement for Payment for completion of Culvert Repairs (Varying Sizes) will be made by Lump Sum based on the percentage of the work completed and accepted by the Departmental Representative.
- .9 Payment for install of culvert inlet and outlet protection on culvert (≤ 1200 mm \emptyset) will be made on the basis of the Price per Unit Bid for Riprap Culvert End Protection (≤ 1200 mm \emptyset) 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, supply, transport, and placement of the 50 kg class riprap, the supply and placement of the nonwoven geotextile, and all other items necessary for successful completion of the work.
- .10 Measurement for Payment for completion of the Riprap Culvert End Protection (≤ 1200 mm \emptyset) will be made by the count of culvert inlet and outlet protection installations installed and accepted by the Departmental Representative. Each culvert end will be counted as an inlet or outlet protection installed.
- .11 Payment for install of Polk A Dot Creek culvert inlet and outlet protection will be made on the basis of the Price per Unit Bid for Polk A Dot Creek Culvert End 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, supply, transport, and placement of the riprap, the supply and placement of the nonwoven geotextile, and all other items necessary for successful completion of the work.
- .12 Measurement for Payment for completion of Polk A Dot Creek Culvert End Protection will be made by Lump Sum

based on the percentage of the work completed and accepted by the Departmental Representative.

.13 Payment for install of Ditch Blocks will be made on the basis of the Price per Unit Bid for Ditch Blocks in the Bid and Acceptance Form. The price per Unit Bid shall include all costs for supply, transport, and placement of the granular materials, and all other items necessary for successful completion of the work.

.14 Measurement for Payment for completion of Ditch Blocks will be made the count of each ditch block installed and accepted by the Departmental Representative.

1.3 References

.1 Canadian Standards Association (CSA International), latest edition:

.1 CSA-G401, Corrugated Steel Pipe Products.

.2 CSA W59, Welded steel construction (metal arc welding).

.3 CSA W48, Filler metals and allied materials for metal arc welding.

.2 The Pipe Jacking Association – Guide to Best Practices for the Installation of Pipe Jacks and Microtunnels.

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

.1 ASTM D4832, Standard Test Methods for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.

.2 ASTM A252, Standard Specification for Welded and Seamless Steel Pipe Piles.

.3 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).

1.4 Definitions

.1 Trenchless: Culvert installation through existing ground within strict alignment and grade tolerances using hydraulic equipment without the need for the excavation of the existing ground.

.2 Obstruction: Rock or other material which must be removed prior to the continuation of the trenchless culvert installation

work. Obstructions encountered during the installation process shall be removed by the Contractor at the Contractor's expense.

- .3 Flowable Fill: Ready-mix Controlled Low Strength Material used as an alternative to compacted soil, and is also known as controlled density fill, and several other names, some of which are trademark names of material suppliers. Flowable Fill differs from Portland cement concrete as it contains a low cementitious content to reduce strength development for possible future removal.
- 1.5 Submittals
- .1 Submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.
- .2 The following submittals are required for all culverts using the Open Cut Method for culvert installation:
- .1 Prior to ordering materials, submit manufacturer's test data and certification in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Certification to be marked on pipe culverts.
- .3 Submit to the Departmental Representative for review and acceptance construction staging and detour drawings as per Section 01 14 00 – Work Restrictions, Access Development, Construction Staging, and Restoration.
- .4 Submit to the Departmental Representative for review and acceptance the steel producer's certificates for the steel pipe culverts in accordance with ASTM A252.
- .3 The following submittals are required for all culverts using the Trenchless Method for culvert installation:
- .1 Submit to the Departmental Representative for review and acceptance the steel producer's certificates for the steel pipe culverts in accordance with ASTM A252.
- .2 Unless advised otherwise in advance of the work by the Departmental Representative, submit to the Departmental Representative for review and acceptance a Tunneling Methodology report. The report shall be sufficient to convey the following:
- .1 Proposed method of tunnel construction and

-
- type of face support.
 - .2 Manufacturer and type of tunneling equipment proposed.
 - .3 Sequence of operations.
 - .4 Method of spoil transportation from the face and surface storage.
 - .5 Capacity of trenchless equipment and cushioning.
 - .6 Identify critical utility crossings and special precautions proposed.
 - .7 Proposed methodology to remove any obstructions encountered.
 - .8 Slurry injection system details (if required).
- .3 Submit to the Departmental Representative for review and acceptance a Flowable Fill mix design as per Section 03 40 00 – Flowable Fill.
- 1.6 Environmental
- .1 Complete culvert installation and related works in conformance with the requirements of Section 01 35 43 – Environmental Protection, the Contractor’s accepted Environmental Protection Plan (EPP), and FLNRO Section 11 Approval for Instream Work (Appendix I).
 - .2 The Contractor shall account for the possibility of not being able to complete work due to high flows or adverse weather conditions in the construction schedule and in the unit prices. No payment for temporary work stoppages due to high flows or adverse weather conditions will be made. See Item 2.2 – Work Completion, Subsection .5 through .7 inclusive of Contract Specification Section 01 11 10 – Summary of Work for more information.
- 1.7 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 2a – PRODUCTS (Open
Cut Method)

- 2.1a Aluminized CSP Culvert .1 Culvert shall be.
- .1 Aluminized CSP Culverts shall be CSP with an aluminum coating such as Armtec Hel-Cor Aluminized Steel Type 2 CSP culverts, Atlantic Industries Limited Aluminized Type 2 CSP culverts, or a preapproved 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 Culverts \leq 1800 mm Diameter: 2.0 mm.
 - .2 Culverts $>$ 1800 mm Diameter: 3.5 mm.
 - .4 Corrugations to be:
 - .1 Culverts \leq 1800 mm Diameter: 68 mm x 13 mm.
 - .2 Culverts $>$ 1800 mm Diameter: 76 mm x 25 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 Ensure that all components for each particular Aluminized CSP Culvert comes from a single supplier.
- 2.2a Zinc-Rich paint .1 Zinc-rich paint shall be Galvacon™ or preapproved equivalent.
- 2.3a Culvert Bedding Material .1 Culvert Bedding Material shall be Crushed Base Gravel and 75 mm Clear Crush Culvert Bedding Material in accordance

- with Section 31 05 16 – Aggregates: General.
- 2.4a Nonwoven Geotextile .1 The nonwoven geotextile for the culvert end protection shall be Nilex 4551 or preapproved equivalent.
- 2.5a Riprap .1 The riprap for the culvert end protection shall be 50 Kg Class Riprap accordance with Section 31 37 00 – Riprap.
- 2.6a Embankment .1 Embankment (backfill above culvert bedding) shall be reused material excavated from the trench meeting the following requirements.
- .1 Be comprised of gravels and rocks containing no more than 3% organic matter by mass and free from weeds, sod, roots, logs, stumps, frozen lumps, snow, ice or any other unsuitable material as directed by the Departmental Representative. The maximum size of embankment rock placed within 300 mm of final grade of embankment material shall be 200 mm in diameter.
- 2.7a Bentonite .1 The Contractor shall propose to the Departmental Representative a sodium bentonite product for use as self-sealing low permeability barrier. The sodium bentonite shall be provided in powder form, insoluble in water, and have a low thickening and good binding properties.
- 2.8a Steel Pipe Culverts .1 Provide steel pipe culverts of required 600 mm diameter, minimum 12 mm wall thickness, and length as shown on the Contract Drawings for Ditch and Slope Reestablishment Culverts. Substitution of pipe with larger diameter or thicker wall thickness to suit equipment availability or ground conditions shall be pre-approved by the Departmental Representative. The substitution of pipe with smaller diameter or thinner wall thickness will not be permitted.
- .2 Steel pipe culverts shall be seamless or welded pipe conforming with the requirements of ASTM A252 with a minimum yield strength of 310 MPa.
- .3 Steel pipe culverts shall be delivered to the site in uniform lengths.
- .4 The Contractor shall be responsible for selection of appropriate pipe, pipe joints, and pipe wall thickness to carry the thrust of any trenchless installation forces or any other construction loads in combination with overburden, earth and hydrostatic loads. The trenchless installation equipment shall not unduly damage or distort the ends of the

steel pipe culverts during the installation process.

PART 2b – PRODUCTS
(Trenchless Method)

- 2.1b Steel Pipe Culverts
- .1 Provide steel pipe culverts of required diameter, minimum 12 mm wall thickness, and length as shown on the Contract Drawings. Substitution of pipe with larger diameter or thicker wall thickness to suit equipment availability or ground conditions shall be pre-approved by the Departmental Representative. The substitution of pipe with smaller diameter or thinner wall thickness will not be permitted.
 - .2 Steel pipe culverts shall be seamless or welded pipe conforming with the requirements of ASTM A252 with a minimum yield strength of 310 MPa.
 - .3 Steel pipe culverts shall be delivered to the site in uniform lengths.
 - .4 The Contractor shall be responsible for selection of appropriate pipe, pipe joints, and pipe wall thickness to carry the thrust of any trenchless installation forces or any other construction loads in combination with overburden, earth and hydrostatic loads. The trenchless installation equipment shall not unduly damage or distort the ends of the steel pipe culverts during the installation process.
- 2.2b Welding
- .1 Welding materials to CSA W59.
 - .2 Welding electrodes to CSA W48 Series.
- 2.3b Flowable Fill
- .1 The existing abandoned pipe culvert shall be backfilled with Flowable Fill in accordance with Section 03 40 00 – Flowable Fill.
- 2.4b Nonwoven Geotextile
- .1 The nonwoven geotextile for the culvert end protection shall be Nilex 4551 or preapproved equivalent.
- 2.5b Riprap
- .1 The riprap for the culvert end protection shall be accordance with Section 31 37 00 – Riprap.

PART 3a – EXECUTION (Open
Cut Method)

- 3.1a Culvert Removal
- .1 Schedule culvert removal as required to facilitate conveyance of flows and installation of new culvert (unless shown otherwise on Contract Drawings, new culvert shall be installed in location of existing culvert). Excavate and

- remove existing culvert and associated components as indicated on the Contract Drawings. Dispose of culvert materials in an offsite disposal facility permitted to accept culvert materials and acceptable to the Departmental Representative.
- 3.2a 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 Temporally stockpile excavated material for later reuse as Backfill Material provided the material excavated achieves the criteria for Backfill Material. Should the excavated material not achieve the properties of Backfill Material, notify the Departmental Representative and await further instruction.
 - .2 Place required Geotextile and Culvert Bedding Material (Crushed Base Gravel or 75 mm Clear Crush Culvert Bedding Material) in preparation for culvert placement on the bottom of excavation to the thickness and locations shown on Contract Drawings and compact. Compact final 150 mm lift of bedding material on bottom side of culvert in contact with corrugation to 95% of the standard maximum dry density in accordance with ASTM D698. Compact other lifts to a minimum 98% of the standard maximum dry density in accordance with ASTM D698.
 - .3 Shape Culvert Bedding Material 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 Backfill with Culvert Bedding Material around and over culverts as indicated on the Contract Drawings.
 - .5 Place Culvert Bedding Material in 150 mm lifts to full width of trench alternating on each side of culvert, so as not to allow movement or uplift of the culvert.
 - .6 Compact each lift to a density not less than 98% of the standard maximum dry density in accordance with ASTM D698 taking special care to obtain required density under haunches. Hand tamp where necessary to obtain compaction.
 - .7 Place Culvert Bedding Material in an unfrozen condition.
 - .8 When indicated on the Contract Drawings, place Bentonite

-
- to the thicknesses and location shown on the contract drawings during the backfill process.
- 3.3a Culvert Placement
- .1 Place culvert such that when complete the alignment, grade, camber, location, and inverts are in compliance with 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.
- 3.4a Culvert Joints
- .1 Install culvert joints per the manufacturer'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.
- 3.5a Embankment
- .1 Place Embankment (material above culvert bedding material, below crushed base gravel) in 150 mm lifts to full width of trench and compact each lift to a density not less than 98% of the standard maximum dry density in accordance with ASTM D698. Add water or dry Embankment material as needed according to ASTM D698. Break Embankment material down to sizes that enable required compaction and mix for uniform moisture to full depth of lift. Embankment 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 by the Contractor.
 - .2 Any embankment designated to remain on either side of the 600 mm Ditch and Slope Reestablishment Culverts but gets disturbed during the culvert installation process shall be reestablished to the depths and grades on the contracts drawings via placement of embankment in 150 mm lifts and compaction of each lift to a density not less than 98% of the standard maximum dry density in accordance with ASTM D698.
 - .3 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.
- .4 Place Embankment material backfill in unfrozen condition free of snow and ice.
- .5 Dispose of unused excavated material (Embankment material) to a location approved by the Departmental Representative within 500 m of the culvert within the highway right-of-way.
- 3.6a Crushed Base Gravel
- .1 Supply and place Crushed Base Gravel above embankment materials in accordance with Section 32 11 24 – Crushed Base Gravel.
- .2 The crushed base gravel shall be maintained by the Contractor in a condition suitable for traffic, free of pot holes, with necessary signage installed until such time as the Full Depth Reclamation and paving in the area of the culvert is complete.
- .3 Reinstall of BST removed to complete the repairs to the Km 334.7 culvert shall be completed by others. Notify the Departmental Representative 3 days in advance of completion of the Crushed Base Gravel. Maintain construction signage as required by Departmental Representative until BST installed by others (maximum 3 weeks).
- 3.7a 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 Re-use excavated material as Embankment (if suitable and needed) or dispose of material offsite at 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 and to the requirements. 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.

- | | | |
|---------------|----|---|
| 3.8a Clean-up | .1 | Clean-up all disturbed areas to an equal or better condition to that prior to construction. |
| | .2 | Hydraulic Seeding of all disturbed areas per Section 32 93 21 – Hydraulic Seeding. |

PART 3b – EXECUTION
(Trenchless Method)

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|-------------------|----|--|
| 3.1b Equipment | .1 | The Contractor shall be solely responsible for selection of trenchless installation equipment capable of handling the culvert size, ground conditions, and existing soils. |
| 3.2b Installation | .1 | Divert the existing flows from the area of work using a berm or pumps as required and prevent sediment-laden water from entering the water course. |
| | .2 | Use trenchless methods that will minimize movement of the ground in front of and surrounding the steel pipe culverts. |
| | .3 | Perform the trenchless installation as to avoid interference with the operation of the vehicles travelling the highway. |
| | .4 | Install new culvert such that the outside edge is 1 m or less in distance from the outside edge of the existing culvert. |
| | .5 | Install suitable gravel pad and or thrust reaction blocks as required for trenchless equipment. Complete excavation as necessary for install of the pipe lengths while keeping the construction footprint within the limits of the construction shown on the Contract Drawings to the maximum extent possible. |
| | .6 | Divert stream water, drainage, and discharge from dewatering away from the trenchless operations to a location in compliance with the Contractor's accepted Environmental Protection Plan (EPP). |
| | .7 | Install steel pipe culvert ensuring the culvert is not reverse graded and +/- 300 mm of the true line and level at any point along the culvert. Adjustments to the line and level should be gradual to ensure that the steel pipe or joints are not damaged. Monitor line and level of the culvert with appropriate instruments. |
| | .8 | Monitor ground movement (settlement and heave) throughout the trenchless installation. Halt all operations, take immediate remedial action (including notification of the Departmental Representative) if ground movements greater than +/- 50 mm are detected. |

- .9 If ground movements in excess of +/- 50 mm are detected, the Departmental Representative will consult with the Contractor and others if required to determine the most appropriate course of action. The install of the steel pipe culverts can only commence again following approval from the Departmental Representative.
- .10 Cushion pipe joints as necessary to transmit the jacking forces without damage to the steel pipe or steel pipe joints.
- .11 Fuse Steel Pipe Culverts sections using Full Penetration Butt welds. Complete welding in accordance with CSA W59.
- .12 If necessary maintain an envelope of bentonite slurry around the exterior of the pipe during the trenchless installation to reduce the exterior friction and reduce the possibility of the pipe seizing in place.
- .13 If the steel pipe culvert seizes in place and Contractor elects to construct a recovery access shaft, pre-approval must first be obtained from the Departmental Representative.
- .14 In the event a section of pipe is damaged during the trenchless installation, or joint failure occurs, as evident by inspection, visible ground water inflow or other observations, the Contractor shall submit for approval his methods for repair or replacement of the steel pipe culvert. Any steel pipe damage or misalignment of the steel pipe shall be removed and replaced by the Contractor at no additional costs to the owner.
- .15 Ensure no voids between the outside of the steel pipe culvert and ground result from the trenchless installation process. Any voids which form shall be filled with pressure grouting. If pressure grouting is necessary, submit pressure grouting materials and procedures to the Departmental Representative for review and acceptance prior to undertaking the work.
- .16 In the event an obstruction is encountered during the trenchless less installation process, notify the Departmental Representative immediately. Await further instruction from the Departmental Representative before proceeding.
- .17 Remove soil materials from within the steel pipes using appropriate equipment. Temporarily stockpile materials for off-site disposal.

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- .18 Trim ends of steel pipe culverts per the lines shown on the Contract Drawings.
- 3.3b Flowable Fill
- .1 The existing abandoned pipe culvert shall be backfilled with Flowable Fill in accordance with Section 03 40 00 – Flowable Fill.
- .2 Ensure ends of existing culvert and Flowable Fill are encased and not visible at the conclusion of the work in accordance with Section 03 40 00 – Flowable Fill.
- 3.4b 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.
- 3.5b Ditch Realignment
- .1 Re-establish ditch to the existing width, grades, and cut slope angles. Ensure positive drainage to/from inlet and outlet of new culvert.
- 3.6b Clean-up
- .1 Clean-up all disturbed areas to an equal or better condition to that prior to construction.
- .2 Hydraulic Seeding of all disturbed areas per Section 32 93 21 – Hydraulic Seeding.

END OF SECTION

PART 1 – GENERAL

Section Includes

- 1.1 Measurement and Payment Procedures.
- 1.2 References.
- 1.3 Submittals.
- 1.4 Quality Management.

PART 2:

- 2.1 Precast Concrete Barrier.
- 2.2 Riprap.
- 2.3 Nonwoven Geotextile.

PART 3:

- 3.1 Preparation.
- 3.2 Remove Existing Precast Concrete Barriers.
- 3.3 Install Precast Concrete Barriers.
- 3.4 Riprap Spillway.
- 3.5 Disposal.

1.1 Measurement and Payment Procedures

- .1 Payment for removal and reinstatement of existing precast concrete barrier will be made on the basis of the Price per Unit Bid for Remove and Reinstatement Existing Concrete Barrier in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for removal, transport, temporary stockpile, reinstatement (to design locations), removal and offsite stockpile of existing signage (where conflicting with paving or new barrier installation location), and all other items necessary for successful completion of the work.
- .2 Measurement for Payment for completion of Remove and Reinstatement Existing Concrete Barrier will be made by the count of Precast Concrete Barrier units temporarily removed and then reinstated as accepted by the Departmental Representative. Barriers removed but then not needed for reuse will be included in the count of Remove and Reinstatement Existing Concrete Barrier.
- .3 Payment for the supply and install of new precast concrete barriers will be made on the basis of the Price per Unit Bid

- for Precast Concrete Median Drainage Barrier – 810 mm in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for supply, transport, and placement of the precast concrete barriers, and all other items necessary for successful completion of the work.
- .4 Measurement for Payment for completion of the supply and install of new Precast Concrete Median Drainage Barrier – 810 mm will be made by the count of each new Precast Concrete Barrier installed and accepted by the Departmental Representative.
- .5 Payment for the disposal of existing precast concrete barriers will be made on the basis of the Price per Unit Bid for Disposal Existing Precast Concrete Barrier in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for loading, transport, and stockpiling of the precast concrete barriers, and all other items necessary for successful completion of the work.
- .6 Measurement for Payment for completion of Disposal Existing Precast Concrete Barrier will be made by the count of each type of precast concrete barrier removed from the site and disposed as accepted by the Departmental Representative.
- .7 Payment for the installation of riprap spillways will be made on the basis of the Price per Unit Bid for Riprap Spillway in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for excavating, loading, transport, and disposal of native materials, and supply, placement, and installation of riprap and non-woven geotextile, and all other items necessary for successful completion of the work.
- .8 Measurement for Payment for the completion of riprap spillways will be made by the count of each Riprap Spillway installed and accepted by the Departmental Representative.
- 1.2 References .1 British Columbia MoTI – 2016 Standard Specifications for Highway Construction.
- 1.3 Submittals .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 If requested by the Departmental Representative, submit concrete mix design to the Departmental Representative for review and acceptance should contractor choose to enhance the mix through the use of admixtures. Submit and receive approval of proposed mix design prior to casting or shipping

of precast concrete barriers.

- 1.4 Quality Management
- .1 Quality Control and Quality Assurance in accordance with Section 01 45 00 – Quality Management.
 - .2 In addition to the Quality Control undertaken by the Contractor, the Departmental Representative may undertake, through an independent CSA-certified testing firm, random sampling, inspection, and testing for the purpose of Quality Assurance.
 - .3 Provide access to all portions of the work and cooperate with the Departmental Representatives.
 - .4 Make space available for storage and curing of test samples.
 - .5 Allow ample time for notification and inspection before scheduling concrete placement.
 - .6 In the case of the ambiguity whether the product or work conforms to the applicable standard, the Departmental Representative reserves the right to have such product of system tested or re-inspected to ascertain the conformance.
 - .7 Upon request, the Contractor will furnish the Departmental Representative with the concrete production records used in the work.

PART 2 – PRODUCTS

- 2.1 Precast Concrete Barrier
- .1 Precast concrete barrier shall be in accordance with Section 941 – Precast Reinforced Concrete Barriers of the British Columbia MoTI – 2016 Standard Specifications for Highway Construction. The precast concrete barrier units shall be per the following drawings and custom details as follows:
 - .1 Precast Concrete Median Drainage Barrier 810 mm – CMDB: Drawings – SP941-02.01.10. Note, the anchor and key shall be custom order as needed to suit barrier anchor types on adjacent existing / proposed barrier. The anchor and key on each end of the barrier unit shall be any combination of the hook and key connection shown on SP941-02.01.03 or the eye and key void shown on SP941-02.01.04.
 - .2 Precast concrete barrier shall be manufactured per the requirements of the applicable sections of Section 941 – Precast Reinforced Concrete Barriers of the British Columbia MoTI – 2016 Standard Specifications for

 Highway Construction as follows:

- .1 941.02 – Concrete Quality (deviation from any quality standards (if desired by Contractor) will require the submission of a mix design prior to casting – see Item 2.1 - Precast Concrete Barrier, Subsection .3 of Contract Specification Section 34 71 13.01 – Precast Concrete Barriers).
 - .2 941.03 – Reinforced Steel, Fibrillated Fibres, Attached Hardware & Miscellaneous Items.
 - .3 941.05 – Placing and Finishing of Concrete.
 - .4 941.06 – Tolerances – Allowable.
 - .5 941.07 – Procedure of Manufacture.
 - .6 941.08 – Handling.
 - .7 Drawings as applicable: SP941-01.01.01 – SP941-04.02.01
- .3 Should the Contractor choose to enhance the mix through the use of admixtures or deviate from any of the quality standards listed in 941.02 of the British Columbia MoTI – 2016 Standard Specifications for Highway Construction, a concrete mix design from the Contractor shall be provided to the Departmental Representative for review and acceptance. Submit the proposed mix design and receive acceptance of the proposed mix design from the Departmental Representative prior to casting or shipping of precast concrete barriers. The Departmental Representative is not obligated to accept a mix design which in the Departmental Representative’s opinion results in a product of lesser quality than would be provided had the standards detailed in Section 941 – Precast Reinforced Concrete Barriers of the British Columbia MoTI – 2016 Standard Specifications for Highway Construction be followed.
- 2.2 Riprap .1 The riprap for the riprap spillways shall be 10 Kg Class Riprap in accordance with Section 31 37 00 – Riprap.
- 2.3 Nonwoven Geotextile .1 The nonwoven geotextile for the culvert end protection shall be Nilex 4551 or preapproved equivalent.

PART 3 – EXECUTION

- 3.1 Preparation .1 Prior to ordering Precast Concrete Median Drainage Barriers complete the following:

-
- .1 Review the topography at Buckinghorse River Bridge and confirm with the Departmental Representative the locations for each riprap spillway installation.
- .2 Review the existing / proposed precast concrete barrier anchors types and determine which anchor type (hook and key connection) is needed on each end of the new Precast Concrete Median Drainage Barriers (CMDB) to allow the barriers to be installed in the desired location and in the case of the Buckinghorse River Bridge, to accommodate the reuse of the existing barriers to the design barrier flare lengths required. If required order barrier with a custom hook and key connection combination.
- 3.2 Remove Existing Precast Concrete Barriers
- .1 Obtain approval from Departmental Representative prior to removal of existing precast concrete barriers. Existing precast concrete barriers shall only be removed immediately prior to commencement of subsequent works in area.
- .2 Remove and temporarily stockpile precast concrete barriers and related warning signs designated for removal as shown on the Contract Drawings. The Contractor shall take necessary precautions to prevent damage to the precast concrete barriers during the removal, transport, and stockpiling process. Dispose of warning signs designated for removal in a location acceptable to the Departmental Representative at PWGSC's Km 254 Sikanni Maintenance Yard.
- .3 Install applicable signage warning of missing precast concrete barrier and 100 cm tubular markers in location of removed precast concrete until concrete barrier is reinstalled.
- .4 Stockpile the existing precast concrete barriers in a neat fashion in a location preapproved by the Departmental Representative within highway right-of-way.
- 3.3 Install Precast Concrete Barriers
- .1 Install precast concrete barriers following the completion and acceptance of the Hot Mix Asphalt Concrete Pavement.
- .2 Install precast concrete barrier units in the locations and alignment shown on the Contract Drawings. Install the new CMDB units to align with the proposed riprap spillway locations as agreed to with the Departmental Representative. Unless instructed otherwise by the Departmental

Representative, the CMDDB units at the Buckingham River Bridge shall be installed a minimum of 1 precast concrete barrier unit from the bridge parapet ends.

- .3 Object marker signs (W-54 L/R) on the ends of the precast concrete barrier shall be installed by others. Identify ends of precast concrete barrier with 100 cm tubular markers until project completion of until object marker signs have been installed by the Departmental Representative.

3.4 Riprap Spillway

- .1 Prior to or during installation of the precast concrete culverts, excavate existing ground to facilitate the installation of the Riprap Spillways in the locations agreed to with the Departmental Representative. Extend excavation from the edge of asphalt to the toe of embankment slope or as directed by the Departmental Representative. Ensure excavation will allow for positive drainage upon placement of riprap.
- .2 Dispose of excavated material in accordance with Item 3.5 – Disposal of Excavated Material of Section 31 23 33 – Excavation Trenching and Backfilling.
- .3 Install 10 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.

3.5 Disposal

- .1 Unless Directed otherwise by Departmental Representative, dispose of excess precast concrete barrier from the Buckingham River Bridge barrier flares at PWGSC's Km 254 Sikanni Maintenance Yard. The Contractor shall take necessary precautions to prevent damage to the precast concrete barriers during the removal, transport, and stockpiling process.
- .2 Stockpile the existing precast concrete barrier in a neat fashion and location preapproved by the Departmental Representative within PWGSC's Km 254 Sikanni Maintenance Yard.

END OF SECTION

R.017173.344
Appendix A

Preliminary Hazard Assessment Form



PRELIMINARY HAZARD ASSESSMENT FORM

Project Number:	R.017173.344		
Location:	Km 183 – Km 335 Alaska Highway		
Date:	Spring - Fall 2018		
Name of Departmental Representative:	Alex Taheri		
Name of Client:	PWGSC		
Name of Client Project Co-ordinator	Alex Taheri	PH: (604)-666-9374	

Site Specific Orientation Provided at Project Location Yes No

Notice of Project Required Yes No

NOTE:

PWGSC REQUIRES A Notice of Project FOR ALL CONSTRUCTION WORK RELATED ACTIVITIES

NOTE:

OHS law is made up of many municipal, provincial, and federal acts, regulations, bylaws and codes. There are also many other pieces of legislation in British Columbia that impose OHS obligations.

Important Notice: This hazard assessment has been prepared by PWGSC for its own project planning process, and to inform the service provider of actual and potential hazards that may be encountered in performance of the work. PWGSC does not warrant the completeness or adequacy of this hazard assessment for the project and the paramount responsibility for project hazard assessment rests with the service provider.

TYPES OF HAZARDS TO CONSIDER	Potential Risk for:				COMMENTS
	PWGSC, OGD's, or tenants		General Public or other contractors		
	Yes	No	Yes	No	
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.					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.

Typical Construction Hazards					
Hazard	Yes	No	Yes	No	Comments
Concealed/Buried Services (electrical, gas, water, sewer etc.)	X		X		
Slip Hazards or Unsound Footing	X		X		
Working at Heights	X		X		
Working Over or Around Water	X		X		
Heavy overhead lifting operations, mobile cranes etc.	X		X		
Marine and/or Vehicular Traffic (site vehicles, public vehicles, etc.)	X		X		
Fire and Explosion Hazards	X		X		
High Noise Levels	X		X		
Excavations	X		X		
Blasting		X		X	
Construction Equipment	X		X		



Pedestrian Traffic (site personnel, tenants, visitors, public)	X		X		
Multiple Employer Worksite	X		X		Example: Contractor working in an occupied Federal Employee space.

Electrical Hazards					Comments
Contact With Overhead Wires	X		X		
Live Electrical Systems or Equipment	X		X		
Other:					
Physical Hazards					
Equipment Slippage Due To Slopes/Ground Conditions	X		X		
Earthquake	X		X		
Tsunami		X		X	
Avalanche		X		X	
Forest Fires	X		X		
Fire and Explosion Hazards	X		X		
Working in Isolation	X		X		
Working Alone	X		X		
Violence in the Workplace	X		X		
High Noise Levels	X		X		
Inclement weather	X		X		
High Pressure Systems	X		X		
Other:					
Hazardous Work Environments					
Confined Spaces / Restricted Spaces	X		X		Review and provide confined space assessment(s) from PWGSC or client confined space inventories. Refer to PWGSC Standard on Entry into Confined Spaces. Contact the Regional Construction Safety Coordinator.
Suspended / Mobile Work Platforms	X		X		
Other:					
Biological Hazards					
Mould Proliferations		X		X	
Accumulation of Bird or Bat Guano		X		X	
Bacteria / Legionella in Cooling Towers / Process Water		X		X	
Rodent / Insect Infestation	X		X		
Poisonous Plants	X		X		
Sharp or Potentially Infectious Objects in Wastes	X		X		
Wildlife	X		X		
Chemical Hazards					
Asbestos Materials on Site		X		X	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		X		X	If "yes" a pre-project designated substance survey report is required.
Chemicals Used in work	X		X		



Lead in paint		X		X	If "yes" a pre-project lead survey report is required.
Mercury in Thermostats or Switches		X		X	If "yes" a pre-project mercury survey report is required.
Application of Chemicals or Pesticides	X		X		
PCB Liquids in Electrical Equipment		X		X	
Radioactive Materials in Equipment	X		X		
Other:					
Contaminated Sites Hazards					
Hazardous Waste		X		X	
Hydrocarbons	X		X		
Metals		X		X	
Other:					

Security Hazards					Comments
Risk of Assault	X		X		
Other:					
Other Hazards					

Other Compliance and Permit Requirements ¹	YES	NO	Notes / Comments ²
Is a Building Permit required?		X	
Is an Electrical permit required?		X	
Is a Plumbing Permit required?		X	
Is a Sewage Permit required?		X	
Is a Dumping Permit required?	X		
Is a Hot Work Permit required?		X	
Is a Permit to Work required?	X		Mandatory for ALL AFD managed work sites.
Is a Confined Space Entry Permit required?		X	Mandatory
Is a Confined Space Entry Log required		X	Mandatory for all Confined Spaces
Discharge Approval for treated water required	X		

Notes:

- (1) Does not relieve Service Provider from complying with all applicable federal, provincial, and municipal laws and regulations.
- (2) TBD means To Be Determined by Service Provider.

Service Provider Acknowledgement: We confirm receipt and review of this Pre-Project Hazard Assessment and acknowledge our responsibility for conducting our own assessment of project hazards, and taking all necessary protective measures (which may exceed those cited herein) for performance of the work.			
Service Provider Name			
Signatory for Service Provider		Date Signed	
RETURN EXECUTED DOCUMENT TO PWGSC DEPARTMENTAL REPRESENTATIVE PRIOR TO ANY WORK COMMENCING			

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Appendix B

**Confirmation of Prime Contractor's Main Responsibilities Under
the WorkSafeBC Occupational Health and Safety Regulations
and Worker's Compensation Act**

Confirmation of Prime Contractor's Main Responsibilities Under the Worksafe B.C. Occupational Health and Safety Regulations and *Worker's Compensation Act*

Name of Project: Km 266 - 315 Pavement Replacement and Miscellaneous Works, Alaska Highway, BC

Owner: Public Works and Government Services Canada

Contractor: _____

Consulting Engineer: Tetra Tech

	YES	NO
1. The Contractor acknowledges appointment as Prime Contractor on the construction project noted below	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input type="checkbox"/>	<input type="checkbox"/>
3. The Prime Contractor understands that in any conflict of directions, WCB OH&S Regulations and/or the Worker's Compensation Act shall prevail.	<input type="checkbox"/>	<input type="checkbox"/>
4. The Prime Contractor understands and will direct that all supervisors/coordinators must immediately report any apparent conflict as described above.	<input type="checkbox"/>	<input type="checkbox"/>
5. The Prime Contractor agrees that their supervisor shall immediately notify the consulting Engineer's representative of any reported conflict.	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input type="checkbox"/>	<input type="checkbox"/>
7. The Prime Contractor has conducted an inspection of the workplace to verify the presence of any hazards.	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input type="checkbox"/>	<input type="checkbox"/>
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 PWGSC departmental representatives and/or to a WCB officer at the workplace.	<input type="checkbox"/>	<input type="checkbox"/>
10. The Prime Contractor will confirm that all workers are suitably trained and competent to perform the duties for which they have been assigned.	<input type="checkbox"/>	<input type="checkbox"/>
11. The Prime Contractor confirms that safety orientation of all new workers will be conducted.	<input type="checkbox"/>	<input type="checkbox"/>
12. The Prime Contractor's written Safety Program has been provided to the Owner's representative.	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input type="checkbox"/>	<input type="checkbox"/>
14. The Prime Contractor confirms that before the commencement of work, crews will attend a daily crew safety meeting.	<input type="checkbox"/>	<input type="checkbox"/>
15. The Prime Contractor confirms that their supervisor has assessed and will coordinate the workplace first-aid requirements	<input type="checkbox"/>	<input type="checkbox"/>
16. The Prime Contractor confirms that the procedure to transport injured workers is established	<input type="checkbox"/>	<input type="checkbox"/>

Prime Contractor Representative's

Name: _____

Title: _____ Signature: _____

Date: _____

Prime Contractor's OH&S Coordinator

Name: _____

Title: _____ Signature: _____

Date: _____

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Appendix C

Written Communication / Document Management Protocol



Alaska Highway Km XXXX – XXXX Project: Written Communication / Document Management Protocol

Written Communication for the Alaska Highway Km XXX – XXX Project (R.017173.XXX) will occur through three main platforms: email, SharePoint, and hardcopy.

1. Email

Email is to be used for general communication, transitory information and the submittal of draft documents, if file size allows. Email is not to be used for the submission of deliverables or significant project documentation.

Email contact information is provided on the project contact list.

2. SharePoint

SharePoint 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 SharePoint in the correct folder and with the correct file naming convention.

SharePoint can be accessed via the link provided by the Departmental Representative at the time of contract award.

The Contractor is encouraged to have SharePoint accounts for project team members who are involved with accessing or posting project documentation. Accounts can be created by PWGSC throughout the project by contacting the PWGSC 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.

2.1 **Uploading to SharePoint**

Upload individual documents to the appropriate folder on SharePoint. For folder names, refer to Table 2 of this document.

2.2 **SharePoint File Naming Convention:**

All SharePoint 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 – 2017 02 15
- Schedule – AHP – Km XXX Project – Project Schedule – 2017 02 20
- Finance – AHP – Km XXX Project – Progress Payment 01 – 2017 02 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

2.3 SharePoint Folder Arrangement:

All files must be uploaded to the correct folder in SharePoint. 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
SharePoint folder: R.017173.XXX – Km XXX 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 PWGSC
04_Site Instructions	Site Instructions (typically generated by PWGSC)
05_CCN	Contemplated Change Notice forms generated by PWGSC and pricing responses from Contractor
06_Change Orders	Change Orders (typically generated by PWGSC)
07_Progress Payments	Progress Payment documents (as instructed by PWGSC)
08_Field Reviews	Field Review forms (typically generated by PWGSC)



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: <ul style="list-style-type: none"> • Project Schedule • Traffic Management Plan • Construction Staging Drawings • Culvert Mill Certificates • Other supplier information as needed
15_Deficiency List	Deficiency lists (typically generated by PWGSC)
16_Certificate of Substantial Performance	Certificate of Substantial Performance as generated by PWGSC
17_Certificate of Completion	Certificate of Completion as generated by PWGSC
18_Claims	Documentation related to any claims on the project
19_Contract Close out	Documentation related to contract closeout including closeout submittals such as: <ul style="list-style-type: none"> • 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 PWGSC.
21_Quality Management	Quality control and Quality Assurance documentation generated by the Contractor and PWGSC <ul style="list-style-type: none"> • Quality Management Plan • Check Sheets • Daily Reports • NCR's
SharePoint folder: R.017173.XXX – Km XXX Project > G_COMMUNICATIONS & MEETINGS >	



Table 2: Common Document Filing / Folder Locations	
Folder Names	Description of Typical Documents
01_Correspondence	Emails and other correspondence requiring posting to SharePoint, generated by the Contractor or PWGSC
02_Contact List	Project contact list generated by PWGSC
03_ATIP	
04_Communications Plan	Communication plan generated by PWGSC
05_Supporting Documents	
06_Meeting Minutes	Meeting minutes as generated by PWGSC
07_Inquiries	
08_Public Notices	
09_Other	
SharePoint folder: R.017173.XXX – Km XXX Project > H_PROJECT MONITORING>	
01_Project Time Scope Budget	For PWGSC only
02_Progress Report	For PWGSC only
03_Photos	For PWGSC only
04_Project Commissioning	For PWGSC only
05_Compliance & Audits	For PWGSC only
SharePoint folder: R.017173.XXX – Km XXX Project > Z_BASE DATA>	
01_Base Data	Digital drawings and other documentation required by the Contractor (typically generated by PWGSC)

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**

3. Hardcopy

Submittals only available in original hardcopy (or hardcopies requested by PWGSC or required by contract) should be prearranged with project team prior to shipping but will generally be directed as follows:

XXXXXX XXXXXX
XXXXXX XXXXXX
XXXXXX XXXXXX



Samples shall be provided directly to the testing lab specified by the Departmental Representative for QA purposes or delivered to the project site.

SAMPLE

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Appendix D

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 PWGSC 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 shut-downs 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 PWGSC'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.			

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Appendix E

**Responsibility Checklist for Authorizations / Approvals /
Notifications / Permitting**

Responsibility Checklist For Authorizations/Approvals/Notifications/Permitting

Project Title	
Project Description	
Project Type	
Comments	

Issued By	Document Type	Yes	No	N/A
PWGSC 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 (eg. 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: <ul style="list-style-type: none"> 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 gryones) or "waters" that are not large enough for vessel traffic (ie. 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 PWGSC CEAA Checklist, and will be the mechanism by which project information is submitted to PWGSC 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, PWGSC project managers ¹ 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 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://class.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 FrontCounter BC 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 and Natural Resources Operations	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.			

¹ Project Manager refers to anyone who leads, manages or delivers a project

	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://wapwww.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 and Natural Resources Operations 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	A list of provincially-listed species at risk likely to occur at a given subject site must be			

Explorer http://a100.gov.bc.ca/pub/eswp/	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 and Natural Resources Operations 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 and Natural Resources Operations 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.			
<p>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”.</p> <p>http://www.env.gov.bc.ca/pasb/applications/process/scientific_fish_collect.html#a5</p>				
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.			

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Appendix F

Relevant Environmental Publications

Relevant Environmental Publications

The below list of documents are those commonly used when determining how to design and advance a project with the potential to impact a waterbody.

Agency	Publications	Summary
DFO	<i>Land Development Guidelines for the Protection of Aquatic Habitat - 1993</i>	This document is a good reference guide for any works that are occurring in or around the water.
	<i>Canada's Fish Habitat Law</i>	Document explaining the fish and fish habitat laws under the Fisheries Act.
	<i>Riparian Revegetation</i>	Information on minimizing, stabilizing and revegetating construction areas.
	<i>Freshwater Intake End-of Pipe Fish Screen Guideline - 1995</i>	Provides guidelines for the contractor to follow to ensure fish screens are used during freshwater intake operations at construction sites.
	<i>Operational Statements</i> Stream Crossings by Roads: <ul style="list-style-type: none"> • 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 <i>Fisheries Act</i> . 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	<i>Fish-stream Crossing Guidebook - 2002</i>	Guidelines in protection of fish and fish habitat and the safe passage of fish during construction at/on stream crossings.
	<i>Standards and Best Practices for Instream Works - 2004</i>	Guide to planning and carrying out the proposed construction activities to comply with relevant legislation, regulations and policies.
	<i>A User's Guide to Working In and Around Water - 2005</i>	Understanding the regulation under British Columbia's Water Act.
	<i>Fish-Stream Identification Guidebook - 1998</i>	Assists in providing information on determining fish streams.
	<i>The Streamkeepers Handbook</i>	A practical guide to stream and wetland care in regards to rehabilitation planting.

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Appendix G

Finished Grading Table
Km 266+180 – Km 315+000

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
START 110mm ACP						
266+180	510270.734	6349393.759	VARIES, TIE-TO EXISTING			
266+200	510260.441	6349410.907	1,000.056	1,000.096	-2.00%	-2.00%
266+220	510250.148	6349428.055	999.973	1,000.048	-2.00%	-2.00%
266+240	510239.856	6349445.203	999.891	999.986	-2.00%	-2.00%
266+260	510229.563	6349462.352	999.818	999.913	-2.00%	-2.00%
266+280	510219.270	6349479.500	999.767	999.862	-2.00%	-2.00%
266+300	510208.978	6349496.648	999.749	999.829	-2.00%	-2.00%
266+320	510198.685	6349513.796	999.760	999.840	-2.00%	-2.00%
266+340	510188.392	6349530.944	999.765	999.845	-2.00%	-2.00%
266+360	510178.100	6349548.093	999.798	999.893	-2.00%	-2.00%
266+380	510167.807	6349565.241	999.841	999.936	-2.00%	-2.00%
266+400	510157.515	6349582.389	999.884	999.979	-2.00%	-2.00%
266+420	510147.222	6349599.537	999.937	1,000.032	-1.60%	-2.00%
266+440	510136.929	6349616.686	1,000.000	1,000.095	-0.30%	-2.00%
266+460	510126.647	6349633.840	1,000.086	1,000.156	1.10%	-2.00%
266+480	510116.464	6349651.053	1,000.148	1,000.208	2.60%	-2.60%
266+500	510106.509	6349668.399	1,000.170	1,000.240	4.10%	-4.10%
266+520	510096.903	6349685.941	1,000.235	1,000.305	4.40%	-4.40%
266+540	510087.689	6349703.692	1,000.302	1,000.362	4.40%	-4.40%
266+560	510078.871	6349721.643	1,000.334	1,000.399	4.40%	-4.40%
266+580	510070.455	6349739.785	1,000.417	1,000.482	4.40%	-4.40%
266+600	510062.444	6349758.110	1,000.524	1,000.589	4.40%	-4.40%
266+620	510054.842	6349776.609	1,000.664	1,000.729	4.40%	-4.40%
266+640	510047.653	6349795.272	1,000.842	1,000.912	4.40%	-4.40%
266+660	510040.881	6349814.090	1,001.083	1,001.133	4.40%	-4.40%
266+680	510034.528	6349833.053	1,001.339	1,001.379	4.40%	-4.40%
266+700	510028.598	6349852.154	1,001.605	1,001.665	4.40%	-4.40%
266+720	510023.094	6349871.381	1,001.906	1,001.986	4.40%	-4.40%
266+740	510018.019	6349890.726	1,002.213	1,002.294	4.40%	-4.40%
266+760	510013.375	6349910.179	1,002.504	1,002.579	4.40%	-4.40%
266+780	510009.164	6349929.730	1,002.805	1,002.880	4.40%	-4.40%
266+800	510005.375	6349949.368	1,003.141	1,003.211	3.20%	-3.20%
266+820	510001.901	6349969.063	1,003.456	1,003.526	1.70%	-2.00%
266+840	509998.597	6349988.789	1,003.749	1,003.819	0.20%	-2.00%
266+860	509995.331	6350008.520	1,004.054	1,004.123	-1.10%	-2.00%
266+880	509992.066	6350028.252	1,004.412	1,004.482	-2.00%	-2.00%
266+900	509988.800	6350047.983	1,004.740	1,004.830	-2.00%	-2.00%
266+920	509985.535	6350067.715	1,005.055	1,005.145	-2.00%	-2.00%
266+940	509982.269	6350087.447	1,005.366	1,005.456	-2.00%	-2.00%
266+960	509979.004	6350107.178	1,005.705	1,005.795	-2.00%	-2.00%
266+980	509975.738	6350126.910	1,006.050	1,006.140	-2.00%	-2.00%
267+000	509972.473	6350146.641	1,006.389	1,006.479	-2.00%	-2.00%
267+020	509969.207	6350166.373	1,006.719	1,006.804	-2.00%	-2.00%
267+040	509965.942	6350186.105	1,007.050	1,007.145	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
267+060	509962.676	6350205.836	1,007.439	1,007.514	-2.00%	-2.00%
267+080	509959.411	6350225.568	1,007.804	1,007.879	-2.00%	-2.00%
267+100	509956.145	6350245.300	1,008.133	1,008.213	-2.00%	-2.00%
267+120	509952.880	6350265.031	1,008.443	1,008.523	-2.00%	-2.00%
267+140	509949.614	6350284.763	1,008.721	1,008.821	-2.00%	-2.00%
267+160	509946.349	6350304.494	1,008.998	1,009.098	-2.00%	-2.00%
267+180	509943.084	6350324.226	1,009.271	1,009.371	-2.00%	-2.00%
267+200	509939.818	6350343.958	1,009.510	1,009.610	-2.00%	-2.00%
267+220	509936.553	6350363.689	1,009.689	1,009.779	-2.00%	-2.00%
267+240	509933.287	6350383.421	1,009.805	1,009.900	-2.00%	-2.00%
267+260	509930.022	6350403.152	1,009.901	1,009.986	-2.00%	-2.00%
267+280	509926.756	6350422.884	1,009.954	1,010.019	-2.00%	-2.00%
267+300	509923.491	6350442.616	1,010.044	1,010.109	-2.00%	-2.00%
267+320	509920.225	6350462.347	1,010.081	1,010.131	-2.00%	-2.00%
267+340	509916.960	6350482.079	1,010.025	1,010.080	-2.00%	-2.00%
267+360	509913.694	6350501.811	1,009.883	1,009.958	-2.00%	-2.00%
267+380	509910.429	6350521.542	1,009.719	1,009.824	-2.00%	-2.00%
267+400	509907.163	6350541.274	1,009.564	1,009.669	-2.00%	-2.00%
267+420	509903.898	6350561.005	1,009.383	1,009.488	-2.00%	-2.00%
267+440	509900.632	6350580.737	1,009.147	1,009.252	-2.00%	-2.00%
267+460	509897.367	6350600.469	1,008.905	1,009.010	-2.00%	-2.00%
267+480	509894.101	6350620.200	1,008.665	1,008.745	-2.00%	-2.00%
267+500	509890.836	6350639.932	1,008.340	1,008.430	-2.00%	-2.00%
267+520	509887.570	6350659.663	1,008.027	1,008.117	-2.00%	-2.00%
267+540	509884.305	6350679.395	1,007.692	1,007.782	-2.00%	-2.00%
267+560	509881.040	6350699.127	1,007.369	1,007.459	-2.00%	-2.00%
267+580	509877.774	6350718.858	1,007.057	1,007.147	-2.00%	-2.00%
267+600	509874.509	6350738.590	1,006.749	1,006.824	-2.00%	-2.00%
267+620	509871.243	6350758.322	1,006.413	1,006.488	-2.00%	-2.00%
267+640	509867.978	6350778.053	1,006.120	1,006.195	-2.00%	-2.00%
267+660	509864.712	6350797.785	1,005.825	1,005.900	-2.00%	-2.00%
267+680	509861.447	6350817.516	1,005.517	1,005.597	-2.00%	-2.00%
267+700	509858.181	6350837.248	1,005.286	1,005.356	-2.00%	-2.00%
267+720	509854.916	6350856.980	1,005.129	1,005.199	-2.00%	-2.00%
267+740	509851.650	6350876.711	1,005.032	1,005.102	-2.00%	-2.00%
267+760	509848.385	6350896.443	1,004.991	1,005.061	-2.00%	-2.00%
267+780	509845.119	6350916.174	1,004.997	1,005.077	-2.00%	-2.00%
267+800	509841.854	6350935.906	1,005.084	1,005.183	-2.00%	-2.00%
267+820	509838.588	6350955.638	1,005.291	1,005.357	-2.00%	-2.00%
267+840	509835.323	6350975.369	1,005.463	1,005.526	-2.00%	-2.00%
267+860	509832.057	6350995.101	1,005.611	1,005.683	-1.50%	-2.00%
267+880	509828.792	6351014.833	1,005.767	1,005.827	-0.10%	-2.00%
267+900	509825.545	6351034.567	1,005.924	1,005.988	1.40%	-2.00%
267+920	509822.434	6351054.324	1,006.065	1,006.125	2.90%	-2.90%
267+940	509819.609	6351074.123	1,006.206	1,006.266	4.50%	-4.50%
267+960	509817.204	6351093.977	1,006.384	1,006.444	4.60%	-4.60%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
267+980	509815.254	6351113.882	1,006.561	1,006.621	4.60%	-4.60%
268+000	509813.760	6351133.825	1,006.697	1,006.757	4.60%	-4.60%
268+020	509812.721	6351153.798	1,006.830	1,006.905	4.60%	-4.60%
268+040	509812.139	6351173.789	1,006.975	1,007.050	4.60%	-4.60%
268+060	509812.014	6351193.788	1,007.135	1,007.210	4.60%	-4.60%
268+080	509812.347	6351213.785	1,007.257	1,007.332	4.60%	-4.60%
268+100	509813.136	6351233.769	1,007.403	1,007.478	4.60%	-4.60%
268+120	509814.382	6351253.730	1,007.549	1,007.629	4.60%	-4.60%
268+140	509816.084	6351273.657	1,007.749	1,007.819	4.60%	-4.60%
268+160	509818.240	6351293.540	1,007.921	1,007.991	4.60%	-4.60%
268+180	509820.851	6351313.368	1,008.071	1,008.141	4.60%	-4.60%
268+200	509823.914	6351333.132	1,008.204	1,008.274	4.60%	-4.60%
268+220	509827.428	6351352.820	1,008.332	1,008.392	4.60%	-4.60%
268+240	509831.391	6351372.423	1,008.452	1,008.512	4.60%	-4.60%
268+260	509835.801	6351391.930	1,008.618	1,008.678	4.60%	-4.60%
268+280	509840.656	6351411.332	1,008.792	1,008.862	4.60%	-4.60%
268+300	509845.953	6351430.617	1,008.996	1,009.066	4.60%	-4.60%
268+320	509851.689	6351449.776	1,009.220	1,009.290	4.60%	-4.60%
268+340	509857.861	6351468.800	1,009.511	1,009.591	4.60%	-4.60%
268+360	509864.467	6351487.677	1,009.919	1,009.989	4.60%	-4.60%
268+380	509871.503	6351506.398	1,010.360	1,010.420	4.60%	-4.60%
268+400	509878.964	6351524.953	1,010.796	1,010.856	4.60%	-4.60%
268+420	509886.848	6351543.334	1,011.306	1,011.372	4.60%	-4.60%
268+440	509895.137	6351561.535	1,011.945	1,011.990	3.30%	-3.30%
268+460	509903.728	6351579.596	1,012.676	1,012.706	1.80%	-2.00%
268+480	509912.481	6351597.579	1,013.390	1,013.420	0.30%	-2.00%
268+500	509921.271	6351615.543	1,014.073	1,014.128	-1.10%	-2.00%
268+520	509930.061	6351633.508	1,014.749	1,014.829	-2.00%	-2.00%
268+540	509938.852	6351651.473	1,015.397	1,015.477	-2.00%	-2.00%
268+560	509947.642	6351669.437	1,016.055	1,016.135	-2.00%	-2.00%
268+580	509956.432	6351687.402	1,016.679	1,016.759	-2.00%	-2.00%
268+600	509965.223	6351705.367	1,017.271	1,017.351	-2.00%	-2.00%
268+620	509974.013	6351723.331	1,017.840	1,017.919	-2.00%	-2.00%
268+640	509982.804	6351741.296	1,018.338	1,018.418	-2.00%	-2.00%
268+660	509991.594	6351759.260	1,018.792	1,018.872	-2.00%	-2.00%
268+680	510000.384	6351777.225	1,019.196	1,019.276	-2.00%	-2.00%
268+700	510009.175	6351795.190	1,019.595	1,019.660	-2.00%	-2.00%
268+720	510017.965	6351813.154	1,019.964	1,020.029	-2.00%	-2.00%
268+740	510026.756	6351831.119	1,020.262	1,020.352	-2.00%	-2.00%
268+760	510035.546	6351849.084	1,020.569	1,020.659	-2.00%	-2.00%
268+780	510044.337	6351867.048	1,020.828	1,020.918	-2.00%	-2.00%
268+800	510053.127	6351885.013	1,021.058	1,021.128	-2.00%	-2.00%
268+820	510061.917	6351902.978	1,021.234	1,021.304	-2.00%	-2.00%
268+840	510070.708	6351920.942	1,021.417	1,021.487	-2.00%	-2.00%
268+860	510079.498	6351938.907	1,021.551	1,021.621	-2.00%	-2.00%
268+880	510088.289	6351956.872	1,021.620	1,021.690	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
268+900	510097.079	6351974.836	1,021.688	1,021.758	-2.00%	-2.00%
268+920	510105.869	6351992.801	1,021.751	1,021.821	-2.00%	-2.00%
268+940	510114.660	6352010.766	1,021.784	1,021.859	-2.00%	-2.00%
268+960	510123.450	6352028.730	1,021.848	1,021.923	-2.00%	-2.00%
268+980	510132.241	6352046.695	1,021.927	1,021.992	-2.00%	-2.00%
269+000	510141.031	6352064.660	1,021.959	1,022.034	-2.00%	-2.00%
269+020	510149.821	6352082.624	1,021.987	1,022.052	-2.00%	-2.00%
269+040	510158.612	6352100.589	1,022.059	1,022.124	-2.00%	-2.00%
269+060	510167.402	6352118.553	1,022.124	1,022.189	-2.00%	-2.00%
269+080	510176.193	6352136.518	1,022.207	1,022.272	-2.00%	-2.00%
269+100	510184.983	6352154.483	1,022.290	1,022.370	-2.00%	-2.00%
269+120	510193.774	6352172.447	1,022.342	1,022.422	-2.00%	-2.00%
269+140	510202.564	6352190.412	1,022.356	1,022.436	-2.00%	-2.00%
269+160	510211.354	6352208.377	1,022.356	1,022.431	-2.00%	-2.00%
269+180	510220.145	6352226.341	1,022.312	1,022.387	-2.00%	-2.00%
269+200	510228.935	6352244.306	1,022.231	1,022.306	-2.00%	-2.00%
269+220	510237.726	6352262.271	1,022.114	1,022.189	-2.00%	-2.00%
269+240	510246.516	6352280.235	1,021.980	1,022.035	-2.00%	-2.00%
269+260	510255.306	6352298.200	1,021.761	1,021.856	-2.00%	-2.00%
269+280	510264.097	6352316.165	1,021.601	1,021.666	-2.00%	-2.00%
269+300	510272.887	6352334.129	1,021.360	1,021.445	-2.00%	-2.00%
269+320	510281.678	6352352.094	1,021.119	1,021.204	-2.00%	-2.00%
269+340	510290.468	6352370.059	1,020.834	1,020.919	-2.00%	-2.00%
269+360	510299.258	6352388.023	1,020.497	1,020.567	-2.00%	-2.00%
269+380	510308.049	6352405.988	1,020.143	1,020.213	-2.00%	-2.00%
269+400	510316.839	6352423.953	1,019.786	1,019.856	-2.00%	-2.00%
269+420	510325.630	6352441.917	1,019.379	1,019.449	-2.00%	-2.00%
269+440	510334.420	6352459.882	1,018.926	1,018.996	-2.00%	-2.00%
269+460	510343.211	6352477.846	1,018.463	1,018.509	-2.00%	-2.00%
269+480	510352.001	6352495.811	1,017.888	1,017.958	-2.00%	-2.00%
269+500	510360.791	6352513.776	1,017.333	1,017.403	-2.00%	-2.00%
269+520	510369.582	6352531.740	1,016.797	1,016.867	-2.00%	-2.00%
269+540	510378.372	6352549.705	1,016.206	1,016.266	-2.00%	-2.00%
269+560	510387.163	6352567.670	1,015.551	1,015.621	-2.00%	-2.00%
269+580	510395.953	6352585.634	1,014.860	1,014.930	-2.00%	-2.00%
269+600	510404.743	6352603.599	1,014.167	1,014.237	-2.00%	-2.00%
269+620	510413.534	6352621.564	1,013.417	1,013.487	-2.00%	-2.00%
269+640	510422.324	6352639.528	1,012.671	1,012.741	-2.00%	-2.00%
269+660	510431.115	6352657.493	1,011.928	1,011.998	-2.00%	-2.00%
269+680	510439.905	6352675.458	1,011.209	1,011.279	-2.00%	-2.00%
269+700	510448.695	6352693.422	1,010.444	1,010.514	-2.00%	-2.00%
269+720	510457.486	6352711.387	1,009.731	1,009.801	-2.00%	-2.00%
269+740	510466.276	6352729.352	1,008.993	1,009.063	-2.00%	-2.00%
269+760	510475.067	6352747.316	1,008.208	1,008.288	-2.00%	-2.00%
269+780	510483.857	6352765.281	1,007.501	1,007.571	-2.00%	-2.00%
269+800	510492.648	6352783.246	1,006.878	1,006.948	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
269+820	510501.438	6352801.210	1,006.342	1,006.412	-2.00%	-2.00%
269+840	510510.228	6352819.175	1,005.861	1,005.931	-2.00%	-2.00%
269+860	510519.019	6352837.139	1,005.410	1,005.480	-2.00%	-2.00%
269+880	510527.809	6352855.104	1,005.023	1,005.093	-2.00%	-2.00%
269+900	510536.600	6352873.069	1,004.689	1,004.759	-2.00%	-2.00%
269+920	510545.390	6352891.033	1,004.402	1,004.472	-2.00%	-2.00%
269+940	510554.180	6352908.998	1,004.118	1,004.198	-2.00%	-2.00%
269+960	510562.971	6352926.963	1,003.834	1,003.914	-2.00%	-2.00%
269+980	510571.761	6352944.927	1,003.537	1,003.641	-2.00%	-2.00%
270+000	510580.552	6352962.892	1,003.287	1,003.371	-2.00%	-2.00%
270+020	510589.342	6352980.857	1,002.995	1,003.061	-2.00%	-2.00%
270+040	510598.132	6352998.821	1,002.693	1,002.750	-2.00%	-2.00%
270+060	510606.923	6353016.786	1,002.383	1,002.452	-2.00%	-2.00%
270+080	510615.713	6353034.751	1,002.085	1,002.154	-2.00%	-2.00%
270+100	510624.504	6353052.715	1,001.839	1,001.895	-2.00%	-2.00%
270+120	510633.294	6353070.680	1,001.578	1,001.615	-2.00%	-2.00%
270+140	510642.085	6353088.645	1,001.230	1,001.290	-2.00%	-2.00%
270+160	510650.875	6353106.609	1,000.834	1,000.904	-2.00%	-2.00%
270+180	510659.665	6353124.574	1,000.383	1,000.453	-2.00%	-2.00%
270+200	510668.456	6353142.539	999.873	999.958	-2.00%	-2.00%
270+220	510677.246	6353160.503	999.396	999.481	-2.00%	-2.00%
270+240	510686.037	6353178.468	998.921	998.962	-2.00%	-2.00%
270+260	510694.827	6353196.432	998.285	998.376	-2.00%	-2.00%
270+280	510703.617	6353214.397	997.630	997.740	-2.00%	-2.00%
270+300	510712.408	6353232.362	996.974	997.084	-2.00%	-2.00%
270+320	510721.198	6353250.326	996.325	996.424	-2.00%	-2.00%
270+340	510729.989	6353268.291	995.754	995.764	-2.00%	-2.00%
270+360	510738.779	6353286.256	995.165	995.071	-2.00%	-2.00%
270+380	510747.569	6353304.220	994.430	994.324	-2.00%	-2.00%
270+400	510756.360	6353322.185	993.888	993.524	-2.00%	-2.00%
270+420	510765.150	6353340.150	993.020	992.671	-2.00%	-2.00%
270+440	510773.941	6353358.114	992.025	991.775	-2.00%	-2.00%
270+460	510782.731	6353376.079	991.059	990.875	-2.00%	-2.00%
270+480	510791.522	6353394.044	990.088	989.975	-2.00%	-2.00%
270+500	510800.312	6353412.008	989.132	989.075	-2.00%	-1.20%
270+520	510809.102	6353429.973	988.143	988.175	-2.00%	-1.20%
270+540	510817.852	6353447.958	987.215	987.275	-2.00%	1.80%
270+560	510826.404	6353466.036	986.427	986.487	-3.50%	3.50%
270+580	510834.581	6353484.288	985.718	985.788	-5.30%	5.30%
270+600	510842.205	6353502.777	984.981	985.051	-6.00%	6.00%
270+620	510849.194	6353521.515	984.290	984.380	-6.00%	6.00%
270+640	510855.539	6353540.481	983.663	983.793	-6.00%	6.00%
270+660	510861.231	6353559.653	983.112	983.302	-6.00%	6.00%
270+680	510866.265	6353579.008	982.631	982.786	-6.00%	6.00%
270+700	510870.635	6353598.524	982.226	982.341	-6.00%	6.00%
270+720	510874.334	6353618.177	981.904	981.989	-6.00%	6.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
270+740	510877.360	6353637.946	981.665	981.730	-6.00%	6.00%
270+760	510879.709	6353657.807	981.503	981.568	-6.00%	6.00%
270+780	510881.377	6353677.736	981.422	981.507	-6.00%	6.00%
270+800	510882.363	6353697.711	981.533	981.603	-6.00%	6.00%
270+820	510882.665	6353717.708	981.668	981.688	-6.00%	6.00%
270+840	510882.284	6353737.703	981.668	981.698	-6.00%	6.00%
270+860	510881.220	6353757.674	981.625	981.725	-6.00%	6.00%
270+880	510879.473	6353777.596	981.784	981.854	-6.00%	6.00%
270+900	510877.047	6353797.448	982.201	982.271	-6.00%	6.00%
270+920	510873.944	6353817.204	982.758	982.853	-6.00%	6.00%
270+940	510870.167	6353836.844	983.505	983.600	-6.00%	6.00%
270+960	510865.721	6353856.342	984.340	984.410	-6.00%	6.00%
270+980	510860.611	6353875.677	985.169	985.239	-6.00%	6.00%
271+000	510854.843	6353894.827	985.955	986.065	-6.00%	6.00%
271+020	510848.424	6353913.767	986.815	986.910	-6.00%	6.00%
271+040	510841.361	6353932.478	987.645	987.815	-6.00%	6.00%
271+060	510833.663	6353950.936	988.431	988.651	-6.00%	6.00%
271+080	510825.339	6353969.120	989.179	989.419	-6.00%	6.00%
271+100	510816.397	6353987.009	989.945	990.115	-6.00%	6.00%
271+120	510806.850	6354004.582	990.645	990.790	-6.00%	6.00%
271+140	510796.709	6354021.819	991.349	991.454	-5.40%	5.40%
271+160	510786.050	6354038.741	992.067	992.152	-3.60%	3.60%
271+180	510775.039	6354055.437	992.808	992.893	-2.00%	1.80%
271+200	510763.842	6354072.009	993.478	993.573	-2.00%	0.20%
271+220	510752.605	6354088.554	994.197	994.262	-2.00%	-1.10%
271+240	510741.368	6354105.099	994.950	995.020	-2.00%	-2.00%
271+260	510730.131	6354121.643	995.700	995.770	-2.00%	-2.00%
271+280	510718.894	6354138.188	996.416	996.486	-2.00%	-2.00%
271+300	510707.657	6354154.733	997.101	997.151	-2.00%	-2.00%
271+320	510696.419	6354171.277	997.815	997.865	-2.00%	-2.00%
271+340	510685.182	6354187.822	998.482	998.532	-2.00%	-2.00%
271+360	510673.945	6354204.367	999.063	999.113	-2.00%	-2.00%
271+380	510662.708	6354220.911	999.602	999.652	-2.00%	-2.00%
271+400	510651.471	6354237.456	1,000.091	1,000.161	-2.00%	-2.00%
271+420	510640.234	6354254.001	1,000.561	1,000.631	-2.00%	-2.00%
271+440	510628.997	6354270.546	1,001.065	1,001.135	-2.00%	-2.00%
271+460	510617.759	6354287.090	1,001.561	1,001.646	-2.00%	-2.00%
271+480	510606.522	6354303.635	1,002.083	1,002.168	-2.00%	-2.00%
271+500	510595.285	6354320.180	1,002.668	1,002.753	-2.00%	-2.00%
271+520	510584.048	6354336.724	1,003.247	1,003.312	-2.00%	-2.00%
271+540	510572.811	6354353.269	1,003.795	1,003.860	-2.00%	-2.00%
271+560	510561.574	6354369.814	1,004.335	1,004.400	-2.00%	-2.00%
271+580	510550.337	6354386.358	1,004.906	1,004.971	-2.00%	-2.00%
271+600	510539.099	6354402.903	1,005.441	1,005.506	-2.00%	-2.00%
271+620	510527.862	6354419.448	1,005.985	1,006.040	-2.00%	-2.00%
271+640	510516.625	6354435.992	1,006.507	1,006.562	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
271+660	510505.388	6354452.537	1,007.081	1,007.136	-2.00%	-2.00%
271+680	510494.151	6354469.082	1,007.661	1,007.716	-2.00%	-2.00%
271+700	510482.914	6354485.626	1,008.258	1,008.313	-2.00%	-2.00%
271+720	510471.677	6354502.171	1,008.846	1,008.901	-2.00%	-2.00%
271+740	510460.439	6354518.716	1,009.467	1,009.522	-2.00%	-2.00%
271+760	510449.202	6354535.261	1,010.108	1,010.163	-2.00%	-2.00%
271+780	510437.965	6354551.805	1,010.755	1,010.810	-2.00%	-2.00%
271+800	510426.728	6354568.350	1,011.395	1,011.470	-2.00%	-2.00%
271+820	510415.491	6354584.895	1,012.069	1,012.144	-2.00%	-2.00%
271+840	510404.254	6354601.439	1,012.748	1,012.823	-2.00%	-2.00%
271+860	510393.017	6354617.984	1,013.423	1,013.488	-2.00%	-2.00%
271+880	510381.779	6354634.529	1,014.096	1,014.161	-2.00%	-2.00%
271+900	510370.542	6354651.073	1,014.776	1,014.861	-2.00%	-2.00%
271+920	510359.305	6354667.618	1,015.430	1,015.525	-2.00%	-2.00%
271+940	510348.068	6354684.163	1,016.059	1,016.159	-2.00%	-2.00%
271+960	510336.831	6354700.707	1,016.739	1,016.839	-2.00%	-2.00%
271+980	510325.594	6354717.252	1,017.440	1,017.555	-2.00%	-2.00%
272+000	510314.357	6354733.797	1,018.092	1,018.207	-2.00%	-2.00%
272+020	510303.119	6354750.341	1,018.746	1,018.871	-2.00%	-2.00%
272+040	510291.882	6354766.886	1,019.413	1,019.538	-2.00%	-2.00%
272+060	510280.645	6354783.431	1,020.113	1,020.238	-2.00%	-2.00%
272+080	510269.408	6354799.975	1,020.838	1,020.963	-2.00%	-2.00%
272+100	510258.171	6354816.520	1,021.606	1,021.716	-2.00%	-2.00%
272+120	510246.934	6354833.065	1,022.411	1,022.521	-2.00%	-2.00%
272+140	510235.697	6354849.610	1,023.252	1,023.362	-2.00%	-2.00%
272+160	510224.459	6354866.154	1,024.119	1,024.229	-2.00%	-2.00%
272+180	510213.222	6354882.699	1,025.008	1,025.118	-2.00%	-2.00%
272+200	510201.985	6354899.244	1,025.920	1,026.030	-2.00%	-2.00%
272+220	510190.748	6354915.788	1,026.804	1,026.904	-2.00%	-2.00%
272+240	510179.511	6354932.333	1,027.699	1,027.799	-2.00%	-2.00%
272+260	510168.274	6354948.878	1,028.603	1,028.703	-2.00%	-2.00%
272+280	510157.037	6354965.422	1,029.511	1,029.626	-2.00%	-2.00%
272+300	510145.799	6354981.967	1,030.448	1,030.563	-2.00%	-2.00%
272+320	510134.562	6354998.512	1,031.316	1,031.431	-2.00%	-2.00%
272+340	510123.325	6355015.056	1,032.209	1,032.329	-2.00%	-2.00%
272+360	510112.088	6355031.601	1,033.111	1,033.231	-2.00%	-2.00%
272+380	510100.851	6355048.146	1,033.988	1,034.108	-2.00%	-2.00%
272+400	510089.614	6355064.690	1,034.800	1,034.915	-2.00%	-2.00%
272+420	510078.377	6355081.235	1,035.553	1,035.668	-2.00%	-2.00%
272+440	510067.139	6355097.780	1,036.251	1,036.366	-2.00%	-2.00%
272+460	510055.902	6355114.325	1,036.943	1,037.058	-2.00%	-2.00%
272+480	510044.665	6355130.869	1,037.644	1,037.754	-2.00%	-2.00%
272+500	510033.428	6355147.414	1,038.283	1,038.408	-2.00%	-2.00%
272+520	510022.191	6355163.959	1,038.920	1,039.010	-2.00%	-2.00%
272+540	510010.954	6355180.503	1,039.563	1,039.668	-2.00%	-2.00%
272+560	509999.717	6355197.048	1,040.199	1,040.304	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
272+580	509988.479	6355213.593	1,040.883	1,040.988	-2.00%	-2.00%
272+600	509977.242	6355230.137	1,041.588	1,041.673	-2.00%	-2.00%
272+620	509966.005	6355246.682	1,042.322	1,042.407	-2.00%	-2.00%
272+640	509954.768	6355263.227	1,043.128	1,043.213	-2.00%	-2.00%
272+660	509943.531	6355279.771	1,044.017	1,044.102	-2.00%	-2.00%
272+680	509932.294	6355296.316	1,044.947	1,045.022	-2.00%	-2.00%
272+700	509921.057	6355312.861	1,045.907	1,045.982	-2.00%	-2.00%
272+720	509909.819	6355329.405	1,046.930	1,047.005	-2.00%	-2.00%
272+740	509898.582	6355345.950	1,048.008	1,048.083	-2.00%	-2.00%
272+760	509887.345	6355362.495	1,049.123	1,049.198	-2.00%	-2.00%
272+780	509876.108	6355379.039	1,050.283	1,050.358	-2.00%	-2.00%
272+800	509864.871	6355395.584	1,051.490	1,051.590	-2.00%	-2.00%
272+820	509853.634	6355412.129	1,052.661	1,052.761	-2.00%	-2.00%
272+840	509842.397	6355428.674	1,053.759	1,053.859	-2.00%	-2.00%
272+860	509831.159	6355445.218	1,054.807	1,054.907	-2.00%	-2.00%
272+880	509819.922	6355461.763	1,055.833	1,055.928	-2.00%	-2.00%
272+900	509808.685	6355478.308	1,056.800	1,056.895	-2.00%	-2.00%
272+920	509797.448	6355494.852	1,057.685	1,057.780	-2.00%	-2.00%
272+940	509786.211	6355511.397	1,058.519	1,058.629	-2.00%	-2.00%
272+960	509774.974	6355527.942	1,059.324	1,059.434	-2.00%	-2.00%
272+980	509763.737	6355544.486	1,060.106	1,060.216	-2.00%	-2.00%
273+000	509752.499	6355561.031	1,060.831	1,060.941	-2.00%	-2.00%
273+020	509741.262	6355577.576	1,061.503	1,061.598	-2.00%	-2.00%
273+040	509730.025	6355594.120	1,062.092	1,062.187	-2.00%	-2.00%
273+060	509718.788	6355610.665	1,062.646	1,062.741	-2.00%	-2.00%
273+080	509707.551	6355627.210	1,063.156	1,063.251	-2.00%	-2.00%
273+100	509696.314	6355643.754	1,063.625	1,063.720	-2.00%	-2.00%
273+120	509685.059	6355660.287	1,064.038	1,064.133	-2.00%	-2.00%
273+140	509673.804	6355676.820	1,064.387	1,064.467	-2.00%	-2.00%
273+160	509662.549	6355693.352	1,064.700	1,064.780	-2.00%	-2.00%
273+180	509651.294	6355709.885	1,064.988	1,065.068	-2.00%	-2.00%
273+200	509640.039	6355726.418	1,065.193	1,065.273	-2.00%	-2.00%
273+220	509628.784	6355742.950	1,065.364	1,065.444	-2.00%	-2.00%
273+240	509617.530	6355759.483	1,065.473	1,065.558	-2.00%	-2.00%
273+260	509606.275	6355776.015	1,065.526	1,065.611	-2.00%	-2.00%
273+280	509595.020	6355792.548	1,065.512	1,065.597	-2.00%	-2.00%
273+300	509583.765	6355809.081	1,065.456	1,065.531	-2.00%	-2.00%
273+320	509572.510	6355825.613	1,065.370	1,065.445	-2.00%	-2.00%
273+340	509561.255	6355842.146	1,065.244	1,065.319	-2.00%	-2.00%
273+360	509550.000	6355858.679	1,065.090	1,065.165	-2.00%	-2.00%
273+380	509538.745	6355875.211	1,064.954	1,065.029	-2.00%	-2.00%
273+400	509527.491	6355891.744	1,064.815	1,064.890	-2.00%	-2.00%
273+420	509516.236	6355908.276	1,064.725	1,064.800	-2.00%	-2.00%
273+440	509504.981	6355924.809	1,064.734	1,064.809	-2.00%	-2.00%
273+460	509493.726	6355941.342	1,064.849	1,064.904	-2.00%	-2.00%
273+480	509482.471	6355957.874	1,064.963	1,065.028	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
273+500	509471.216	6355974.407	1,065.130	1,065.225	-2.00%	-2.00%
273+520	509459.991	6355990.960	1,065.471	1,065.542	-2.00%	-2.00%
273+540	509448.765	6356007.512	1,065.911	1,065.976	-2.00%	-2.00%
273+560	509437.540	6356024.065	1,066.345	1,066.445	-2.00%	-2.00%
273+580	509426.315	6356040.618	1,066.802	1,066.902	-2.00%	-2.00%
273+600	509415.090	6356057.170	1,067.294	1,067.394	-2.00%	-2.00%
273+620	509403.864	6356073.723	1,067.763	1,067.863	-2.00%	-2.00%
273+640	509392.639	6356090.276	1,068.218	1,068.318	-2.00%	-2.00%
273+660	509381.414	6356106.829	1,068.646	1,068.751	-2.00%	-2.00%
273+680	509370.188	6356123.381	1,069.104	1,069.209	-2.00%	-2.00%
273+700	509358.963	6356139.934	1,069.579	1,069.684	-2.00%	-2.00%
273+720	509347.738	6356156.487	1,070.027	1,070.130	-2.00%	-2.00%
273+740	509336.512	6356173.039	1,070.421	1,070.518	-2.00%	-2.00%
273+760	509325.287	6356189.592	1,070.784	1,070.889	-2.00%	-2.00%
273+780	509314.062	6356206.145	1,071.158	1,071.263	-2.00%	-2.00%
273+800	509302.836	6356222.698	1,071.487	1,071.587	-2.00%	-2.00%
273+820	509291.611	6356239.250	1,071.755	1,071.865	-2.00%	-2.00%
273+840	509280.386	6356255.803	1,071.979	1,072.089	-2.00%	-2.00%
273+860	509269.161	6356272.356	1,072.129	1,072.239	-2.00%	-2.00%
273+880	509257.935	6356288.909	1,072.276	1,072.386	-2.00%	-2.00%
273+900	509246.710	6356305.461	1,072.402	1,072.512	-2.00%	-2.00%
273+920	509235.485	6356322.014	1,072.494	1,072.604	-2.00%	-2.00%
273+940	509224.259	6356338.567	1,072.536	1,072.646	-2.00%	-2.00%
273+960	509213.034	6356355.119	1,072.525	1,072.635	-2.00%	-2.00%
273+980	509201.809	6356371.672	1,072.489	1,072.599	-2.00%	-2.00%
274+000	509190.583	6356388.225	1,072.415	1,072.525	-2.00%	-2.00%
274+020	509179.358	6356404.778	1,072.307	1,072.417	-2.00%	-2.00%
274+040	509168.133	6356421.330	1,072.167	1,072.277	-2.00%	-2.00%
274+060	509156.907	6356437.883	1,072.010	1,072.120	-2.00%	-2.00%
274+080	509145.682	6356454.436	1,071.786	1,071.891	-2.00%	-2.00%
274+100	509134.457	6356470.988	1,071.528	1,071.633	-2.00%	-2.00%
274+120	509123.220	6356487.533	1,071.248	1,071.353	-2.00%	-2.00%
274+140	509111.983	6356504.078	1,070.933	1,071.038	-2.00%	-2.00%
274+160	509100.745	6356520.622	1,070.565	1,070.670	-2.00%	-2.00%
274+180	509089.508	6356537.167	1,070.171	1,070.271	-2.00%	-2.00%
274+200	509078.271	6356553.712	1,069.751	1,069.851	-2.00%	-2.00%
274+220	509067.034	6356570.257	1,069.373	1,069.473	-2.00%	-2.00%
274+240	509055.797	6356586.801	1,069.015	1,069.110	-2.00%	-2.00%
274+260	509044.560	6356603.346	1,068.680	1,068.775	-2.00%	-2.00%
274+280	509033.323	6356619.891	1,068.358	1,068.453	-2.00%	-2.00%
274+300	509022.085	6356636.435	1,068.079	1,068.174	-2.00%	-2.00%
274+320	509010.848	6356652.980	1,067.874	1,067.969	-2.00%	-2.00%
274+340	508999.611	6356669.525	1,067.701	1,067.796	-2.00%	-2.00%
274+360	508988.374	6356686.069	1,067.598	1,067.693	-2.00%	-2.00%
274+380	508977.137	6356702.614	1,067.536	1,067.626	-2.00%	-2.00%
274+400	508965.900	6356719.159	1,067.519	1,067.609	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
274+420	508954.663	6356735.703	1,067.550	1,067.625	-2.00%	-2.00%
274+440	508943.425	6356752.248	1,067.554	1,067.629	-2.00%	-2.00%
274+460	508932.188	6356768.793	1,067.572	1,067.647	-2.00%	-2.00%
274+480	508920.951	6356785.337	1,067.568	1,067.643	-2.00%	-2.00%
274+500	508909.714	6356801.882	1,067.587	1,067.677	-2.00%	-2.00%
274+520	508898.477	6356818.427	1,067.625	1,067.715	-2.00%	-2.00%
274+540	508887.240	6356834.971	1,067.648	1,067.738	-2.00%	-2.00%
274+560	508876.003	6356851.516	1,067.661	1,067.751	-2.00%	-2.00%
274+580	508864.765	6356868.061	1,067.678	1,067.768	-2.00%	-2.00%
274+600	508853.528	6356884.606	1,067.715	1,067.805	-2.00%	-2.00%
274+620	508842.291	6356901.150	1,067.766	1,067.856	-2.00%	-2.00%
274+640	508831.054	6356917.695	1,067.797	1,067.887	-2.00%	-2.00%
274+660	508819.817	6356934.240	1,067.851	1,067.941	-2.00%	-2.00%
274+680	508808.580	6356950.784	1,067.882	1,067.972	-2.00%	-2.00%
274+700	508797.343	6356967.329	1,067.918	1,068.008	-2.00%	-2.00%
274+720	508786.105	6356983.874	1,067.928	1,068.018	-2.00%	-2.00%
274+740	508774.868	6357000.418	1,067.937	1,068.027	-2.00%	-2.00%
274+760	508763.631	6357016.963	1,068.004	1,068.094	-2.00%	-2.00%
274+780	508752.394	6357033.508	1,068.069	1,068.159	-2.00%	-2.00%
274+800	508741.157	6357050.052	1,068.127	1,068.202	-0.90%	-2.00%
274+820	508729.921	6357066.598	1,068.210	1,068.250	0.50%	-2.00%
274+840	508718.742	6357083.182	1,068.234	1,068.274	2.20%	-2.20%
274+860	508707.771	6357099.904	1,068.287	1,068.322	3.90%	-3.90%
274+880	508697.171	6357116.863	1,068.397	1,068.422	5.00%	-5.00%
274+900	508687.050	6357134.113	1,068.433	1,068.458	5.00%	-5.00%
274+920	508677.426	6357151.644	1,068.388	1,068.433	5.00%	-5.00%
274+940	508668.307	6357169.443	1,068.439	1,068.469	5.00%	-5.00%
274+960	508659.700	6357187.496	1,068.476	1,068.506	5.00%	-5.00%
274+980	508651.613	6357205.787	1,068.442	1,068.472	5.00%	-5.00%
275+000	508644.051	6357224.302	1,068.427	1,068.457	5.00%	-5.00%
275+020	508637.021	6357243.025	1,068.449	1,068.489	5.00%	-5.00%
275+040	508630.529	6357261.941	1,068.421	1,068.481	5.00%	-5.00%
275+060	508624.581	6357281.035	1,068.381	1,068.441	5.00%	-5.00%
275+080	508619.179	6357300.292	1,068.358	1,068.418	5.00%	-5.00%
275+100	508614.331	6357319.694	1,068.344	1,068.425	5.00%	-5.00%
275+120	508610.038	6357339.227	1,068.309	1,068.369	5.00%	-5.00%
275+140	508606.306	6357358.875	1,068.239	1,068.299	5.00%	-5.00%
275+160	508603.136	6357378.622	1,068.176	1,068.236	5.00%	-5.00%
275+180	508600.531	6357398.451	1,068.147	1,068.207	5.00%	-5.00%
275+200	508598.494	6357418.346	1,068.161	1,068.221	5.00%	-5.00%
275+220	508597.026	6357438.291	1,068.114	1,068.184	5.00%	-5.00%
275+240	508596.129	6357458.271	1,068.059	1,068.129	5.00%	-5.00%
275+260	508595.803	6357478.267	1,067.969	1,068.039	5.00%	-5.00%
275+280	508596.048	6357498.265	1,067.928	1,068.003	5.00%	-5.00%
275+300	508596.864	6357518.248	1,067.870	1,067.955	5.00%	-5.00%
275+320	508598.250	6357538.199	1,067.815	1,067.900	4.50%	-4.50%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
275+340	508600.137	6357558.109	1,067.773	1,067.858	2.80%	-2.80%
275+360	508602.345	6357577.987	1,067.793	1,067.878	1.20%	-2.00%
275+380	508604.685	6357597.850	1,067.878	1,067.973	-0.40%	-2.00%
275+400	508607.036	6357617.711	1,068.002	1,068.097	-1.70%	-2.00%
275+420	508609.387	6357637.572	1,068.228	1,068.323	-2.00%	-2.00%
275+440	508611.737	6357657.434	1,068.500	1,068.595	-2.00%	-2.00%
275+460	508614.088	6357677.295	1,068.840	1,068.930	-2.00%	-2.00%
275+480	508616.439	6357697.157	1,069.250	1,069.340	-2.00%	-2.00%
275+500	508618.790	6357717.018	1,069.666	1,069.776	-2.00%	-2.00%
275+520	508621.140	6357736.879	1,070.212	1,070.302	-2.00%	-2.00%
275+540	508623.491	6357756.741	1,070.834	1,070.924	-2.00%	-2.00%
275+560	508625.842	6357776.602	1,071.359	1,071.449	-2.00%	-2.00%
275+580	508628.193	6357796.463	1,071.869	1,071.959	-2.00%	-2.00%
275+600	508630.543	6357816.325	1,072.361	1,072.451	-2.00%	-2.00%
275+620	508632.894	6357836.186	1,072.842	1,072.932	-2.00%	-2.00%
275+640	508635.245	6357856.048	1,073.289	1,073.379	-2.00%	-2.00%
275+660	508637.595	6357875.909	1,073.671	1,073.756	-2.00%	-2.00%
275+680	508639.946	6357895.770	1,074.008	1,074.093	-2.00%	-2.00%
275+700	508642.297	6357915.632	1,074.329	1,074.409	-2.00%	-2.00%
275+720	508644.648	6357935.493	1,074.637	1,074.717	-2.00%	-2.00%
275+740	508646.998	6357955.354	1,074.901	1,074.981	-2.00%	-2.00%
275+760	508649.349	6357975.216	1,075.118	1,075.198	-2.00%	-2.00%
275+780	508651.700	6357995.077	1,075.312	1,075.392	-2.00%	-2.00%
275+800	508654.051	6358014.939	1,075.504	1,075.579	-2.00%	-2.00%
275+820	508656.401	6358034.800	1,075.605	1,075.680	-2.00%	-2.00%
275+840	508658.752	6358054.661	1,075.648	1,075.728	-2.00%	-2.00%
275+860	508661.103	6358074.523	1,075.663	1,075.753	-2.00%	-2.00%
275+880	508663.454	6358094.384	1,075.666	1,075.756	-2.00%	-2.00%
275+900	508665.804	6358114.245	1,075.631	1,075.721	-2.00%	-2.00%
275+920	508668.155	6358134.107	1,075.534	1,075.624	-2.00%	-2.00%
275+940	508670.506	6358153.968	1,075.426	1,075.516	-2.00%	-2.00%
275+960	508672.857	6358173.829	1,075.262	1,075.352	-2.00%	-2.00%
275+980	508675.207	6358193.691	1,075.016	1,075.106	-2.00%	-2.00%
276+000	508677.558	6358213.552	1,074.809	1,074.899	-2.00%	-2.00%
276+020	508679.909	6358233.414	1,074.580	1,074.670	-2.00%	-2.00%
276+040	508682.259	6358253.275	1,074.324	1,074.414	-2.00%	-2.00%
276+060	508684.610	6358273.136	1,074.004	1,074.094	-2.00%	-2.00%
276+080	508686.961	6358292.998	1,073.743	1,073.833	-2.00%	-2.00%
276+100	508689.312	6358312.859	1,073.456	1,073.546	-2.00%	-2.00%
276+120	508691.662	6358332.720	1,073.187	1,073.272	-2.00%	-2.00%
276+140	508694.013	6358352.582	1,072.944	1,073.029	-2.00%	-2.00%
276+160	508696.364	6358372.443	1,072.666	1,072.746	-2.00%	-2.00%
276+180	508698.715	6358392.305	1,072.358	1,072.438	-2.00%	-2.00%
276+200	508701.065	6358412.166	1,072.121	1,072.201	-2.00%	-2.00%
276+220	508703.416	6358432.027	1,071.832	1,071.912	-2.00%	-2.00%
276+240	508705.767	6358451.889	1,071.564	1,071.644	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
276+260	508708.118	6358471.750	1,071.314	1,071.394	-2.00%	-2.00%
276+280	508710.468	6358491.611	1,071.058	1,071.137	-2.00%	-2.00%
276+300	508712.819	6358511.473	1,070.791	1,070.876	-2.00%	-2.00%
276+320	508715.170	6358531.334	1,070.519	1,070.604	-2.00%	-2.00%
276+340	508717.521	6358551.196	1,070.217	1,070.302	-2.00%	-2.00%
276+360	508719.871	6358571.057	1,069.899	1,069.989	-2.00%	-2.00%
276+380	508722.222	6358590.918	1,069.560	1,069.650	-2.00%	-2.00%
276+400	508724.573	6358610.780	1,069.200	1,069.290	-2.00%	-2.00%
276+420	508726.924	6358630.641	1,068.793	1,068.883	-2.00%	-2.00%
276+440	508729.274	6358650.502	1,068.341	1,068.431	-2.00%	-2.00%
276+460	508731.625	6358670.364	1,067.887	1,067.982	-2.00%	-2.00%
276+480	508733.976	6358690.225	1,067.403	1,067.498	-2.00%	-2.00%
276+500	508736.326	6358710.086	1,066.879	1,066.974	-2.00%	-2.00%
276+520	508738.677	6358729.948	1,066.331	1,066.411	-2.00%	-2.00%
276+540	508741.028	6358749.809	1,065.741	1,065.821	-2.00%	-2.00%
276+560	508743.379	6358769.671	1,065.108	1,065.198	-2.00%	-2.00%
276+580	508745.729	6358789.532	1,064.457	1,064.547	-2.00%	-2.00%
276+600	508748.080	6358809.393	1,063.746	1,063.836	-2.00%	-2.00%
276+620	508750.431	6358829.255	1,063.025	1,063.120	-2.00%	-2.00%
276+640	508752.782	6358849.116	1,062.261	1,062.356	-2.00%	-2.00%
276+660	508755.132	6358868.977	1,061.462	1,061.557	-2.00%	-2.00%
276+680	508757.483	6358888.839	1,060.630	1,060.725	-2.00%	-1.10%
276+700	508759.834	6358908.700	1,059.792	1,059.862	-2.00%	0.20%
276+720	508762.171	6358928.563	1,058.898	1,058.953	-2.00%	1.10%
276+740	508764.451	6358948.433	1,057.993	1,058.038	-2.00%	2.00%
276+760	508766.624	6358968.314	1,057.036	1,057.081	-2.70%	2.70%
276+780	508768.654	6358988.211	1,056.063	1,056.108	-2.70%	2.70%
276+800	508770.537	6359008.122	1,055.141	1,055.186	-2.70%	2.70%
276+820	508772.273	6359028.047	1,054.307	1,054.347	-2.70%	2.70%
276+840	508773.860	6359047.983	1,053.530	1,053.560	-2.70%	2.70%
276+860	508775.300	6359067.931	1,052.800	1,052.825	-2.70%	2.70%
276+880	508776.592	6359087.890	1,052.162	1,052.187	-2.70%	2.70%
276+900	508777.737	6359107.857	1,051.536	1,051.551	-2.70%	2.70%
276+920	508778.739	6359127.832	1,050.861	1,050.876	-2.00%	1.90%
276+940	508779.636	6359147.812	1,050.198	1,050.213	-2.00%	1.00%
276+960	508780.479	6359167.794	1,049.556	1,049.601	-2.00%	0.10%
276+980	508781.310	6359187.777	1,048.911	1,048.971	-2.00%	-1.20%
277+000	508782.141	6359207.759	1,048.269	1,048.359	-2.00%	-2.00%
277+020	508782.972	6359227.742	1,047.597	1,047.687	-2.00%	-2.00%
277+040	508783.803	6359247.725	1,046.947	1,047.037	-2.00%	-2.00%
277+060	508784.634	6359267.707	1,046.245	1,046.330	-2.00%	-2.00%
277+080	508785.465	6359287.690	1,045.462	1,045.557	-2.00%	-2.00%
277+100	508786.296	6359307.673	1,044.676	1,044.761	-2.00%	-2.00%
277+120	508787.128	6359327.656	1,043.825	1,043.900	-2.00%	-2.00%
277+140	508787.976	6359347.638	1,042.966	1,043.037	-2.00%	-2.00%
277+160	508788.852	6359367.618	1,042.060	1,042.133	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
277+180	508789.753	6359387.598	1,041.058	1,041.129	-2.00%	-2.00%
277+200	508790.682	6359407.576	1,040.022	1,040.092	-2.00%	-2.00%
277+220	508791.637	6359427.554	1,038.989	1,039.063	-2.00%	-2.00%
277+240	508792.619	6359447.530	1,037.937	1,038.010	-2.00%	-2.00%
277+260	508793.627	6359467.504	1,036.830	1,036.913	-2.00%	-2.00%
277+280	508794.655	6359487.478	1,035.706	1,035.777	-2.00%	-2.00%
277+300	508795.683	6359507.451	1,034.610	1,034.665	-2.00%	-2.00%
277+320	508796.711	6359527.425	1,033.580	1,033.649	-2.00%	-2.00%
277+340	508797.740	6359547.398	1,032.703	1,032.739	-2.00%	-2.00%
277+360	508798.768	6359567.372	1,031.829	1,031.941	-2.00%	-2.00%
277+380	508799.796	6359587.345	1,031.265	1,031.325	-2.00%	-2.00%
277+400	508800.825	6359607.319	1,030.891	1,030.909	-2.00%	-2.00%
277+420	508801.853	6359627.293	1,030.612	1,030.670	-2.00%	-2.00%
277+440	508802.840	6359647.268	1,030.503	1,030.580	-2.00%	-2.00%
277+460	508803.760	6359667.247	1,030.577	1,030.651	-2.00%	-2.00%
277+480	508804.614	6359687.229	1,030.754	1,030.818	-2.00%	-2.00%
277+500	508805.401	6359707.213	1,030.999	1,031.094	-2.00%	-2.00%
277+520	508806.122	6359727.200	1,031.329	1,031.417	-2.00%	-2.00%
277+540	508806.776	6359747.189	1,031.629	1,031.676	-2.00%	-2.00%
277+560	508807.363	6359767.181	1,031.768	1,031.846	-2.00%	-2.00%
277+580	508807.916	6359787.173	1,031.842	1,031.946	-2.00%	-2.00%
277+600	508808.468	6359807.166	1,031.924	1,032.034	-2.00%	-2.00%
277+620	508809.020	6359827.158	1,032.009	1,032.107	-2.00%	-2.00%
277+640	508809.572	6359847.150	1,031.998	1,032.091	-2.00%	-2.00%
277+660	508810.124	6359867.143	1,031.886	1,031.977	-2.00%	-2.00%
277+680	508810.685	6359887.135	1,031.635	1,031.739	-2.00%	-2.00%
277+700	508811.281	6359907.126	1,031.278	1,031.378	-2.00%	-2.00%
277+720	508811.913	6359927.116	1,030.841	1,030.939	-2.00%	-2.00%
277+740	508812.582	6359947.105	1,030.330	1,030.431	-2.00%	-2.00%
277+760	508813.287	6359967.092	1,029.717	1,029.818	-2.00%	-2.00%
277+780	508814.028	6359987.079	1,029.010	1,029.123	-2.00%	-2.00%
277+800	508814.806	6360007.064	1,028.276	1,028.367	-2.00%	-2.00%
277+820	508815.620	6360027.047	1,027.411	1,027.511	-2.00%	-2.00%
277+840	508816.457	6360047.029	1,026.481	1,026.587	-2.00%	-2.00%
277+860	508817.295	6360067.012	1,025.466	1,025.564	-2.00%	-2.00%
277+880	508818.133	6360086.994	1,024.364	1,024.467	-2.00%	-2.00%
277+900	508818.971	6360106.977	1,023.224	1,023.318	-2.00%	-2.00%
277+920	508819.809	6360126.959	1,022.137	1,022.241	-2.00%	-2.00%
277+940	508820.647	6360146.942	1,021.142	1,021.256	-2.00%	-2.00%
277+960	508821.485	6360166.924	1,020.265	1,020.394	-2.00%	-2.00%
277+980	508822.323	6360186.906	1,019.538	1,019.645	-2.00%	-2.00%
278+000	508823.161	6360206.889	1,018.870	1,018.948	-2.00%	-2.00%
278+020	508823.999	6360226.871	1,018.216	1,018.277	-2.00%	-2.00%
278+040	508824.837	6360246.854	1,017.543	1,017.652	-2.00%	-2.00%
278+060	508825.675	6360266.836	1,017.076	1,017.123	VARIES, TIE-TO EXISTING	
278+080	508826.512	6360286.819	1,016.669	1,016.669	EXISTING BRIDGE	

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
278+100	508827.350	6360306.801	1,016.315	1,016.312	EXISTING BRIDGE	
278+120	508828.188	6360326.784	1,015.923	1,015.923	EXISTING BRIDGE	
278+140	508829.026	6360346.766	1,015.513	1,015.528	VARIES, TIE-TO EXISTING	
278+160	508829.864	6360366.748	1,015.291	1,015.308	-2.00%	-2.00%
278+180	508830.702	6360386.731	1,015.231	1,015.291	-2.00%	-2.00%
278+200	508831.540	6360406.713	1,015.274	1,015.355	-2.00%	-2.00%
278+220	508832.378	6360426.696	1,015.343	1,015.436	-2.00%	-2.00%
278+240	508833.216	6360446.678	1,015.448	1,015.538	-2.00%	-2.00%
278+260	508834.054	6360466.661	1,015.638	1,015.731	-2.00%	-2.00%
278+280	508834.892	6360486.643	1,015.905	1,015.996	-2.00%	-2.00%
278+300	508835.730	6360506.625	1,016.250	1,016.341	-2.00%	-2.00%
278+320	508836.568	6360526.608	1,016.645	1,016.733	-2.00%	-2.00%
278+340	508837.406	6360546.590	1,017.019	1,017.088	-2.00%	-2.00%
278+360	508838.244	6360566.573	1,017.395	1,017.462	-2.00%	-2.00%
278+380	508839.082	6360586.555	1,017.781	1,017.855	-2.00%	-2.00%
278+400	508839.919	6360606.538	1,018.094	1,018.183	-2.00%	-2.00%
278+420	508840.757	6360626.520	1,018.403	1,018.486	-2.00%	-2.00%
278+440	508841.595	6360646.503	1,018.723	1,018.808	-2.00%	-2.00%
278+460	508842.433	6360666.485	1,019.032	1,019.118	-2.00%	-2.00%
278+480	508843.271	6360686.467	1,019.363	1,019.447	-2.00%	-2.00%
278+500	508844.109	6360706.450	1,019.653	1,019.742	-2.00%	-2.00%
278+520	508844.947	6360726.432	1,019.933	1,020.019	-2.00%	-2.00%
278+540	508845.785	6360746.415	1,020.188	1,020.277	-2.00%	-2.00%
278+560	508846.623	6360766.397	1,020.451	1,020.537	-2.00%	-2.00%
278+580	508847.461	6360786.380	1,020.739	1,020.828	-2.00%	-2.00%
278+600	508848.299	6360806.362	1,021.002	1,021.076	-2.00%	-2.00%
278+620	508849.137	6360826.345	1,021.247	1,021.319	-2.00%	-2.00%
278+640	508849.975	6360846.327	1,021.465	1,021.542	-2.00%	-2.00%
278+660	508850.813	6360866.309	1,021.643	1,021.719	-2.00%	-2.00%
278+680	508851.651	6360886.292	1,021.849	1,021.921	-2.00%	-2.00%
278+700	508852.489	6360906.274	1,022.127	1,022.203	-2.00%	-2.00%
278+720	508853.327	6360926.257	1,022.383	1,022.461	-2.00%	-2.00%
278+740	508854.164	6360946.239	1,022.625	1,022.700	-2.00%	-2.00%
278+760	508855.002	6360966.222	1,022.810	1,022.883	-2.00%	-2.00%
278+780	508855.840	6360986.204	1,022.948	1,023.021	-2.00%	-2.00%
278+800	508856.678	6361006.186	1,023.104	1,023.178	-2.00%	-2.00%
278+820	508857.516	6361026.169	1,023.296	1,023.369	-2.00%	-2.00%
278+840	508858.354	6361046.151	1,023.487	1,023.558	-2.00%	-2.00%
278+860	508859.192	6361066.134	1,023.667	1,023.740	-2.00%	-2.00%
278+880	508860.030	6361086.116	1,023.877	1,023.949	-2.00%	-2.00%
278+900	508860.868	6361106.099	1,024.143	1,024.222	-2.00%	-2.00%
278+920	508861.706	6361126.081	1,024.433	1,024.513	-2.00%	-2.00%
278+940	508862.544	6361146.064	1,024.777	1,024.855	-2.00%	-2.00%
278+960	508863.382	6361166.046	1,025.195	1,025.276	-2.00%	-2.00%
278+980	508864.220	6361186.028	1,025.679	1,025.760	-2.00%	-2.00%
279+000	508865.058	6361206.011	1,026.260	1,026.342	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
279+020	508865.896	6361225.993	1,026.909	1,026.986	-2.00%	-2.00%
279+040	508866.734	6361245.976	1,027.584	1,027.662	-2.00%	-2.00%
279+060	508867.571	6361265.958	1,028.319	1,028.399	-2.00%	-2.00%
279+080	508868.409	6361285.941	1,029.085	1,029.166	-2.00%	-2.00%
279+100	508869.247	6361305.923	1,029.883	1,029.959	-2.00%	-2.00%
279+120	508870.085	6361325.905	1,030.763	1,030.842	-2.00%	-2.00%
279+140	508870.923	6361345.888	1,031.702	1,031.781	-2.00%	-2.00%
279+160	508871.761	6361365.870	1,032.584	1,032.663	-2.00%	-2.00%
279+180	508872.599	6361385.853	1,033.498	1,033.571	-2.00%	-2.00%
279+200	508873.437	6361405.835	1,034.446	1,034.521	-2.00%	-2.00%
279+220	508874.275	6361425.818	1,035.423	1,035.484	-2.00%	-2.00%
279+240	508875.113	6361445.800	1,036.374	1,036.437	-2.00%	-2.00%
279+260	508875.951	6361465.783	1,037.313	1,037.373	-2.00%	-2.00%
279+280	508876.789	6361485.765	1,038.302	1,038.364	-2.00%	-0.90%
279+300	508877.626	6361505.747	1,039.311	1,039.375	-2.00%	0.40%
279+320	508878.420	6361525.732	1,040.290	1,040.354	-2.00%	1.70%
279+340	508879.066	6361545.721	1,041.302	1,041.367	-3.00%	3.00%
279+360	508879.453	6361565.717	1,042.372	1,042.438	-3.80%	3.80%
279+380	508879.512	6361585.717	1,043.429	1,043.494	-3.80%	3.80%
279+400	508879.237	6361605.715	1,044.514	1,044.578	-3.80%	3.80%
279+420	508878.630	6361625.705	1,045.666	1,045.732	-3.80%	3.80%
279+440	508877.689	6361645.683	1,046.875	1,046.940	-3.80%	3.80%
279+460	508876.415	6361665.642	1,048.054	1,048.118	-3.80%	3.80%
279+480	508874.809	6361685.577	1,049.209	1,049.273	-3.80%	3.80%
279+500	508872.871	6361705.483	1,050.310	1,050.379	-3.80%	3.80%
279+520	508870.602	6361725.354	1,051.401	1,051.475	-3.80%	3.80%
279+540	508868.001	6361745.184	1,052.507	1,052.580	-3.80%	3.80%
279+560	508865.071	6361764.967	1,053.563	1,053.636	-3.80%	3.80%
279+580	508861.811	6361784.700	1,054.576	1,054.653	-3.80%	3.80%
279+600	508858.223	6361804.375	1,055.582	1,055.659	-3.80%	3.80%
279+620	508854.307	6361823.988	1,056.569	1,056.646	-3.80%	3.80%
279+640	508850.065	6361843.532	1,057.525	1,057.602	-3.80%	3.80%
279+660	508845.498	6361863.004	1,058.441	1,058.518	-3.80%	3.80%
279+680	508840.607	6361882.396	1,059.321	1,059.397	-3.80%	3.80%
279+700	508835.394	6361901.705	1,060.204	1,060.281	-3.80%	3.80%
279+720	508829.859	6361920.923	1,061.005	1,061.081	-3.80%	3.80%
279+740	508824.005	6361940.047	1,061.733	1,061.809	-3.80%	3.80%
279+760	508817.834	6361959.071	1,062.509	1,062.585	-3.80%	3.80%
279+780	508811.377	6361978.000	1,063.209	1,063.364	-3.80%	3.80%
279+800	508804.732	6361996.864	1,063.970	1,064.175	-3.80%	3.80%
279+820	508798.006	6362015.699	1,064.777	1,064.952	-2.50%	2.50%
279+840	508791.270	6362034.530	1,065.608	1,065.784	-2.00%	1.30%
279+860	508784.535	6362053.362	1,066.483	1,066.629	-2.00%	0.00%
279+880	508777.800	6362072.194	1,067.353	1,067.449	-2.00%	-1.30%
279+900	508771.065	6362091.026	1,068.223	1,068.314	-2.00%	-2.00%
279+920	508764.330	6362109.858	1,069.135	1,069.210	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
279+940	508757.595	6362128.689	1,070.027	1,070.102	-2.00%	-2.00%
279+960	508750.859	6362147.521	1,070.921	1,071.001	-2.00%	-2.00%
279+980	508744.124	6362166.353	1,071.860	1,071.945	-2.00%	-2.00%
280+000	508737.389	6362185.185	1,072.822	1,072.908	-2.00%	-2.00%
280+020	508730.654	6362204.017	1,073.744	1,073.829	-2.00%	-2.00%
280+040	508723.919	6362222.849	1,074.622	1,074.708	-2.00%	-2.00%
280+060	508717.184	6362241.680	1,075.510	1,075.596	-2.00%	-2.00%
280+080	508710.448	6362260.512	1,076.431	1,076.506	-2.00%	-2.00%
280+100	508703.713	6362279.344	1,077.338	1,077.413	-2.00%	-2.00%
280+120	508696.978	6362298.176	1,078.215	1,078.296	-2.00%	-2.00%
280+140	508690.243	6362317.008	1,079.084	1,079.165	-2.00%	-2.00%
280+160	508683.508	6362335.840	1,079.911	1,079.992	-2.00%	-2.00%
280+180	508676.773	6362354.671	1,080.714	1,080.795	-2.00%	-2.00%
280+200	508670.037	6362373.503	1,081.487	1,081.567	-2.00%	-2.00%
280+220	508663.302	6362392.335	1,082.264	1,082.345	-2.00%	-2.00%
280+240	508656.567	6362411.167	1,083.024	1,083.104	-2.00%	-2.00%
280+260	508649.832	6362429.999	1,083.784	1,083.865	-2.00%	-2.00%
280+280	508643.097	6362448.830	1,084.512	1,084.593	-2.00%	-2.00%
280+300	508636.362	6362467.662	1,085.206	1,085.281	-2.00%	-2.00%
280+320	508629.626	6362486.494	1,085.898	1,085.973	-2.00%	-2.00%
280+340	508622.891	6362505.326	1,086.562	1,086.637	-2.00%	-2.00%
280+360	508616.156	6362524.158	1,087.205	1,087.280	-2.00%	-2.00%
280+380	508609.421	6362542.990	1,087.866	1,087.942	-2.00%	-2.00%
280+400	508602.686	6362561.821	1,088.560	1,088.625	-2.00%	-2.00%
280+420	508595.951	6362580.653	1,089.280	1,089.346	-2.00%	-2.00%
280+440	508589.215	6362599.485	1,089.958	1,090.044	-2.00%	-2.00%
280+460	508582.480	6362618.317	1,090.749	1,090.804	-2.00%	-2.00%
280+480	508575.745	6362637.149	1,091.565	1,091.620	-2.00%	-2.00%
280+500	508569.010	6362655.981	1,092.407	1,092.462	-2.00%	-2.00%
280+520	508562.275	6362674.812	1,093.233	1,093.289	-2.00%	-2.00%
280+540	508555.540	6362693.644	1,094.060	1,094.120	-2.00%	-2.00%
280+560	508548.804	6362712.476	1,094.933	1,094.998	-2.00%	-2.00%
280+580	508542.069	6362731.308	1,095.752	1,095.827	-2.00%	-2.00%
280+600	508535.334	6362750.140	1,096.529	1,096.605	-2.00%	-2.00%
280+620	508528.599	6362768.971	1,097.349	1,097.424	-2.00%	-2.00%
280+640	508521.864	6362787.803	1,098.180	1,098.256	-2.00%	-2.00%
280+660	508515.129	6362806.635	1,098.969	1,099.044	-2.00%	-2.00%
280+680	508508.393	6362825.467	1,099.716	1,099.792	-2.00%	-2.00%
280+700	508501.658	6362844.299	1,100.475	1,100.550	-2.00%	-2.00%
280+720	508494.923	6362863.131	1,101.187	1,101.263	-2.00%	-2.00%
280+740	508488.188	6362881.962	1,101.875	1,101.951	-2.00%	-2.00%
280+760	508481.453	6362900.794	1,102.512	1,102.588	-2.00%	-2.00%
280+780	508474.718	6362919.626	1,103.114	1,103.190	-2.00%	-2.00%
280+800	508467.982	6362938.458	1,103.721	1,103.796	-2.00%	-2.00%
280+820	508461.247	6362957.290	1,104.336	1,104.411	-2.00%	-2.00%
280+840	508454.512	6362976.121	1,104.957	1,105.032	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
280+860	508447.777	6362994.953	1,105.568	1,105.644	-2.00%	-2.00%
280+880	508441.042	6363013.785	1,106.172	1,106.248	-2.00%	-2.00%
280+900	508434.307	6363032.617	1,106.810	1,106.885	-2.00%	-2.00%
280+920	508427.571	6363051.449	1,107.403	1,107.479	-2.00%	-2.00%
280+940	508420.836	6363070.281	1,107.981	1,108.057	-2.00%	-2.00%
280+960	508414.101	6363089.112	1,108.593	1,108.669	-2.00%	-2.00%
280+980	508407.366	6363107.944	1,109.234	1,109.300	-2.00%	-2.00%
281+000	508400.631	6363126.776	1,109.846	1,109.911	-2.00%	-2.00%
281+020	508393.896	6363145.608	1,110.403	1,110.468	-2.00%	-2.00%
281+040	508387.160	6363164.440	1,110.989	1,111.054	-2.00%	-2.00%
281+060	508380.425	6363183.272	1,111.611	1,111.676	-2.00%	-2.00%
281+080	508373.690	6363202.103	1,112.270	1,112.336	-2.00%	-2.00%
281+100	508366.955	6363220.935	1,112.945	1,113.011	-2.00%	-2.00%
281+120	508360.220	6363239.767	1,113.618	1,113.684	-2.00%	-2.00%
281+140	508353.485	6363258.599	1,114.327	1,114.392	-2.00%	-2.00%
281+160	508346.749	6363277.431	1,115.014	1,115.079	-2.00%	-2.00%
281+180	508340.014	6363296.262	1,115.655	1,115.720	-2.00%	-2.00%
281+200	508333.279	6363315.094	1,116.348	1,116.414	-2.00%	-2.00%
281+220	508326.544	6363333.926	1,117.095	1,117.161	-2.00%	-2.00%
281+240	508319.809	6363352.758	1,117.793	1,117.858	-2.00%	-2.00%
281+260	508313.074	6363371.590	1,118.430	1,118.525	-2.00%	-2.00%
281+280	508306.338	6363390.422	1,119.171	1,119.237	-2.00%	-2.00%
281+300	508299.603	6363409.253	1,119.868	1,119.934	-2.00%	-2.00%
281+320	508292.868	6363428.085	1,120.527	1,120.588	-2.00%	-2.00%
281+340	508286.133	6363446.917	1,121.248	1,121.308	-2.00%	-2.00%
281+360	508279.398	6363465.749	1,121.939	1,122.000	-2.00%	-2.00%
281+380	508272.663	6363484.581	1,122.614	1,122.674	-2.00%	-2.00%
281+400	508265.927	6363503.413	1,123.318	1,123.378	-2.00%	-2.00%
281+420	508259.192	6363522.244	1,123.992	1,124.052	-2.00%	-2.00%
281+440	508252.457	6363541.076	1,124.640	1,124.700	-2.00%	-2.00%
281+460	508245.722	6363559.908	1,125.299	1,125.360	-2.00%	-2.00%
281+480	508238.987	6363578.740	1,125.948	1,126.009	-2.00%	-2.00%
281+500	508232.252	6363597.572	1,126.516	1,126.577	-2.00%	-2.00%
281+520	508225.517	6363616.403	1,127.022	1,127.077	-2.00%	-2.00%
281+540	508218.781	6363635.235	1,127.511	1,127.566	-2.00%	-2.00%
281+560	508212.046	6363654.067	1,127.968	1,128.018	-2.00%	-2.00%
281+580	508205.311	6363672.899	1,128.371	1,128.422	-2.00%	-2.00%
281+600	508198.576	6363691.731	1,128.732	1,128.782	-2.00%	-2.00%
281+620	508191.841	6363710.563	1,129.039	1,129.090	-2.00%	-2.00%
281+640	508185.106	6363729.394	1,129.342	1,129.392	-2.00%	-2.00%
281+660	508178.370	6363748.226	1,129.605	1,129.635	-2.00%	-2.00%
281+680	508171.635	6363767.058	1,129.778	1,129.828	-2.00%	-2.00%
281+700	508164.900	6363785.890	1,129.906	1,129.971	-2.00%	-2.00%
281+720	508158.165	6363804.722	1,130.041	1,130.107	-2.00%	-2.00%
281+740	508151.430	6363823.554	1,130.177	1,130.242	-2.00%	-2.00%
281+760	508144.695	6363842.385	1,130.271	1,130.336	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
281+780	508137.959	6363861.217	1,130.297	1,130.362	-2.00%	-2.00%
281+800	508131.224	6363880.049	1,130.306	1,130.381	-2.00%	-2.00%
281+820	508124.489	6363898.881	1,130.297	1,130.372	-2.00%	-2.00%
281+840	508117.754	6363917.713	1,130.231	1,130.301	-2.00%	-2.00%
281+860	508111.019	6363936.544	1,130.074	1,130.144	-2.00%	-2.00%
281+880	508104.284	6363955.376	1,129.870	1,129.940	-2.00%	-1.50%
281+900	508097.548	6363974.208	1,129.690	1,129.755	-2.00%	-0.20%
281+920	508090.805	6363993.037	1,129.440	1,129.495	-2.00%	0.90%
281+940	508083.996	6364011.842	1,129.101	1,129.155	-2.00%	2.00%
281+960	508077.046	6364030.596	1,128.710	1,128.765	-3.10%	3.10%
281+980	508069.887	6364049.270	1,128.291	1,128.345	-3.30%	3.30%
282+000	508062.502	6364067.857	1,127.892	1,127.957	-3.30%	3.30%
282+020	508054.893	6364086.353	1,127.436	1,127.511	-3.30%	3.30%
282+040	508047.060	6364104.755	1,126.931	1,127.005	-3.30%	3.30%
282+060	508039.005	6364123.061	1,126.365	1,126.436	-3.30%	3.30%
282+080	508030.728	6364141.268	1,125.835	1,125.910	-3.30%	3.30%
282+100	508022.231	6364159.373	1,125.201	1,125.285	-3.30%	3.30%
282+120	508013.516	6364177.374	1,124.594	1,124.678	-3.30%	3.30%
282+140	508004.583	6364195.268	1,123.920	1,124.004	-3.30%	3.30%
282+160	507995.433	6364213.052	1,123.229	1,123.303	-3.30%	3.30%
282+180	507986.069	6364230.725	1,122.479	1,122.548	-3.30%	3.30%
282+200	507976.491	6364248.282	1,121.684	1,121.754	-3.30%	3.30%
282+220	507966.702	6364265.722	1,120.859	1,120.928	-3.30%	3.30%
282+240	507956.701	6364283.042	1,120.018	1,120.098	-3.30%	3.30%
282+260	507946.491	6364300.240	1,119.154	1,119.238	-3.30%	3.30%
282+280	507936.074	6364317.312	1,118.327	1,118.388	-3.30%	3.30%
282+300	507925.450	6364334.257	1,117.510	1,117.560	-3.30%	3.30%
282+320	507914.622	6364351.072	1,116.626	1,116.710	-3.30%	3.30%
282+340	507903.591	6364367.755	1,115.797	1,115.865	-3.00%	3.00%
282+360	507892.381	6364384.318	1,114.956	1,115.030	-2.00%	1.90%
282+380	507881.055	6364400.802	1,114.119	1,114.204	-2.00%	0.80%
282+400	507869.680	6364417.252	1,113.299	1,113.383	-2.00%	-0.40%
282+420	507858.301	6364433.700	1,112.539	1,112.623	-2.00%	-1.70%
282+440	507846.922	6364450.147	1,111.904	1,111.953	-2.00%	-2.00%
282+460	507835.543	6364466.594	1,111.270	1,111.349	-2.00%	-2.00%
282+480	507824.164	6364483.042	1,110.728	1,110.794	-2.00%	-2.00%
282+500	507812.784	6364499.489	1,110.245	1,110.315	-2.00%	-2.00%
282+520	507801.405	6364515.936	1,109.859	1,109.929	-2.00%	-2.00%
282+540	507790.026	6364532.384	1,109.525	1,109.595	-2.00%	-2.00%
282+560	507778.647	6364548.831	1,109.219	1,109.299	-2.00%	-2.00%
282+580	507767.268	6364565.278	1,108.970	1,109.070	-2.00%	-2.00%
282+600	507755.889	6364581.726	1,108.843	1,108.923	-2.00%	-2.00%
282+620	507744.510	6364598.173	1,108.783	1,108.863	-2.00%	-2.00%
282+640	507733.131	6364614.620	1,108.806	1,108.886	-2.00%	-2.00%
282+660	507721.751	6364631.068	1,108.913	1,108.991	-2.00%	-2.00%
282+680	507710.372	6364647.515	1,109.071	1,109.152	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
282+700	507698.993	6364663.962	1,109.285	1,109.369	-2.00%	-2.00%
282+720	507687.614	6364680.410	1,109.556	1,109.636	-2.00%	-2.00%
282+740	507676.235	6364696.857	1,109.913	1,109.993	-2.00%	-2.00%
282+760	507664.856	6364713.304	1,110.317	1,110.402	-2.00%	-2.00%
282+780	507653.477	6364729.752	1,110.800	1,110.872	-2.00%	-2.00%
282+800	507642.097	6364746.199	1,111.348	1,111.432	-2.00%	-2.00%
282+820	507630.718	6364762.646	1,111.950	1,112.035	-2.00%	-2.00%
282+840	507619.339	6364779.094	1,112.633	1,112.719	-2.00%	-2.00%
282+860	507607.960	6364795.541	1,113.373	1,113.459	-2.00%	-2.00%
282+880	507596.581	6364811.989	1,114.189	1,114.274	-2.00%	-2.00%
282+900	507585.202	6364828.436	1,115.034	1,115.120	-2.00%	-2.00%
282+920	507573.823	6364844.883	1,115.880	1,115.966	-2.00%	-2.00%
282+940	507562.443	6364861.331	1,116.735	1,116.821	-2.00%	-2.00%
282+960	507551.064	6364877.778	1,117.541	1,117.617	-2.00%	-2.00%
282+980	507539.685	6364894.225	1,118.332	1,118.408	-2.00%	-2.00%
283+000	507528.306	6364910.673	1,119.089	1,119.169	-2.00%	-2.00%
283+020	507516.927	6364927.120	1,119.821	1,119.902	-2.00%	-2.00%
283+040	507505.548	6364943.567	1,120.465	1,120.543	-2.00%	-2.00%
283+060	507494.169	6364960.015	1,121.090	1,121.175	-2.00%	-2.00%
283+080	507482.789	6364976.462	1,121.692	1,121.770	-2.00%	-2.00%
283+100	507471.410	6364992.909	1,122.249	1,122.334	-2.00%	-2.00%
283+120	507460.031	6365009.357	1,122.788	1,122.868	-2.00%	-2.00%
283+140	507448.652	6365025.804	1,123.309	1,123.389	-2.00%	-2.00%
283+160	507437.273	6365042.251	1,123.800	1,123.874	-2.00%	-2.00%
283+180	507425.894	6365058.699	1,124.239	1,124.314	-2.00%	-2.00%
283+200	507414.515	6365075.146	1,124.619	1,124.694	-2.00%	-2.00%
283+220	507403.135	6365091.593	1,124.945	1,125.031	-2.00%	-2.00%
283+240	507391.756	6365108.041	1,125.249	1,125.335	-2.00%	-2.00%
283+260	507380.377	6365124.488	1,125.500	1,125.585	-2.00%	-2.00%
283+280	507368.998	6365140.935	1,125.711	1,125.796	-2.00%	-2.00%
283+300	507357.619	6365157.383	1,125.928	1,126.013	-2.00%	-2.00%
283+320	507346.240	6365173.830	1,126.109	1,126.194	-2.00%	-2.00%
283+340	507334.861	6365190.277	1,126.259	1,126.334	-2.00%	-2.00%
283+360	507323.482	6365206.725	1,126.377	1,126.422	-2.00%	-2.00%
283+380	507312.102	6365223.172	1,126.371	1,126.451	-2.00%	-2.00%
283+400	507300.723	6365239.620	1,126.361	1,126.421	-2.00%	-2.00%
283+420	507289.344	6365256.067	1,126.398	1,126.458	-2.00%	-2.00%
283+440	507277.965	6365272.514	1,126.418	1,126.528	-2.00%	-2.00%
283+460	507266.586	6365288.962	1,126.607	1,126.647	-2.00%	-2.00%
283+480	507255.207	6365305.409	1,126.705	1,126.755	-2.00%	-2.00%
283+500	507243.828	6365321.856	1,126.747	1,126.842	-2.00%	-2.00%
283+520	507232.448	6365338.304	1,126.880	1,126.942	-2.00%	-2.00%
283+540	507221.069	6365354.751	1,127.005	1,127.060	-2.00%	-2.00%
283+560	507209.690	6365371.198	1,127.062	1,127.147	-2.00%	-2.00%
283+580	507198.311	6365387.646	1,127.143	1,127.228	-2.00%	-2.00%
283+600	507186.932	6365404.093	1,127.273	1,127.358	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
283+620	507175.553	6365420.540	1,127.447	1,127.532	-2.00%	-2.00%
283+640	507164.174	6365436.988	1,127.616	1,127.686	-2.00%	-2.00%
283+660	507152.794	6365453.435	1,127.741	1,127.821	-2.00%	-2.00%
283+680	507141.415	6365469.882	1,127.898	1,127.948	-2.00%	-2.00%
283+700	507130.036	6365486.330	1,127.994	1,128.059	-2.00%	-2.00%
283+720	507118.657	6365502.777	1,128.057	1,128.142	-2.00%	-2.00%
283+740	507107.278	6365519.224	1,128.179	1,128.254	-2.00%	-2.00%
283+760	507095.899	6365535.672	1,128.325	1,128.400	-2.00%	-2.00%
283+780	507084.520	6365552.119	1,128.452	1,128.528	-2.00%	-2.00%
283+800	507073.140	6365568.566	1,128.559	1,128.644	-2.00%	-2.00%
283+820	507061.761	6365585.014	1,128.666	1,128.751	-2.00%	-2.00%
283+840	507050.382	6365601.461	1,128.790	1,128.886	-2.00%	-2.00%
283+860	507039.003	6365617.908	1,128.978	1,129.063	-2.00%	-2.00%
283+880	507027.624	6365634.356	1,129.153	1,129.234	-2.00%	-2.00%
283+900	507016.245	6365650.803	1,129.302	1,129.372	-2.00%	-2.00%
283+920	507004.866	6365667.251	1,129.464	1,129.534	-2.00%	-2.00%
283+940	506993.486	6365683.698	1,129.617	1,129.688	-2.00%	-2.00%
283+960	506982.107	6365700.145	1,129.755	1,129.825	-2.00%	-2.00%
283+980	506970.728	6365716.593	1,129.881	1,129.956	-2.00%	-2.00%
284+000	506959.349	6365733.040	1,130.013	1,130.088	-2.00%	-2.00%
284+020	506947.970	6365749.487	1,130.132	1,130.207	-2.00%	-2.00%
284+040	506936.591	6365765.935	1,130.273	1,130.348	-2.00%	-2.00%
284+060	506925.212	6365782.382	1,130.409	1,130.494	-2.00%	-2.00%
284+080	506913.833	6365798.829	1,130.540	1,130.631	-2.00%	-2.00%
284+100	506902.453	6365815.277	1,130.689	1,130.789	-2.00%	-2.00%
284+120	506891.074	6365831.724	1,130.882	1,130.972	-2.00%	-2.00%
284+140	506879.695	6365848.171	1,131.053	1,131.143	-2.00%	-2.00%
284+160	506868.316	6365864.619	1,131.209	1,131.300	-2.00%	-2.00%
284+180	506856.937	6365881.066	1,131.335	1,131.425	-2.00%	-2.00%
284+200	506845.558	6365897.513	1,131.478	1,131.568	-2.00%	-2.00%
284+220	506834.179	6365913.961	1,131.586	1,131.686	-2.00%	-2.00%
284+240	506822.799	6365930.408	1,131.676	1,131.796	-2.00%	-2.00%
284+260	506811.420	6365946.855	1,131.732	1,131.852	-2.00%	-2.00%
284+280	506800.041	6365963.303	1,131.762	1,131.882	-2.00%	-2.00%
284+300	506788.662	6365979.750	1,131.759	1,131.879	-2.00%	-2.00%
284+320	506777.283	6365996.197	1,131.697	1,131.812	-2.00%	-2.00%
284+340	506765.904	6366012.645	1,131.594	1,131.714	-1.90%	-2.00%
284+360	506754.525	6366029.092	1,131.467	1,131.577	-0.50%	-2.00%
284+380	506743.148	6366045.541	1,131.257	1,131.351	0.70%	-2.00%
284+400	506731.813	6366062.019	1,130.987	1,131.062	1.80%	-2.00%
284+420	506720.585	6366078.570	1,130.716	1,130.791	2.90%	-2.90%
284+440	506709.529	6366095.236	1,130.445	1,130.470	3.30%	-3.30%
284+460	506698.676	6366112.035	1,130.000	1,130.074	3.30%	-3.30%
284+480	506688.028	6366128.964	1,129.528	1,129.603	3.30%	-3.30%
284+500	506677.585	6366146.022	1,129.039	1,129.114	3.30%	-3.30%
284+520	506667.350	6366163.204	1,128.517	1,128.592	3.30%	-3.30%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
284+540	506657.323	6366180.509	1,127.946	1,128.021	3.30%	-3.30%
284+560	506647.508	6366197.935	1,127.337	1,127.412	3.30%	-3.30%
284+580	506637.904	6366215.478	1,126.682	1,126.757	3.30%	-3.30%
284+600	506628.514	6366233.136	1,125.968	1,126.038	3.30%	-3.30%
284+620	506619.338	6366250.907	1,125.256	1,125.316	3.30%	-3.30%
284+640	506610.378	6366268.788	1,124.442	1,124.511	3.30%	-3.30%
284+660	506601.636	6366286.776	1,123.556	1,123.635	3.30%	-3.30%
284+680	506593.112	6366304.868	1,122.623	1,122.697	3.30%	-3.30%
284+700	506584.809	6366323.063	1,121.668	1,121.742	3.30%	-3.30%
284+720	506576.726	6366341.357	1,120.673	1,120.748	3.30%	-3.30%
284+740	506568.866	6366359.747	1,119.672	1,119.736	3.30%	-3.30%
284+760	506561.230	6366378.232	1,118.567	1,118.641	3.30%	-3.30%
284+780	506553.817	6366396.808	1,117.550	1,117.624	3.30%	-3.30%
284+800	506546.631	6366415.472	1,116.506	1,116.580	3.30%	-3.30%
284+820	506539.659	6366434.217	1,115.383	1,115.458	2.20%	-2.20%
284+840	506532.839	6366453.019	1,114.271	1,114.355	1.10%	-2.00%
284+860	506526.096	6366471.848	1,113.250	1,113.344	0.00%	-2.00%
284+880	506519.366	6366490.681	1,112.291	1,112.395	-1.30%	-2.00%
284+900	506512.636	6366509.515	1,111.387	1,111.491	-2.00%	-2.00%
284+920	506505.906	6366528.348	1,110.518	1,110.622	-2.00%	-2.00%
284+940	506499.176	6366547.182	1,109.694	1,109.798	-2.00%	-2.00%
284+960	506492.446	6366566.016	1,108.928	1,109.043	-2.00%	-2.00%
284+980	506485.715	6366584.849	1,108.267	1,108.372	-2.00%	-2.00%
285+000	506478.985	6366603.683	1,107.613	1,107.708	-2.00%	-2.00%
285+020	506472.255	6366622.516	1,106.958	1,107.053	-2.00%	-2.00%
285+040	506465.525	6366641.350	1,106.318	1,106.402	-2.00%	-2.00%
285+060	506458.795	6366660.184	1,105.605	1,105.699	-2.00%	-2.00%
285+080	506452.065	6366679.017	1,104.861	1,104.983	-2.00%	-2.00%
285+100	506445.334	6366697.851	1,104.131	1,104.198	-2.00%	-2.00%
285+120	506438.604	6366716.684	1,103.357	1,103.441	-2.00%	-2.00%
285+140	506431.874	6366735.518	1,102.598	1,102.682	-2.00%	-2.00%
285+160	506425.144	6366754.352	1,101.838	1,101.919	-2.00%	-2.00%
285+180	506418.414	6366773.185	1,101.042	1,101.107	-2.00%	-2.00%
285+200	506411.684	6366792.019	1,100.163	1,100.254	-2.00%	-2.00%
285+220	506404.953	6366810.853	1,099.256	1,099.320	-2.00%	-2.00%
285+240	506398.223	6366829.686	1,098.295	1,098.370	-2.00%	-2.00%
285+260	506391.493	6366848.520	1,097.350	1,097.429	-2.00%	-2.00%
285+280	506384.763	6366867.353	1,096.373	1,096.448	-2.00%	-2.00%
285+300	506378.033	6366886.187	1,095.394	1,095.468	-2.00%	-2.00%
285+320	506371.303	6366905.021	1,094.384	1,094.454	-2.00%	-2.00%
285+340	506364.573	6366923.854	1,093.332	1,093.402	-2.00%	-2.00%
285+360	506357.842	6366942.688	1,092.288	1,092.358	-2.00%	-2.00%
285+380	506351.112	6366961.521	1,091.197	1,091.266	-2.00%	-2.00%
285+400	506344.382	6366980.355	1,090.096	1,090.165	-2.00%	-2.00%
285+420	506337.652	6366999.189	1,088.935	1,089.001	-2.00%	-2.00%
285+440	506330.922	6367018.022	1,087.746	1,087.820	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
285+460	506324.192	6367036.856	1,086.658	1,086.732	-2.00%	-2.00%
285+480	506317.461	6367055.690	1,085.650	1,085.724	-2.00%	-2.00%
285+500	506310.731	6367074.523	1,084.683	1,084.757	-2.00%	-2.00%
285+520	506304.001	6367093.357	1,083.800	1,083.875	-2.00%	-2.00%
285+540	506297.271	6367112.190	1,082.971	1,083.045	-2.00%	-2.00%
285+560	506290.541	6367131.024	1,082.159	1,082.244	-2.00%	-2.00%
285+580	506283.811	6367149.858	1,081.432	1,081.526	-2.00%	-2.00%
285+600	506277.080	6367168.691	1,080.805	1,080.899	-2.00%	-2.00%
285+620	506270.350	6367187.525	1,080.228	1,080.323	-2.00%	-2.00%
285+640	506263.620	6367206.358	1,079.704	1,079.798	-2.00%	-2.00%
285+660	506256.890	6367225.192	1,079.267	1,079.353	-2.00%	-2.00%
285+680	506250.160	6367244.026	1,078.917	1,079.002	-2.00%	-2.00%
285+700	506243.430	6367262.859	1,078.558	1,078.663	-2.00%	-2.00%
285+720	506236.699	6367281.693	1,078.337	1,078.421	-2.00%	-2.00%
285+740	506229.969	6367300.526	1,078.012	1,078.171	-2.00%	-2.00%
285+760	506223.239	6367319.360	1,077.887	1,077.977	-2.00%	-2.00%
285+780	506216.509	6367338.194	1,077.707	1,077.789	-2.00%	-2.00%
285+800	506209.779	6367357.027	1,077.506	1,077.580	-2.00%	-2.00%
285+820	506203.049	6367375.861	1,077.298	1,077.373	-2.00%	-2.00%
285+840	506196.319	6367394.695	1,077.102	1,077.177	-2.00%	-2.00%
285+860	506189.588	6367413.528	1,076.915	1,076.980	-2.00%	-2.00%
285+880	506182.858	6367432.362	1,076.690	1,076.755	-2.00%	-2.00%
285+900	506176.128	6367451.195	1,076.471	1,076.536	-2.00%	-2.00%
285+920	506169.398	6367470.029	1,076.297	1,076.367	-2.00%	-2.00%
285+940	506162.668	6367488.863	1,076.186	1,076.256	-2.00%	-2.00%
285+960	506155.938	6367507.696	1,076.158	1,076.228	-2.00%	-2.00%
285+980	506149.207	6367526.530	1,076.183	1,076.253	-2.00%	-2.00%
286+000	506142.477	6367545.363	1,076.271	1,076.356	-2.00%	-2.00%
286+020	506135.747	6367564.197	1,076.414	1,076.499	-2.00%	-2.00%
286+040	506129.017	6367583.031	1,076.628	1,076.708	-2.00%	-2.00%
286+060	506122.287	6367601.864	1,076.851	1,076.961	-2.00%	-2.00%
286+080	506115.557	6367620.698	1,077.101	1,077.211	-2.00%	-2.00%
286+100	506108.826	6367639.531	1,077.432	1,077.552	-2.00%	-2.00%
286+120	506102.096	6367658.365	1,077.870	1,077.981	-2.00%	-2.00%
286+140	506095.366	6367677.199	1,078.271	1,078.381	-2.00%	-2.00%
286+160	506088.636	6367696.032	1,078.593	1,078.703	-2.00%	-2.00%
286+180	506081.906	6367714.866	1,078.927	1,079.047	-2.00%	-2.00%
286+200	506075.176	6367733.700	1,079.287	1,079.407	-2.00%	-2.00%
286+220	506068.446	6367752.533	1,079.600	1,079.726	-2.00%	-2.00%
286+240	506061.715	6367771.367	1,079.881	1,080.007	-2.00%	-2.00%
286+260	506054.985	6367790.200	1,080.190	1,080.315	-2.00%	-2.00%
286+280	506048.255	6367809.034	1,080.516	1,080.642	-2.00%	-2.00%
286+300	506041.525	6367827.868	1,080.782	1,080.897	-2.00%	-2.00%
286+320	506034.795	6367846.701	1,081.013	1,081.128	-2.00%	-2.00%
286+340	506028.065	6367865.535	1,081.210	1,081.326	-2.00%	-2.00%
286+360	506021.334	6367884.368	1,081.413	1,081.529	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
286+380	506014.604	6367903.202	1,081.565	1,081.680	-2.00%	-2.00%
286+400	506007.874	6367922.036	1,081.691	1,081.804	-2.00%	-2.00%
286+420	506001.144	6367940.869	1,081.824	1,081.949	-2.00%	-2.00%
286+440	505994.414	6367959.703	1,081.915	1,082.045	-2.00%	-2.00%
286+460	505987.684	6367978.537	1,082.025	1,082.155	-2.00%	-2.00%
286+480	505980.953	6367997.370	1,082.142	1,082.251	-2.00%	-2.00%
286+500	505974.223	6368016.204	1,082.187	1,082.297	-2.00%	-2.00%
286+520	505967.493	6368035.037	1,082.217	1,082.357	-2.00%	-2.00%
286+540	505960.763	6368053.871	1,082.391	1,082.521	-2.00%	-2.00%
286+560	505954.033	6368072.705	1,082.629	1,082.759	-2.00%	-2.00%
286+580	505947.303	6368091.538	1,082.957	1,083.087	-2.00%	-2.00%
286+600	505940.572	6368110.372	1,083.345	1,083.476	-2.00%	-2.00%
286+620	505933.842	6368129.205	1,083.772	1,083.913	-2.00%	-2.00%
286+640	505927.112	6368148.039	1,084.301	1,084.431	-2.00%	-2.00%
286+660	505920.382	6368166.873	1,084.920	1,085.031	-2.00%	-2.00%
286+680	505913.652	6368185.706	1,085.610	1,085.721	-2.00%	-2.00%
286+700	505906.922	6368204.540	1,086.386	1,086.497	-2.00%	-2.00%
286+720	505900.192	6368223.373	1,087.185	1,087.295	-2.00%	-2.00%
286+740	505893.461	6368242.207	1,087.967	1,088.077	-2.00%	-2.00%
286+760	505886.731	6368261.041	1,088.719	1,088.830	-2.00%	-2.00%
286+780	505880.001	6368279.874	1,089.402	1,089.513	-2.00%	-2.00%
286+800	505873.271	6368298.708	1,090.022	1,090.132	-2.00%	-2.00%
286+820	505866.541	6368317.542	1,090.593	1,090.703	-2.00%	-2.00%
286+840	505859.811	6368336.375	1,091.089	1,091.199	-2.00%	-2.00%
286+860	505853.080	6368355.209	1,091.572	1,091.682	-2.00%	-2.00%
286+880	505846.350	6368374.042	1,092.012	1,092.122	-2.00%	-2.00%
286+900	505839.620	6368392.876	1,092.426	1,092.536	-2.00%	-2.00%
286+920	505832.890	6368411.710	1,092.794	1,092.904	-2.00%	-2.00%
286+940	505826.160	6368430.543	1,093.120	1,093.230	-2.00%	-2.00%
286+960	505819.430	6368449.377	1,093.376	1,093.476	-2.00%	-2.00%
286+980	505812.699	6368468.210	1,093.527	1,093.637	-2.00%	-2.00%
287+000	505805.969	6368487.044	1,093.641	1,093.751	-2.00%	-2.00%
287+020	505799.239	6368505.878	1,093.712	1,093.822	-2.00%	-2.00%
287+040	505792.509	6368524.711	1,093.771	1,093.881	-2.00%	-2.00%
287+060	505785.779	6368543.545	1,093.781	1,093.891	-2.00%	-2.00%
287+080	505779.049	6368562.379	1,093.715	1,093.825	-2.00%	-2.00%
287+100	505772.319	6368581.212	1,093.596	1,093.706	-2.00%	-2.00%
287+120	505765.588	6368600.046	1,093.426	1,093.535	-2.00%	-2.00%
287+140	505758.858	6368618.879	1,093.198	1,093.308	-2.00%	-2.00%
287+160	505752.128	6368637.713	1,092.934	1,093.044	-2.00%	-2.00%
287+180	505745.398	6368656.547	1,092.613	1,092.722	-2.00%	-2.00%
287+200	505738.668	6368675.380	1,092.272	1,092.382	-2.00%	-2.00%
287+220	505731.938	6368694.214	1,091.892	1,092.002	-2.00%	-2.00%
287+240	505725.207	6368713.047	1,091.457	1,091.566	-2.00%	-2.00%
287+260	505718.477	6368731.881	1,090.925	1,091.035	-2.00%	-2.00%
287+280	505711.747	6368750.715	1,090.361	1,090.471	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
287+300	505705.017	6368769.548	1,089.724	1,089.834	-2.00%	-2.00%
287+320	505698.287	6368788.382	1,089.058	1,089.167	-2.00%	-2.00%
287+340	505691.557	6368807.215	1,088.342	1,088.452	-2.00%	-2.00%
287+360	505684.826	6368826.049	1,087.610	1,087.719	-2.00%	-2.00%
287+380	505678.096	6368844.883	1,086.830	1,086.940	-2.00%	-2.00%
287+400	505671.366	6368863.716	1,085.970	1,086.079	-2.00%	-2.00%
287+420	505664.636	6368882.550	1,085.086	1,085.195	-2.00%	-2.00%
287+440	505657.906	6368901.384	1,084.223	1,084.332	-2.00%	-2.00%
287+460	505651.176	6368920.217	1,083.363	1,083.472	-2.00%	-2.00%
287+480	505644.445	6368939.051	1,082.466	1,082.576	-2.00%	-2.00%
287+500	505637.715	6368957.884	1,081.582	1,081.691	-2.00%	-2.00%
287+520	505630.985	6368976.718	1,080.719	1,080.828	-2.00%	-2.00%
287+540	505624.255	6368995.552	1,079.936	1,080.045	-2.00%	-2.00%
287+560	505617.525	6369014.385	1,079.257	1,079.366	-2.00%	-2.00%
287+580	505610.795	6369033.219	1,078.592	1,078.701	-2.00%	-2.00%
287+600	505604.065	6369052.052	1,077.997	1,078.106	-2.00%	-2.00%
287+620	505597.334	6369070.886	1,077.425	1,077.535	-2.00%	-2.00%
287+640	505590.604	6369089.720	1,076.840	1,076.970	-2.00%	-2.00%
287+660	505583.874	6369108.553	1,076.377	1,076.487	-2.00%	-2.00%
287+680	505577.144	6369127.387	1,075.985	1,076.095	-2.00%	-2.00%
287+700	505570.414	6369146.220	1,075.639	1,075.759	-2.00%	-2.00%
287+720	505563.684	6369165.054	1,075.401	1,075.511	-2.00%	-2.00%
287+740	505556.953	6369183.888	1,075.171	1,075.281	-2.00%	-2.00%
287+760	505550.223	6369202.721	1,074.984	1,075.094	-2.00%	-2.00%
287+780	505543.493	6369221.555	1,074.806	1,074.916	-2.00%	-2.00%
287+800	505536.763	6369240.389	1,074.647	1,074.757	-2.00%	-2.00%
287+820	505530.033	6369259.222	1,074.433	1,074.543	-2.00%	-2.00%
287+840	505523.303	6369278.056	1,074.271	1,074.381	-2.00%	-2.00%
287+860	505516.572	6369296.889	1,074.124	1,074.234	-2.00%	-2.00%
287+880	505509.842	6369315.723	1,074.001	1,074.101	-2.00%	-2.00%
287+900	505503.112	6369334.557	1,073.925	1,074.035	-2.00%	-2.00%
287+920	505496.382	6369353.390	1,073.971	1,074.081	-2.00%	-2.00%
287+940	505489.652	6369372.224	1,074.136	1,074.236	-2.00%	-2.00%
287+960	505482.922	6369391.057	1,074.261	1,074.361	-2.00%	-2.00%
287+980	505476.192	6369409.891	1,074.416	1,074.516	-2.00%	-2.00%
288+000	505469.461	6369428.725	1,074.584	1,074.723	-2.00%	-2.00%
288+020	505462.731	6369447.558	1,074.918	1,075.009	-2.00%	-2.00%
288+040	505456.001	6369466.392	1,075.275	1,075.380	-2.00%	-2.00%
288+060	505449.271	6369485.226	1,075.748	1,075.854	-2.00%	-2.00%
288+080	505442.541	6369504.059	1,076.291	1,076.396	-2.00%	-2.00%
288+100	505435.811	6369522.893	1,076.835	1,076.936	-2.00%	-2.00%
288+120	505429.080	6369541.726	1,077.393	1,077.493	-2.00%	-2.00%
288+140	505422.350	6369560.560	1,077.921	1,078.022	-2.00%	-2.00%
288+160	505415.620	6369579.394	1,078.418	1,078.519	-2.00%	-2.00%
288+180	505408.890	6369598.227	1,078.884	1,078.985	-2.00%	-2.00%
288+200	505402.160	6369617.061	1,079.268	1,079.368	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
288+220	505395.430	6369635.894	1,079.604	1,079.704	-2.00%	-2.00%
288+240	505388.699	6369654.728	1,079.896	1,080.001	-2.00%	-2.00%
288+260	505381.969	6369673.562	1,080.174	1,080.279	-2.00%	-2.00%
288+280	505375.239	6369692.395	1,080.390	1,080.495	-2.00%	-2.00%
288+300	505368.509	6369711.229	1,080.569	1,080.674	-2.00%	-2.00%
288+320	505361.779	6369730.062	1,080.661	1,080.766	-2.00%	-2.00%
288+340	505355.049	6369748.896	1,080.763	1,080.869	-2.00%	-2.00%
288+360	505348.318	6369767.730	1,080.824	1,080.919	-2.00%	-2.00%
288+380	505341.588	6369786.563	1,080.771	1,080.876	-2.00%	-2.00%
288+400	505334.858	6369805.397	1,080.657	1,080.762	-2.00%	-2.00%
288+420	505328.128	6369824.231	1,080.531	1,080.636	-2.00%	-2.00%
288+440	505321.398	6369843.064	1,080.376	1,080.480	-2.00%	-2.00%
288+460	505314.668	6369861.898	1,080.191	1,080.296	-2.00%	-2.00%
288+480	505307.938	6369880.731	1,079.981	1,080.081	-2.00%	-2.00%
288+500	505301.207	6369899.565	1,079.688	1,079.783	-2.00%	-2.00%
288+520	505294.477	6369918.399	1,079.351	1,079.446	-2.00%	-2.00%
288+540	505287.747	6369937.232	1,078.948	1,079.042	-2.00%	-2.00%
288+560	505281.017	6369956.066	1,078.533	1,078.628	-2.00%	-2.00%
288+580	505274.287	6369974.899	1,078.077	1,078.172	-2.00%	-2.00%
288+600	505267.557	6369993.733	1,077.528	1,077.623	-2.00%	-2.00%
288+620	505260.826	6370012.567	1,076.900	1,076.994	-2.00%	-2.00%
288+640	505254.096	6370031.400	1,076.285	1,076.380	-2.00%	-2.00%
288+660	505247.366	6370050.234	1,075.658	1,075.713	-2.00%	-2.00%
288+680	505240.636	6370069.067	1,074.987	1,075.047	-2.00%	-2.00%
288+700	505233.906	6370087.901	1,074.325	1,074.384	-2.00%	-2.00%
288+720	505227.176	6370106.735	1,073.674	1,073.734	-2.00%	-2.00%
288+740	505220.445	6370125.568	1,072.982	1,073.041	-2.00%	-2.00%
288+760	505213.715	6370144.402	1,072.270	1,072.330	-2.00%	-2.00%
288+780	505206.985	6370163.236	1,071.575	1,071.635	-2.00%	-2.00%
288+800	505200.255	6370182.069	1,070.908	1,070.967	-2.00%	-2.00%
288+820	505193.525	6370200.903	1,070.265	1,070.335	-2.00%	-2.00%
288+840	505186.795	6370219.736	1,069.651	1,069.720	-2.00%	-2.00%
288+860	505180.065	6370238.570	1,069.000	1,069.090	-2.00%	-2.00%
288+880	505173.334	6370257.404	1,068.319	1,068.408	-2.00%	-2.00%
288+900	505166.604	6370276.237	1,067.673	1,067.763	-2.00%	-2.00%
288+920	505159.874	6370295.071	1,067.056	1,067.145	-2.00%	-2.00%
288+940	505153.144	6370313.904	1,066.408	1,066.507	-2.00%	-2.00%
288+960	505146.414	6370332.738	1,065.785	1,065.885	-2.00%	-2.00%
288+980	505139.684	6370351.572	1,065.138	1,065.238	-2.00%	-2.00%
289+000	505132.953	6370370.405	1,064.485	1,064.585	-2.00%	-2.00%
289+020	505126.223	6370389.239	1,063.894	1,063.994	-2.00%	-2.00%
289+040	505119.493	6370408.073	1,063.322	1,063.422	-2.00%	-2.00%
289+060	505112.763	6370426.906	1,062.700	1,062.799	-2.00%	-2.00%
289+080	505106.033	6370445.740	1,062.107	1,062.216	-2.00%	-2.00%
289+100	505099.303	6370464.573	1,061.520	1,061.630	-2.00%	-2.00%
289+120	505092.572	6370483.407	1,060.945	1,061.030	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
289+140	505085.842	6370502.241	1,060.411	1,060.496	-2.00%	-2.00%
289+160	505079.112	6370521.074	1,059.798	1,059.882	-2.00%	-2.00%
289+180	505072.382	6370539.908	1,059.219	1,059.329	-2.00%	-2.00%
289+200	505065.652	6370558.741	1,058.639	1,058.748	-2.00%	-2.00%
289+220	505058.922	6370577.575	1,058.092	1,058.202	-2.00%	-2.00%
289+240	505052.191	6370596.409	1,057.544	1,057.654	-2.00%	-2.00%
289+260	505045.461	6370615.242	1,056.963	1,057.073	-2.00%	-2.00%
289+280	505038.731	6370634.076	1,056.415	1,056.517	-2.00%	-2.00%
289+300	505032.001	6370652.909	1,055.807	1,055.917	-2.00%	-2.00%
289+320	505025.271	6370671.743	1,055.223	1,055.316	-2.00%	-2.00%
289+340	505018.541	6370690.577	1,054.630	1,054.731	-2.00%	-2.00%
289+360	505011.811	6370709.410	1,054.044	1,054.164	-2.00%	-2.00%
289+380	505005.080	6370728.244	1,053.496	1,053.616	-2.00%	-2.00%
289+400	504998.350	6370747.078	1,052.890	1,053.010	-1.30%	-2.00%
289+420	504991.620	6370765.911	1,052.318	1,052.417	0.00%	-2.00%
289+440	504984.903	6370784.749	1,051.750	1,051.839	1.10%	-2.00%
289+460	504978.262	6370803.615	1,051.201	1,051.280	2.20%	-2.20%
289+480	504971.774	6370822.533	1,050.638	1,050.718	3.30%	-3.30%
289+500	504965.503	6370841.524	1,050.074	1,050.154	3.30%	-3.30%
289+520	504959.463	6370860.590	1,049.509	1,049.573	3.30%	-3.30%
289+540	504953.654	6370879.728	1,048.936	1,049.000	3.30%	-3.30%
289+560	504948.078	6370898.935	1,048.370	1,048.434	3.30%	-3.30%
289+580	504942.735	6370918.208	1,047.832	1,047.901	3.30%	-3.30%
289+600	504937.626	6370937.544	1,047.369	1,047.444	3.30%	-3.30%
289+620	504932.752	6370956.941	1,046.958	1,047.052	3.30%	-3.30%
289+640	504928.113	6370976.395	1,046.676	1,046.751	3.30%	-3.30%
289+660	504923.711	6370995.905	1,046.472	1,046.547	3.30%	-3.30%
289+680	504919.545	6371015.466	1,046.295	1,046.370	3.30%	-3.30%
289+700	504915.616	6371035.076	1,046.193	1,046.278	3.30%	-3.30%
289+720	504911.926	6371054.733	1,046.160	1,046.255	3.30%	-3.30%
289+740	504908.474	6371074.432	1,046.232	1,046.313	3.30%	-3.30%
289+760	504905.261	6371094.173	1,046.294	1,046.374	3.30%	-3.30%
289+780	504902.288	6371113.950	1,046.415	1,046.504	3.30%	-3.30%
289+800	504899.545	6371133.761	1,046.650	1,046.730	2.30%	-2.30%
289+820	504896.973	6371153.595	1,046.949	1,047.044	1.20%	-2.00%
289+840	504894.491	6371173.440	1,047.361	1,047.446	0.10%	-2.00%
289+860	504892.028	6371193.288	1,047.733	1,047.834	-1.20%	-2.00%
289+880	504889.565	6371213.136	1,048.130	1,048.240	-2.00%	-2.00%
289+900	504887.102	6371232.984	1,048.484	1,048.594	-2.00%	-2.00%
289+920	504884.638	6371252.831	1,048.760	1,048.895	-2.00%	-2.00%
289+940	504882.175	6371272.679	1,049.026	1,049.166	-2.00%	-2.00%
289+960	504879.712	6371292.527	1,049.225	1,049.365	-2.00%	-2.00%
289+980	504877.249	6371312.375	1,049.421	1,049.550	-2.00%	-2.00%
290+000	504874.786	6371332.222	1,049.548	1,049.688	-2.00%	-2.00%
290+020	504872.323	6371352.070	1,049.591	1,049.731	-2.00%	-2.00%
290+040	504869.860	6371371.918	1,049.607	1,049.747	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
290+060	504867.397	6371391.766	1,049.560	1,049.700	-2.00%	-2.00%
290+080	504864.934	6371411.613	1,049.478	1,049.618	-2.00%	-2.00%
290+100	504862.470	6371431.461	1,049.320	1,049.445	-2.00%	-2.00%
290+120	504860.007	6371451.309	1,049.146	1,049.256	-2.00%	-2.00%
290+140	504857.544	6371471.157	1,048.935	1,049.025	-2.00%	-2.00%
290+160	504855.081	6371491.004	1,048.663	1,048.752	-2.00%	-2.00%
290+180	504852.618	6371510.852	1,048.331	1,048.431	-2.00%	-2.00%
290+200	504850.155	6371530.700	1,047.967	1,048.067	-2.00%	-2.00%
290+220	504847.692	6371550.548	1,047.537	1,047.637	-2.00%	-2.00%
290+240	504845.229	6371570.395	1,047.077	1,047.186	-2.00%	-2.00%
290+260	504842.766	6371590.243	1,046.575	1,046.685	-2.00%	-2.00%
290+280	504840.302	6371610.091	1,046.000	1,046.110	-2.00%	-2.00%
290+300	504837.839	6371629.939	1,045.418	1,045.527	-2.00%	-2.00%
290+320	504835.376	6371649.786	1,044.800	1,044.909	-2.00%	-2.00%
290+340	504832.913	6371669.634	1,044.125	1,044.215	-2.00%	-2.00%
290+360	504830.450	6371689.482	1,043.320	1,043.440	-2.00%	-2.00%
290+380	504827.987	6371709.330	1,042.559	1,042.678	-2.00%	-2.00%
290+400	504825.524	6371729.177	1,041.847	1,041.967	-2.00%	-2.00%
290+420	504823.061	6371749.025	1,041.224	1,041.354	-2.00%	-2.00%
290+440	504820.598	6371768.873	1,040.710	1,040.830	-2.00%	-2.00%
290+460	504818.134	6371788.721	1,040.239	1,040.358	-2.00%	-2.00%
290+480	504815.671	6371808.568	1,039.849	1,039.979	-2.00%	-2.00%
290+500	504813.208	6371828.416	1,039.509	1,039.644	-2.00%	-2.00%
290+520	504810.745	6371848.264	1,039.220	1,039.390	-2.00%	-2.00%
290+540	504808.282	6371868.112	1,039.039	1,039.213	-2.00%	-2.00%
290+560	504805.819	6371887.959	1,038.913	1,039.113	-2.00%	-2.00%
290+580	504803.356	6371907.807	1,038.922	1,039.092	-2.00%	-2.00%
290+600	504800.893	6371927.655	1,038.998	1,039.149	-2.00%	-2.00%
290+620	504798.430	6371947.503	1,039.131	1,039.283	-2.00%	-2.00%
290+640	504795.966	6371967.350	1,039.374	1,039.496	-2.00%	-2.00%
290+660	504793.503	6371987.198	1,039.641	1,039.761	-2.00%	-2.00%
290+680	504791.040	6372007.046	1,039.936	1,040.057	-2.00%	-2.00%
290+700	504788.577	6372026.894	1,040.285	1,040.405	-2.00%	-1.90%
290+720	504786.114	6372046.741	1,040.590	1,040.685	-2.00%	-1.00%
290+740	504783.650	6372066.589	1,040.824	1,040.909	-2.00%	-0.10%
290+760	504781.165	6372086.434	1,041.027	1,041.112	-2.00%	0.80%
290+780	504778.628	6372106.272	1,041.167	1,041.253	-2.00%	1.70%
290+800	504776.006	6372126.100	1,041.331	1,041.416	-2.00%	2.00%
290+820	504773.285	6372145.914	1,041.466	1,041.551	-2.00%	2.00%
290+840	504770.466	6372165.714	1,041.552	1,041.632	-2.00%	2.00%
290+860	504767.547	6372185.500	1,041.627	1,041.707	-2.00%	2.00%
290+880	504764.530	6372205.271	1,041.672	1,041.752	-2.00%	2.00%
290+900	504761.413	6372225.027	1,041.651	1,041.731	-2.00%	2.00%
290+920	504758.198	6372244.766	1,041.605	1,041.685	-2.00%	2.00%
290+940	504754.884	6372264.490	1,041.533	1,041.603	-2.00%	2.00%
290+960	504751.472	6372284.197	1,041.410	1,041.475	-2.00%	2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
290+980	504747.961	6372303.886	1,041.232	1,041.297	-2.00%	2.00%
291+000	504744.352	6372323.558	1,041.023	1,041.088	-2.00%	2.00%
291+020	504740.644	6372343.211	1,040.777	1,040.842	-2.00%	2.00%
291+040	504736.838	6372362.846	1,040.515	1,040.580	-2.00%	2.00%
291+060	504732.935	6372382.461	1,040.252	1,040.317	-2.00%	2.00%
291+080	504728.933	6372402.056	1,039.895	1,039.960	-2.00%	2.00%
291+100	504724.833	6372421.632	1,039.504	1,039.569	-2.00%	1.70%
291+120	504720.649	6372441.189	1,039.081	1,039.151	-2.00%	0.80%
291+140	504716.411	6372460.735	1,038.679	1,038.748	-2.00%	-0.10%
291+160	504712.152	6372480.276	1,038.203	1,038.273	-2.00%	-1.00%
291+180	504707.891	6372499.817	1,037.669	1,037.769	-2.00%	-1.90%
291+200	504703.631	6372519.358	1,037.100	1,037.199	-2.00%	-2.00%
291+220	504699.370	6372538.899	1,036.541	1,036.640	-2.00%	-2.00%
291+240	504695.110	6372558.440	1,035.891	1,035.990	-2.00%	-2.00%
291+260	504690.849	6372577.981	1,035.226	1,035.326	-2.00%	-2.00%
291+280	504686.589	6372597.522	1,034.528	1,034.628	-2.00%	-2.00%
291+300	504682.329	6372617.063	1,033.846	1,033.931	-2.00%	-2.00%
291+320	504678.068	6372636.604	1,033.127	1,033.211	-2.00%	-2.00%
291+340	504673.808	6372656.145	1,032.427	1,032.512	-2.00%	-2.00%
291+360	504669.547	6372675.686	1,031.719	1,031.803	-2.00%	-2.00%
291+380	504665.287	6372695.227	1,031.041	1,031.126	-2.00%	-2.00%
291+400	504661.026	6372714.767	1,030.394	1,030.484	-2.00%	-2.00%
291+420	504656.766	6372734.308	1,029.816	1,029.906	-2.00%	-2.00%
291+440	504652.505	6372753.849	1,029.257	1,029.347	-2.00%	-2.00%
291+460	504648.245	6372773.390	1,028.716	1,028.806	-2.00%	-2.00%
291+480	504643.984	6372792.931	1,028.169	1,028.258	-2.00%	-2.00%
291+500	504639.724	6372812.472	1,027.672	1,027.762	-2.00%	-2.00%
291+520	504635.463	6372832.013	1,027.212	1,027.302	-2.00%	-2.00%
291+540	504631.203	6372851.554	1,026.775	1,026.865	-2.00%	-2.00%
291+560	504626.942	6372871.095	1,026.353	1,026.442	-2.00%	-2.00%
291+580	504622.682	6372890.636	1,025.975	1,026.064	-2.00%	-2.00%
291+600	504618.421	6372910.177	1,025.600	1,025.690	-2.00%	-2.00%
291+620	504614.161	6372929.718	1,025.231	1,025.311	-2.00%	-2.00%
291+640	504609.900	6372949.259	1,024.859	1,024.938	-2.00%	-2.00%
291+660	504605.640	6372968.800	1,024.492	1,024.562	-2.00%	-2.00%
291+680	504601.380	6372988.341	1,024.101	1,024.171	-2.00%	-2.00%
291+700	504597.119	6373007.882	1,023.672	1,023.742	-2.00%	-2.00%
291+720	504592.859	6373027.423	1,023.260	1,023.330	-2.00%	-2.00%
291+740	504588.598	6373046.963	1,022.836	1,022.906	-2.00%	-2.00%
291+760	504584.338	6373066.504	1,022.439	1,022.508	-2.00%	-2.00%
291+780	504580.077	6373086.045	1,022.041	1,022.121	-2.00%	-2.00%
291+800	504575.817	6373105.586	1,021.619	1,021.709	-2.00%	-2.00%
291+820	504571.556	6373125.127	1,021.212	1,021.301	-2.00%	-2.00%
291+840	504567.296	6373144.668	1,020.812	1,020.902	-2.00%	-2.00%
291+860	504563.035	6373164.209	1,020.481	1,020.571	-2.00%	-2.00%
291+880	504558.775	6373183.750	1,020.202	1,020.292	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
291+900	504554.514	6373203.291	1,019.939	1,020.028	-2.00%	-2.00%
291+920	504550.254	6373222.832	1,019.668	1,019.763	-2.00%	-2.00%
291+940	504545.993	6373242.373	1,019.417	1,019.532	-2.00%	-2.00%
291+960	504541.733	6373261.914	1,019.222	1,019.337	-2.00%	-2.00%
291+980	504537.472	6373281.455	1,019.023	1,019.158	-2.00%	-2.00%
292+000	504533.212	6373300.996	1,018.939	1,019.054	-2.00%	-2.00%
292+020	504528.952	6373320.537	1,018.868	1,018.983	-2.00%	-2.00%
292+040	504524.691	6373340.078	1,018.760	1,018.880	-2.00%	-2.00%
292+060	504520.431	6373359.619	1,018.701	1,018.821	-2.00%	-2.00%
292+080	504516.170	6373379.159	1,018.618	1,018.738	-2.00%	-2.00%
292+100	504511.910	6373398.700	1,018.491	1,018.611	-2.00%	-2.00%
292+120	504507.649	6373418.241	1,018.352	1,018.472	-2.00%	-2.00%
292+140	504503.389	6373437.782	1,018.189	1,018.308	-2.00%	-2.00%
292+160	504499.128	6373457.323	1,017.957	1,018.072	-2.00%	-2.00%
292+180	504494.868	6373476.864	1,017.681	1,017.785	-2.00%	-2.00%
292+200	504490.607	6373496.405	1,017.372	1,017.477	-2.00%	-2.00%
292+220	504486.347	6373515.946	1,017.013	1,017.108	-2.00%	-2.00%
292+240	504482.086	6373535.487	1,016.625	1,016.720	-2.00%	-2.00%
292+260	504477.826	6373555.028	1,016.204	1,016.299	-2.00%	-2.00%
292+280	504473.565	6373574.569	1,015.731	1,015.821	-2.00%	-2.00%
292+300	504469.305	6373594.110	1,015.231	1,015.321	-2.00%	-2.00%
292+320	504465.044	6373613.651	1,014.647	1,014.736	-2.00%	-2.00%
292+340	504460.784	6373633.192	1,014.051	1,014.141	-2.00%	-2.00%
292+360	504456.523	6373652.733	1,013.383	1,013.472	-2.00%	-2.00%
292+380	504452.263	6373672.274	1,012.708	1,012.798	-2.00%	-2.00%
292+400	504448.003	6373691.815	1,011.978	1,012.063	-2.00%	-2.00%
292+420	504443.742	6373711.355	1,011.205	1,011.289	-2.00%	-2.00%
292+440	504439.482	6373730.896	1,010.401	1,010.480	-2.00%	-2.00%
292+460	504435.221	6373750.437	1,009.545	1,009.624	-2.00%	-2.00%
292+480	504430.961	6373769.978	1,008.624	1,008.713	-2.00%	-2.00%
292+500	504426.700	6373789.519	1,007.679	1,007.748	-2.00%	-2.00%
292+520	504422.440	6373809.060	1,006.633	1,006.723	-2.00%	-2.00%
292+540	504418.179	6373828.601	1,005.644	1,005.728	-2.00%	-2.00%
292+560	504413.919	6373848.142	1,004.653	1,004.728	-2.00%	-2.00%
292+580	504409.658	6373867.683	1,003.568	1,003.642	-2.00%	-2.00%
292+600	504405.398	6373887.224	1,002.433	1,002.508	-2.00%	-2.00%
292+620	504401.137	6373906.765	1,001.314	1,001.408	-2.00%	-2.00%
292+640	504396.877	6373926.306	1,000.305	1,000.399	-2.00%	-2.00%
292+660	504392.616	6373945.847	999.366	999.461	-2.00%	-2.00%
292+680	504388.356	6373965.388	998.488	998.582	-2.00%	-2.00%
292+700	504384.095	6373984.929	997.668	997.773	-2.00%	-2.00%
292+720	504379.835	6374004.470	996.904	997.009	-2.00%	-2.00%
292+740	504375.575	6374024.011	996.231	996.335	-2.00%	-2.00%
292+760	504371.314	6374043.551	995.605	995.740	-2.00%	-2.00%
292+780	504367.054	6374063.092	995.130	995.235	-2.00%	-2.00%
292+800	504362.793	6374082.633	994.703	994.788	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
292+820	504358.533	6374102.174	994.294	994.398	-2.00%	-2.00%
292+840	504354.272	6374121.715	993.975	994.080	-2.00%	-2.00%
292+860	504350.012	6374141.256	993.726	993.830	-2.00%	-2.00%
292+880	504345.751	6374160.797	993.535	993.645	-2.00%	-2.00%
292+900	504341.491	6374180.338	993.414	993.524	-2.00%	-2.00%
292+920	504337.230	6374199.879	993.293	993.403	-2.00%	-2.00%
292+940	504332.970	6374219.420	993.177	993.287	-2.00%	-2.00%
292+960	504328.709	6374238.961	993.108	993.218	-2.00%	-2.00%
292+980	504324.449	6374258.502	993.050	993.158	-2.00%	-2.00%
293+000	504320.188	6374278.043	992.960	993.069	-2.00%	-2.00%
293+020	504315.928	6374297.584	992.899	993.009	-2.00%	-2.00%
293+040	504311.667	6374317.125	992.812	992.922	-2.00%	-2.00%
293+060	504307.407	6374336.666	992.771	992.881	-2.00%	-2.00%
293+080	504303.146	6374356.207	992.681	992.777	-2.00%	-2.00%
293+100	504298.886	6374375.747	992.566	992.666	-2.00%	-2.00%
293+120	504294.626	6374395.288	992.450	992.550	-2.00%	-2.00%
293+140	504290.365	6374414.829	992.366	992.466	-2.00%	-2.00%
293+160	504286.105	6374434.370	992.275	992.374	-2.00%	-2.00%
293+180	504281.844	6374453.911	992.176	992.276	-2.00%	-2.00%
293+200	504277.584	6374473.452	992.104	992.204	-2.00%	-2.00%
293+220	504273.323	6374492.993	992.024	992.116	-2.00%	-2.00%
293+240	504269.063	6374512.534	991.925	992.020	-2.00%	-2.00%
293+260	504264.802	6374532.075	991.834	991.929	-2.00%	-2.00%
293+280	504260.542	6374551.616	991.728	991.823	-2.00%	-2.00%
293+300	504256.281	6374571.157	991.627	991.722	-2.00%	-2.00%
293+320	504252.021	6374590.698	991.574	991.659	-2.00%	-2.00%
293+340	504247.760	6374610.239	991.507	991.592	-2.00%	-2.00%
293+360	504243.500	6374629.780	991.397	991.487	-2.00%	-2.00%
293+380	504239.239	6374649.321	991.289	991.379	-2.00%	-2.00%
293+400	504234.979	6374668.862	991.243	991.333	-2.00%	-2.00%
293+420	504230.718	6374688.403	991.151	991.235	-2.00%	-2.00%
293+440	504226.458	6374707.943	991.056	991.141	-2.00%	-2.00%
293+460	504222.198	6374727.484	990.956	991.041	-2.00%	-2.00%
293+480	504217.937	6374747.025	990.892	990.987	-2.00%	-2.00%
293+500	504213.677	6374766.566	990.770	990.865	-2.00%	-2.00%
293+520	504209.416	6374786.107	990.641	990.741	-2.00%	-2.00%
293+540	504205.156	6374805.648	990.524	990.634	-2.00%	-2.00%
293+560	504200.895	6374825.189	990.407	990.516	-2.00%	-2.00%
293+580	504196.635	6374844.730	990.271	990.381	-2.00%	-2.00%
293+600	504192.374	6374864.271	990.218	990.328	-2.00%	-2.00%
293+620	504188.114	6374883.812	990.123	990.233	-2.00%	-2.00%
293+640	504183.853	6374903.353	990.021	990.131	-2.00%	-2.00%
293+660	504179.593	6374922.894	989.917	990.027	-2.00%	-2.00%
293+680	504175.332	6374942.435	989.824	989.939	-2.00%	-2.00%
293+700	504171.072	6374961.976	989.701	989.826	-2.00%	-2.00%
293+720	504166.811	6374981.517	989.595	989.720	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
293+740	504162.551	6375001.058	989.508	989.633	-2.00%	-2.00%
293+760	504158.290	6375020.599	989.441	989.566	-2.00%	-2.00%
293+780	504154.030	6375040.139	989.401	989.526	-2.00%	-2.00%
293+800	504149.769	6375059.680	989.362	989.487	-2.00%	-2.00%
293+820	504145.509	6375079.221	989.360	989.480	-2.00%	-2.00%
293+840	504141.249	6375098.762	989.339	989.444	-2.00%	-2.00%
293+860	504136.988	6375118.303	989.308	989.413	-2.00%	-2.00%
293+880	504132.728	6375137.844	989.314	989.414	-2.00%	-2.00%
293+900	504128.467	6375157.385	989.325	989.425	-2.00%	-2.00%
293+920	504124.207	6375176.926	989.338	989.438	-2.00%	-2.00%
293+940	504119.946	6375196.467	989.353	989.463	-2.00%	-2.00%
293+960	504115.686	6375216.008	989.362	989.472	-2.00%	-2.00%
293+980	504111.425	6375235.549	989.415	989.525	-2.00%	-2.00%
294+000	504107.165	6375255.090	989.444	989.554	-2.00%	-2.00%
294+020	504102.904	6375274.631	989.476	989.571	-2.00%	-2.00%
294+040	504098.644	6375294.172	989.524	989.619	-2.00%	-2.00%
294+060	504094.383	6375313.713	989.567	989.662	-2.00%	-2.00%
294+080	504090.123	6375333.254	989.593	989.683	-2.00%	-2.00%
294+100	504085.862	6375352.795	989.611	989.701	-2.00%	-2.00%
294+120	504081.602	6375372.335	989.600	989.690	-2.00%	-2.00%
294+140	504077.341	6375391.876	989.643	989.728	-2.00%	-2.00%
294+160	504073.081	6375411.417	989.650	989.735	-2.00%	-2.00%
294+180	504068.821	6375430.958	989.626	989.711	-2.00%	-2.00%
294+200	504064.560	6375450.499	989.618	989.703	-2.00%	-2.00%
294+220	504060.300	6375470.040	989.585	989.670	-2.00%	-2.00%
294+240	504056.039	6375489.581	989.521	989.606	-2.00%	-2.00%
294+260	504051.779	6375509.122	989.447	989.542	-2.00%	-2.00%
294+280	504047.518	6375528.663	989.414	989.509	-2.00%	-2.00%
294+300	504043.258	6375548.204	989.333	989.428	-2.00%	-2.00%
294+320	504038.997	6375567.745	989.246	989.341	-2.00%	-2.00%
294+340	504034.737	6375587.286	989.143	989.238	-2.00%	-2.00%
294+360	504030.476	6375606.827	989.041	989.126	-2.00%	-2.00%
294+380	504026.216	6375626.368	988.918	989.003	-2.00%	-2.00%
294+400	504021.955	6375645.909	988.786	988.876	-2.00%	-2.00%
294+420	504017.695	6375665.450	988.667	988.757	-2.00%	-2.00%
294+440	504013.434	6375684.991	988.552	988.642	-2.00%	-2.00%
294+460	504009.174	6375704.531	988.417	988.507	-2.00%	-2.00%
294+480	504004.913	6375724.072	988.285	988.375	-2.00%	-2.00%
294+500	504000.653	6375743.613	988.159	988.249	-2.00%	-2.00%
294+520	503996.392	6375763.154	988.055	988.145	-2.00%	-2.00%
294+540	503992.132	6375782.695	987.990	988.080	-2.00%	-2.00%
294+560	503987.872	6375802.236	987.907	987.992	-2.00%	-2.00%
294+580	503983.611	6375821.777	987.823	987.908	-2.00%	-2.00%
294+600	503979.351	6375841.318	987.740	987.825	-2.00%	-2.00%
294+620	503975.090	6375860.859	987.671	987.756	-2.00%	-2.00%
294+640	503970.830	6375880.400	987.546	987.630	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
294+660	503966.569	6375899.941	987.403	987.488	-2.00%	-2.00%
294+680	503962.309	6375919.482	987.291	987.376	-2.00%	-2.00%
294+700	503958.048	6375939.023	987.165	987.250	-2.00%	-2.00%
294+720	503953.788	6375958.564	987.035	987.119	-2.00%	-2.00%
294+740	503949.527	6375978.105	986.951	987.036	-2.00%	-2.00%
294+760	503945.267	6375997.646	986.863	986.948	-2.00%	-2.00%
294+780	503941.006	6376017.187	986.746	986.831	-2.00%	-2.00%
294+800	503936.746	6376036.727	986.621	986.706	-2.00%	-2.00%
294+820	503932.485	6376056.268	986.510	986.615	-2.00%	-2.00%
294+840	503928.225	6376075.809	986.442	986.547	-2.00%	-2.00%
294+860	503923.964	6376095.350	986.387	986.492	-2.00%	-2.00%
294+880	503919.704	6376114.891	986.331	986.436	-2.00%	-2.00%
294+900	503915.444	6376134.432	986.307	986.402	-2.00%	-2.00%
294+920	503911.183	6376153.973	986.316	986.406	-2.00%	-2.00%
294+940	503906.923	6376173.514	986.348	986.438	-2.00%	-2.00%
294+960	503902.662	6376193.055	986.394	986.484	-2.00%	-2.00%
294+980	503898.402	6376212.596	986.411	986.501	-2.00%	-2.00%
295+000	503894.141	6376232.137	986.483	986.573	-2.00%	-2.00%
295+020	503889.881	6376251.678	986.531	986.621	-2.00%	-2.00%
295+040	503885.620	6376271.219	986.557	986.652	-2.00%	-2.00%
295+060	503881.360	6376290.760	986.574	986.669	-2.00%	-2.00%
295+080	503877.110	6376310.303	986.578	986.673	-2.00%	-2.00%
295+100	503872.880	6376329.851	986.648	986.743	-2.00%	-2.00%
295+120	503868.669	6376349.402	986.773	986.862	-2.00%	-2.00%
295+140	503864.479	6376368.958	986.831	986.920	-2.00%	-2.00%
295+160	503860.307	6376388.518	986.830	986.919	-2.00%	-2.00%
295+180	503856.155	6376408.083	986.831	986.925	-2.00%	-2.00%
295+200	503852.023	6376427.651	986.839	986.934	-2.00%	-2.00%
295+220	503847.904	6376447.222	986.889	986.984	-2.00%	-2.00%
295+240	503843.786	6376466.794	986.938	987.033	-2.00%	-2.00%
295+260	503839.668	6376486.365	986.994	987.089	-2.00%	-2.00%
295+280	503835.550	6376505.937	987.095	987.190	-2.00%	-2.00%
295+300	503831.432	6376525.508	987.193	987.288	-2.00%	-2.00%
295+320	503827.314	6376545.080	987.263	987.358	-2.00%	-2.00%
295+340	503823.196	6376564.651	987.369	987.465	-2.00%	-2.00%
295+360	503819.078	6376584.223	987.552	987.647	-2.00%	-2.00%
295+380	503814.960	6376603.794	987.729	987.824	-2.00%	-2.00%
295+400	503810.842	6376623.365	987.987	988.082	-2.00%	-2.00%
295+420	503806.723	6376642.937	988.212	988.307	-2.00%	-2.00%
295+440	503802.605	6376662.508	988.424	988.519	-2.00%	-2.00%
295+460	503798.487	6376682.080	988.648	988.744	-2.00%	-2.00%
295+480	503794.369	6376701.651	988.933	989.023	-2.00%	-2.00%
295+500	503790.251	6376721.223	989.176	989.261	-2.00%	-2.00%
295+520	503786.133	6376740.794	989.360	989.445	-2.00%	-2.00%
295+540	503782.015	6376760.366	989.546	989.636	-2.00%	-2.00%
295+560	503777.897	6376779.937	989.724	989.814	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
295+580	503773.779	6376799.508	989.804	989.914	-2.00%	-2.00%
295+600	503769.661	6376819.080	989.948	990.029	-2.00%	-2.00%
295+620	503765.543	6376838.651	990.051	990.126	-2.00%	-2.00%
295+640	503761.424	6376858.223	990.120	990.195	-2.00%	-2.00%
295+660	503757.306	6376877.794	990.149	990.224	-2.00%	-2.00%
295+680	503753.188	6376897.366	990.132	990.222	-2.00%	-2.00%
295+700	503749.070	6376916.937	990.095	990.190	-2.00%	-2.00%
295+720	503744.952	6376936.509	990.086	990.181	-2.00%	-2.00%
295+740	503740.834	6376956.080	990.045	990.135	-2.00%	-2.00%
295+760	503736.716	6376975.651	989.981	990.071	-2.00%	-2.00%
295+780	503732.598	6376995.223	989.854	989.943	-2.00%	-2.00%
295+800	503728.480	6377014.794	989.706	989.801	-2.00%	-2.00%
295+820	503724.362	6377034.366	989.513	989.613	-2.00%	-2.00%
295+840	503720.244	6377053.937	989.320	989.420	-2.00%	-2.00%
295+860	503716.126	6377073.509	989.119	989.224	-2.00%	-2.00%
295+880	503712.007	6377093.080	988.930	989.009	-2.00%	-2.00%
295+900	503707.889	6377112.652	988.682	988.756	-2.00%	-2.00%
295+920	503703.771	6377132.223	988.417	988.522	-2.00%	-2.00%
295+940	503699.653	6377151.794	988.176	988.275	-2.00%	-2.00%
295+960	503695.535	6377171.366	987.944	988.044	-2.00%	-2.00%
295+980	503691.417	6377190.937	987.735	987.825	-2.00%	-2.00%
296+000	503687.299	6377210.509	987.476	987.566	-2.00%	-2.00%
296+020	503683.181	6377230.080	987.219	987.309	-2.00%	-2.00%
296+040	503679.063	6377249.652	987.013	987.102	-2.00%	-2.00%
296+060	503674.945	6377269.223	986.760	986.855	-2.00%	-2.00%
296+080	503670.827	6377288.794	986.531	986.626	-2.00%	-2.00%
296+100	503666.708	6377308.366	986.305	986.390	-2.00%	-2.00%
296+120	503662.590	6377327.937	986.097	986.177	-2.00%	-2.00%
296+140	503658.472	6377347.509	985.856	985.936	-2.00%	-2.00%
296+160	503654.354	6377367.080	985.564	985.644	-2.00%	-2.00%
296+180	503650.236	6377386.652	985.307	985.387	-2.00%	-2.00%
296+200	503646.118	6377406.223	985.145	985.225	-2.00%	-2.00%
296+220	503642.000	6377425.795	984.917	984.997	-2.00%	-2.00%
296+240	503637.882	6377445.366	984.680	984.765	-2.00%	-2.00%
296+260	503633.764	6377464.937	984.430	984.520	-2.00%	-2.00%
296+280	503629.646	6377484.509	984.152	984.247	-2.00%	-2.00%
296+300	503625.528	6377504.080	983.946	984.041	-2.00%	-2.00%
296+320	503621.409	6377523.652	983.723	983.818	-2.00%	-2.00%
296+340	503617.291	6377543.223	983.535	983.630	-2.00%	-2.00%
296+360	503613.173	6377562.795	983.289	983.379	-2.00%	-2.00%
296+380	503609.055	6377582.366	983.017	983.107	-2.00%	-2.00%
296+400	503604.937	6377601.938	982.758	982.848	-2.00%	-2.00%
296+420	503600.819	6377621.509	982.535	982.625	-2.00%	-2.00%
296+440	503596.701	6377641.080	982.309	982.394	-2.00%	-2.00%
296+460	503592.583	6377660.652	982.056	982.140	-2.00%	-2.00%
296+480	503588.465	6377680.223	981.815	981.905	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
296+500	503584.347	6377699.795	981.547	981.637	-2.00%	-2.00%
296+520	503580.229	6377719.366	981.206	981.295	-2.00%	-2.00%
296+540	503576.111	6377738.938	980.873	980.973	-2.00%	-2.00%
296+560	503571.992	6377758.509	980.571	980.670	-2.00%	-2.00%
296+580	503567.874	6377778.081	980.246	980.346	-2.00%	-2.00%
296+600	503563.756	6377797.652	979.901	980.001	-2.00%	-2.00%
296+620	503559.638	6377817.223	979.547	979.647	-2.00%	-2.00%
296+640	503555.520	6377836.795	979.187	979.287	-2.00%	-2.00%
296+660	503551.402	6377856.366	978.800	978.895	-2.00%	-2.00%
296+680	503547.284	6377875.938	978.362	978.457	-2.00%	-2.00%
296+700	503543.166	6377895.509	977.930	978.025	-2.00%	-2.00%
296+720	503539.048	6377915.081	977.446	977.546	-2.00%	-2.00%
296+740	503534.930	6377934.652	976.966	977.065	-2.00%	-2.00%
296+760	503530.812	6377954.224	976.494	976.594	-2.00%	-2.00%
296+780	503526.693	6377973.795	976.066	976.165	-2.00%	-2.00%
296+800	503522.575	6377993.366	975.634	975.714	-2.00%	-2.00%
296+820	503518.457	6378012.938	975.181	975.266	-2.00%	-2.00%
296+840	503514.339	6378032.509	974.736	974.821	-2.00%	-2.00%
296+860	503510.221	6378052.081	974.301	974.386	-2.00%	-2.00%
296+880	503506.103	6378071.652	973.862	973.946	-2.00%	-2.00%
296+900	503501.985	6378091.224	973.435	973.519	-2.00%	-2.00%
296+920	503497.867	6378110.795	973.086	973.171	-2.00%	-2.00%
296+940	503493.749	6378130.367	972.749	972.834	-2.00%	-2.00%
296+960	503489.631	6378149.938	972.409	972.494	-2.00%	-2.00%
296+980	503485.513	6378169.509	972.150	972.235	-2.00%	-2.00%
297+000	503481.395	6378189.081	971.910	971.995	-2.00%	-2.00%
297+020	503477.276	6378208.652	971.708	971.793	-2.00%	-2.00%
297+040	503473.158	6378228.224	971.547	971.632	-2.00%	-2.00%
297+060	503469.040	6378247.795	971.416	971.500	-2.00%	-2.00%
297+080	503464.922	6378267.367	971.279	971.364	-2.00%	-2.00%
297+100	503460.804	6378286.938	971.097	971.182	-2.00%	-2.00%
297+120	503456.686	6378306.509	970.976	971.056	-2.00%	-2.00%
297+140	503452.568	6378326.081	970.873	970.953	-2.00%	-2.00%
297+160	503448.450	6378345.652	970.720	970.800	-2.00%	-2.00%
297+180	503444.332	6378365.224	970.567	970.647	-2.00%	-2.00%
297+200	503440.214	6378384.795	970.442	970.522	-2.00%	-2.00%
297+220	503436.096	6378404.367	970.315	970.390	-2.00%	-2.00%
297+240	503431.977	6378423.938	970.161	970.236	-2.00%	-2.00%
297+260	503427.859	6378443.510	969.976	970.051	-2.00%	-2.00%
297+280	503423.741	6378463.081	969.817	969.892	-2.00%	-2.00%
297+300	503419.623	6378482.652	969.653	969.728	-2.00%	-2.00%
297+320	503415.505	6378502.224	969.506	969.581	-2.00%	-2.00%
297+340	503411.387	6378521.795	969.349	969.429	-2.00%	-2.00%
297+360	503407.269	6378541.367	969.181	969.260	-2.00%	-2.00%
297+380	503403.151	6378560.938	968.999	969.079	-2.00%	-2.00%
297+400	503399.033	6378580.510	968.842	968.922	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
297+420	503394.915	6378600.081	968.707	968.787	-2.00%	-2.00%
297+440	503390.797	6378619.653	968.587	968.666	-2.00%	-2.00%
297+460	503386.678	6378639.224	968.418	968.498	-2.00%	-2.00%
297+480	503382.560	6378658.795	968.235	968.315	-2.00%	-2.00%
297+500	503378.442	6378678.367	968.060	968.140	-2.00%	-2.00%
297+520	503374.324	6378697.938	967.872	967.951	-2.00%	-2.00%
297+540	503370.206	6378717.510	967.752	967.847	-2.00%	-2.00%
297+560	503366.088	6378737.081	967.668	967.763	-2.00%	-2.00%
297+580	503361.970	6378756.653	967.539	967.634	-2.00%	-2.00%
297+600	503357.852	6378776.224	967.442	967.536	-2.00%	-2.00%
297+620	503353.734	6378795.796	967.384	967.459	-2.00%	-2.00%
297+640	503349.616	6378815.367	967.275	967.316	-2.00%	-2.00%
297+660	503345.498	6378834.938	967.124	967.194	-2.00%	-2.00%
297+680	503341.380	6378854.510	966.974	967.039	-2.00%	-2.00%
297+700	503337.261	6378874.081	966.807	966.872	-2.00%	-2.00%
297+720	503333.143	6378893.653	966.625	966.689	-2.00%	-2.00%
297+740	503329.025	6378913.224	966.450	966.515	-2.00%	-2.00%
297+760	503324.907	6378932.796	966.278	966.343	-2.00%	-2.00%
297+780	503320.789	6378952.367	966.066	966.141	-2.00%	-2.00%
297+800	503316.671	6378971.939	965.846	965.925	-2.00%	-2.00%
297+820	503312.553	6378991.510	965.626	965.719	-2.00%	-2.00%
297+840	503308.435	6379011.081	965.377	965.445	-2.00%	-2.00%
297+860	503304.317	6379030.653	965.060	965.130	-2.00%	-2.00%
297+880	503300.199	6379050.224	964.724	964.819	-2.00%	-2.00%
297+900	503296.081	6379069.796	964.455	964.550	-2.00%	-2.00%
297+920	503291.962	6379089.367	964.105	964.199	-2.00%	-2.00%
297+940	503287.844	6379108.939	963.699	963.793	-2.00%	-2.00%
297+960	503283.726	6379128.510	963.339	963.438	-2.00%	-2.00%
297+980	503279.608	6379148.082	962.991	963.090	-2.00%	-2.00%
298+000	503275.490	6379167.653	962.604	962.703	-2.00%	-2.00%
298+020	503271.372	6379187.224	962.135	962.235	-2.00%	-2.00%
298+040	503267.254	6379206.796	961.643	961.742	-2.00%	-2.00%
298+060	503263.136	6379226.367	961.198	961.298	-2.00%	-2.00%
298+080	503259.018	6379245.939	960.720	960.820	-2.00%	-2.00%
298+100	503254.900	6379265.510	960.250	960.349	-2.00%	-2.00%
298+120	503250.782	6379285.082	959.837	959.937	-2.00%	-2.00%
298+140	503246.663	6379304.653	959.475	959.575	-2.00%	-2.00%
298+160	503242.545	6379324.224	959.142	959.232	-2.00%	-2.00%
298+180	503238.427	6379343.796	958.836	958.926	-2.00%	-2.00%
298+200	503234.309	6379363.367	958.606	958.696	-2.00%	-2.00%
298+220	503230.191	6379382.939	958.435	958.525	-2.00%	-2.00%
298+240	503226.073	6379402.510	958.295	958.385	-2.00%	-2.00%
298+260	503221.955	6379422.082	958.172	958.266	-2.00%	-2.00%
298+280	503217.837	6379441.653	958.047	958.142	-2.00%	-2.00%
298+300	503213.719	6379461.225	957.919	958.014	-2.00%	-2.00%
298+320	503209.601	6379480.796	957.857	957.952	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
298+340	503205.483	6379500.367	957.817	957.912	-2.00%	-2.00%
298+360	503201.365	6379519.939	957.717	957.812	-2.00%	-2.00%
298+380	503197.246	6379539.510	957.624	957.719	-2.00%	-2.00%
298+400	503193.128	6379559.082	957.539	957.619	-2.00%	-2.00%
298+420	503189.010	6379578.653	957.465	957.545	-2.00%	-2.00%
298+440	503184.892	6379598.225	957.393	957.472	-2.00%	-2.00%
298+460	503180.774	6379617.796	957.345	957.425	-2.00%	-2.00%
298+480	503176.656	6379637.368	957.281	957.361	-2.00%	-2.00%
298+500	503172.538	6379656.939	957.182	957.261	-2.00%	-2.00%
298+520	503168.420	6379676.510	957.085	957.175	-2.00%	-2.00%
298+540	503164.302	6379696.082	956.971	957.065	-2.00%	-2.00%
298+560	503160.184	6379715.653	956.888	956.983	-2.00%	-2.00%
298+580	503156.066	6379735.225	956.792	956.887	-2.00%	-2.00%
298+600	503151.947	6379754.796	956.659	956.774	-2.00%	-2.00%
298+620	503147.829	6379774.368	956.564	956.679	-2.00%	-2.00%
298+640	503143.711	6379793.939	956.515	956.630	-2.00%	-2.00%
298+660	503139.593	6379813.511	956.451	956.566	-2.00%	-2.00%
298+680	503135.475	6379833.082	956.362	956.477	-2.00%	-2.00%
298+700	503131.357	6379852.653	956.223	956.338	-2.00%	-2.00%
298+720	503127.239	6379872.225	956.068	956.183	-2.00%	-2.00%
298+740	503123.121	6379891.796	955.968	956.083	-2.00%	-2.00%
298+760	503119.003	6379911.368	955.881	955.991	-2.00%	-2.00%
298+780	503114.885	6379930.939	955.735	955.840	-2.00%	-2.00%
298+800	503110.767	6379950.511	955.567	955.667	-2.00%	-2.00%
298+820	503106.649	6379970.082	955.436	955.536	-2.00%	-2.00%
298+840	503102.530	6379989.654	955.310	955.405	-2.00%	-2.00%
298+860	503098.412	6380009.225	955.130	955.225	-2.00%	-2.00%
298+880	503094.294	6380028.796	954.917	955.012	-2.00%	-2.00%
298+900	503090.176	6380048.368	954.751	954.828	-2.00%	-2.00%
298+920	503086.058	6380067.939	954.580	954.656	-2.00%	-2.00%
298+940	503081.940	6380087.511	954.317	954.412	-2.00%	-2.00%
298+960	503077.822	6380107.082	954.102	954.197	-2.00%	-2.00%
298+980	503073.704	6380126.654	953.926	954.016	-2.00%	-2.00%
299+000	503069.586	6380146.225	953.739	953.829	-2.00%	-2.00%
299+020	503065.468	6380165.797	953.513	953.603	-2.00%	-2.00%
299+040	503061.350	6380185.368	953.319	953.414	-2.00%	-2.00%
299+060	503057.231	6380204.939	953.051	953.155	-2.00%	-2.00%
299+080	503053.113	6380224.511	952.845	952.950	-2.00%	-2.00%
299+100	503048.995	6380244.082	952.641	952.746	-2.00%	-2.00%
299+120	503044.877	6380263.654	952.461	952.566	-2.00%	-2.00%
299+140	503040.759	6380283.225	952.283	952.388	-2.00%	-2.00%
299+160	503036.641	6380302.797	952.089	952.190	-2.00%	-2.00%
299+180	503032.523	6380322.368	951.913	952.008	-2.00%	-2.00%
299+200	503028.405	6380341.939	951.723	951.818	-2.00%	-2.00%
299+220	503024.287	6380361.511	951.520	951.614	-2.00%	-2.00%
299+240	503020.169	6380381.082	951.317	951.397	-2.00%	-0.90%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
299+260	503016.050	6380400.654	951.142	951.182	-2.00%	0.20%
299+280	503011.917	6380420.222	950.968	951.003	-2.00%	0.90%
299+300	503007.727	6380439.778	950.740	950.770	-2.00%	1.50%
299+320	503003.438	6380459.313	950.496	950.526	-2.00%	2.00%
299+340	502999.021	6380478.819	950.297	950.327	-2.00%	2.00%
299+360	502994.474	6380498.295	950.098	950.128	-2.00%	2.00%
299+380	502989.798	6380517.741	949.884	949.914	-2.00%	2.00%
299+400	502984.992	6380537.155	949.664	949.694	-2.00%	2.00%
299+420	502980.057	6380556.536	949.439	949.469	-2.00%	2.00%
299+440	502974.992	6380575.884	949.224	949.249	-2.00%	2.00%
299+460	502969.799	6380595.198	949.006	949.031	-2.00%	2.00%
299+480	502964.477	6380614.477	948.757	948.782	-2.00%	2.00%
299+500	502959.027	6380633.720	948.522	948.551	-2.00%	2.00%
299+520	502953.448	6380652.926	948.335	948.365	-2.00%	2.00%
299+540	502947.742	6380672.095	948.132	948.162	-2.00%	2.00%
299+560	502941.908	6380691.225	947.906	947.935	-2.00%	1.90%
299+580	502935.957	6380710.319	947.673	947.712	-2.00%	1.20%
299+600	502929.926	6380729.388	947.476	947.541	-2.00%	0.60%
299+620	502923.859	6380748.446	947.400	947.460	-2.00%	-0.20%
299+640	502917.787	6380767.502	947.399	947.459	-2.00%	-1.50%
299+660	502911.716	6380786.558	947.385	947.455	-2.00%	-2.00%
299+680	502905.644	6380805.614	947.373	947.453	-2.00%	-2.00%
299+700	502899.572	6380824.670	947.418	947.498	-2.00%	-2.00%
299+720	502893.501	6380843.726	947.518	947.601	-2.00%	-2.00%
299+740	502887.429	6380862.782	947.688	947.768	-2.00%	-2.00%
299+760	502881.357	6380881.838	947.914	947.989	-2.00%	-2.00%
299+780	502875.285	6380900.895	948.168	948.244	-2.00%	-2.00%
299+800	502869.214	6380919.951	948.411	948.486	-2.00%	-2.00%
299+820	502863.142	6380939.007	948.656	948.726	-2.00%	-2.00%
299+840	502857.070	6380958.063	948.935	949.000	-2.00%	-2.00%
299+860	502850.998	6380977.119	949.218	949.283	-2.00%	-2.00%
299+880	502844.927	6380996.175	949.466	949.531	-2.00%	-2.00%
299+900	502838.855	6381015.231	949.700	949.765	-2.00%	-2.00%
299+920	502832.783	6381034.287	949.884	949.959	-2.00%	-2.00%
299+940	502826.712	6381053.343	950.080	950.151	-2.00%	-2.00%
299+960	502820.640	6381072.399	950.231	950.285	-2.00%	-2.00%
299+980	502814.568	6381091.455	950.279	950.352	-2.00%	-2.00%
300+000	502808.496	6381110.511	950.350	950.425	-2.00%	-2.00%
300+020	502802.425	6381129.567	950.393	950.448	-2.00%	-1.60%
300+040	502796.353	6381148.624	950.355	950.410	-2.00%	-0.30%
300+060	502790.275	6381167.678	950.285	950.330	-2.00%	0.90%
300+080	502784.134	6381186.712	950.186	950.231	-2.00%	2.00%
300+100	502777.856	6381205.700	950.040	950.085	-3.10%	3.10%
300+120	502771.369	6381224.619	949.846	949.891	-3.30%	3.30%
300+140	502764.653	6381243.458	949.644	949.704	-3.30%	3.30%
300+160	502757.710	6381262.214	949.389	949.459	-3.30%	3.30%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
300+180	502750.540	6381280.884	949.080	949.155	-3.30%	3.30%
300+200	502743.144	6381299.466	948.759	948.834	-3.30%	3.30%
300+220	502735.523	6381317.957	948.407	948.476	-3.30%	3.30%
300+240	502727.679	6381336.355	948.009	948.073	-3.30%	3.30%
300+260	502719.612	6381354.656	947.537	947.602	-3.30%	3.30%
300+280	502711.324	6381372.857	947.044	947.109	-3.30%	3.30%
300+300	502702.816	6381390.957	946.560	946.625	-3.30%	3.30%
300+320	502694.090	6381408.953	946.048	946.108	-3.30%	3.30%
300+340	502685.146	6381426.842	945.457	945.516	-3.30%	3.30%
300+360	502675.985	6381444.620	944.822	944.882	-3.30%	3.30%
300+380	502666.610	6381462.287	944.166	944.205	-3.30%	3.30%
300+400	502657.022	6381479.838	943.379	943.454	-3.30%	3.30%
300+420	502647.221	6381497.272	942.709	942.774	-3.30%	3.30%
300+440	502637.219	6381514.592	941.973	942.038	-2.30%	2.30%
300+460	502627.073	6381531.827	941.189	941.258	-2.00%	1.20%
300+480	502616.853	6381549.018	940.435	940.510	-2.00%	0.10%
300+500	502606.619	6381566.201	939.641	939.715	-2.00%	-1.20%
300+520	502596.385	6381583.385	938.910	938.984	-2.00%	-2.00%
300+540	502586.150	6381600.568	938.186	938.260	-2.00%	-2.00%
300+560	502575.916	6381617.751	937.397	937.472	-2.00%	-2.00%
300+580	502565.682	6381634.934	936.657	936.731	-2.00%	-2.00%
300+600	502555.448	6381652.117	935.918	936.003	-2.00%	-2.00%
300+620	502545.213	6381669.300	935.212	935.297	-2.00%	-2.00%
300+640	502534.979	6381686.483	934.510	934.594	-2.00%	-2.00%
300+660	502524.745	6381703.667	933.822	933.907	-2.00%	-2.00%
300+680	502514.511	6381720.850	933.207	933.291	-2.00%	-2.00%
300+700	502504.276	6381738.033	932.593	932.668	-2.00%	-2.00%
300+720	502494.042	6381755.216	931.880	931.955	-2.00%	-2.00%
300+740	502483.808	6381772.399	931.236	931.310	-2.00%	-2.00%
300+760	502473.574	6381789.582	930.630	930.714	-2.00%	-2.00%
300+780	502463.339	6381806.765	929.985	930.069	-2.00%	-2.00%
300+800	502453.105	6381823.949	929.372	929.457	-2.00%	-2.00%
300+820	502442.871	6381841.132	928.810	928.894	-2.00%	-2.00%
300+840	502432.637	6381858.315	928.216	928.301	-2.00%	-2.00%
300+860	502422.402	6381875.498	927.611	927.695	-2.00%	-2.00%
300+880	502412.168	6381892.681	926.984	927.068	-2.00%	-2.00%
300+900	502401.934	6381909.864	926.367	926.451	-2.00%	-2.00%
300+920	502391.700	6381927.047	925.778	925.862	-2.00%	-2.00%
300+940	502381.465	6381944.230	925.248	925.333	-2.00%	-2.00%
300+960	502371.231	6381961.414	924.666	924.751	-2.00%	-2.00%
300+980	502360.997	6381978.597	924.038	924.122	-2.00%	-2.00%
301+000	502350.763	6381995.780	923.380	923.465	-2.00%	-2.00%
301+020	502340.528	6382012.963	922.759	922.843	-2.00%	-2.00%
301+040	502330.294	6382030.146	922.148	922.233	-2.00%	-2.00%
301+060	502320.060	6382047.329	921.510	921.594	-2.00%	-2.00%
301+080	502309.826	6382064.512	920.849	920.933	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
301+100	502299.591	6382081.696	920.182	920.267	-2.00%	-2.00%
301+120	502289.357	6382098.879	919.458	919.532	-2.00%	-2.00%
301+140	502279.123	6382116.062	918.675	918.750	-2.00%	-2.00%
301+160	502268.889	6382133.245	917.823	917.898	-2.00%	-2.00%
301+180	502258.654	6382150.428	916.955	917.030	-2.00%	-2.00%
301+200	502248.420	6382167.611	916.128	916.202	-2.00%	-2.00%
301+220	502238.186	6382184.794	915.214	915.284	-2.00%	-2.00%
301+240	502227.952	6382201.977	914.270	914.339	-2.00%	-2.00%
301+260	502217.717	6382219.161	913.299	913.369	-2.00%	-2.00%
301+280	502207.483	6382236.344	912.310	912.379	-2.00%	-2.00%
301+300	502197.249	6382253.527	911.384	911.454	-2.00%	-2.00%
301+320	502187.015	6382270.710	910.369	910.438	-2.00%	-2.00%
301+340	502176.780	6382287.893	909.335	909.409	-2.00%	-2.00%
301+360	502166.546	6382305.076	908.332	908.406	-2.00%	-2.00%
301+380	502156.312	6382322.259	907.310	907.384	-2.00%	-2.00%
301+400	502146.077	6382339.443	906.264	906.338	-2.00%	-2.00%
301+420	502135.843	6382356.626	905.289	905.364	-2.00%	-2.00%
301+440	502125.609	6382373.809	904.342	904.416	-2.00%	-2.00%
301+460	502115.375	6382390.992	903.387	903.462	-2.00%	-2.00%
301+480	502105.140	6382408.175	902.449	902.524	-2.00%	-2.00%
301+500	502094.906	6382425.358	901.493	901.587	-2.00%	-2.00%
301+520	502084.672	6382442.541	900.648	900.723	-2.00%	-2.00%
301+540	502074.438	6382459.725	899.857	899.932	-2.00%	-2.00%
301+560	502064.203	6382476.908	899.155	899.229	-2.00%	-2.00%
301+580	502053.969	6382494.091	898.477	898.552	-2.00%	-2.00%
301+600	502043.735	6382511.274	897.816	897.891	-2.00%	-2.00%
301+620	502033.501	6382528.457	897.213	897.297	-2.00%	-2.00%
301+640	502023.266	6382545.640	896.711	896.786	-2.00%	-2.00%
301+660	502013.032	6382562.823	896.238	896.313	-2.00%	-2.00%
301+680	502002.798	6382580.006	895.807	895.882	-2.00%	-2.00%
301+700	501992.564	6382597.190	895.404	895.479	-2.00%	-2.00%
301+720	501982.329	6382614.373	895.043	895.118	-2.00%	-2.00%
301+740	501972.095	6382631.556	894.674	894.749	-2.00%	-2.00%
301+760	501961.861	6382648.739	894.286	894.360	-2.00%	-2.00%
301+780	501951.627	6382665.922	893.885	893.959	-2.00%	-2.00%
301+800	501941.392	6382683.105	893.487	893.562	-2.00%	-2.00%
301+820	501931.158	6382700.288	893.094	893.169	-2.00%	-2.00%
301+840	501920.924	6382717.472	892.725	892.810	-2.00%	-2.00%
301+860	501910.690	6382734.655	892.357	892.441	-2.00%	-2.00%
301+880	501900.455	6382751.838	891.983	892.068	-2.00%	-2.00%
301+900	501890.221	6382769.021	891.593	891.688	-2.00%	-2.00%
301+920	501879.987	6382786.204	891.190	891.285	-2.00%	-2.00%
301+940	501869.753	6382803.387	890.788	890.893	-2.00%	-2.00%
301+960	501859.518	6382820.570	890.414	890.518	-1.80%	-2.00%
301+980	501849.284	6382837.753	890.061	890.166	-0.50%	-2.00%
302+000	501839.053	6382854.938	889.717	889.817	0.70%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
302+020	501828.866	6382872.150	889.303	889.397	1.80%	-2.00%
302+040	501818.793	6382889.428	888.899	888.994	2.90%	-2.90%
302+060	501808.901	6382906.810	888.535	888.629	3.30%	-3.30%
302+080	501799.220	6382924.311	888.121	888.216	3.30%	-3.30%
302+100	501789.752	6382941.927	887.721	887.816	3.30%	-3.30%
302+120	501780.498	6382959.658	887.333	887.428	3.30%	-3.30%
302+140	501771.460	6382977.499	886.961	887.056	3.30%	-3.30%
302+160	501762.638	6382995.448	886.572	886.667	3.30%	-3.30%
302+180	501754.035	6383013.503	886.173	886.268	3.30%	-3.30%
302+200	501745.651	6383031.661	885.751	885.846	3.30%	-3.30%
302+220	501737.488	6383049.919	885.401	885.496	3.30%	-3.30%
302+240	501729.547	6383068.275	885.094	885.189	3.30%	-3.30%
302+260	501721.829	6383086.725	884.728	884.823	3.30%	-3.30%
302+280	501714.335	6383105.268	884.382	884.477	3.30%	-3.30%
302+300	501707.067	6383123.901	884.064	884.159	3.30%	-3.30%
302+320	501700.025	6383142.620	883.804	883.898	3.30%	-3.30%
302+340	501693.210	6383161.423	883.537	883.632	3.30%	-3.30%
302+360	501686.624	6383180.307	883.275	883.370	3.30%	-3.30%
302+380	501680.264	6383199.269	883.038	883.133	2.60%	-2.60%
302+400	501674.085	6383218.290	882.754	882.849	1.50%	-2.00%
302+420	501668.012	6383237.346	882.481	882.576	0.40%	-2.00%
302+440	501661.971	6383256.412	882.252	882.347	-0.80%	-2.00%
302+460	501655.930	6383275.478	882.010	882.105	-2.00%	-2.00%
302+480	501649.890	6383294.544	881.765	881.860	-2.00%	-2.00%
302+500	501643.849	6383313.610	881.533	881.628	-2.00%	-2.00%
302+520	501637.809	6383332.676	881.302	881.386	-2.00%	-2.00%
302+540	501631.768	6383351.742	881.077	881.162	-2.00%	-2.00%
302+560	501625.728	6383370.808	880.816	880.901	-2.00%	-2.00%
302+580	501619.687	6383389.874	880.579	880.664	-2.00%	-2.00%
302+600	501613.647	6383408.940	880.371	880.446	-2.00%	-2.00%
302+620	501607.606	6383428.006	880.123	880.198	-2.00%	-2.00%
302+640	501601.566	6383447.072	879.869	879.944	-2.00%	-2.00%
302+660	501595.525	6383466.138	879.650	879.724	-2.00%	-2.00%
302+680	501589.485	6383485.204	879.462	879.537	-2.00%	-2.00%
302+700	501583.444	6383504.270	879.302	879.377	-2.00%	-2.00%
302+720	501577.404	6383523.336	879.127	879.201	-2.00%	-2.00%
302+740	501571.363	6383542.402	878.946	879.021	-2.00%	-2.00%
302+760	501565.323	6383561.468	878.823	878.898	-2.00%	-2.00%
302+780	501559.282	6383580.534	878.716	878.780	-2.00%	-2.00%
302+800	501553.242	6383599.600	878.572	878.637	-2.00%	-2.00%
302+820	501547.201	6383618.666	878.496	878.561	-2.00%	-2.00%
302+840	501541.161	6383637.732	878.445	878.510	-2.00%	-2.00%
302+860	501535.120	6383656.798	878.400	878.465	-2.00%	-2.00%
302+880	501529.080	6383675.864	878.320	878.385	-2.00%	-2.00%
302+900	501523.039	6383694.930	878.239	878.304	-2.00%	-2.00%
302+920	501516.999	6383713.996	878.189	878.263	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
302+940	501510.958	6383733.062	878.204	878.278	-2.00%	-2.00%
302+960	501504.918	6383752.128	878.136	878.211	-2.00%	-2.00%
302+980	501498.877	6383771.194	878.078	878.153	-2.00%	-2.00%
303+000	501492.837	6383790.260	877.969	878.054	-2.00%	-2.00%
303+020	501486.796	6383809.326	877.907	877.982	-2.00%	-2.00%
303+040	501480.756	6383828.392	877.902	877.977	-2.00%	-2.00%
303+060	501474.715	6383847.458	877.855	877.930	-2.00%	-2.00%
303+080	501468.675	6383866.524	877.766	877.841	-2.00%	-2.00%
303+100	501462.634	6383885.590	877.724	877.799	-2.00%	-2.00%
303+120	501456.594	6383904.656	877.650	877.725	-2.00%	-2.00%
303+140	501450.553	6383923.722	877.593	877.668	-2.00%	-2.00%
303+160	501444.513	6383942.788	877.492	877.567	-2.00%	-2.00%
303+180	501438.473	6383961.854	877.408	877.483	-2.00%	-2.00%
303+200	501432.432	6383980.920	877.301	877.376	-2.00%	-2.00%
303+220	501426.392	6383999.986	877.141	877.216	-2.00%	-2.00%
303+240	501420.351	6384019.052	876.982	877.057	-2.00%	-2.00%
303+260	501414.311	6384038.118	876.867	876.942	-2.00%	-2.00%
303+280	501408.270	6384057.184	876.738	876.813	-2.00%	-2.00%
303+300	501402.230	6384076.250	876.554	876.619	-2.00%	-2.00%
303+320	501396.189	6384095.316	876.278	876.353	-2.00%	-2.00%
303+340	501390.149	6384114.382	876.043	876.118	-2.00%	-2.00%
303+360	501384.108	6384133.448	875.849	875.934	-2.00%	-2.00%
303+380	501378.068	6384152.514	875.658	875.743	-2.00%	-2.00%
303+400	501372.027	6384171.580	875.511	875.596	-2.00%	-2.00%
303+420	501365.987	6384190.646	875.330	875.410	-2.00%	-2.00%
303+440	501359.946	6384209.712	875.145	875.225	-2.00%	-2.00%
303+460	501353.906	6384228.778	874.966	875.046	-2.00%	-2.00%
303+480	501347.865	6384247.844	874.771	874.851	-2.00%	-2.00%
303+500	501341.825	6384266.910	874.587	874.667	-2.00%	-2.00%
303+520	501335.784	6384285.976	874.414	874.493	-2.00%	-2.00%
303+540	501329.744	6384305.042	874.217	874.302	-2.00%	-2.00%
303+560	501323.703	6384324.108	874.016	874.101	-2.00%	-2.00%
303+580	501317.663	6384343.174	873.822	873.907	-2.00%	-2.00%
303+600	501311.622	6384362.240	873.615	873.700	-2.00%	-2.00%
303+620	501305.582	6384381.306	873.383	873.468	-2.00%	-2.00%
303+640	501299.541	6384400.372	873.235	873.320	-2.00%	-2.00%
303+660	501293.501	6384419.438	873.123	873.208	-2.00%	-2.00%
303+680	501287.460	6384438.504	873.027	873.107	-2.00%	-2.00%
303+700	501281.420	6384457.570	872.913	872.993	-2.00%	-2.00%
303+720	501275.379	6384476.636	872.856	872.936	-2.00%	-2.00%
303+740	501269.339	6384495.702	872.839	872.919	-2.00%	-2.00%
303+760	501263.298	6384514.768	872.844	872.924	-2.00%	-2.00%
303+780	501257.258	6384533.834	872.902	872.977	-2.00%	-2.00%
303+800	501251.217	6384552.900	872.945	873.020	-2.00%	-2.00%
303+820	501245.177	6384571.966	872.959	873.034	-2.00%	-2.00%
303+840	501239.136	6384591.032	873.059	873.139	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
303+860	501233.096	6384610.098	873.161	873.241	-2.00%	-2.00%
303+880	501227.055	6384629.164	873.230	873.310	-2.00%	-2.00%
303+900	501221.015	6384648.230	873.296	873.381	-2.00%	-2.00%
303+920	501214.974	6384667.296	873.393	873.478	-2.00%	-2.00%
303+940	501208.934	6384686.362	873.520	873.605	-2.00%	-2.00%
303+960	501202.893	6384705.428	873.628	873.713	-2.00%	-2.00%
303+980	501196.853	6384724.494	873.718	873.804	-2.00%	-2.00%
304+000	501190.812	6384743.560	873.821	873.906	-2.00%	-2.00%
304+020	501184.772	6384762.626	873.917	874.002	-2.00%	-2.00%
304+040	501178.731	6384781.692	874.017	874.102	-2.00%	-2.00%
304+060	501172.691	6384800.758	874.076	874.161	-2.00%	-2.00%
304+080	501166.650	6384819.824	874.135	874.220	-2.00%	-2.00%
304+100	501160.610	6384838.890	874.207	874.292	-2.00%	-2.00%
304+120	501154.569	6384857.956	874.283	874.368	-2.00%	-2.00%
304+140	501148.529	6384877.022	874.362	874.447	-2.00%	-2.00%
304+160	501142.489	6384896.088	874.432	874.517	-2.00%	-2.00%
304+180	501136.448	6384915.154	874.514	874.599	-2.00%	-2.00%
304+200	501130.408	6384934.220	874.612	874.697	-2.00%	-2.00%
304+220	501124.367	6384953.286	874.725	874.810	-2.00%	-2.00%
304+240	501118.327	6384972.352	874.814	874.899	-2.00%	-2.00%
304+260	501112.286	6384991.418	874.908	874.993	-2.00%	-2.00%
304+280	501106.246	6385010.484	874.993	875.078	-2.00%	-2.00%
304+300	501100.205	6385029.550	875.077	875.157	-2.00%	-2.00%
304+320	501094.165	6385048.616	875.132	875.212	-2.00%	-2.00%
304+340	501088.124	6385067.682	875.234	875.314	-2.00%	-2.00%
304+360	501082.084	6385086.748	875.335	875.415	-2.00%	-2.00%
304+380	501076.043	6385105.814	875.416	875.496	-2.00%	-2.00%
304+400	501070.003	6385124.880	875.451	875.531	-2.00%	-2.00%
304+420	501063.962	6385143.946	875.518	875.598	-2.00%	-2.00%
304+440	501057.922	6385163.012	875.589	875.669	-2.00%	-2.00%
304+460	501051.881	6385182.078	875.684	875.764	-2.00%	-2.00%
304+480	501045.841	6385201.144	875.802	875.882	-2.00%	-2.00%
304+500	501039.800	6385220.210	875.893	875.973	-2.00%	-2.00%
304+520	501033.760	6385239.276	875.910	875.995	-2.00%	-2.00%
304+540	501027.719	6385258.342	875.941	876.026	-2.00%	-2.00%
304+560	501021.679	6385277.408	876.012	876.097	-2.00%	-2.00%
304+580	501015.638	6385296.474	876.121	876.206	-2.00%	-2.00%
304+600	501009.598	6385315.540	876.200	876.285	-2.00%	-2.00%
304+620	501003.557	6385334.606	876.357	876.442	-2.00%	-2.00%
304+640	500997.517	6385353.672	876.536	876.621	-2.00%	-2.00%
304+660	500991.476	6385372.738	876.685	876.770	-2.00%	-2.00%
304+680	500985.436	6385391.804	876.822	876.902	-2.00%	-2.00%
304+700	500979.395	6385410.870	876.955	877.035	-2.00%	-2.00%
304+720	500973.355	6385429.936	877.162	877.232	-2.00%	-2.00%
304+740	500967.314	6385449.002	877.380	877.426	-2.00%	-2.00%
304+760	500961.274	6385468.068	877.523	877.604	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
304+780	500955.233	6385487.134	877.685	877.764	-2.00%	-2.00%
304+800	500949.193	6385506.200	877.848	877.941	-2.00%	-2.00%
304+820	500943.152	6385525.266	878.024	878.100	-2.00%	-2.00%
304+840	500937.112	6385544.332	878.169	878.263	-2.00%	-2.00%
304+860	500931.071	6385563.398	878.325	878.396	-2.00%	-2.00%
304+880	500925.031	6385582.464	878.465	878.549	-2.00%	-2.00%
304+900	500918.990	6385601.530	878.632	878.702	-2.00%	-2.00%
304+920	500912.950	6385620.596	878.753	878.835	-2.00%	-2.00%
304+940	500906.909	6385639.662	878.884	878.984	-2.00%	-2.00%
304+960	500900.869	6385658.728	879.092	879.155	-2.00%	-2.00%
304+980	500894.828	6385677.794	879.268	879.352	-2.00%	-2.00%
305+000	500888.788	6385696.860	879.435	879.513	-2.00%	-2.00%
305+020	500882.747	6385715.926	879.601	879.682	-2.00%	-2.00%
305+040	500876.707	6385734.992	879.746	879.833	-2.00%	-2.00%
305+060	500870.666	6385754.058	879.913	880.005	-2.00%	-2.00%
305+080	500864.626	6385773.124	880.055	880.151	-2.00%	-2.00%
305+100	500858.585	6385792.190	880.233	880.306	-2.00%	-2.00%
305+120	500852.545	6385811.256	880.409	880.474	-2.00%	-2.00%
305+140	500846.504	6385830.322	880.573	880.623	-2.00%	-2.00%
305+160	500840.464	6385849.388	880.667	880.762	-2.00%	-2.00%
305+180	500834.424	6385868.454	880.812	880.902	-2.00%	-2.00%
305+200	500828.383	6385887.520	881.014	881.084	-2.00%	-2.00%
305+220	500822.343	6385906.586	881.191	881.271	-2.00%	-2.00%
305+240	500816.302	6385925.652	881.356	881.436	-2.00%	-2.00%
305+260	500810.262	6385944.718	881.493	881.573	-2.00%	-2.00%
305+280	500804.221	6385963.784	881.619	881.709	-2.00%	-2.00%
305+300	500798.181	6385982.850	881.793	881.873	-2.00%	-2.00%
305+320	500792.140	6386001.916	881.974	882.044	-2.00%	-2.00%
305+340	500786.100	6386020.982	882.130	882.210	-2.00%	-2.00%
305+360	500780.059	6386040.048	882.302	882.382	-2.00%	-2.00%
305+380	500774.019	6386059.114	882.493	882.573	-2.00%	-2.00%
305+400	500767.978	6386078.180	882.686	882.766	-2.00%	-2.00%
305+420	500761.938	6386097.246	882.864	882.934	-2.00%	-2.00%
305+440	500755.897	6386116.312	882.996	883.076	-2.00%	-2.00%
305+460	500749.857	6386135.378	883.136	883.226	-2.00%	-2.00%
305+480	500743.816	6386154.444	883.316	883.396	-2.00%	-2.00%
305+500	500737.776	6386173.510	883.503	883.573	-2.00%	-2.00%
305+520	500731.735	6386192.576	883.667	883.747	-2.00%	-2.00%
305+540	500725.695	6386211.642	883.830	883.910	-2.00%	-2.00%
305+560	500719.654	6386230.708	883.980	884.060	-2.00%	-2.00%
305+580	500713.614	6386249.774	884.153	884.233	-2.00%	-2.00%
305+600	500707.573	6386268.840	884.372	884.412	-2.00%	-2.00%
305+620	500701.533	6386287.906	884.519	884.589	-2.00%	-2.00%
305+640	500695.492	6386306.972	884.665	884.745	-2.00%	-2.00%
305+660	500689.452	6386326.038	884.822	884.902	-2.00%	-2.00%
305+680	500683.411	6386345.104	884.977	885.057	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
305+700	500677.371	6386364.170	885.139	885.219	-2.00%	-2.00%
305+720	500671.330	6386383.236	885.296	885.376	-2.00%	-2.00%
305+740	500665.290	6386402.302	885.456	885.536	-2.00%	-2.00%
305+760	500659.249	6386421.368	885.652	885.692	-2.00%	-2.00%
305+780	500653.209	6386440.434	885.773	885.853	-2.00%	-2.00%
305+800	500647.168	6386459.500	885.939	886.019	-2.00%	-2.00%
305+820	500641.128	6386478.566	886.121	886.171	-2.00%	-2.00%
305+840	500635.087	6386497.632	886.248	886.318	-2.00%	-2.00%
305+860	500629.047	6386516.698	886.356	886.446	-2.00%	-2.00%
305+880	500623.006	6386535.764	886.489	886.579	-2.00%	-2.00%
305+900	500616.966	6386554.830	886.701	886.771	-2.00%	-2.00%
305+920	500610.925	6386573.896	886.896	886.966	-2.00%	-2.00%
305+940	500604.885	6386592.962	887.071	887.141	-2.00%	-2.00%
305+960	500598.844	6386612.028	887.268	887.328	-2.00%	-2.00%
305+980	500592.804	6386631.094	887.411	887.471	-2.00%	-2.00%
306+000	500586.763	6386650.160	887.522	887.592	-2.00%	-2.00%
306+020	500580.723	6386669.226	887.637	887.727	-2.00%	-2.00%
306+040	500574.682	6386688.292	887.794	887.864	-2.00%	-2.00%
306+060	500568.642	6386707.358	887.960	888.030	-2.00%	-2.00%
306+080	500562.601	6386726.424	888.131	888.211	-2.00%	-2.00%
306+100	500556.561	6386745.490	888.336	888.406	-2.00%	-2.00%
306+120	500550.520	6386764.556	888.523	888.593	-2.00%	-2.00%
306+140	500544.480	6386783.622	888.702	888.772	-2.00%	-2.00%
306+160	500538.440	6386802.688	888.854	888.944	-2.00%	-2.00%
306+180	500532.399	6386821.754	889.047	889.117	-2.00%	-2.00%
306+200	500526.359	6386840.820	889.214	889.274	-2.00%	-2.00%
306+220	500520.318	6386859.886	889.337	889.387	-2.00%	-2.00%
306+240	500514.278	6386878.952	889.421	889.491	-2.00%	-2.00%
306+260	500508.237	6386898.018	889.526	889.596	-2.00%	-2.00%
306+280	500502.197	6386917.084	889.636	889.706	-2.00%	-2.00%
306+300	500496.156	6386936.150	889.719	889.789	-2.00%	-2.00%
306+320	500490.116	6386955.216	889.781	889.851	-2.00%	-2.00%
306+340	500484.075	6386974.282	889.838	889.908	-2.00%	-2.00%
306+360	500478.035	6386993.348	889.877	889.947	-2.00%	-2.00%
306+380	500471.994	6387012.414	889.893	889.963	-2.00%	-2.00%
306+400	500465.954	6387031.480	889.873	889.933	-2.00%	-2.00%
306+420	500459.913	6387050.546	889.819	889.879	-2.00%	-2.00%
306+440	500453.873	6387069.612	889.749	889.829	-2.00%	-2.00%
306+460	500447.832	6387088.678	889.700	889.780	-2.00%	-2.00%
306+480	500441.792	6387107.744	889.657	889.737	-2.00%	-2.00%
306+500	500435.751	6387126.810	889.608	889.668	-2.00%	-2.00%
306+520	500429.711	6387145.876	889.484	889.564	-2.00%	-2.00%
306+540	500423.670	6387164.942	889.357	889.437	-2.00%	-2.00%
306+560	500417.630	6387184.008	889.261	889.341	-2.00%	-2.00%
306+580	500411.589	6387203.074	889.203	889.283	-2.00%	-2.00%
306+600	500405.549	6387222.140	889.144	889.224	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
306+620	500399.508	6387241.206	889.061	889.141	-2.00%	-2.00%
306+640	500393.468	6387260.272	888.961	889.041	-2.00%	-2.00%
306+660	500387.427	6387279.338	888.869	888.949	-2.00%	-2.00%
306+680	500381.387	6387298.404	888.763	888.843	-2.00%	-2.00%
306+700	500375.346	6387317.470	888.668	888.748	-2.00%	-2.00%
306+720	500369.306	6387336.536	888.564	888.644	-2.00%	-2.00%
306+740	500363.265	6387355.602	888.435	888.535	-2.00%	-2.00%
306+760	500357.225	6387374.668	888.366	888.446	-2.00%	-2.00%
306+780	500351.184	6387393.734	888.288	888.348	-2.00%	-2.00%
306+800	500345.144	6387412.800	888.187	888.257	-2.00%	-2.00%
306+820	500339.103	6387431.866	888.095	888.185	-2.00%	-2.00%
306+840	500333.063	6387450.932	888.040	888.120	-2.00%	-2.00%
306+860	500327.022	6387469.998	887.968	888.028	-2.00%	-2.00%
306+880	500320.982	6387489.064	887.853	887.933	-2.00%	-2.00%
306+900	500314.941	6387508.130	887.759	887.839	-2.00%	-2.00%
306+920	500308.901	6387527.196	887.682	887.767	-2.00%	-2.00%
306+940	500302.860	6387546.262	887.638	887.708	-2.00%	-2.00%
306+960	500296.820	6387565.328	887.567	887.627	-2.00%	-2.00%
306+980	500290.779	6387584.394	887.459	887.519	-2.00%	-2.00%
307+000	500284.739	6387603.460	887.321	887.411	-2.00%	-2.00%
307+020	500278.698	6387622.526	887.233	887.313	-2.00%	-2.00%
307+040	500272.658	6387641.592	887.131	887.211	-2.00%	-2.00%
307+060	500266.617	6387660.658	887.046	887.126	-2.00%	-2.00%
307+080	500260.577	6387679.724	886.980	887.060	-2.00%	-2.00%
307+100	500254.536	6387698.790	886.905	886.985	-2.00%	-2.00%
307+120	500248.496	6387717.856	886.800	886.880	-2.00%	-2.00%
307+140	500242.456	6387736.922	886.716	886.776	-2.00%	-2.00%
307+160	500236.415	6387755.988	886.568	886.653	-2.00%	-2.00%
307+180	500230.375	6387775.054	886.432	886.517	-2.00%	-2.00%
307+200	500224.334	6387794.120	886.301	886.386	-2.00%	-2.00%
307+220	500218.294	6387813.186	886.206	886.291	-2.00%	-2.00%
307+240	500212.253	6387832.252	886.113	886.198	-2.00%	-2.00%
307+260	500206.213	6387851.318	886.052	886.137	-2.00%	-2.00%
307+280	500200.172	6387870.384	886.025	886.100	-2.00%	-2.00%
307+300	500194.132	6387889.450	885.991	886.056	-2.00%	-2.00%
307+320	500188.091	6387908.516	885.888	885.973	-2.00%	-2.00%
307+340	500182.051	6387927.582	885.773	885.858	-2.00%	-2.00%
307+360	500176.010	6387946.648	885.673	885.758	-2.00%	-2.00%
307+380	500169.970	6387965.714	885.613	885.688	-2.00%	-2.00%
307+400	500163.929	6387984.780	885.566	885.621	-2.00%	-2.00%
307+420	500157.889	6388003.846	885.479	885.564	-2.00%	-2.00%
307+440	500151.848	6388022.912	885.438	885.518	-2.00%	-2.00%
307+460	500145.808	6388041.978	885.443	885.523	-2.00%	-2.00%
307+480	500139.767	6388061.044	885.485	885.555	-2.00%	-2.00%
307+500	500133.735	6388080.113	885.514	885.594	-2.00%	-2.00%
307+520	500127.706	6388099.183	885.547	885.627	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
307+540	500121.677	6388118.252	885.636	885.716	-2.00%	-2.00%
307+560	500115.648	6388137.322	885.743	885.823	-2.00%	-2.00%
307+580	500109.619	6388156.392	885.923	885.983	-2.00%	-2.00%
307+600	500103.590	6388175.461	886.108	886.158	-2.00%	-2.00%
307+620	500097.561	6388194.531	886.244	886.324	-2.00%	-2.00%
307+640	500091.532	6388213.601	886.387	886.477	-2.00%	-2.00%
307+660	500085.503	6388232.670	886.597	886.657	-2.00%	-2.00%
307+680	500079.474	6388251.740	886.771	886.841	-2.00%	-2.00%
307+700	500073.445	6388270.810	886.914	886.984	-2.00%	-2.00%
307+720	500067.416	6388289.879	887.067	887.137	-2.00%	-2.00%
307+740	500061.387	6388308.949	887.219	887.289	-2.00%	-2.00%
307+760	500055.358	6388328.019	887.365	887.445	-2.00%	-2.00%
307+780	500049.329	6388347.088	887.507	887.587	-2.00%	-2.00%
307+800	500043.300	6388366.158	887.677	887.752	-2.00%	-2.00%
307+820	500037.272	6388385.227	887.857	887.922	-2.00%	-2.00%
307+840	500031.243	6388404.297	888.003	888.078	-2.00%	-2.00%
307+860	500025.214	6388423.367	888.179	888.244	-2.00%	-2.00%
307+880	500019.185	6388442.436	888.343	888.398	-2.00%	-2.00%
307+900	500013.156	6388461.506	888.468	888.543	-2.00%	-2.00%
307+920	500007.127	6388480.576	888.647	888.712	-2.00%	-2.00%
307+940	500001.098	6388499.645	888.833	888.898	-2.00%	-2.00%
307+960	499995.069	6388518.715	889.019	889.084	-2.00%	-2.00%
307+980	499989.025	6388537.780	889.180	889.245	-2.00%	-2.00%
308+000	499982.967	6388556.841	889.299	889.364	-2.00%	-2.00%
308+020	499976.910	6388575.901	889.427	889.492	-2.00%	-2.00%
308+040	499970.852	6388594.962	889.559	889.624	-2.00%	-2.00%
308+060	499964.794	6388614.022	889.715	889.780	-2.00%	-2.00%
308+080	499958.737	6388633.083	889.872	889.937	-2.00%	-2.00%
308+100	499952.679	6388652.143	890.013	890.098	-2.00%	-2.00%
308+120	499946.621	6388671.204	890.176	890.241	-2.00%	-2.00%
308+140	499940.564	6388690.264	890.310	890.385	-2.00%	-2.00%
308+160	499934.506	6388709.325	890.476	890.531	-2.00%	-2.00%
308+180	499928.448	6388728.385	890.620	890.675	-2.00%	-2.00%
308+200	499922.391	6388747.446	890.734	890.799	-2.00%	-2.00%
308+220	499916.333	6388766.507	890.824	890.889	-2.00%	-2.00%
308+240	499910.275	6388785.567	890.891	890.976	-2.00%	-2.00%
308+260	499904.218	6388804.628	890.980	891.045	-2.00%	-2.00%
308+280	499898.160	6388823.688	891.020	891.065	-2.00%	-2.00%
308+300	499892.102	6388842.749	890.965	891.040	-2.00%	-2.00%
308+320	499886.044	6388861.809	890.926	890.991	-2.00%	-2.00%
308+340	499879.987	6388880.870	890.864	890.929	-2.00%	-2.00%
308+360	499873.929	6388899.930	890.751	890.816	-2.00%	-2.00%
308+380	499867.871	6388918.991	890.607	890.672	-2.00%	-2.00%
308+400	499861.814	6388938.052	890.415	890.500	-2.00%	-2.00%
308+420	499855.756	6388957.112	890.240	890.315	-2.00%	-2.00%
308+440	499849.698	6388976.173	890.039	890.104	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
308+460	499843.641	6388995.233	889.789	889.854	-2.00%	-2.00%
308+480	499837.583	6389014.294	889.534	889.614	-2.00%	-2.00%
308+500	499831.525	6389033.354	889.243	889.323	-2.00%	-2.00%
308+520	499825.468	6389052.415	888.942	889.022	-2.00%	-2.00%
308+540	499819.410	6389071.475	888.678	888.758	-2.00%	-2.00%
308+560	499813.352	6389090.536	888.438	888.518	-2.00%	-2.00%
308+580	499807.295	6389109.596	888.206	888.286	-2.00%	-2.00%
308+600	499801.237	6389128.657	887.961	888.041	-2.00%	-2.00%
308+620	499795.179	6389147.718	887.688	887.768	-2.00%	-2.00%
308+640	499789.122	6389166.778	887.427	887.507	-2.00%	-2.00%
308+660	499783.067	6389185.840	887.175	887.270	-2.00%	-2.00%
308+680	499777.034	6389204.908	886.957	887.042	-2.00%	-2.00%
308+700	499771.002	6389223.977	886.684	886.779	-2.00%	-2.00%
308+720	499764.969	6389243.045	886.397	886.492	-2.00%	-2.00%
308+740	499758.937	6389262.114	886.112	886.207	-2.00%	-2.00%
308+760	499752.904	6389281.182	885.864	885.959	-2.00%	-2.00%
308+780	499746.872	6389300.251	885.605	885.700	-2.00%	-2.00%
308+800	499740.839	6389319.319	885.301	885.396	-2.00%	-2.00%
308+820	499734.807	6389338.388	885.012	885.102	-2.00%	-2.00%
308+840	499728.774	6389357.456	884.735	884.820	-2.00%	-2.00%
308+860	499722.742	6389376.525	884.403	884.488	-2.00%	-2.00%
308+880	499716.709	6389395.593	884.004	884.089	-2.00%	-2.00%
308+900	499710.677	6389414.662	883.553	883.638	-2.00%	-2.00%
308+920	499704.644	6389433.730	883.099	883.184	-2.00%	-2.00%
308+940	499698.612	6389452.799	882.636	882.721	-2.00%	-2.00%
308+960	499692.579	6389471.867	882.123	882.208	-2.00%	-2.00%
308+980	499686.547	6389490.936	881.626	881.711	-2.00%	-2.00%
309+000	499680.514	6389510.005	881.114	881.199	-2.00%	-2.00%
309+020	499674.482	6389529.073	880.592	880.677	-2.00%	-2.00%
309+040	499668.449	6389548.142	880.036	880.121	-2.00%	-2.00%
309+060	499662.417	6389567.210	879.495	879.580	-2.00%	-2.00%
309+080	499656.384	6389586.279	878.935	879.020	-2.00%	-2.00%
309+100	499650.352	6389605.347	878.367	878.452	-2.00%	-2.00%
309+120	499644.319	6389624.416	877.768	877.853	-2.00%	-2.00%
309+140	499638.287	6389643.484	877.168	877.263	-2.00%	-2.00%
309+160	499632.254	6389662.553	876.627	876.682	-2.00%	-2.00%
309+180	499626.222	6389681.621	876.008	876.093	-2.00%	-2.00%
309+200	499620.189	6389700.690	875.418	875.503	-2.00%	-2.00%
309+220	499614.157	6389719.758	874.864	874.909	-2.00%	-2.00%
309+240	499608.124	6389738.827	874.215	874.300	-2.00%	-2.00%
309+260	499602.092	6389757.895	873.557	873.652	-2.00%	-2.00%
309+280	499596.059	6389776.964	872.982	873.057	-2.00%	-2.00%
309+300	499590.027	6389796.033	872.418	872.483	-2.00%	-2.00%
309+320	499583.994	6389815.101	871.856	871.926	-2.00%	-2.00%
309+340	499577.962	6389834.170	871.256	871.336	-2.00%	-2.00%
309+360	499571.929	6389853.238	870.671	870.751	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
309+380	499565.897	6389872.307	870.089	870.169	-2.00%	-2.00%
309+400	499559.864	6389891.375	869.480	869.560	-2.00%	-2.00%
309+420	499553.832	6389910.444	868.845	868.935	-2.00%	-2.00%
309+440	499547.799	6389929.512	868.265	868.345	-2.00%	-2.00%
309+460	499541.767	6389948.581	867.697	867.757	-2.00%	-2.00%
309+480	499535.734	6389967.649	867.083	867.163	-2.00%	-2.00%
309+500	499529.702	6389986.718	866.495	866.575	-2.00%	-2.00%
309+520	499523.669	6390005.786	865.896	865.986	-2.00%	-2.00%
309+540	499517.637	6390024.855	865.350	865.435	-2.00%	-2.00%
309+560	499511.604	6390043.923	864.834	864.904	-2.00%	-2.00%
309+580	499505.572	6390062.992	864.251	864.336	-2.00%	-2.00%
309+600	499499.539	6390082.061	863.655	863.750	-2.00%	-2.00%
309+620	499493.506	6390101.129	863.067	863.172	-2.00%	-2.00%
309+640	499487.474	6390120.198	862.514	862.599	-2.00%	-2.00%
309+660	499481.441	6390139.266	861.915	862.000	-2.00%	-2.00%
309+680	499475.409	6390158.335	861.278	861.398	-2.00%	-2.00%
309+700	499469.376	6390177.403	860.715	860.805	-2.00%	-2.00%
309+720	499463.344	6390196.472	860.202	860.232	-2.00%	-2.00%
309+740	499457.311	6390215.540	859.605	859.665	-2.00%	-2.00%
309+760	499451.279	6390234.609	858.996	859.066	-2.00%	-2.00%
309+780	499445.246	6390253.677	858.345	858.435	-2.00%	-2.00%
309+800	499439.214	6390272.746	857.751	857.831	-2.00%	-2.00%
309+820	499433.181	6390291.814	857.171	857.231	-2.00%	-2.00%
309+840	499427.149	6390310.883	856.550	856.630	-2.00%	-2.00%
309+860	499421.116	6390329.951	855.950	856.030	-2.00%	-2.00%
309+880	499415.084	6390349.020	855.396	855.456	-2.00%	-2.00%
309+900	499409.051	6390368.088	854.785	854.855	-2.00%	-2.00%
309+920	499403.019	6390387.157	854.166	854.236	-2.00%	-2.00%
309+940	499396.986	6390406.226	853.613	853.683	-2.00%	-2.00%
309+960	499390.954	6390425.294	853.122	853.202	-2.00%	-2.00%
309+980	499384.921	6390444.363	852.681	852.760	-2.00%	-2.00%
310+000	499378.889	6390463.431	852.273	852.353	-2.00%	-2.00%
310+020	499372.856	6390482.500	851.886	851.966	-2.00%	-2.00%
310+040	499366.824	6390501.568	851.531	851.621	-2.00%	-2.00%
310+060	499360.791	6390520.637	851.239	851.329	-2.00%	-2.00%
310+080	499354.759	6390539.705	850.998	851.078	-2.00%	-2.00%
310+100	499348.726	6390558.774	850.805	850.885	-2.00%	-2.00%
310+120	499342.694	6390577.842	850.627	850.697	-2.00%	-2.00%
310+140	499336.661	6390596.911	850.423	850.493	-2.00%	-2.00%
310+160	499330.629	6390615.979	850.249	850.319	-2.00%	-2.00%
310+180	499324.596	6390635.048	850.070	850.120	-2.00%	-2.00%
310+200	499318.564	6390654.116	849.837	849.897	-2.00%	-2.00%
310+220	499312.531	6390673.185	849.602	849.652	-2.00%	-2.00%
310+240	499306.499	6390692.254	849.390	849.450	-2.00%	-2.00%
310+260	499300.466	6390711.322	849.256	849.316	-2.00%	-2.00%
310+280	499294.434	6390730.391	849.174	849.234	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
310+300	499288.401	6390749.459	849.137	849.202	-2.00%	-2.00%
310+320	499282.365	6390768.526	849.062	849.112	-2.00%	-2.00%
310+340	499276.308	6390787.587	848.900	848.950	-2.00%	-2.00%
310+360	499270.251	6390806.648	848.655	848.725	-2.00%	-2.00%
310+380	499264.194	6390825.709	848.392	848.461	-2.00%	-2.00%
310+400	499258.137	6390844.770	848.111	848.181	-2.00%	-2.00%
310+420	499252.080	6390863.830	847.768	847.838	-2.00%	-2.00%
310+440	499246.023	6390882.891	847.407	847.477	-2.00%	-2.00%
310+460	499239.967	6390901.952	847.043	847.113	-2.00%	-2.00%
310+480	499233.910	6390921.013	846.664	846.734	-2.00%	-2.00%
310+500	499227.853	6390940.074	846.240	846.310	-2.00%	-2.00%
310+520	499221.796	6390959.134	845.793	845.873	-2.00%	-2.00%
310+540	499215.739	6390978.195	845.369	845.439	-2.00%	-2.00%
310+560	499209.682	6390997.256	844.903	844.973	-2.00%	-2.00%
310+580	499203.625	6391016.317	844.399	844.479	-2.00%	-2.00%
310+600	499197.568	6391035.377	843.922	843.992	-2.00%	-2.00%
310+620	499191.511	6391054.438	843.439	843.504	-2.00%	-2.00%
310+640	499185.454	6391073.499	842.956	843.031	-2.00%	-2.00%
310+660	499179.397	6391092.560	842.512	842.587	-2.00%	-2.00%
310+680	499173.340	6391111.621	842.071	842.146	-2.00%	-2.00%
310+700	499167.283	6391130.681	841.633	841.708	-2.00%	-2.00%
310+720	499161.226	6391149.742	841.179	841.244	-2.00%	-2.00%
310+740	499155.169	6391168.803	840.674	840.759	-2.00%	-2.00%
310+760	499149.112	6391187.864	840.161	840.241	-2.00%	-2.00%
310+780	499143.055	6391206.924	839.619	839.739	-2.00%	-2.00%
310+800	499136.999	6391225.985	839.156	839.246	-2.00%	-2.00%
310+820	499130.942	6391245.046	838.688	838.738	-2.00%	-2.00%
310+840	499124.885	6391264.107	838.148	838.228	-2.00%	-2.00%
310+860	499118.828	6391283.168	837.691	837.771	-2.00%	-2.00%
310+880	499112.771	6391302.228	837.268	837.328	-2.00%	-2.00%
310+900	499106.714	6391321.289	836.816	836.895	-2.00%	-2.00%
310+920	499100.657	6391340.350	836.378	836.458	-2.00%	-2.00%
310+940	499094.600	6391359.411	835.930	836.010	-2.00%	-2.00%
310+960	499088.543	6391378.472	835.474	835.554	-2.00%	-2.00%
310+980	499082.486	6391397.532	835.011	835.091	-2.00%	-2.00%
311+000	499076.429	6391416.593	834.520	834.620	-2.00%	-2.00%
311+020	499070.372	6391435.654	834.038	834.138	-2.00%	-2.00%
311+040	499064.315	6391454.715	833.559	833.659	-2.00%	-2.00%
311+060	499058.258	6391473.775	833.094	833.193	-2.00%	-2.00%
311+080	499052.201	6391492.836	832.609	832.709	-2.00%	-2.00%
311+100	499046.144	6391511.897	832.162	832.252	-2.00%	-2.00%
311+120	499040.087	6391530.958	831.756	831.846	-2.00%	-2.00%
311+140	499034.031	6391550.019	831.343	831.463	-2.00%	-2.00%
311+160	499027.974	6391569.079	831.056	831.146	-2.00%	-2.00%
311+180	499021.917	6391588.140	830.805	830.885	-2.00%	-2.00%
311+200	499015.860	6391607.201	830.583	830.673	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
311+220	499009.803	6391626.262	830.407	830.517	-2.00%	-2.00%
311+240	499003.746	6391645.323	830.331	830.436	-2.00%	-2.00%
311+260	498997.689	6391664.383	830.268	830.378	-2.00%	-2.00%
311+280	498991.632	6391683.444	830.211	830.321	-2.00%	-2.00%
311+300	498985.575	6391702.505	830.181	830.261	-0.70%	-2.00%
311+320	498979.520	6391721.566	830.152	830.217	0.60%	-2.00%
311+340	498973.514	6391740.643	830.063	830.163	1.80%	-2.00%
311+360	498967.662	6391759.768	829.959	830.109	3.10%	-3.10%
311+380	498962.069	6391778.969	829.967	830.067	3.80%	-3.80%
311+400	498956.793	6391798.261	829.968	830.028	3.80%	-3.80%
311+420	498951.840	6391817.638	829.918	829.998	3.80%	-3.80%
311+440	498947.210	6391837.094	829.854	829.950	3.80%	-3.80%
311+460	498942.905	6391856.625	829.780	829.890	3.80%	-3.80%
311+480	498938.926	6391876.225	829.748	829.818	3.80%	-3.80%
311+500	498935.274	6391895.889	829.680	829.751	3.80%	-3.80%
311+520	498931.951	6391915.610	829.559	829.679	3.80%	-3.80%
311+540	498928.957	6391935.385	829.528	829.623	3.80%	-3.80%
311+560	498926.292	6391955.206	829.509	829.570	3.80%	-3.80%
311+580	498923.959	6391975.069	829.437	829.518	3.80%	-3.80%
311+600	498921.957	6391994.969	829.367	829.468	3.80%	-3.80%
311+620	498920.286	6392014.898	829.335	829.441	3.80%	-3.80%
311+640	498918.948	6392034.853	829.345	829.436	3.80%	-3.80%
311+660	498917.943	6392054.828	829.349	829.441	3.80%	-3.80%
311+680	498917.271	6392074.816	829.357	829.449	3.80%	-3.80%
311+700	498916.932	6392094.813	829.358	829.450	3.80%	-3.80%
311+720	498916.927	6392114.813	829.343	829.455	3.80%	-3.80%
311+740	498917.254	6392134.810	829.404	829.505	3.80%	-3.80%
311+760	498917.915	6392154.799	829.515	829.577	3.80%	-3.80%
311+780	498918.909	6392174.774	829.596	829.648	3.80%	-3.80%
311+800	498920.236	6392194.730	829.601	829.703	3.80%	-3.80%
311+820	498921.895	6392214.661	829.679	829.755	3.80%	-3.80%
311+840	498923.886	6392234.561	829.763	829.825	3.80%	-3.80%
311+860	498926.208	6392254.425	829.814	829.906	3.80%	-3.80%
311+880	498928.862	6392274.248	829.957	830.003	3.80%	-3.80%
311+900	498931.829	6392294.027	830.059	830.101	2.60%	-2.60%
311+920	498935.022	6392313.770	830.112	830.163	1.30%	-2.00%
311+940	498938.330	6392333.495	830.151	830.213	0.10%	-2.00%
311+960	498941.659	6392353.216	830.210	830.270	-1.30%	-2.00%
311+980	498944.988	6392372.937	830.255	830.317	-2.00%	-2.00%
312+000	498948.317	6392392.658	830.245	830.357	-2.00%	-2.00%
312+020	498951.646	6392412.379	830.316	830.409	-2.00%	-2.00%
312+040	498954.975	6392432.100	830.429	830.482	-2.00%	-2.00%
312+060	498958.304	6392451.821	830.518	830.551	-2.00%	-2.00%
312+080	498961.633	6392471.542	830.528	830.611	-2.00%	-2.00%
312+100	498964.962	6392491.263	830.577	830.660	-2.00%	-2.00%
312+120	498968.291	6392510.984	830.677	830.730	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
312+140	498971.620	6392530.705	830.728	830.792	-2.00%	-2.00%
312+160	498974.949	6392550.426	830.797	830.851	-2.00%	-2.00%
312+180	498978.278	6392570.147	830.830	830.913	-2.00%	-2.00%
312+200	498981.607	6392589.868	830.955	831.008	-2.00%	-2.00%
312+220	498984.936	6392609.589	831.049	831.102	-2.00%	-2.00%
312+240	498988.265	6392629.310	831.116	831.179	-2.00%	-2.00%
312+260	498991.594	6392649.031	831.194	831.248	-2.00%	-2.00%
312+280	498994.923	6392668.752	831.239	831.303	-2.00%	-2.00%
312+300	498998.252	6392688.473	831.268	831.358	-2.00%	-2.00%
312+320	499001.581	6392708.194	831.328	831.413	-2.00%	-2.00%
312+340	499004.910	6392727.915	831.396	831.471	-2.00%	-2.00%
312+360	499008.239	6392747.636	831.454	831.498	-2.00%	-2.00%
312+380	499011.568	6392767.357	831.448	831.493	-2.00%	-2.00%
312+400	499014.897	6392787.078	831.343	831.434	-2.00%	-2.00%
312+420	499018.226	6392806.799	831.315	831.385	-2.00%	-2.00%
312+440	499021.555	6392826.520	831.279	831.350	-2.00%	-2.00%
312+460	499024.884	6392846.241	831.265	831.328	-2.00%	-2.00%
312+480	499028.213	6392865.962	831.240	831.302	-2.00%	-2.00%
312+500	499031.542	6392885.683	831.180	831.252	-2.00%	-2.00%
312+520	499034.871	6392905.404	831.106	831.178	-2.00%	-2.00%
312+540	499038.200	6392925.125	831.040	831.101	-2.00%	-2.00%
312+560	499041.529	6392944.846	830.954	831.024	-2.00%	-2.00%
312+580	499044.858	6392964.567	830.909	830.961	-2.00%	-2.00%
312+600	499048.187	6392984.288	830.862	830.910	-2.00%	-2.00%
312+620	499051.517	6393004.009	830.801	830.861	-2.00%	-2.00%
312+640	499054.846	6393023.730	830.751	830.813	-2.00%	-2.00%
312+660	499058.175	6393043.451	830.709	830.759	-2.00%	-2.00%
312+680	499061.504	6393063.172	830.616	830.699	-2.00%	-2.00%
312+700	499064.833	6393082.893	830.560	830.635	-2.00%	-2.00%
312+720	499068.162	6393102.614	830.507	830.578	-2.00%	-2.00%
312+740	499071.491	6393122.335	830.452	830.530	-2.00%	-2.00%
312+760	499074.820	6393142.056	830.431	830.497	-2.00%	-2.00%
312+780	499078.149	6393161.777	830.402	830.472	-2.00%	-2.00%
312+800	499081.478	6393181.498	830.386	830.477	-2.00%	-2.00%
312+820	499084.807	6393201.219	830.453	830.519	-2.00%	-2.00%
312+840	499088.136	6393220.940	830.538	830.612	-2.00%	-2.00%
312+860	499091.465	6393240.661	830.653	830.733	-2.00%	-2.00%
312+880	499094.794	6393260.382	830.820	830.893	-2.00%	-2.00%
312+900	499098.123	6393280.103	831.005	831.098	-2.00%	-2.00%
312+920	499101.452	6393299.824	831.279	831.342	-2.00%	-2.00%
312+940	499104.781	6393319.545	831.561	831.627	-2.00%	-2.00%
312+960	499108.110	6393339.266	831.895	831.955	-2.00%	-2.00%
312+980	499111.439	6393358.987	832.231	832.290	-2.00%	-2.00%
313+000	499114.768	6393378.708	832.571	832.639	-2.00%	-2.00%
313+020	499118.097	6393398.429	832.935	833.002	-2.00%	-2.00%
313+040	499121.426	6393418.150	833.276	833.343	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
313+060	499124.755	6393437.871	833.602	833.665	-2.00%	-2.00%
313+080	499128.084	6393457.592	833.886	833.945	-2.00%	-2.00%
313+100	499131.413	6393477.313	834.133	834.185	-2.00%	-2.00%
313+120	499134.742	6393497.034	834.353	834.402	-2.00%	-2.00%
313+140	499138.071	6393516.755	834.536	834.591	-2.00%	-2.00%
313+160	499141.400	6393536.476	834.691	834.732	-2.00%	-2.00%
313+180	499144.729	6393556.197	834.783	834.843	-2.00%	-2.00%
313+200	499148.058	6393575.918	834.862	834.913	-2.00%	-2.00%
313+220	499151.387	6393595.639	834.887	834.957	-2.00%	-2.00%
313+240	499154.716	6393615.360	834.896	834.969	-2.00%	-2.00%
313+260	499158.045	6393635.081	834.879	834.932	-2.00%	-2.00%
313+280	499161.374	6393654.801	834.770	834.841	-2.00%	-2.00%
313+300	499164.703	6393674.522	834.632	834.720	-2.00%	-2.00%
313+320	499168.032	6393694.243	834.502	834.560	-2.00%	-2.00%
313+340	499171.361	6393713.964	834.326	834.386	-2.00%	-2.00%
313+360	499174.690	6393733.685	834.130	834.202	-2.00%	-2.00%
313+380	499178.019	6393753.406	833.925	833.992	-2.00%	-2.00%
313+400	499181.348	6393773.127	833.717	833.788	-2.00%	-2.00%
313+420	499184.677	6393792.848	833.506	833.581	-2.00%	-2.00%
313+440	499188.007	6393812.569	833.314	833.376	-2.00%	-2.00%
313+460	499191.336	6393832.290	833.096	833.159	-2.00%	-2.00%
313+480	499194.665	6393852.011	832.852	832.931	-2.00%	-2.00%
313+500	499197.994	6393871.732	832.634	832.696	-2.00%	-2.00%
313+520	499201.323	6393891.453	832.402	832.461	-2.00%	-2.00%
313+540	499204.652	6393911.174	832.160	832.238	-2.00%	-2.00%
313+560	499207.981	6393930.895	831.988	832.030	-2.00%	-2.00%
313+580	499211.310	6393950.616	831.814	831.845	-2.00%	-2.00%
313+600	499214.639	6393970.337	831.620	831.671	-2.00%	-2.00%
313+620	499217.968	6393990.058	831.508	831.549	-2.00%	-2.00%
313+640	499221.297	6394009.779	831.427	831.442	-2.00%	-2.00%
313+660	499224.626	6394029.500	831.280	831.332	-2.00%	-2.00%
313+680	499227.955	6394049.221	831.197	831.262	-2.00%	-2.00%
313+700	499231.284	6394068.942	831.213	831.217	-2.00%	-2.00%
313+720	499234.613	6394088.663	831.183	831.202	-2.00%	-2.00%
313+740	499237.942	6394108.384	831.201	831.223	-2.00%	-2.00%
313+760	499241.271	6394128.105	831.291	831.329	-2.00%	-2.00%
313+780	499244.600	6394147.826	831.441	831.512	-2.00%	-2.00%
313+800	499247.929	6394167.547	831.746	831.771	-2.00%	-2.00%
313+820	499251.258	6394187.268	832.063	832.105	-2.00%	-2.00%
313+840	499254.587	6394206.989	832.357	832.433	-2.00%	-2.00%
313+860	499257.916	6394226.710	832.701	832.770	-2.00%	-2.00%
313+880	499261.245	6394246.431	833.065	833.132	-2.00%	-2.00%
313+900	499264.574	6394266.152	833.433	833.502	-2.00%	-2.00%
313+920	499267.903	6394285.873	833.768	833.847	-2.00%	-2.00%
313+940	499271.232	6394305.594	834.018	834.117	-2.00%	-2.00%
313+960	499274.561	6394325.315	834.294	834.390	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
313+980	499277.890	6394345.036	834.545	834.652	-1.00%	-2.00%
314+000	499281.220	6394364.757	834.751	834.855	0.30%	-2.00%
314+020	499284.585	6394384.472	834.927	835.036	1.60%	-2.00%
314+040	499288.087	6394404.163	835.078	835.191	2.90%	-2.90%
314+060	499291.831	6394423.809	835.181	835.291	3.80%	-3.80%
314+080	499295.889	6394443.393	835.249	835.359	3.80%	-3.80%
314+100	499300.266	6394462.908	835.263	835.372	3.80%	-3.80%
314+120	499304.961	6394482.349	835.254	835.366	3.80%	-3.80%
314+140	499309.973	6394501.710	835.248	835.339	3.80%	-3.80%
314+160	499315.301	6394520.987	835.162	835.274	3.80%	-3.80%
314+180	499320.942	6394540.175	835.056	835.185	3.80%	-3.80%
314+200	499326.896	6394559.268	834.974	835.081	3.80%	-3.80%
314+220	499333.161	6394578.261	834.848	834.954	3.80%	-3.80%
314+240	499339.735	6394597.150	834.697	834.801	3.80%	-3.80%
314+260	499346.616	6394615.929	834.545	834.650	3.80%	-3.80%
314+280	499353.803	6394634.592	834.368	834.474	3.80%	-3.80%
314+300	499361.294	6394653.136	834.166	834.279	3.80%	-3.80%
314+320	499369.087	6394671.555	833.974	834.085	3.80%	-3.80%
314+340	499377.179	6394689.845	833.797	833.907	3.80%	-3.80%
314+360	499385.569	6394708.000	833.627	833.736	3.80%	-3.80%
314+380	499394.254	6394726.015	833.484	833.589	3.80%	-3.80%
314+400	499403.232	6394743.887	833.382	833.484	3.80%	-3.80%
314+420	499412.500	6394761.609	833.281	833.385	3.80%	-3.80%
314+440	499422.057	6394779.178	833.169	833.286	3.80%	-3.80%
314+460	499431.899	6394796.588	833.134	833.244	3.80%	-3.80%
314+480	499442.025	6394813.836	833.146	833.255	3.80%	-3.80%
314+500	499452.430	6394830.915	833.196	833.304	3.80%	-3.80%
314+520	499463.113	6394847.823	833.260	833.367	3.80%	-3.80%
314+540	499474.070	6394864.554	833.370	833.476	3.80%	-3.80%
314+560	499485.288	6394881.112	833.510	833.585	2.70%	-2.70%
314+580	499496.694	6394897.540	833.599	833.704	1.40%	-2.00%
314+600	499508.198	6394913.901	833.723	833.828	0.10%	-2.00%
314+620	499519.721	6394930.248	833.921	834.004	-1.20%	-2.00%
314+640	499531.244	6394946.595	834.107	834.191	-2.00%	-2.00%
314+660	499542.767	6394962.941	834.289	834.372	-2.00%	-2.00%
314+680	499554.290	6394979.288	834.450	834.534	-2.00%	-2.00%
314+700	499565.813	6394995.635	834.626	834.705	-2.00%	-2.00%
314+720	499577.336	6395011.982	834.776	834.860	-2.00%	-2.00%
314+740	499588.859	6395028.329	834.946	835.029	-2.00%	-2.00%
314+760	499600.382	6395044.676	835.118	835.202	-2.00%	-2.00%
314+780	499611.905	6395061.023	835.281	835.365	-2.00%	-2.00%
314+800	499623.427	6395077.370	835.474	835.548	-2.00%	-2.00%
314+820	499634.950	6395093.717	835.658	835.722	-2.00%	-2.00%
314+840	499646.473	6395110.064	835.802	835.876	-2.00%	-2.00%
314+860	499657.996	6395126.411	835.969	836.043	-2.00%	-2.00%
314+880	499669.519	6395142.757	836.147	836.221	-2.00%	-2.00%

Station	CL Easting	CL Northing	EG. @ CL Elevation	FG. @ CL Elevation	Cross Fall Slope Left	Cross Fall Slope Right
314+900	499681.042	6395159.104	836.334	836.393	-2.00%	-2.00%
314+920	499692.565	6395175.451	836.506	836.570	-2.00%	-2.00%
314+940	499704.088	6395191.798	836.643	836.727	-2.00%	-2.00%
314+960	499715.611	6395208.145	836.795	836.879	-2.00%	-2.00%
314+980	499727.134	6395224.492	836.991	837.045	-2.00%	-2.00%
315+000	499738.657	6395240.839	VARIES,TIE-TOEXISTING			

R.017173.344
Appendix H

PWGSC Environmental Effects Evaluation (EEE) Report

R.017173.344
Appendix I

**British Columbia Ministry of Forests, Lands, and Natural
Resource Operations (FLNRO) Section 11 Approval for Instream
Work, By TBD – Date TBD.**