# Public Works and Government Services Canada

Requisition No. EZ899-162871

SPECIFICATIONS

For

Km 205 – 229 Pavement Replacement, Alaska Highway, BC

Project No. R.017173.803 March, 2016

**APPROVED BY:**

Alaska Hwy Program Manager, EASS — Date: 24 March 2016

Construction Safety Coordinator — Date: 2016-03-15

**TENDER:**

Project Manager — Date: Mar 24 2016

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


24 March 2016

**APPENDICES**

**REFERENCE DOCUMENTATION**

Standards and Best Practices for Instream Works, British Columbia Ministry of Land and Air Protection Ecosystem Standards and Planning Biodiversity Branch – March 2004.

Available online at:
http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf

Land Development Guidelines for the Protection of Aquatic Habitat, Fisheries and Oceans – September 1993.

Available online at:
http://www.dfo-mpo.gc.ca/Library/165353.pdf

2012 Standard Specifications for Highway Construction, BC Ministry of Transportation and Highways – November 1, 2011 – Volume 1 and 2.

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

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

Available online at:
http://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/trafficmanagementmanual

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, Legend, and Control Monument Locations | C001 | 0 |
| 3 | Plan Sta. Varies to Sta. Varies | C101 – C137 | 0 |
| 4 | Typical Sections | C201 | 0 |
| 5 | Culvert & Paint Marking Details | C202 | 0 |
| 6 | Access Road & Asphalt Pavement Overlay Tie-in Details | C203 | 0 |
| 7 | Rumble Strip Details | C204 | 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.

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 Lab 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 If conflict arises between an item in these Specifications and an item found in one of the Reference Documents (Appendices), the Specifications shall govern.

.3 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 the Contract is awarded.

1.2 Work Covered by Contract Documents

.1 The project includes the placement of Hot Mix asphalt concrete pavement and related works. The project site spans from Km 205 to 229 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, Watson Lake is at approximately Km 986 on the Alaska Highway.

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

.1 Contract submittals (using CentralCollab) prior to and during the work (see 2.7 – Contract Submittals).

.2 Supply and maintain of all traffic control for the duration of the works.

.3 Quality Management.

.4 Excavation and removal of existing culverts

.5 Supply and installation of new culverts.

.6 Supply and manufacture of aggregate materials for gravel shouldering and Asphalt Mix.

.7 Supply of Asphalt Cement and other additives (if necessary).

.8 Saw cutting and removal of asphalt for asphalt pavement overlay tie-in.

.9 Completion of Full Depth Reclamation including the pulverization of existing Bituminous Surface Treatment (BST) and mixing with existing base gravels, regrading, and compaction.

.10 Supply, manufacture, transport, and placement of asphalt primer, asphalt tack coat, and Hot Mix Asphalt Concrete Pavement.

.11 Transport, placement (using a purpose built shouldering machine), grading, and compaction of gravel shouldering.

.12 Installation of rumble strips and pavement markings.

.13 Supply and installation of new precast concrete

barriers following removal and offsite stockpile of existing concrete barriers.

.14 Surveys (construction layout, payment quantities, as-built survey, and others as required).

.15 Environmental protection.

.16 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 limits shown on the drawings.

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

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

PART 2 – 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 September 2, 2016.

.3 Achieve Completion by September 16, 2016.

.4 Complete the work in accordance with the staging requirements / dates detailed in Section 01 14 00 – Work Restrictions, Access Development, Construction Staging, and

Restoration, Item 1.9.

2.3 Special Precautions

.1 The Contractor's attention is drawn to the possibility of impacting utilities, etc., within the limits of work. The Contractor shall confirm the locations of all such 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 drawings, 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 Complete survey layout for all aspects of construction and payment (see Section 01 29 00 – Payment Procedures) using project survey control as shown on Contract Drawings. Survey methods and equipment shall be per industry standards, the survey requirements of Section 01 29 00 – Payment Procedures, and as approved by the Departmental Representative.

.2 The contractor shall utilize a qualified registered surveyor licensed to practice in British Columbia, acceptable to the Departmental Representative, to perform all the required surveying on the project. Submit name and address to Departmental Representative.

.3 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.

.4 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.

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

and survey control monuments provided.

.6 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.

.7 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.

.8 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.

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).

.2 Upon award of the project, PWGSC will provide the successful Contractor with a 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 Representatives discretion.

.3 The Departmental Representative accepts no responsibility for the accuracy or completeness of the electronic contract drawings. Should the Contractor choose to reference the electronic contract drawings, the Contractor shall satisfy itself as to the accuracy and completeness of the electronic contract drawings before commencing construction. Should a discrepancy between the electronic contract drawings and the

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 Construction Staging Drawings (management of traffic during culvert replacement) (see Section 01 14 00).

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

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

.7 Quality Management Plan and related Quality Management documentation (see Section 01 45 00).

.8 Hazardous Materials Management Plan (see Section 02 61 33).

.9 As-built Survey, As-built Drawing mark-ups, and (see Section 01 78 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 PWGSC Preliminary Hazard Assessment Form (Appendix A).

2.8 Supervisory Personnel

.1 Within fifteen 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.

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

.3 Health and Safety Coordinator: shall possess safety experience in general construction. Duties shall encompass all matters of safety activities from commencement of work until Substantial Performance and Completion of the Work (see Section 01 35 33 – Health and Safety for further requirements).

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

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 Lab Trailer | .1 | Provide power and laydown area in vicinity of Contractor's asphalt plant suitable for Departmental Representatives lab testing trailer. Ensure Departmental Representative has vehicle access to the lab and power source as requested by Departmental Representative. |

**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 its 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 Workers Compensation Board of British Columbia (WCB) including, but not limited to, WCB's 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 will not be allowed on the Alaska Highway outside the limits of the work shown on the contract drawings except as 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 not to exceed legal highway load limits. 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 00.06 – 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 The Contractor shall install two PWGSC supplied Government of Canada "Accelerated Infrastructure Program" signs at each end of the project in a location approved by the Departmental Representative.

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, and contract specifications are achieved.

.2 All requirements of Section 01 35 00.06 – Special Procedures – Traffic Control are achieved.

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

.4 The work is completed in accordance scheduling

outlined in 1.8.3 below 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 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 work (including vertical and horizontal alignments).

.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 area from Km 207+000 to Km 207+700 is the last area on the project to receive full depth reclamation and asphalt concrete pavement.

1.9 Restoration

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

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

.2 Eliminating uneven areas and low spots.

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

.4 Removal of all gravels, other materials, or structures

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

**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:

.1 Preparation and acceptance of submittals (Construction Schedule, Traffic Management Plan, Quality Management Plan, Environmental Protection 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 two PWGSC supplied Government of Canada "Accelerated Infrastructure Program" signs at each end of the project. The signs will be approximately 1.2 m x 2.4 m in size and required two posts to secure in place.

.5 Work and costs incurred in the completion of cleanup 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 in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs associated with the items of work listed in 1.2 Definition above.

.2 The Lump Sum arrangement for Mobilization and Demobilization shall be a maximum of 10% of the Total Tender Price. If the Lump Sum arrangement is greater than 10% of the Total Tender Price, payment for the Mobilization amount greater than 10% will only be authorized when the contract has achieved completion.

.3 Payment for this item will be made at the Lump Sum price and

will be scheduled as follows:

.1 50% at the beginning of construction after the Contractor required submittals (including Construction Schedule, Traffic Management Plan, Quality Management Plan, Environmental Protection Plan, and any other submittals required prior to starting work) have been submitted for approval, accepted, and work onsite has commenced to the satisfaction of the Departmental Representative.

.2 50% once the project has achieved "Completion" and the site has been cleaned to the satisfaction of the Departmental Representative.

**END OF SECTION**

PART 1 – GENERAL

Section Includes

PART 1:

1.1 Basis of Payment.

1.2 Survey.

1.1 Basis of Payment

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

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

.3 For unit price items in the Bid and Acceptance Form, progress payments shall be made based on the quantities of work in place (prior to excavation or following placement and compaction), compacted (if required) surveyed, and accepted by the Departmental Representative in the field. 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 Representatives 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 Representatives survey data indicates that materials were excavated or placed outside / beyond the specified tolerances of the design lines and grades on the contract drawings.

1.2 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 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 and the location of all treatment boundaries including changes in material type / placement, changes in surface treatment, and changes in the terrain.

.3 A survey of the existing ground surfaces and other topographic features may be undertaken by the Contractor prior to initiation of construction. If undertaken by the Contractor and if requested by the Departmental Representative, provide the survey the Departmental Representative for review. During construction no material shall be placed unless the applicable surveys confirming the grades and tolerance of 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.

.4 Survey data shall be collected at an accuracy of +/-0.025 m horizontal and +/-0.025 m vertical or better and shall be referenced / tie into the PWGSC's monument / coordinate system as shown on the contract drawings.

.5 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 available and 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.

.6 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.

.7 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, and 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, storage sheds, utilities, 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 Record 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 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.

.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 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, contract specifications, and shop drawings for as-built purposes.

1.3 Schedules

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

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

.3 During progress of work, revise and resubmit as directed by Departmental Representative.

1.4 Cash Flow Forecasting

.1 Develop detailed cash flow forecasting derived from the project schedule and the agreed up progress payment schedule. Submit 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 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 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.

.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 E.

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 system "CentralCollab". 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 system "CentralCollab".

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

.5 Process change orders through Departmental Representative via PWGSC's cloud based system "CentralCollab".

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

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 derived from Master Plan in accordance with the project completion date found in Section 01 11 10 – Summary of Work.

.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 Environmental Protection Plan.

.2 Traffic Management Plan / Detour Plan.

.3 Construction Staging / Site Access.

.4 Quality Management Plan.

.5 Site Specific Health and Safety Plan, including MSDS sheets.

.6 Material Purchase Plan.

.7 Survey Plan.

.8 If applicable, Shop Drawings, product date, and samples.

.4 Mobilization.

.5 Work activities by segment / locations.

.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 Gant bar chart.

.2 Provide a separate bar for each major item of work or 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 days after award of Contract but in all cases prior to starting work onsite work.

.2 Submit schedules in electronic format via PWGSC's cloud-based system "CentralCollab" (login details to be provided by Departmental Representative at time of submission following contract award). Provide schedules in PDF format and native file format if requested by the Departmental Representative.

.3 If requested submit two 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 days after return of review copy.

.6 Submit revised progress schedule with each application for payment.

.7 Distribute copies of revised schedule to:

.1 Job site office.

.2 Subcontractors.

.3 Other concerned parties.

.8 Instruct recipients to report to Contractor within ten 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 reflecting activity changes and completions, as well as activities in progress.

.2 Indicate progress of each activity to date of submission schedule.

.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.

**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 system "CentralCollab" (login details to be provided by Departmental Representative at time of submission following contract award). Submittals shall be named and filed on "CentralCollab" in accordance with the Written Communication / Document Management Protocol (see template Appendix E).

.3 The Departmental Representative will endeavor to complete 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 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.

.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), temporary gravel surfacing and shouldering (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.

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 in Section 3.2.6 – Traffic Management (15 min).

.2 Limits of Work – The limits of work for this project are defined as Km 204+920 and Km 229+000 as shown on the drawings.

1.4 Submittals

.1 Submit to the Departmental Representative for review and acceptance a Traffic Management Plan. The Traffic Management Plan shall provide a complete and unambiguous plan of the traffic accommodation strategies proposed for use during the work and shall be:

.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 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).

.4 Developed and conform with the standards for Category 3 Traffic Management Plans as defined in Section 3.0: 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 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).

.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).

.2 The Contractor's Traffic Management Plan shall be submitted to the Departmental Representative 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 either:

.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 plan for review.

.3 Reject the plan and provide comments outlining required changes or additional information needed. Following completion of edits by the Contractor, re-submit the 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.

PART 2 – PRODUCTS

2.1 Temporary Traffic Control Devices

.1 Temporary Traffic Control Devices shall be in accordance with Section 4.0: 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 two (2) portable dynamic message signs (DMS) for the duration of the work. The DMS shall have a minimum of 3 lines with 8 characters per line.

.2 Unless preapproved by the Departmental Representative, 45 cm, 70 cm and 90 cm cones shall be substituted for 100 cm tubular markers.

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

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:

- Site Supervisor/Foreman/Superintendent;
- Traffic Control Manager; and
- Traffic Control Supervisors and Traffic Control Persons.

.3 PWGSC will assist the Contractor with the Public Information Plan by notifying Drive BC 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).

.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 signage/traffic control layouts as described in Section 7 and with the following revisions.

.1 Sign C-035 shall be replaced with PWGSC supplied "Government of

Canada" signs. The signs will be approximately 1.2 m x 2.4 m in size and require two posts to secure in place.

.2 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.

.3 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 outside of 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 Maintain existing conditions for traffic throughout the period of contract except that, when required for construction under contract and when measures have been taken as specified herein and reviewed by Departmental Representative to protect and control public traffic. Existing conditions for traffic may be restricted to single lane (min 5.5 m lane width) alternating traffic during completion of on highway work including, full depth reclamation, regrading, paving, shouldering, line painting, rumble strip installation, or others works as preapproved by the Departmental Representative. Speed limit reduced to 30 km/h during these times.

.7 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.

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

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

**Table 01 35 00 - 01: Single Lane Alternating Traffic**

| Criteria | Value |
|---|---|
| Design Speed | 30 km/hr |
| 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) | 1.0 m |

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

.2 Maintain 3H:1V or flatter embankment or 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.

.9 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.

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 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

1.1 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.

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 PWGSC Preliminary Hazard Assessment Form (Appendix A).

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 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 either:

.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 plan for review, re-submit the plan for review.

.3 Reject the plan and provide comments outlining required changes or additional information needed. Following completion of edits by the Contractor, re-submit the 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 PWGSC Preliminary Hazard Assessment Form (Appendix A).

.2 Copies of reports or directions issued by Federal

and Provincial health and safety inspectors.

.3 Copies of incident and accident reports.

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

.5 Emergency Procedures.

.6 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.

.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 and fire reporting procedures.

.2 Include with the Health and Safety plan, a resume(s) of Health and Safety Coordinator(s) detailing the Health and Safety Coordinator's past experience.

.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 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

CentralCollab on a weekly or more frequent basis.

1.9 Project / Site Conditions

.1 Work at the site will, 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.

1.11 Work Permits

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

1.12 Filing of Notice

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

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

1.13 Emergency Procedures

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

.1 Designated personnel from own company.

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

.3 Local emergency resources.

.4 Departmental Representative.

.2 Include the following provisions in the emergency

procedures:

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

.2 Evacuate all workers safely.

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

.4 Notify the fire department or other emergency responders.

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

.6 Notify Departmental Representative.

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

.1 Work at high angles.

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

.3 Work with hazardous substances.

.4 Underground work.

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

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

.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 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 accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.

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

1.19 Correction of Non-compliance

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

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

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

1.20 Medical

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

.2 Provide the appropriate first aid kit, based on the number

of workers, in accordance with the Workers' Compensation Act or the Occupational Health and Safety Regulations.

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

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

.5 Emergency and First Aid Equipment:

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

.2 Locate sufficient; blankets and towels; stretcher; and 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 Site Access and Parking.

1.7 Protection of Work Limits.

1.8 Erosion Control.

1.9 Pollution Control.

1.10 Equipment Maintenance, Fueling, and Operation.

1.11 Operation of Equipment.

1.12 Managing of Invasive Plant Vegetation.

1.13 Fires and Fire Prevention and Control.

1.14 Wildlife.

1.15 Relics and Antiquities.

1.16 Waste Materials Storage and Removal.

1.17 Wastewater Discharge Criteria.

1.18 Drainage.

1.19 Environmental Protection Supplies.

1.20 Notification.

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.

.2 Land Development Guidelines for the Protection of Aquatic Habitat, Fisheries and Oceans – September 1993.

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

.4 Responsibility Checklist For Authorizations /Approvals / Notifications / Permitting (Appendix C).

.5 Relevant Environmental Publications (Appendix D).

1.3 Regulatory Overview

.1 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 shall be submitted to the Departmental Representative 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 either:

.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 plan for review.

.3 Reject the plan and provide comments outlining required changes or additional information needed. Following completion of edits by the Contractor, re-submit the plan 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 by the Departmental Representative.

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

.5 Should deficiencies in the Contractor's EPP 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 to ensure the correction of any deficiencies.

1.5 Environmental Protection Plan (EPP)

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

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

.2 Erosion, drainage, and sediment control plan which identifies type and location of erosion and sediment controls to be provided to assure that control measures are in compliance with the requirements of the applicable MoE guidelines, and all other applicable regulations including the requirements of these specifications.

.3 Drawings to 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.

.4 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits

of use areas including methods for protection of features to be preserved within authorized work areas.

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

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

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

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

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

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

1.6 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.

1.7 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.

1.8 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).

1.9 Pollution Control

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

.2 A Spill Response Plan will be prepared as part of the EPP and shall detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative, and in accordance with all applicable federal and provincial legislation. The EPP shall include a list of products and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are

not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement and sand blasting agents.

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

.4 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berms shall be capable of holding 110% of tank storage volumes and shall be to the satisfaction of the Departmental Representative. Measures such as collection/drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double lined fuel tanks can prevent spills into the environment.

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

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

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

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

.9 The costs involved in a major spill incident (control, clean up, disposal of contaminants, and site remediation to pre-spill conditions), shall be the responsibility of the

Contractor. The site will be inspected to ensure completion to the pre-spill condition to the satisfaction of the Departmental Representative.

1.10 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 metres to any surface water (streams, wetlands, water bodies or watercourses) shall require discussion with the Departmental Representative. Regardless of fueling location, personnel shall maintain a presence during refueling with immediate attention to the fueling operations.

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

.4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage sites is addressed in 1.9.4 of Pollution Control.

.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.

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| | .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. |
| 1.11 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. |
| | .4 | Restrict vehicle movements to the work limits. |
| | .5 | Workers vehicles are to remain within the construction footprint. |
| 1.12 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.

1.13 Fires and Fire Prevention and Control

.1 Fires or burning of waste materials is not permitted.

.2 A fire extinguisher shall be carried and available for use on each machine and at locations within the quarry in the event of fire. The Contactor's staff shall receive basic training in early response to wildfire events during the "environmental briefing" presented by the Contractor.

.3 Construction equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.

.4 Care shall be taken while smoking on the construction site to ensure that the accidental ignition of any flammable material is prevented.

.5 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The Departmental Representative shall be notified of any fire immediately as well as the applicable Provincial Authorities. Basic instruction and phone numbers will be provided on-site by the Contractor and will be discussed in the project start-up meeting.

.6 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.

.7 Provide supervision, attendance and fire protection measures as directed by the Departmental Representative or other authorities.

1.14 Wildlife

.1 Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from bears, cougars, wolves, elk, moose, or bison, 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.

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| | .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. |
| 1.15 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. |
| 1.16 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. |
| 1.17 Wastewater Discharge Criteria | .1 | Wash water, meltwater collection, rinse water resulting from the cleaning of fuel tanks and pipelines, contaminated |

groundwater, and/or any other liquid effluent stream will be released onto the ground at a location that is a minimum of 30 metres from natural drainage courses and 100 metres from fish bearing waters, and will conform to the discharge requirements set out in the provincial Water Act Permit:

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

1.18 Drainage

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

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

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

.4 Provide an erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan to include monitoring and reporting requirements to assure that control measures 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 metres from natural drainage courses and 100 metres from fish bearing waters.

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

1.19 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 metres or more and as required of 200 mm diameter hydrophobic, sorbent booms. This will be used as necessary to prevent the migration of hydrocarbons.

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

.5 At the completion of construction, dispose of used silt fence off-site as non-Hazardous Waste. Dispose of used absorbent boom in accordance with Section 02 61 33 - Hazardous Materials.

.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.

1.20 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.

**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 Check Sheets and Daily Reports.

1.10 QC Testing.

1.11 Non-conformance Reports.

1.12 Frequency of QC Documentation and Submittal to Departmental Representative.

1.13 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 of the work completed and accepted by the Departmental Representative.

1.2 References

.1 British Columbia MoT – 2012 Standard Specifications for Highway Construction.

1.3 Definitions

.1 Quality Control (QC): The process of checking specific product or services to determine if they comply with the contract quality standards, document, 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.

1.4 Responsibilities

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

.1 Quality Control – The Contractors responsibility.

.2 Quality Assurance – The Departmental Representatives 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 Representatives Quality Assurance review, further testing if needed, and where deemed appropriate by the Departmental Representative, supplemented by the Contractor's Quality Control results.

.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. Non-conforming work shall be removed / replaced from the work unless an exception to the contractor documents is accepted by the

Departmental Representative.

.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.

.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 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 either:

.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 plan for review.

.3 Reject the plan and provide comments outlining required changes or additional information needed. Following completion of edits by the Contractor, re-submit the 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 Testing and survey to be completed by the Contractor (e.g. compaction, aggregate gradation, and tolerances of the work completed, and tests outlined in Table 01 45 00 - 01).

.3 The Quality Management Plan shall include all forms to be filled in by the Quality Control Personnel (ex. check sheets, test forms, daily reports, NCR's, etc.).

.4 Procedures for the review of the submissions by the Contractor prior to submission to the Departmental Representative for review approval.

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

.3 The Contractor shall appoint qualified, and experienced Quality Control Personnel (Quality Control Manager and Quality Control Staff), who are dedicated to quality matters and who will report regularly to the Contractor's management at a level which shall ensure that Quality Management requirements are not subordinated to manufacturing, construction or delivery.

.4 The Quality Management Plan will include the following information:

.1 The name of the Quality Control Manager and qualifications establishing a proven capability to provide the specific services required for the Project.

.2 The name of Quality Control testing agencies and their proven capability 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.

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

.6 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.

1.8 Quality Control Personnel

.1 The Contractor shall appoint qualified, and experienced Quality Control Personnel (Quality Control Manager and Quality Control Staff), 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 who shall be responsible for the implementation of the QC Plan. The 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 Staff 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.

.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 Stop work when material, product, processes or submittals are deficient.

.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.

1.9 Check Sheets and Daily Reports

.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 Daily reports shall be completed by the Quality Control Manager and summarize the QC activities and concerns. Daily report shall include photos of the work and QC activities performed.

.3 All check sheets and daily reports shall be reviewed and signed by the Quality Control Manager prior to submission to the Departmental Representative.

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 during times of construction activity and gravel manufacturing and at a minimum include:

.1 All testing required to confirm aggregate gradation, compaction, 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 the table below.

**Table: Minimum QC Testing Frequencies**

| Activity | Test / Inspection | Frequency |
|---|---|---|
| Manufacture – Gravel Shouldering, Culvert Bedding, & Crushed Base Gravel | Gradation | The more stringent of: 1 test per 3000 $m^3$ or 1 test for every two hours of manufacturing. |
| Screening / sorting riprap | Gradation | 1 Test per every 1 day of production |
| Placement / Site Tolerance – Gravel Shouldering | Survey | 2 points every 20 Stations on each side of road |
| Placement / Site Tolerance – Culvert Bedding, & Crushed Base Gravel | Survey | 1 point every 2 $m^2$ of placed material. |
| Placement / Site Tolerance – BST/Base Material (following Full Depth Reclamation) | Survey | Final lift , 5 points Along Each Cross Section at 20 m Stations |
| Manufacture – Precast Concrete Barrier | Field Test of Plastic Properties (Air and Slump) | As per CSA Certified Manufacturing Plant QC Requirements |
| Manufacture – Precast Concrete Barrier | Compressive Strength Tests | As per CSA Certified Manufacturing Plant QC Requirements |
| Manufacture – Asphalt Aggregate | ASTM C-136, Dry Sieve Analysis of Aggregate | - Split Stockpile: 1 for each stockpile for every 2 hours of production. - One main stockpile: for every 300 t - Blend Sand: 1 for every 100t during stockpiling. - Natural filler: 1 for every 50t during stockpiling |

| | | |
|---|---|---|
| Manufacture – Asphalt Aggregate | ASTM D-5821 Determining the Percentage of Fracture Particles in Coarse Aggregate | - Every second coarse aggregate sieve test |
| Manufacture – Asphalt Aggregate | ASTM C-117 Sieve Analysis of Aggregates by Washing (Field Lab) | - 1 per shift on reduced sample obtained from combined samples from the crusher |
| Manufacture – Asphalt Aggregate | ASTM C-136, Dry Sieve Analysis of Aggregate | 1 of combined aggregate (off the belt) every 300t |
| Asphalt Products Test | Asphalt Tack Coat and Asphalt Prime | Contractor's option |
| Tests During Asphalt Plant Mixing | ASTM C-566 & D2216, Moisture Content | Aggregate: 2 tests/Lot<br>Asphalt Mix: 1 on first Sub-lot and every second day. |
| Tests During Asphalt Plant Mixing | ASTM C-117 Sieve Analysis of Aggregates by Washing (Field Lab) | 1 per shift on reduced sample obtained from combined samples from the plant cold feed. |
| Tests During Asphalt Plant Mixing | ASTM D-5581, Resistance to Plastic Flow Using Marshall Apparatus | One set of three briquettes for 1,200t or Lot, whichever is less |
| Tests During Asphalt Plant Mixing | Asphalt Extraction Test ASTM D-6307 Ignition Method | One per Lot |
| Tests During Asphalt Plant Mixing | Penetration of Bituminous Materials ASTM D -5 | One per Manufacturer's Batch. Samples should be taken every 3000t of mix production |
| Tests During Asphalt Plant Mixing | Viscosity ASTM D-2171 | Contractor's Option |
| Test During Asphalt Paving for Density Testing | Core Samples | At start, two cores for each Sub-Lot. After rolling pattern established, only one core for each Sub-Lot. All cores to be a minimum of 100mm diameter. |
| Test During Asphalt Paving for Density Testing | AASHTO T 245-97 Resistance to Plastic Flow Using Marshall Apparatus | One 15 kg sample for every sub-lot or minimum 1/day for field testing. |

.3 As defined in the BC MoT 2012 Standard Specifications for Highway Construction (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). 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 onsite 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.

.2 Notify the Departmental Representative when sampling will be conducted.

.3 Within 24 hrs. of the completion of a test, submit the test result to the Departmental Representative (hard copy if requested) and in electronic format via PWGSC cloud based system "CentralCollab".

.4 Identify test reports with the name and address of the organization performing all tests, and the date of the tests.

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 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 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 Quality Control Manager, with a copy to the Departmental Representative,

with respect to the NCR, within the specified response time, with 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 Quality Control Manager, with a copy to the Departmental Representative, with respect to the NCR, within the specified response time, with 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.

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 expedient 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 Frequency of QC Documentation and Submittal to Departmental Representative

.1 The frequency of QC Documentation (i.e. 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 QC Documentation shall achieve the following.

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

.2 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 cloud based system "CentralCollab" system within 24 hrs. of the completion. Submit to the Departmental Representative hard copies of the same documents, forms, and test results if requested.

1.13 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 Installation and Removal.

1.2 Scaffolding.

1.3 Hoisting.

1.4 Site Storage/Loading.

1.5 Security.

1.6 Equipment, Tool, and Materials Storage.

1.7 Sanitary Facilities.

1.8 Construction Signage.

1.9 Construction Laydown Area, Construction Parking, and Site Office.

1.10 Power.

1.11 Communications.

1.12 Temporary Heating, Ventilation, and Lighting.

1.13 Fire Protection.

1.1 Installation and Removal

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

.2 Remove from site all such work after use.

1.2 Scaffolding

.1 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, and temporary stairs as necessary to carry out work.

1.3 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.

1.4 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.

| | | |
|---|---|---|
| 1.5 Security | .1 | Provide and pay for responsible security personnel as required. |
| 1.6 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. |
| 1.7 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. |
| 1.8 Construction Signage | .1 | No other signs or advertisements, other than those required by Section 01 35 00 – Traffic Control, are permitted on-site. |
| 1.9 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, preferably on areas previously disturbed and off the traveled potion of the highway. |
| 1.10 Power | .1 | Provide and pay for power as required for the completion of the works and operations of construction offices. |
| 1.11 Communications | .1 | Provide and pay for telephone communications facilities on-site allowing the Departmental Representative reliable communication to the Contractors onsite representative when onsite. |
| 1.12 Temporary Heating, Ventilation, and Lighting | .1 | Provide temporary heating, ventilation, and lighting as required during construction period to facilitate construction of the works. |
| 1.13 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 Guiderail 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) day 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 and make arrangements for land outside of PWGSC 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:

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. Reinstate the work site to the conditions pre-existing and to the satisfaction of the Departmental Representative.

.3 Prior to final review, remove surplus products, tools, construction machinery, and equipment.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Inspect finishes and fitments and ensure specified workmanship and operation.

.6 Remove dirt and other disfiguration from exterior surfaces.

.7 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.8 Sweep and wash clean paved or BST finished areas.

.9 Clean drainage systems.

**END OF SECTION**

PART 1 – GENERAL

Section Includes

PART 1:

1.1 Inspection and Declaration.

1.1 Inspection and Declaration

.1 Contractor's Inspection: Contractor and all subcontractors shall conduct an inspection of work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify the Departmental Representative in writing of satisfactory completion of the Contractor's Inspection and that corrections have been made.

.2 Request the Departmental Representative's Inspection.

.2 Departmental Representative's Inspection: The Departmental Representative and Contractor will perform inspection of work to identify obvious defects or deficiencies. Contractor shall correct work accordingly.

.3 Completion: Submit written certification that the following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Work is complete and ready for final inspection.

.4 Final Inspection: When the items noted above are completed, request final inspection of work by the Departmental Representative and Contractor. If work is deemed incomplete by the Departmental Representative, complete the outstanding items and request re-inspection.

**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 weeks of substantial performance:

.1 As-built survey.

.2 As-built drawing and shop drawing mark-ups.

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 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 (limit of clearing to limit of clearing incl. cut and fill slopes, embankment and gravels placed).

.2 Culverts (inverts at inlet and outlet).

.4 Concrete barriers.

.5 Edge of asphalt.

.6 Gravel shoulder.

.7 Paint Lines.

.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 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 +/- 0.025 m horizontal and +/- 0.025 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. Additionally 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.

.3 Submit Hazardous Materials Management Plan to the Departmental Representative that identifies all hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.

1.3 Storage and Handling

.1 Abide by internal requirements for labeling and storage of materials and wastes. If required coordinate storage of hazardous materials with the Departmental Representative.

.2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

.3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.

.4 Store all flammable and combustible liquids in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval.

.5 Transfer of flammable and combustible liquids is prohibited within buildings.

.6 Transfer of flammable and combustible liquids will not be carried out in the vicinity of open flames or any type of heat-producing devices.

.7 Flammable liquids having a flash point below 38°C, such as naptha 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 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 Materials.

PART 3:

3.1 Preparation.

3.2 Processing.

3.3 Handling and Transportation.

3.4 Stockpiling.

3.5 Cleaning.

1.2 Measurement and Payment Procedures

.1 Measurement and Payment for Aggregate Materials shall be per the applicable work included in Section 31 14 11 – Gravel Shouldering, Section 32 12 16 – Hot Mix Asphalt Concrete Pavement, and any other section as required by these specifications.

1.3 References

.1 American Society for Testing and Materials (ASTM).

.1 ASTM D4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.2 ASTM C117-13, Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.

.3 ASTM C136/C136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.4 ASTM D4318-10e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.5 ASTM C131/C131M-14, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

1.4 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 Quality Control Plan.

.3 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.

.4 Provide access to all portions of the work for sampling by the Departmental Representatives.

.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 its own source(s) of aggregates materials for this project. The Contractor will be solely responsible for the 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 Prior to supply or 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 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.

.2 Name, phone number of client site representative for the project.

.3 For Asphalt Mix Aggregate, provide test results from each of the tests shown in Table 32 12 16 – 01: Requirements for Course Aggregates. The tests shall have been completed within the last two years from samples collected from the same aggregate source and vicinity within the aggregate source which will be used for the extraction of Asphalt Mix Aggregate.

2.2 Materials

.1 Aggregate materials shall be in accordance with the more stringent of the specific requirements of each section (Section 31 14 11 – Gravel Shouldering, Section 32 12 16 – Hot Mix Asphalt Concrete Pavement, 33 42 13 – Pipe Culverts, and other applicable sections as needed) and the following.

.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: to ASTM D4791-10.

.1 Flat and elongated particles are those whose greatest dimension exceeds five times their least dimension.

.3 Fine aggregates satisfying requirements of applicable sections 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 satisfying requirements of applicable section 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.

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 of 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 Traffic Act pertaining to registered weight limits and vehicle size. |
| 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. |
| | .3 | Stockpile sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment. |
| | .4 | Except where stockpiled on acceptably stabilized areas, provide compacted crushed gravel base not less than 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 | Do not use conveying stackers. |
| | .10 | 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 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 metres, 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).

.1 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400ft-lbf/ft$^3$ (600 kN-m/m$^3$)).

.2 British Columbia Ministry of Transportation and Infrastructure (BC MoT) – 2012 Standard Specifications for Highway Construction.

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 The Contractor shall provide its own source(s) of aggregates materials for gravel shouldering. The source will be subject to approval by the Departmental Representative, see Section 31 05 16 – Aggregates: General.

.2 Gravel Shouldering shall be 25 mm WGB in accordance with the BC MoT 2012 Standard Specifications for Highway Construction as follows.

.1 All requirements of Section 202.04 and 202.05.

.2 Aggregate properties and gradations for 25 mm WGB per Section 202 Table 202-B and Table 202-C.

.3 Aggregate materials shall be in accordance with Section 31 05 17 – 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 Asphaltic 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.

.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 95% 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 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.

1.2 References

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C127 – 15, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Course Aggregate.

## PART 2 – PRODUCTS

2.1 Riprap

.1 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:

| 50 Kg Class Riprap | | |
|---|---|---|
| Mass (kg) | Nominal Diameter (mm) @ 2650 kg/m³ | 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 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.

**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.

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 at 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 Base Preparation area measured is defined as 0.5 m beyond the edge of existing 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.

1.2 Definitions .1 Full Depth Reclamation: in place reclamation procedure in which the existing Bituminous Surface Treatment (BST) 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.

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 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 on highway embankment beyond limit of base preparation such that positive drainage from the highway driving surface is maintained.

3.2 Base Preparation .1 Complete base preparation such that Full Depth Reclamation is completed over a maximum of 5 lane kilometers within the project limits prior to the application of asphalt concrete pavement unless a larger area is preapproved by the Departmental Representative.

.2 Confirm limits of full depth reclamation and asphalt concrete pavement overlay with Departmental Representative prior to starting full depth reclamation works. Locate limit of existing asphalt concrete at Km 205+940 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 and granular materials to a depth of 100 mm (measured from the top of existing BST) and the widths indicated on the Contract Drawings.

.4 Reduce existing BST and granular materials to a 50 mm maximum particle size.

.5 Scarify and mix existing BST and granular materials such

that the material is mixed and blended into a homogeneous material.

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 (see Appendix F). 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. The design grades have been prepared such that the import of granular material from offsite are not anticipated.

.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. In areas of fill placement during regrading, place lifts a maximum of 200 mm thick and complete necessary compaction / proof rolling before placement of additional material through regrading.

.3 Test compaction of the final Full Depth Reclamation / 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 unsuitable 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 (see Appendix F), but not uniformly high or low. |
| | .2 | Correct surface irregularities by moving existing materials through the grading process until the surface in within the specified tolerance. |
| 3.6 Protection | .1 | Maintain reshaped 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.

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 purchase, 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 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.

1.2 References

.1 American Society for Testing and Materials (ASTM).

.1 ASTM D140/D140M-15, Standard Practice for Sampling Bituminous Materials.

.2 American Association of State Highway and Transportation Officials (AASHTO).

.1 AASHTO M 320-10 (2015), Standard Specification for Performance-Graded Asphalt Binder.

.2 AASHTO R 29-15, Standard Practice for Grading or Verifying the Performance Graded Asphalt Binder.

.3 AASHTO T 240-13, Standard Method of Test for Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test) (ASTM Designation: D 2872-04).

.4 AASHTO T 313-12, Standard Method of Test for Determining the Flexural Creep Stiffness of Asphalt Binder Using the Bending Beam Rheometer (BBR).

.5 AASHTO T 44-14, Standard Method of Test for Solubility of Bituminous Materials (ASTM D 2042-01).

.6 AASHTO T 48-06 (2015), Standard Method of Test for Flash and Fire Points by Cleveland Open Cup (ASTM D 92-05a).

.7 AASHTO T 315-12, Standard Method of Test for Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR).

.8 AASHTO T 316-13, Standard Method of Test for Viscosity Determination of Asphalt Binder Using Rotational Viscometer.

.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 3 30 – Submittal Procedures, manufactures recommended procedures, and ASTM D140/D140M-15.

.2 Prior to ordering asphalt cement submit manufactures 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 cans to the Departmental Representative.

1.5 Quality Management

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

.2 Provide access throughout the work as requested by the Departmental Representative to sample asphalt cement to be incorporated into work.

PART 2 – PRODUCTS

2.1 Asphalt Cement

.1 Asphalt Cement, Performance Grade PG 58-31 to meet the requirements of AASHTO M320.

.2 Asphalt Cement shall be supplied by one of the "Accepted Producers" from one of the accepted "Terminal Supplier from Accepted Producers" as indicated in the Asphalt Cement section of the British Columbia Ministry of Transportation and Infrastructure Recognized Product List.

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 ACP 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 purchase, 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-15, Standard Practice for Sampling Bituminous Materials.

.2 British Columbia Ministry of Transportation and Infrastructure.

.1 Recognized Product List (latest version available at time of tender closing).

1.3 Definitions

.1 Asphalt Tack Coat: an application of liquid asphalt to ensure a bond between a lift of asphalt concrete pavement and the next course of asphalt concrete pavement.

1.4 Submittals

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures, manufactures recommended procedures, and ASTM D140/D140M-15.

.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 cans 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 tack coated (station start and end, width, and lane).

.2 Quantity of tack coat used and mean application rate. Dipstick measurements or electronic printouts are acceptable. Carry out measurements in presence of Departmental Representative upon request.

.3 Actual product quantity used when using equipment on pressure distributors.

PART 2 – PRODUCTS

2.1 Materials

.1 Asphalt Tack Coat shall be on EAP-2, EP 2000, or preapproved equivalent.

.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 5 meters.

.3 Applied at readily determined and controlled rates from 0.2 L/m$^2$ and greater with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m$^2$.

.4 Distribute in uniform spray without atomization at temperature required.

.3 Equipped with meter, registering travel in metres 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 metres 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 pavement surface at rate between 0.2 $L/m^2$ and 0.4 $L/m^2$ unless recommended otherwise by the product manufacture and preapproved by the Departmental Representative.

.4 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt tack coat material.

.5 Apply asphalt tack coat only when air temperature greater than 10°C and when rain is not forecast within 2 hours of application.

.6 Apply asphalt tack coat only to surfaces that are expected to be overlaid 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-tack contaminated or disturbed areas as directed by Departmental Representative.

.11 Permit asphalt tack coat to set before placing asphalt pavement.

.12 Inspect 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 purchase, 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-15, Standard Practice for Sampling Bituminous Materials.

.2 British Columbia Ministry of Transportation and Infrastructure.

.1 Recognized Product List (latest version available at time of tender closing).

1.3 Definitions

.1 Asphalt Prime: an application of liquid asphalt to ensure a bond between the finished Full Depth Reclamation Surface or a previously paved surface and the bottom lift of asphalt concrete pavement.

1.4 Submittals

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures, manufactures recommended procedures, and ASTM D140/D140M-15.

.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 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 cans 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 prime coated (station start and end, width, and lane).

.2 Quantity of prime coat used and mean application rate. Dipstick measurements or electronic printouts are acceptable. Carry out measurements in presence of Departmental Representative upon request.

.3 Actual product quantity used when using equipment on pressure distributors.

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/m$^2$ and greater with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m$^2$.

.4 Distribute in uniform spray without atomization at temperature required.

.3 Equipped with meter, registering travel in metres 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 metres 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 is complete and accepted by the Departmental Representative and the surface proposed for asphalt prime is clean, dry, and unfrozen.

.2 Dilute asphalt emulsion with water at 1:1 ratio for application. Mix thoroughly by pumping or other method approved by Departmental Representative.

.3 Apply asphalt prime evenly to prepared surface at rate between 1.0 L/m$^2$ and 1.5 L/m$^2$ unless recommended by the product manufacture and preapproved by the Departmental Representative.

.4 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt prime material.

.5 Apply asphalt prime only when air temperature greater than 10°C and when rain is not forecast within 2 hours of application.

.6 Apply asphalt prime only to surfaces that are expected to be overlaid on same day.

.7 Evenly distribute localized excessive deposits of 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 Do not prime surfaces that will be visible when paving is complete.

.11 Keep traffic off primed areas until asphalt prime has set.

.12 Re-prime contaminated or disturbed areas as directed by Departmental Representative.

.13 Permit asphalt prime to set before placing asphalt pavement.

.14 Inspect prime application to ensure uniformity.

.1 Re-spray areas of insufficient or non-uniform prime coverage as directed by Departmental Representative.

.2 Ensure prime 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 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 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.

4.5 Material Application Rate.

4.6 Surface segregation.

4.7 Smoothness.

4.8 Workmanship Defects.

4.9 Appeal Testing.

4.10 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 bid for Hot Mix Asphalt Concrete Pavement in the Bid and Acceptance Form. The Price per Unit bid 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, 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, and all work required to complete the asphalt pavement overlay tie-in at Km 204+920.

The Hot Mix Asphalt Concrete Pavement will be subject 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 of Hot Mix Asphalt Concrete Pavement for payment will occur if 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 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 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 ACP to the site or at the end of each workday as required by the Departmental Representative.

Unless accepted otherwise by the Departmental Representative, only acceptable asphalt pavement will be included in the payment quantity. Where overlays are used as a corrective measure the overlay will not be included in the payment quantity but the quantity of asphalt pavement covered by the overlay will be measured in the payment quantity whether or not it was acceptable.

In the Departmental Representatives sole discretion and without setting precedence, where any work is reject 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.

1.2 Definitions

.1 Additives: solid or liquid materials to enhance the properties of the liquid asphalt cement or mix.

.2 Aggregate: the crushed or screened gravel.

.3 Asphalt Cement: performance grade asphalt used in 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 Asphalt Concrete Pavement / Hot Mix Asphalt Concrete Pavement: paver laid Asphalt Concrete Mix compacted to uniform density.

.6 Asphalt Content: the quantity of asphalt cement in the 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 just prior to the addition of the asphalt cement.

.8 Asphalt Mix Design: the asphalt 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 mix.

.9 Driving Lane: A driving lane shall mean a single lane in any area of the pavement other than a shoulder or a barrier flare.

.10 End Product Specification (EPS): A specification whereby the Contractor is responsible for the workmanship and quality control of the construction processes, and whereby the Departmental Representative reviews the workmanship and may perform the specified quality assurance sampling and testing of the end product for the purpose of determining acceptance / rejection and payment.

.11 Job Mix Formula: the job mix formula establishes aggregate proportioning, gradation and asphalt content to be used for production of asphalt mix and requires approval of Departmental Representative on basis of asphalt mix design.

.12 Leveling Course: asphalt concrete pavement used to improve cross fall, level and strengthen existing pavements.

.13 Lift: a layer of asphalt mix 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 Level Course).

.14 Lot:

.1 Lot is a portion of work being considered for acceptance and for determination of payment. A Lot is defined as:

.1 For the application of the contract requirements for.

.1 Density.

.2 Asphalt Content.

.3 Aggregate Gradation.

.4 Material Application Rate.

A Lot shall be one day's scheduled production of a least 7 hours plant production where no changes have occurred to criteria such as but not limited to.

.1 Accepted Job Mix Formula.

.2 Specified lift being placed.

.3 Required material application rate.

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

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.

Lot shall be no more than two days total production even if above criteria have not changed or been met.

.2 For application of Contract requirements for.

.1 Segregation.

.2 Smoothness.

Lot shall be one 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 Also Section 01 45 00 – Quality Management.

.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. Contractor is entirely responsible for quality control. (See Also Section 01 45 00 – Quality Management).

.17 Reject Mix: Asphalt 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 for Density, Asphalt Content, Gradation and Smoothness:

.1 For Density, Asphalt Content and 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

of un-split stockpiles which singly or combined will meet the asphalt mix aggregate gradation.

.22 Stratified Random Sample - set of test measurements taken one each from a number of separate (stratified) areas or Sub-Lots within a Lot in an unbiased way.

.23 Voids in Mineral Aggregate (VMA): VMA represents the space available to accommodate the effective volume of asphalt (asphalt not absorbed in the aggregate) and volume of air voids necessary in the mixture.

1.3 References

.1 Alberta Transportation

.1 Paving Guidelines and Segregation Rating Manual (2002).

.2 British Columbia Ministry of Transportation and Infrastructure (BC MoT)

.1 Recognized Product List (latest edition).

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

.1 ASTM C 88, Test Method for Soundness of Aggregate by use of Sodium Sulfate or Magnesium Sulfate.

.2 ASTM C 136, Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM C 117, Test Method for Material Finer Than 0.075mm Sieve in Mineral Aggregates by Washing.

.4 ASTM C 123, Test Method for Lightweight Pieces in Aggregate.

.5 ASTM C 127, Test Method for Specific Gravity and Absorption of Coarse Aggregate.

.6 ASTM C 128, Test Method for Specific Gravity and Absorption of Fine Aggregate.

.7 ASTM C 131, Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.8 ASTM C 136, Method for Sieve Analysis of Fine and Coarse Aggregates.

.9 ASTM C 142, Test Method for Clay Lumps and Friable Particles in Aggregates.

.10 ASTM C 566, Test Method for Total Evaporable Moisture Content of Aggregate by Drying.

.11 ASTM D 75, Standard Practice for Sampling Aggregates.

.12 ASTM D 5, Standard Test Method for Penetration of Bituminous Materials.

.13 ASTM D 995b , Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

.14 ASTM D 1188, Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures using Paraffin-Coated Specimens.

.15 ASTM D 1461, Standard Test Method for Moisture or Volatile Distillates in Bituminous Paving Mixtures.

.16 ASTM D 1559, Test Method for Resistance to Plastic flow of Bituminous Mixtures Using Marshall Apparatus.

.17 ASTM D 2041, Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.

.18 ASTM D 2171, Standard Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer.

.19 ASTM D 2172, Standard Test Method for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures.

.20 ASTM D 2419, Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

.21 ASTM D 2726, Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.

.22 ASTM D 3203, Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving

Mixtures.

.23 ASTM D 4125- 94, Determining Asphalt Content by Nuclear Method.

.24 ASTM D 2172, Standard Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures.

.25 ASTM D 4469 Standard Test Method for Calculating Percent Asphalt Absorption by the Aggregate in an Asphalt Pavement Mixture.

.26 ASTM D 4791, Test Method for Flat and Elongated Particles in Coarse Aggregate. ASTM D 5361, Standard Practice for Sampling Compacted Bituminous Mixtures for Laboratory Testing.

.27 ASTM D 5821, Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.

.28 ASTM D 6307, Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition method.

.29 ASTM WK666, Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus.

.30 ASTM D-1075, Effect of Water on Compacted Strength of Compacted Bituminous Mixtures.

.31 ASTM D-5361, Sampling Bituminous Mixtures for Laboratory Testing.

.32 BCH 1-9, Minimum Degradation Factor.

.33 STP-19, Asphalt Film Thickness Determination (Sask.Hwys & Trans.)

.4 Asphalt Institute (AI).

.1 Asphalt Institute MS-2 Sixth Edition, Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types.

1.4 Submittals

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit Job Mix Formula (Mix Design) as per the

requirements of 2.5 – Asphalt Mix and Job Mix Formula.

.3 Prior to ordering anti-stripping agent (if necessary) and other additives (if necessary), submit manufactures 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 cans 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 mix tonnage quantity summary and copies of the weigh scale tickets for each load of asphalt mix received at the placement operation.

.3 Asphalt Cement, Anti-stripping Agents, and any other additives summary tonnage or volume quantity incorporated into the asphalt mix.

.7 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 pavement Lift to be tested. The Contractor shall deliver these cores to the Departmental Representative, within 24 hours of being provided the locations for the coring, to a designated storage 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 Tack coat the inside surfaces and the outside perimeter with an emulsified asphalt.

.4 Place asphalt mix 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.

.8 Loose samples: The Contractor shall allow for the collection of 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 control and payment adjustments purposes.

If requested by the Departmental Representative, the Contractor shall collect 2 loose samples per sub-lot from the paver screed or behind the paver screed at random locations. The loose samples shall be collected for quality control and payment adjustments purposes. 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 storage location as directed by 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.

.3 Quality Control Testing Frequency - Recommended test frequency requirements are 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 the 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 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 Aggregate materials shall be in accordance with Section 31 05 17 – 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 Contractor shall recognize and satisfy himself as to type and amount of work that may be necessary to produce material required.

.4 All material up to and including 300 mm diameter in PWGSC sources shall be crushed.

.5 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.

.6 Paving Aggregates shall meet the following requirements:

.1 Coarse Aggregates.

.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.

**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 Aggregates.

.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.

.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.

.4 Mineral filler shall have a minimum 75% manufactures fines (passing the 4.75 mm sieve).

.7 Coarse aggregate, fine aggregate and mineral filler when required shall be combined to produce the gradation for class of 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 |

.8 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 type or grade must be preapproved by the Departmental Representative.

2.3 Anti-Stripping Agent

.1 Unless shown otherwise per the requirements of 2.4.4 – Asphalt Mix and Job Mix Formula, the Contractor shall select, supply, and incorporate into the Asphalt 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 Mix and Job Mix Formula

.1 Responsibility for Asphalt Mix and Job Mix Formula (Mix Design)

.1 Prepare and submit asphalt mix designs for approval of Departmental Representative are responsibility of Contractor. All costs incurred in mix design formulation are responsibility of Contractor. Shipping costs for samples sent to Departmental Representative for verification and approval are responsibility of Contractor.

.2 Use professional engineering services and a qualified testing laboratory licensed to practice in British Columbia, to assess the aggregate materials proposed for use and to carry out design of asphalt mixture.

.2 Requirements for Mix Design: 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). Mix design, at the Design Asphalt Content, shall meet requirements in Table 32 12 16 – 03 for Asphalt Concrete

Mix Type specified.

| Table 32 12 16 – 03: Marshall Design and Production Criteria | |
|---|---|
| **Property of Laboratory Compacted Paving Mixture** | **Requirement** |
| Number of blows each face of test specimens | 75 |
| Minimum % Voids in mineral aggregate for maximum particle size: 16 mm | 14.5 |
| Voids Fill with Asphalt (VFA) | 65% – 75% |
| Percentage of Air Voids in laboratory compacted mixture for: Medium Mix | 3.5 to 4.0 |
| Minimum Marshall Load, N @ $60^0$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 Acceptance of Mix Design. Submit mix design to Departmental Representative for review. Departmental Representative will require up to seven (7) calendar days from the time of receipt of the asphalt mix design for review. The Mix Design must be reviewed prior to commencement of pavement construction. 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 Mix design gradation of combined aggregate.

.4 Aggregate characteristics including sand equivalent, percentage of fractured faces, 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 supplied, 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/m$^3$).

.4 Tensile Strength Ratio (TSR).

.1 The asphalt 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 mix at a sufficient volume to achieve this minimum TSR ratio.

.2 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 Verification of Mix Design.

.1 Provide representative samples of each of aggregate component and asphalt cement for verification purposes. A sufficient quantity of each component shall be provided to result in a 100 kg sample of combined aggregate at design proportions. Departmental Representative will require up to 5 working days from time of receipt of sample to verify mix design.

.2 Difference between property values submitted by Contractor and property values as determined by Departmental representative shall not fall outside limits shown in Table 32 12 16 – 03.

.3 Asphalt mix design shall be rejected if maximum permissible variations are exceeded.

.4 Any change in nature or sources of aggregates, or where a new mix design is desired by Contractor, a complete mix design will be required. This new mix design shall be subject to verification by Departmental Representative.

.5 Departmental Representative will not accept any asphalt mix produced prior to Contractor receiving written acceptance of mix design from Departmental Representative.

.6 Departmental Representative will require up to 7 working days from the receipt of the mix design to complete the design verification.

.7 Aggregate proportioning and asphalt content for approved mix design will form the Job Mix Formula for Production of asphalt mix.

.8 Contractor shall be totally responsible for production of aggregates and mixes in conformance with this contract.

.6 Variation from Approved Job Mix Formula.

.1 After Job Mix Formula gradation and proportioning of various aggregate sizes have been established and approved, no alteration will be permitted.

.2 The Lot average Marshall air voids, as determined by the Departmental representative, shall not vary from approved mix design air voids by more than 0.5%.

.3 If there are any deviations from the approved Job Mix Formula, or any alterations of aggregate proportioning, Departmental Representative will determine if a new mix design is required.

.4 Any deviation from approved Job Mix Formula shall require written approval of Departmental Representative. Departmental Representative will not accept asphalt mix produced prior to approval.

.5 A new Design Mix Formula must be submitted if limits of Job Mix Formula are exceed by any of the following:

.1 +/-5% passing the 4.75 mm sieve.

.2 +/-1.0% passing the 0.07 mm sieve.

.3 +/-0.3% asphalt content.

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 mix. Contractor shall provide Departmental Representative with a certificate of calibration which certifies that plant has been calibrated to produce uniform mixture in accordance with Job Mix Formula.

.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 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 Mix Production.

.1 Prior to mix production, a minimum of 100% of crushed aggregate for asphalt concrete pavement, when combined at design proportions, shall be stockpiled.

.2 Aggregate and asphalt 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.

.3 Unless otherwise specified, the maximum mixing temperature for all grades of asphalt shall be 155°C.

.4 Plant emissions shall not exceed the limits set by British Columbia Ministry of the Environment.

.5 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.

.6 A uniform mixture shall be produced in which all particles are thoroughly coated. Aggregate particles shall not be coated with residue from fuel combustion.

.7 Contractor shall dispose of rejected asphalt mix or asphalt concrete pavement 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 to have a paver hopper insert with a minimum capacity of 12 tonnes installed in the hopper of conventional paving equipment when a MTV is used.

.4 Materials Transfer Vehicle (MTV) shall be equipped as follows.

.1 To have a truck unloading system which receives mixture from the hauling equipment and independently delivers mixture from the hauling equipment to the paving equipment.

.2 Has mixture remixing capability by either a storage bin in the MTV with a minimum capacity of 12 tonnes of mixture 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 mixture as it discharges to a conveyor system.

.3 Provide the paves 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.

.5 If the MTV malfunctions during spreading operations, discontinue placement of hot mix asphaltic concrete after there is sufficient hot mix placed to maintain traffic in a safe manner. However, placement of hot mix asphaltic concrete in a lift not exceeding 50 mm may continue until any

additional hot mix in transit at the time of the malfunction has been placed. Cease spreading operations thereafter until the MTV in operational.

.6 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 asphalt mix 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, existing pavement shall be cold-milled to expose a vertical surface, of a depth equal to thickness of lift, against which new pavement is to be placed. 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 45° to centreline of roadway across full width of the mat; or

.2 Joint shall be cut at 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 metres 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 mats and contact faces of curbs, gutters, manholes, sidewalks and bridge structures shall be coated with Tack Coat before placing asphalt mix.

.5 Apply Asphalt Prime accordance with Section 32 12 13.23 - Asphalt Prime.

.6 Asphalt Prime shall be allowed to cure prior to placing hot mix asphalt.

3.4 Transportation & Delivery of Mixtures

.1 Trucks used for transportation of the 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, mix shall be completely covered to protect it from precipitation and excessive heat loss by securely fastened waterproofed tarpaulins, unless otherwise approved by Departmental Representative.

.6 No loads shall be sent out so late in the day as to prevent completion of spreading and rolling of mixture during daylight.

3.5 Placing

.1 Asphalt mixtures shall not be placed when air temperature is below 4°C, or when weather is rainy.

.2 Asphalt mixture shall be placed only on clean, dry, and unfrozen surfaces.

.3 Asphalt mixture shall be placed in a MTV in advance of the paver.

.4 Unless otherwise shown on the plans, asphalt mix shall be placed in the following lift thickness.

.1 A single lift when placing asphalt mix in the area of the asphalt concrete overlay from Km 204+920 to Km 205+940.

.2 In two lifts when placing and equal to or greater than 110 mm of compacted total thickness (Km 205+940 – end of project). The lifts thicknesses shall be as follows.

.1 Top lift: 50 mm.

.2 Bottom lift: 60 mm (or as required to complete leveling in areas of overlay, Km 222+660 – Km 223+140 and Km 226+500 – Km 226+900).

.3 A single lift (110 mm of compacted total thickness) when placing asphalt mix in the access road / intersection letdowns beyond the typical shoulder width.

.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 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 required by the Departmental Representative the contact

edge of any mat placed by the Contractor shall be coated with Tack Coat before placing the adjacent mat.

.10 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.

.11 Transverse construction joints from one lift to the next shall be separated by at least 2 metres.

.12 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.

.13 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 asphalt mix shall be spread on intersections by means of a paver as paving of the main lanes progress.

.14 Contact faces of curbs, gutters, manholes, and sidewalks shall be coated with asphalt using a hand applicator before placing the asphalt mix.

.15 When two or more lifts of ACP are required apply Tack Coat between each lift in accordance with Section 32 12 13.16 - Asphalt Tack Coat.

.16 Asphalt Tack Coast shall be allowed to cure prior to placing subsequent lift of hot mix asphalt.

3.6 Compaction

.1 All asphalt mix, 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. Mix will be rejected if asphalt 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 job 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 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 – excluding Asphalt Concrete Pavement Overlay lots).

.5 Surface Segregation (Rejection Limits only).

.6 Smoothness (Unit Price Adjustments and Rejection Limits).

.7 Workmanship Defects (Rejection Limits only).

.2 For the first 1000 tonnes of asphalt mix produced under a contract, the following provisions take precedence overall 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 mix production, the first 1,000 tonnes of asphalt mix production and placement shall not be subject to the bonus/penalty payment adjustments for AC content, density and gradation. Payment adjustments will apply to smoothness, segregation and application rate if the mix is applied in a Top Lift location.

.2 Contrary to any other provision of this specification for Hot Mix Asphalt Concrete Pavement, any 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 2.1, is within the gradation limits specified in Table 32 12 16 – 09 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 AC 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 mix with any characteristic outside the above limits 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 mix (see 1.4.10 – Overlays as a Corrective Measure). 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 low density 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 overlay material where applicable. Where replacement or 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 one random Quality Acceptance samples

obtained from each Sub-Lot (3 per Lot) and tested in accordance with ASTM test procedures.

.2 Asphalt content of asphalt mix 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 ≤ 0.25 | $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, 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 1.4.10 – 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 Cement Content Rejected Work Made Acceptable: Payment Adjustments for asphalt

cement content rejected work made acceptable will be based on testing of the replacement or overlay material where applicable. Where replacement or 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 Hot-Mix Asphalt 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 limiting value specified in Table 32 12 16 - 06, 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 1.4.10 – Overlays as a Corrective Measure). For bottom lifts the lift shall remain in place, however not 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 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 C-117 and C-136 | |
|---|---|
| **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 Asphalt Concrete Pavement Overlay lots) as follows.

.1 Asphalt mix 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 Asphalt Concrete Pavement Overlay lots).

| Table 32 12 16 – 07: Payment Adjustments for Material Application Rates | | |
|---|---|---|
| **Actual Application Rate Expressed as % of Specified Application Rate** | **Payment Adjustment $ Per Tonne of Material in the Lot** | |
| | **Bottom Lift or 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 | |
| ≥ 105.0 to < 106.0 | | -$5.00 |
| ≥ 104.0 to < 105.0 | -$1.00 | -$3.00 |

| | | |
|---|---|---|
| ≥ 96.0 to < 104.0 | +$0.50 | +$0.50 |
| ≥ 94.0 to < 96.0 | -$2.00 | -$2.00 |
| ≥ 92.0 to < 94.0 | -$3.00 | -$3.00 |
| ≥ 90.0 to < 92.0 | -$4.00 | -$4.00 |
| ≥ 85.0 to < 90.0 | -$7.00 | -$7.00 |
| < 85.0 | Reject | Reject |

.2 Rejection limits: Where actual 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 application rate may be corrected by mill and fill (see 1.4.10 – 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 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.

- 25 liters of ss-1 (or equivalent) emulsions
- 4 – 5 kg (2 shovels) of ≤ 3 mm sand
- 2 – 3 kg (1 shovel) Type GU (general use) Portland Cement
- Additional water, if needed for workability
- 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 Contractor at his expense and will not affect the assessment of pay adjustments for segregation.

.7 If an overlay is used as a corrective measure on a defective Lot, the overlay thickness will be subject to approval of Departmental Representative. Where an 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. Minimum thickness of overlay shall be 40 mm.

.8 Whether the 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 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 | Completely 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 asphalt concrete pavement overlay from Km 204+920 – Km 205+940) 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 driver's wheel-path 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 driver's wheel path 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 asphalt concrete pavement overlay from Km 204+920 – Km 205+940 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 sub-lot is rejected (subject to remedial work) if:

- It has an IRI within the reject zone shown in Table 32 12 16 – 09.
- There are obvious defects or it has unrepaired smoothness deficiencies which require remediation in

accordance with 4.6 – Surface Segregation or 1.4.10 – Overlays as a Corrective Measure).

A lot is rejected for smoothness if any sub-lot is rejected.

.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 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 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.

.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 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 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 Segregation Ratings must be done in writing and submitted within 72 hours of receipt of Ratings.

.2 Appeal of 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 Overlays as a Corrective Measure

.1 If an 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 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 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 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 asphalt pavement, and the quantity, to which any payment adjustment is to be applied, will be derived from the tonnage of 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 along with the centerline rumble strips 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. Install centerline rumble strips prior to line painting.

.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 Measurement for Payment for the completion of dust control using water shall not be made and shall be considered incidental to the work.

PART 2 – PRODUCTS

2.1 Water

.1 If necessary, extract water from local sources ensuring extraction method conforms with PWGSC's permit requirements (PWGSC permit available upon request).

PART 3 – EXECUTION

3.1 Dust Control Using Water

.1 Complete 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.

PART 2:

2.1 Paint.

PART 3:

3.1 Equipment.

3.2 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 Line Painting 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 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 this contract specification.

.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.

PART 2 – PRODUCTS

2.1 Paint

.1 Paint.

.1 To CGSB 1 206 M89, alkyd traffic paint.

.2 Color: to CGSB 1-GP-12C, yellow 505 – 308 and 1-GP-12C, white 513 – 301.

.2 Thinner.

.1 To CGSB 1-GP-5M.

.3 Glass Beads.

.1 Overlay Type: to CGSB 1-GP-74M.

PART 3 – EXECUTION

3.1 Equipment

.1 Provide all equipment including but not limited to painting truck, support vehicle (complete with a min of 3 flashing lights and arrow board) and ancillary equipment to load and transport materials.

.2 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.

.3 Distributor to be capable of applying reflective glass beads as an overlay on freshly applied paint.

.4 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.

3.2 Application

.1 Paint pavement markings as shown on contract drawings and as follows:

.1 Solid (White edge lines), Double Solid (yellow directional dividing lines), Simultaneous Solid and Broken (yellow directional dividing lines prohibiting passing from lane bounded by solid line), Broken (yellow directional dividing lines permitting passing).

.2 Paint line types in the locations as provided on the contract drawings. The Contractor shall be responsible for all pre-marking using survey to properly apply markings within the tolerances.

.3 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.

.4 Apply yellow centerline paint lines only after rumble strips have been installed.

.5 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.

.6 Ensure traffic control per Section 01 35 00.06 – Special Procedures Traffic Control is in place for the duration of the paint application and drying process.

.7 Dimensions of lines as per Contract Drawings.

.8 Apply traffic paint evenly at a wet film thickness of 400 micrometers, or 45 litre/km of solid 110 mm line.

.9 Do not thin paint

.10 Paint lines to be of uniform colour and density with sharp edges.

.11 Apply glass beads at rate of 700 g/litre of painted area immediately after application of paint.

.12 Thoroughly clean distributor tank before refilling with paint or different colour.

.13 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.

.14 Remove lines placed outside of tolerance or lines placed with application rate outside tolerance.

.15 Protect pavement marking until dry.

**END OF SECTION**

PART 1 – GENERAL

Section Includes

PART 1:

1.1 Measurement and Payment Procedures.

1.2 References.

1.3 Delivery, Storage, and Handling.

1.3 Material Certification.

PART 2:

2.1 Culverts.

2.2 Zinc-Rich Paint.

2.3 Culvert Bedding Material.

2.4 Nonwoven Geotextile.

2.5 Riprap.

2.6 Backfill Material.

2.7 Crushed Base Gravel.

PART 3:

3.1 General.

3.2 Culvert Removal.

3.3 Culvert Bedding.

3.4 Culvert Placement.

3.5 Culvert Joints.

3.6 Culvert Backfilling.

3.7 Culvert Inlet and Outlet Protection.

1.1 Measurement and Payment Procedures

.1 Payment for the supply and install of aluminized CSP culverts will be made on the basis of the Price per Unit Bid for Aluminized 600 mm CSP Culvert – Km 205+700 and Aluminized 600 mm CSP Culvert – Km 225+760 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 supply, transport, install, bedding and backfill materials (Crushed Base Gravel, Backfill, Bedding Material), couplings, fittings, and hardware for the Aluminized CSP Culvert, and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of Aluminized CSP Culverts 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 install of culvert inlet and outlet protection will be made on the basis of the Price per Unit Bid for Riprap 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 50 kg class riprap, the supply and placement of the nonwoven geotextile, and all other items necessary for successful completion of the work.

.4 Measurement for Payment for completion of the Riprap Culvert End Protection will be made by the count of culvert inlet and outlet protection installations installed and accepted by the Departmental Representative. Each culvert receiving both inlet and outlet protection will be counted as one installation.

1.2 References

.1 Canadian Standards Association (CSA International).

.1 CSA-G401-01, Corrugated Steel Pipe Products.

1.3 Delivery, Storage, and Handling

.1 Handle and store pipe products in a manner to avoid damage, alteration, deterioration and soiling.

.2 Where the material supplied is damaged, the Contractor shall immediately separate nested sections of the plate or pipe to facilitate more detailed inspection by the Departmental Representative. Culvert material designated by the Departmental Representative as unacceptable, due to damage or failure to meet specified requirements, shall be immediately repaired or replaced by the Contractor to the acceptance of the Departmental Representative.

1.4 Material Certification

.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.

PART 2 – PRODUCTS

2.1 Culverts

.1 Culverts 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 2.0 mm.

.4 Corrugations to be 68 mm x 13 mm.

.5 Aluminized type 2 coating – provide 75 year service life in a low-abrasion environment with pH between 5 and 9 and resistivity above 1,500 ohm-cm.

.2 Alternate aluminized CSP culverts may be considered but must be preapproved by the Departmental Representative. Should the contractor propose an alternative aluminized CSP culvert product, it will be the Contractor's responsibility to prove that the product is equivalent or better than the product listed above.

.3 Ensure that all components for each particular Aluminized CSP Culvert comes from a single supplier.

2.2 Zinc-Rich paint

.1 Zinc-rich paint shall be Galvacon™ or preapproved equivalent.

2.3 Culvert Bedding Material

.1 The Contractor shall provide its own source(s) of aggregates materials for Culvert Bedding. The source will be subject to approval by the Departmental Representative, see Section 31 05 17 – Aggregates: General.

.2 Culvert Bedding shall be 25 mm WGB in accordance with the BC MoT 2012 Standard Specifications for Highway

Construction as follows.

.1 All requirements of Section 202.04 and 202.05.

.2 Aggregate properties and gradations for 25 mm WGB per Section 202 Table 202-B and Table 202-C.

2.4 Nonwoven Geotextile

.1 The nonwoven geotextile for the culvert end protection shall be Nilex 4451 or preapproved equivalent.

2.5 Riprap

.1 The riprap for the culvert end protection shall be accordance with Section 31 37 00 – Riprap.

2.6 Backfill Material

.1 Backfill Material shall be reused material excavated from the trench meeting the following requirements.

.1 Contain not more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps, or any other unsuitable material as directed by the Departmental Representative.

2.7 Crushed Base Gravel

.1 The Contractor shall provide its own source(s) of aggregates materials for Crushed Base Gravel. The source will be subject to approval by the Departmental Representative, see Section 31 05 17 – Aggregates: General.

.2 Crushed Base Gravel shall be 25 mm WGB in accordance with the BC MoT 2012 Standard Specifications for Highway Construction as follows.

.1 All requirements of Section 202.04 and 202.05.

.2 Aggregate properties and gradations for 25 mm WGB per Section 202 Table 202-B and Table 202-C.

PART 3 – EXECUTION

3.1 General

.1 Complete culvert installation and related works in conformance with the requirements of Section 01 35 43 – Environmental Protection and the Contractor EPP.

.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.

3.2 Culvert Removal

.1 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.

.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.

3.3 Culvert Bedding

.1 Complete excavation and dewater excavation, as necessary, to allow placement of culvert bedding in dry condition. Excavate to the lines and grades shown on the contract drawings.

.2 Place Culvert Bedding Material in preparation for culvert placement on the bottom of excavation to the thickness shown on contract drawings and compact. Compact final 150 mm lift of bedding material on bottom side of culvert in contact with corrugation to a 95% maximum density to ASTM D698. Compact other lifts to a minimum 98% maximum density to ASTM D698.

.3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to the camber as indicated on the contract drawings, free from sags or high points.

.4 Backfill with Culvert Bedding Material around and over culverts as indicated on the contract drawings.

.5 Place Culvert Bedding Material in 150 mm layers 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 layer to 98% maximum density to 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.

3.4 Culvert Placement

.1 Place culvert such that when complete the alignment, grade, camber, location, and inverts are incompliance 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.

3.5 Culvert Joints

.1 Install culvert joints per the manufactures 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.

3.6 Culvert Backfilling

.1 Place Backfill Material in 150 mm layers to full width of trench and compact each layer to 98% maximum density. Add water or dry Backfill Material to ASTM D698. Break material down Backfill Material to sizes that enable required compaction and mix for uniform moisture to full depth of layer. Backfill Materials which cannot be compacted to the required density due to high moisture content, or Backfill Materials with a natural moisture content greater than optimum, shall not be used without prior aeration and drying by the Contractor.

.2 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.

.3 Place Backfill Material backfill in unfrozen condition.

.4 Dispose of unused excavated material (Backfill Material) to a location approved by the Departmental Representative within 500 m of the culvert within the highway right-of-way.

.5 Place Crushed Base Gravel in 150 mm layers to the depths shown on the contract drawings over the full width of the trench. Compact each layer of Crushed Base Gravel to 100% maximum density to ASTM D698.

3.7 Culvert Inlet and Outlet Protection

.1 Prior to or during installation of the culverts excavate ground to the lines and grades shown on the contract drawings to facilitate the installation of the Inlet and Outlet Riprap Protection. Ensure excavation will allow for positive drainage upon placement of riprap.

.2 Re-use excavated material as Backfill Material (if suitable) or dispose with unused excavated material (Backfill Material).

.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 and uniform. Ensure that all surface voids are filled and nonwoven geotextile is concealed by the riprap.

**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.

PART 3:

3.1 Existing Precast Concrete Barriers.

3.2 Install Precast Concrete Barriers.

1.1 Measurement and Payment Procedures

.1 Payment for removal and off-site stockpile of existing precast concrete barrier will be made on the basis of the Price per Unit Bid for Remove Existing Concrete Barrier in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for loading, transport, and stockpiling and all other items necessary for successful completion of the work.

.2 Measurement for Payment for completion of the removal and off-site stockpile of existing precast concrete barrier will be made by the count of Precast Concrete Barrier units removed from the project limits and stockpiled as accepted by the Departmental Representative.

.3 Payment for the supply and install of new precast concrete barrier will be made on the basis of the Price per Unit Bid for Precast Concrete Barrier (various sizes) in the Bid and Acceptance Form. The Price per Unit Bid shall include all costs for supply, transport, and placement of the precast concrete barrier, and all other items necessary for successful completion of the work.

.4 Measurement for Payment for completion of the Precast Concrete Barrier will be made by the count of each type of new precast concrete barrier installed and accepted by the Departmental Representative.

1.2 References

.1 Public Works and Government Services Canada Precast Concrete Barrier Details (Appendix H).

.2 British Columbia MoT – 2012 Standard Specifications for Highway Construction.

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.

.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 the dimensions and details outlined on the Public Works and Government Services Canada Precast Concrete Barrier Details (Appendix H). The precast concrete barrier units used shall be as follows.

.1 Bull-nose (CBN-H): Sheet 01 – Precast Concrete Bull-nose 460 mm – CBN-H & CBN-E.

.2 Transition Barrier (690 mm to 460 mm) (CTB-1E): Sheet 15 – Precast Concrete Transition Barrier 690 mm to 460 mm – CTB-1E.

.3 Transition Barrier (810 mm to 690 mm) (CTB-2H): Sheet 16 – Precast Concrete Transition Barrier 810 mm to 690 mm – CTB-2H.

.4 Median Barrier (810 mm) (CMB-E): Sheet 09 – Precast Concrete Median Barrier 810 mm – CMB-E.

.5 Median Barrier (810 mm) (CMB-H): Sheet 08 – Precast Concrete Median Barrier 810 mm – CMB-H.

.2 Precast concrete barrier shall be manufactures per the requirements of the applicable sections of Section 941 – Precast Reinforced Concrete Barriers of the British Columbia MoT – 2012 Standard Specifications for Highway Construction as follows.

.1 941.02 – Concrete Quality

.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

PART 3 – EXECUTION

3.1 Existing Precast Concrete Barriers

.1 Remove and transport to PWGSC's Km 254 Sikanni Maintenance Yard all existing precast concrete barrier 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.

.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.

3.2 Install Precast Concrete Barriers

.1 Install precast concrete barrier following the completion and acceptance of the asphalt concrete pavement.

.2 Install precast concrete barrier units in the locations and alignment shown on the contract drawings.

.3 Object marker signs (W-54 L/R) on the ends of the precast

concrete barrier shall be installed by others.

**END OF SECTION**

# R.017173.803
# Appendix A

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

# PRELIMINARY HAZARD ASSESSMENT FORM

| | |
|---|---|
| **Project Number:** | **R.017173.803** |
| **Location:** | **Alaska Highway Km 205 – Km 229** |
| **Date:** | June, July, August 2016 |
| **Name of Departmental Representative:** | Alex Taheri |
| **Name of Client:** | PWGSC Pacific Region |
| **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 |
|---|---|---|---|---|---|
| Examples: Chemical, Biological, Natural, Physical, and Ergonomic<br><br>Listed below are common construction related hazards. Your project may include pre-existing hazards that are not listed. Contact the Regional Construction Safety Coordinator for assistance should this issue arise. | PWGSC, OGD's, or tenants | | General Public or other contractors | | Note: When thinking about this pre-construction hazard assessment, remember a **hazard** is anything that may cause harm, such as chemicals, electricity, working from heights, etc; the **risk** is the chance, high or low, that somebody could be harmed by these and other hazards, together with an indication of how serious the harm could be. |
| | Yes | No | Yes | No | |

| Typical Construction Hazards | | | | | |
|---|---|---|---|---|---|
| Concealed/Buried Services (electrical, gas, water, sewer etc) | 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 | | |



Canada

| | | | | | |
|---|---|---|---|---|---|
| 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 | | | | | 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: | | X | | X | |
| **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: | | X | | X | |

| **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** | | | |

# R.017173.803
# Appendix B

# 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 site and the proposed works when completing the 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. | | | |

# R.017173.803
# Appendix C

## 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***<br>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.<br>Stream Crossings by Roads:<br>• Clear Span Bridges<br>• Temporary Ford Stream Crossing<br>• Ice Bridges and Snow Fills<br>• Bridge Maintenance<br>• 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***<br>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).<br><br>By completing and submitting the ECMP Checklist to Environmental Services, PWGSC project managers1 will ensure that their projects are systematically evaluated for compliance with environmental legislation, policies and sustainable development requirements | | | |
| ***Species at Risk Act (SARA)*** http://www.sararegistry.gc.ca/default_e.cfm | A list of federally-listed species at risk likely to occur at a given subject site must be compiled in | | | |

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

| | | | | |
|---|---|---|---|---|
| | 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***<br>http://clss.nrcan.gc.ca/googledata-donneesgoogle-eng.php | Natural Resources Canada has developed an overlay to be used with Google Earth & Google Maps to identify First Nations lands throughout the country. Notifications of projects within 5 km of such lands and/or directly upstream from such lands should be submitted to the relevant First Nations for a determination of their interest in a given project and/or to request any traditional knowledge they may have to offer. | | | |
| **Provincial –** Note one submission package for instream works is sent to 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***<br>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 - MOE***<br>http://www.qp.gov.bc.ca/statreg/stat/W/96483 | Section 9 – regulates changes in or about a stream and ensure that water quality, riparian habitat, and the rights of licensed water users are not compromised. This is an approval process and takes approximately 140 days. An application fee is also required. Works requiring approval include channel realignment, retaining wall or bank protection stabilization ect. | | | |
| ***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***<br>http://wlapwww.gov.bc.ca/habitat/fishprotectionact/ | This Act was passed in 1997 and is reviewed as part of the Water Act under Section 9 when applying for approval. | | | |
| ***Ministry of Forests, Lands and Natural Resources Operations Archaeological***<br>http://www.for.gov.bc.ca/archaeology/requesting_archaeological_site_information/process_steps.htm<br>*Contact: Hayley Bond (250) 953-3343* | When completing projects such as quarry pits and new highway alignments, a request is put into the archaeological branch of MFLNSO via the EA process to search the data base. An archaeological assessment may be required on those areas that are previously undisturbed or undeveloped. | | | |

| | | | | |
|---|---|---|---|---|
| ***BC Parks*** | Various permits are required when completing construction activities within the Parks. Please note that all works within 150 feet of the centreline of the highway (Right-of-Way) are NOT subject to construction permitting. (this does not include permitting for fish surveys). | | | |
| ***Canada-British Columbia Agreement for Environmental Assessment Cooperation*** http://www.ceaa.gc.ca/default.asp?lang=En&n=04A20DBC-1 | Most Alaska Highway Projects will not trigger this agreement, as both the Vancouver CEAA office and the Victoria BC Environmental Assessment Office (EAO) have confirmed that the types and scopes of the projects are not described in the BC Environmental Assessment Act – Reviewable Projects Regulation. However, for due diligence, it is recommended that notifications for all Alaska Highway projects be submitted to CEAA (info@ceaa-acee.gc.ca) for review and, if necessary, a determination of whether or not CEAA and/or the BC EAO should be involved. | | | |
| ***BC Ministry of Environment – BC Species and Ecosystems Explorer*** http://a100.gov.bc.ca/pub/eswp/ | A list of provincially-listed species at risk likely to occur at a given subject site must be compiled in order to identify potential impacts & propose mitigation measures for minimizing impacts to these species as a result of project activities. This process involves conducting a search of the BC Species and Ecosystems Explorer inventory for the specific area of BC containing the proposed project site. | | | |
| **Consultant Responsibility** | | | | |
| **Provincial** | | | | |
| ***BC Parks Ministry of Forests, Lands 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. | | | |

**Note: research projects and inventory projects are under the same Permit and are applied for under the "Application to Collect Fish for a Scientific Purpose".**

**http://www.env.gov.bc.ca/pasb/applications/process/scientific_fish_collect.html#a5**

| Contractor Responsibility | | | | |
|---|---|---|---|---|
| **Federal** | | | | |
| ***DFO – End of Pipe Guidelines*** | End-of- pipe guidelines for freshwater intake to avoid fish entrainment. | | | |
| **Provincial** | | | | |
| ***Water Act - MOE*** | Schedule A – Water License Applications – use of water from waterbody for road maintenance. | | | |

# R.017173.803
# Appendix D

# 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 | ***Land Development Guidelines for the Protection of Aquatic Habitat - 1993*** | This document is a good reference guide for any works that are occurring in or around the water. |
| | ***Canada's Fish Habitat Law*** | Document explaining the fish and fish habitat laws under the Fisheries Act. |
| | ***Riparian Revegetation*** | Information on minimizing, stabilizing and revegetating construction areas. |
| | ***Freshwater Intake End-of Pipe Fish Screen Guideline - 1995*** | Provides guidelines for the contractor to follow to ensure fish screens are used during freshwater intake operations at construction sites. |
| | ***Operational Statements*** Stream Crossings by Roads:<br>• Clear Span Bridges<br>• Temporary Ford Stream Crossing<br>• Ice Bridges and Snow Fills<br>• Bridge Maintenance<br>• Maintenance of Riparian Vegetation in Existing Rights-of Way | Fisheries and Oceans Canada has developed a series of Operational Statements to streamline the undertaking of low risk activities. The Operational Statements outline conditions and measures for avoiding harmful alteration, disruption and destruction (HADD) of fish habitat, and applying them will ensure the project complies with subsection 35(1) of the *Fisheries Act*. You are NOT required to submit a proposal for review by Fisheries and Oceans Canada when you incorporate the measures and conditions outlined in an appropriate Operational Statement into your plans.<br><br>http://www.pac.dfo-mpo.gc.ca/habitat/os-eo/index-eng.htm |
| MOE | ***Fish-stream Crossing Guidebook - 2002*** | Guidelines in protection of fish and fish habitat and the safe passage of fish during construction at/on stream crossings. |
| | ***Standards and Best Practices for Instream Works - 2004*** | Guide to planning and carrying out the proposed construction activities to comply with relevant legislation, regulations and policies. |
| | ***A User's Guide to Working In and Around Water - 2005*** | Understanding the regulation under British Columbia's Water Act. |
| | ***Fish-Stream Identification Guidebook - 1998*** | Assists in providing information on determining fish streams. |
| | ***The Streamkeepers Handbook*** | A practical guide to stream and wetland care in regards to rehabilitation planting. |

# R.017173.803
# Appendix E

**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, CentralCollab, 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. CentralCollab

CentralCollab is a web-based collaborative platform that is used to submit and store project documentation. It is the responsibility of the submitting party to upload documents to CentralCollab in the correct folder and with the correct file naming convention.

CentralCollab can be accessed at the following address: https://app.centralcollab.com/

The contractor is encouraged to have CentralCollab accounts for project team members who are involved with accessing or posting project documentation. Accounts can be created by 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.

- Upload individual documents to the appropriate folder on CentralCollab. See CentralCollab Suggest Folder Arrangement section below for folder / filing arrangement suggestions or contact the appropriate PWGSC project team member for assistance in locating the correct folder for your files.
- Notify members at time of submittal upload; after uploading the document right-click on the file and select "share". Once the new window opens select the "To" field and select either available individuals or pre-set groups ("XXXXXXX XXX - XXXX"). If necessary, insert message related to the uploaded submittal in the form provided before sending. To ensure the entire project team is aware of CentralCollab postings, unless instructed otherwise, notification of the pre-set group is preferred rather than selection of individuals.

**CentralCollab File Naming Convention:**

All CentralCollab users shall upload files named according to the following convention:

**Doc Type - AHP – Reconstruction Km XXX – XXX – File Description or Document Name – YYYY MM DD**

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 |

Examples file names:

- Contract – AHP – Reconstruction Km XXX – XXX – Change Order No 1 – YYYY MM DD
- Minutes – AHP – Reconstruction Km XXX – XXX – Meeting – YYYY MM DD

**CentralCollab Suggested Folder Arrangement:**

To aid in the organization of files on CentralCollab, users are encouraged to create folders and categorize documents of similar or related data.

Example folders:

- 09_Health & Safety > Tailgate Meetings > Month
- 14_Shop Drawings > Km XXX Culvert > Submission X – YYYY MM DD
- 21_Quality Management > Check Sheets > Month

To aid in the filing of documents, a listing of common filing / folder locations has been prepared as shown in Table 2.

| Table 2: Common Document Filing / Folder Locations | |
|---|---|
| **Folder Names** | **Description of Typical Documents** |
| CentralCollab folder structure:<br>R.017173.XXX – XXXXXXXXXX XXX – XXX > C_Construction > Contract XXXXXXX) > | |
| 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) |
| 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:<br>• Project Schedule<br>• Traffic Management Plan<br>• Construction Staging Drawings<br>• Culvert Mill Certificates<br>• 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:<br>• As-built Surveys<br>• As-built Redline Drawing Mark-ups<br>• Warranties |

| Table 2: Common Document Filing / Folder Locations | |
|---|---|
| **Folder Names** | **Description of Typical Documents** |
| | • 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<br>• Quality Management Plan<br>• Check Sheets<br>• Daily Reports<br>• NCR's |
| CentralCollab folder structure:<br>R.017173.XXX – XXXXXXXXXX XXX – XXX > G_Communication & Meetings > | |
| 01_Correspondence | Emails and other correspondence requiring posting to CentralCollab, generated by the Contractor or PWGSC |
| 02_Contact List | Project contact list generated by PWGSC |
| 04_Communications Plan | Communication plan generated by PWGSC |
| 06_Meeting Minutes | Meeting minutes as generated by PWGSC |
| CentralCollab folder structure:<br>R.017173.XXX – XXXXXXXXXX XXX – XXX > Z_Base Data > | |
| Base Data | Digital drawings and other documentation required by the Contractor (typically generated by PWGSC) |

## 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:

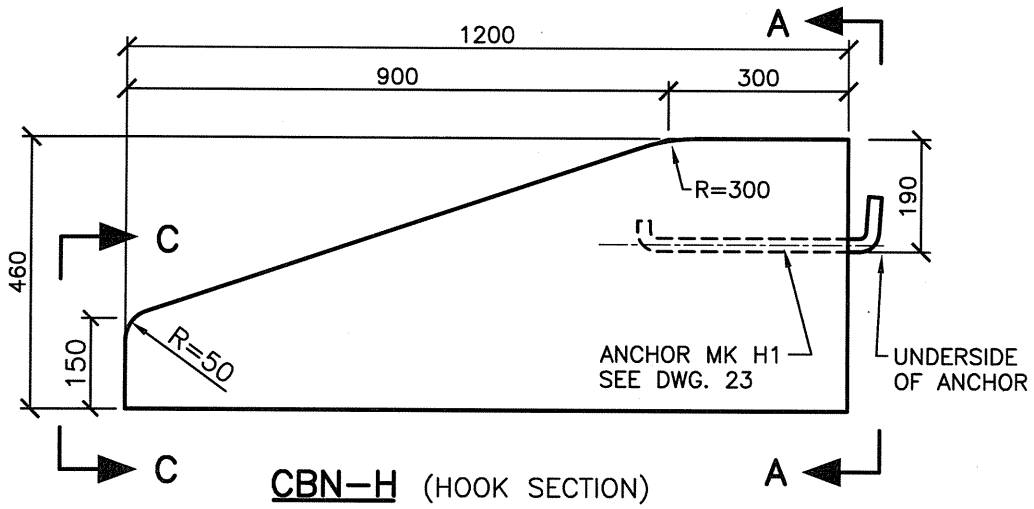
XXXXX XXXXXX
XXXXX XXXXXX
XXXXX XXXXXX

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

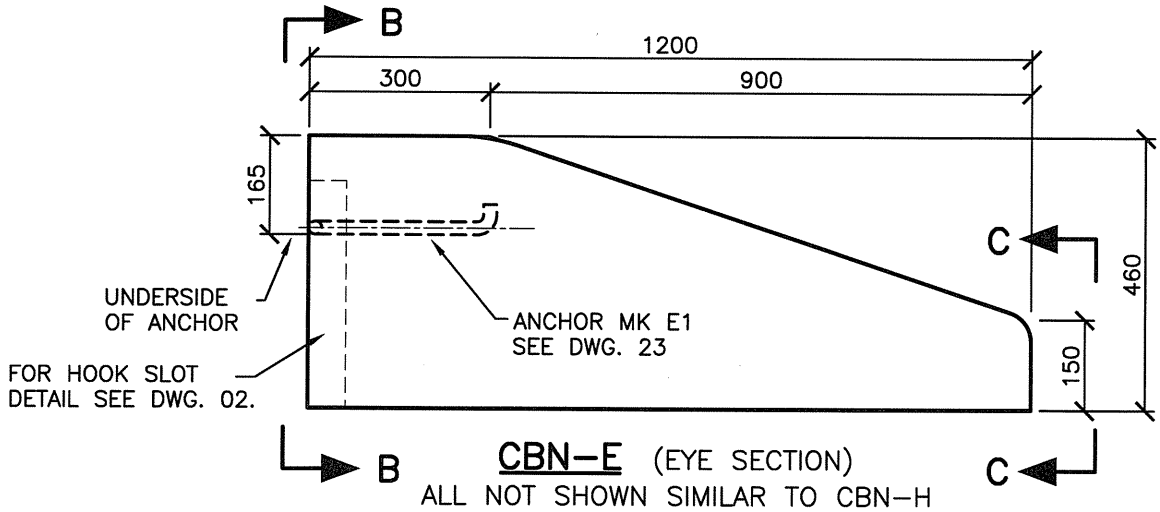
# R.017173.803
# Appendix F

# R.017173.803
# Appendix G

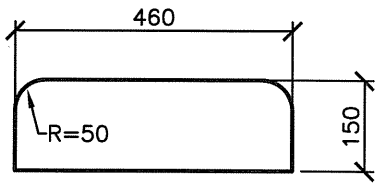
# R.017173.803
# Appendix H




CBN–H (HOOK SECTION)




CBN–E (EYE SECTION)
ALL NOT SHOWN SIMILAR TO CBN–H




VIEW C

**GENERAL NOTES:**

1. FOR VIEWS A & B SEE DWG. 02.
2. FIBRILATED FIBRE STRAND REINFORCED CONCRETE TO BE USED FOR BULL–NOSE (CBN).
3. FIBRILATED FIBRE STRAND REINFORCED CONCRETE MAY BE SUBSTITUTED FOR STEEL REINFORCED CONCRETE IN LOW BARRIER (CLB–H & E)
4. MATERIALS AND QUALITY OF WORK TO BE IN ACCORDANCE WITH STANDARD SPECIFICATION 02845.
5. STANDARD CBN–E MAY BE MANUFACTURED ONLY WITH PRIOR WRITTEN PERMISSION FROM HIGHWAY SAFETY BRANCH.
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

| project title / titre du projet | drawing title / titre du dessin |
|---|---|
| **ALASKA HIGHWAY**<br>**BRITISH COLUMBIA** | **PRECAST CONCRETE BULL-NOSE**<br>**460mm - CBN-H & CBN-E** |

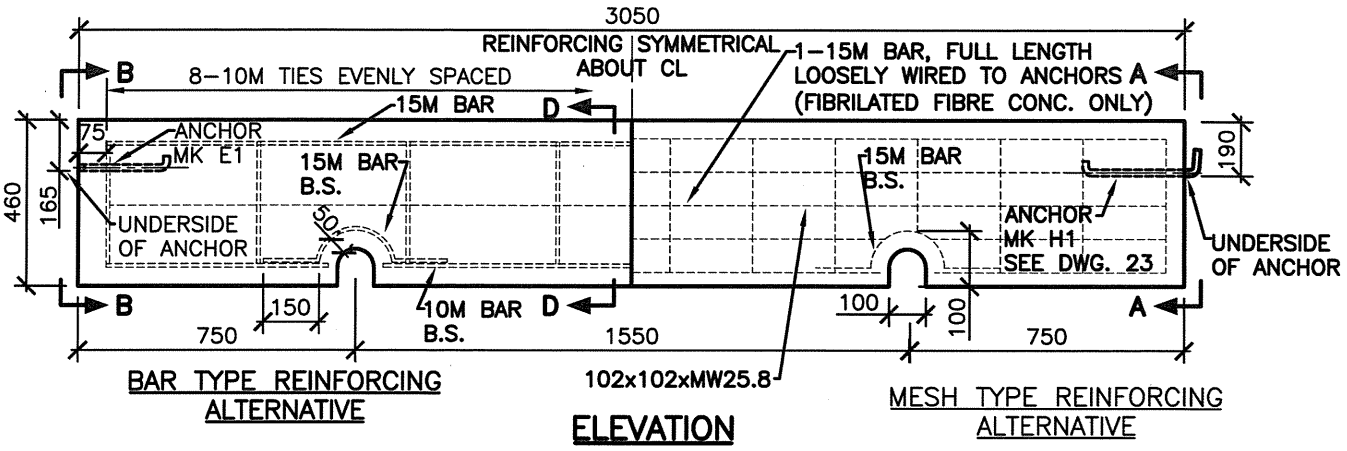
Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

REAL PROPERTY SERVICES
Western Region

| designed by / concu par | drawn by / dessine par | scale / echelle | date / date |
|---|---|---|---|
| | | N.T.S. | JULY 2001 |
| approved by / approuve par | | project no. / projet no. | |
| PWGSC Project Manager / Administrateur de Projets TPSGC | | sheet / feuille | 01 |

A – 8.5x11

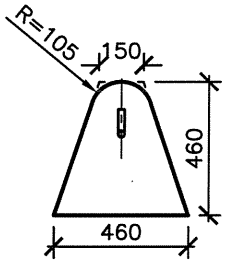
S:\CADD STANDARDS\HWY\STD-DWG\BCTH\01



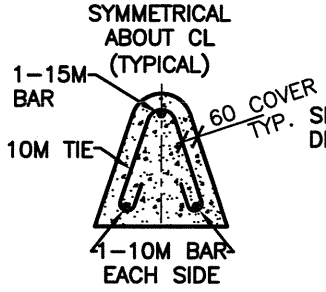

BAR TYPE REINFORCING ALTERNATIVE

MESH TYPE REINFORCING ALTERNATIVE

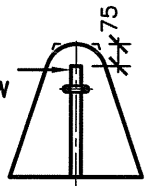
## ELEVATION



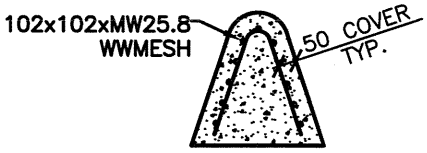

## VIEW A
(HOOK END)



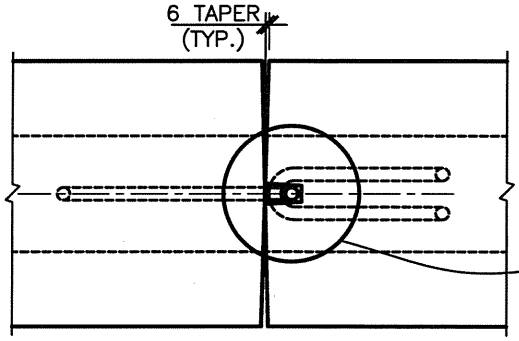

## SECTION D
(BAR TYPE REINFORCING ALTERNATIVE)



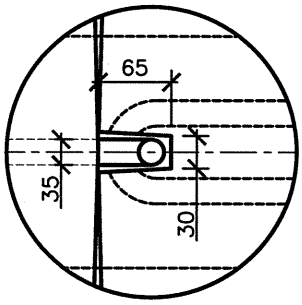

## VIEW B
(EYE END)




## SECTION D
(MESH TYPE REINFORCING ALTERNATIVE)




## HOOK AND EYE DETAIL




## HOOK SLOT DETAIL

**NOTE:**

1. FOR GENERAL NOTES SEE DWG. 01.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

| project title / titre du projet | drawing title / titre du dessin |
|---|---|
| **ALASKA HIGHWAY BRITISH COLUMBIA** | **PRECAST CONCRETE LOW BARRIER 460mm - CLB-H & E** |

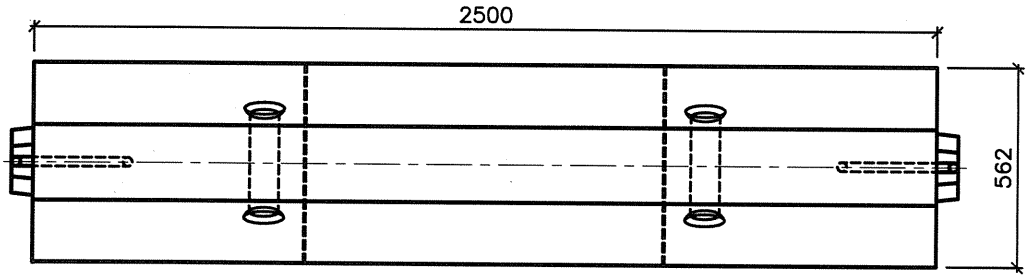
Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

REAL PROPERTY SERVICES
Western Region

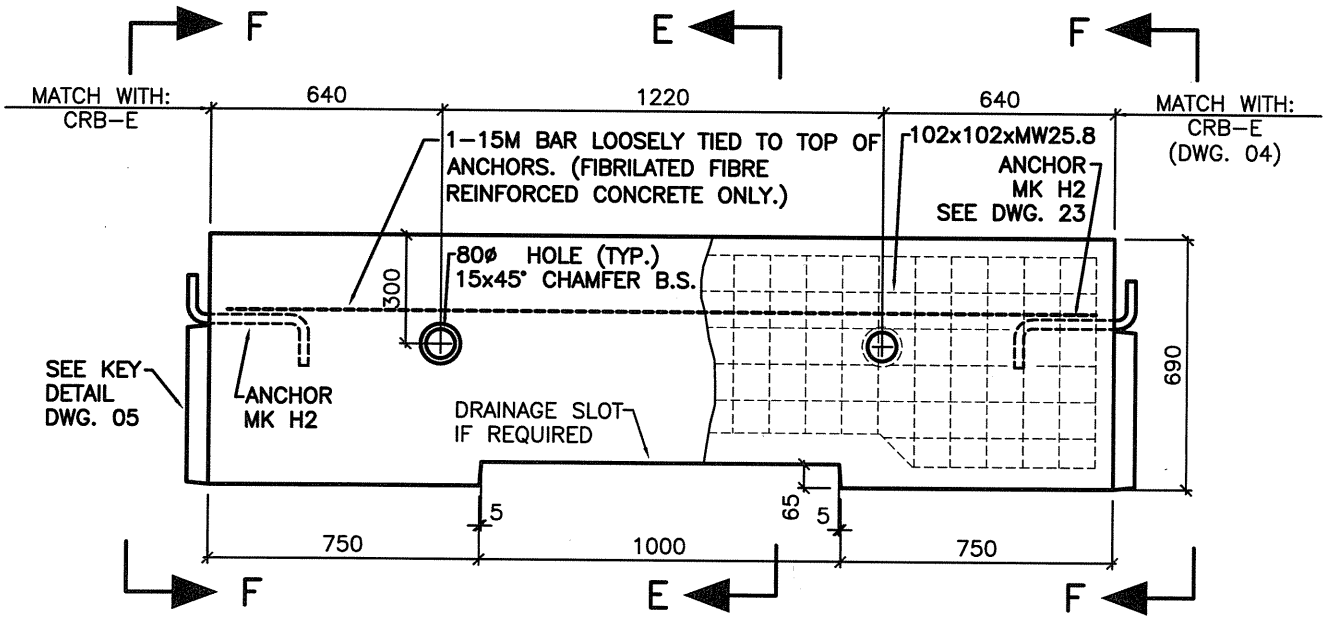
| designed by / concu par | drawn by / dessine par | scale / echelle | date / date |
|---|---|---|---|
| | | N.T.S. | JULY 2001 |
| approved by / approuve par | | project no. / projet no. | |
| PWGSC Project Manager / Administrateur de Projets TPSGC | | sheet / feuille | 02 |

A – 8.5x11

S:\CADD STANDARDS\HWY\STD-DWG\BCTH\02




PLAN




ELEVATION

## GENERAL NOTES:

1. FOR SECTION E, SEE DWG. 04. FOR VIEW F SEE DWG. 05.
2. FOR DETAILS OF EYE UNIT, SEE DWG. 04.
3. ALL REINFORCING TO HAVE 50 MINIMUM COVER EXCEPT AS NOTED.
4. ALL TOLERANCES ±3 EXCEPT AS NOTED.
5. CHANGES TO PICK–UP HOLE DIAMETERS MAY BE MADE WITH THE WRITTEN PERMISSION OF THE HIGHWAY SAFETY ENGINEER.
6. HOOK AND EYE ANCHORS EACH END SHALL BE SECURED IN PLACE DURING CASTING TO PREVENT DISLODGEMENT.
7. MATERIALS AND QUALITY OF WORK TO BE IN ACCORDANCE WITH STANDARD SPECIFICATION 02845.
8. DRAINAGE SLOT IS REQUIRED WHEN NECESSARY TO DRAIN SURFACE WATER THROUGH THE BARRIER.
9. SHEAR KEY VOID WITH GROUTING HOLES BY REQUEST.
10. FIBRILATED FIBRE STRAND REINFORCED CONCRETE MAY BE SUBSTITUTED FOR WELDED WIRE MESH REINFORCED CONCRETE.
11. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

project title / titre du projet

**ALASKA HIGHWAY**
**BRITISH COLUMBIA**

drawing title / titre du dessin

**PRECAST CONCRETE ROADSIDE BARRIER**
**690 mm - CRB-H**

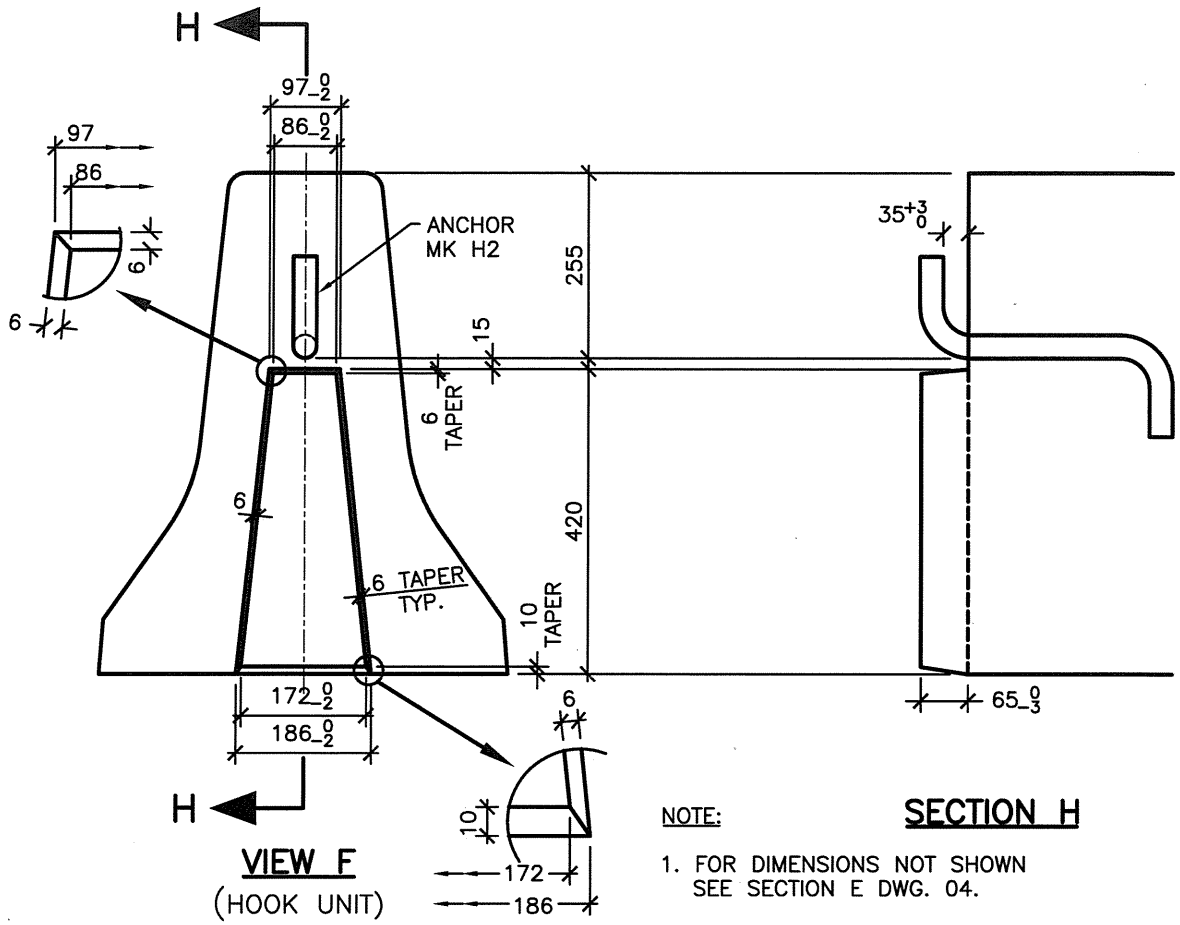
Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

REAL PROPERTY SERVICES
Western Region

| designed by / concu par | drawn by / dessine par | scale / echelle | date / date |
|---|---|---|---|
| | | N.T.S. | JULY 2001 |
| approved by / approuve par | | project no. / projet no. | |
| PWGSC Project Manager / Administrateur de Projets TPSGC | | sheet / feuille | 03 |

A – 8.5x11

S:\CADD STANDARDS\HWY\STD-DWG\BCTH\03

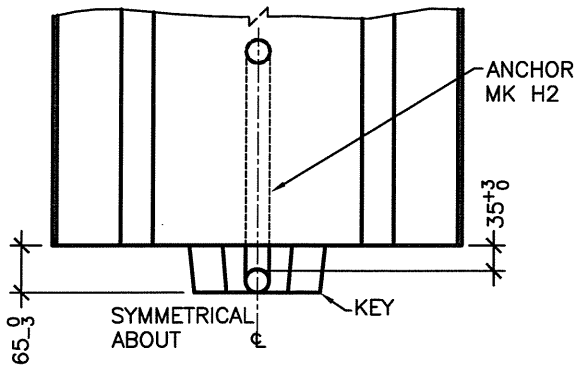



VIEW F
(HOOK UNIT)

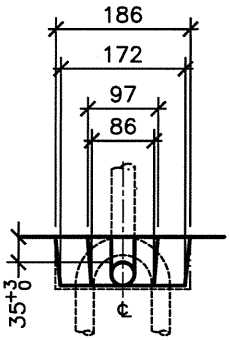
NOTE:

1. FOR DIMENSIONS NOT SHOWN SEE SECTION E DWG. 04.

SECTION H




PLAN – END – HOOK UNIT




CONNECTION DETAIL

NOTES:

1. FOR LOCATION OF VIEW F, SEE DWG's. 03, 16, 17, 19.
2. FOR GENERAL NOTES, SEE DWG. 03.
3. FOR DETAILS OF ANCHORS SEE DWG. 23.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

| project title / titre du projet | drawing title / titre du dessin |
|---|---|
| **ALASKA HIGHWAY**<br>**BRITISH COLUMBIA** | **PRECAST CONCRETE ROADSIDE BARRIER**<br>**690 mm - CRB-H DETAILS** |

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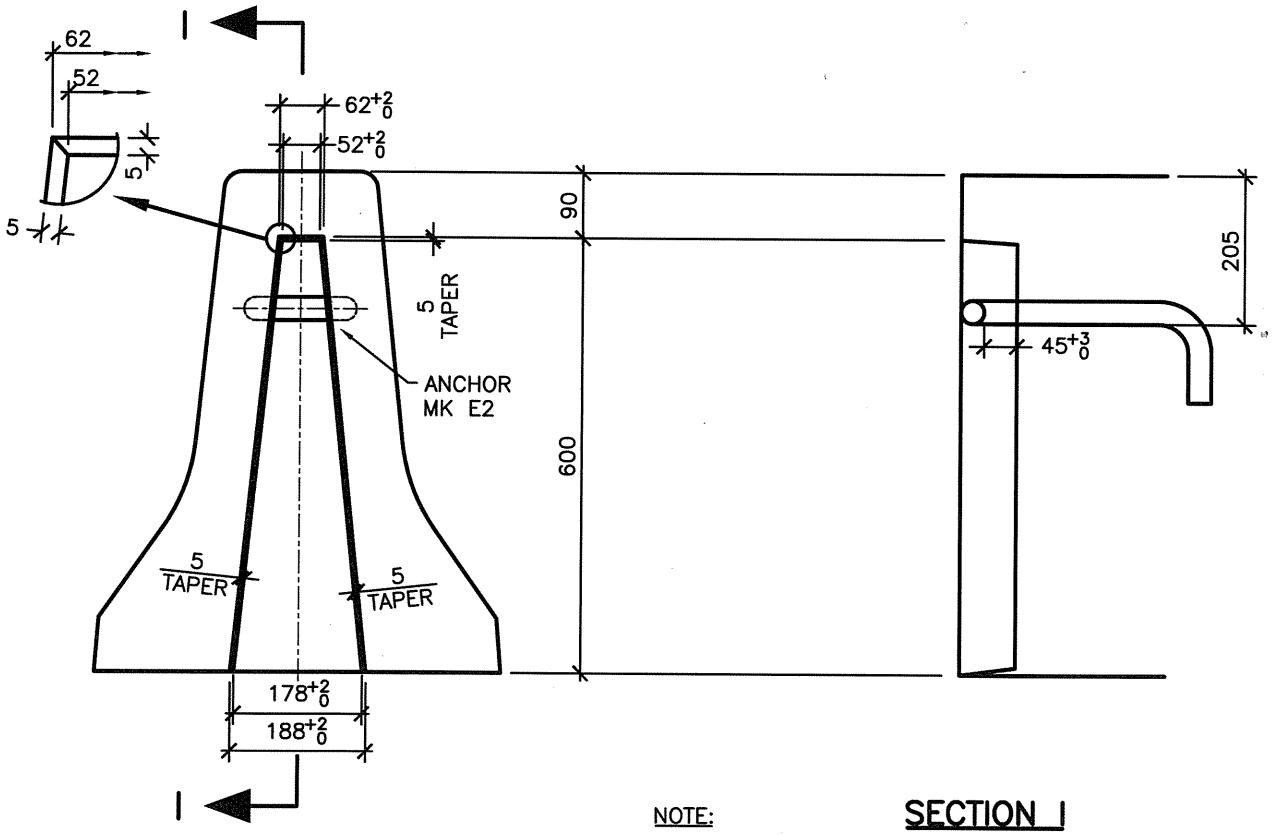
Western Region

| designed by / concu par | drawn by / dessine par | scale / echelle | date / date |
|---|---|---|---|
| | | N.T.S. | |
| approved by / approuve par | | project no. / projet no. | |
| PWGSC Project Manager / Administrateur de Projets TPSGC | | sheet / feuille | 05 |

A – 8.5x11

S:\CADD STANDARDS\HWY\STD-DWG\BCTH\05

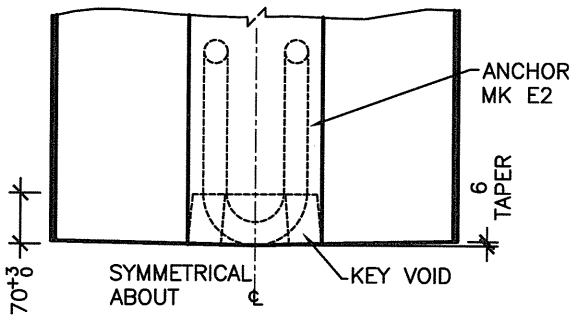



## VIEW G
(EYE UNIT)

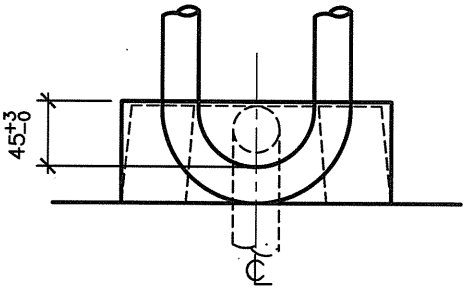
## SECTION I

NOTE:

1. FOR DIMENSIONS NOT SHOWN SEE SECTION E DWG. 04.




## PLAN – END – EYE UNIT




## CONNECTION DETAIL

NOTES:

1. FOR LOCATION OF VIEW G, SEE DWG's. 04, 07 & 15.
2. FOR GENERAL NOTES, SEE DWG. 03.
3. FOR DETAILS OF ANCHORS SEE DWG. 23.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

| project title / titre du projet | drawing title / titre du dessin |
|---|---|
| **ALASKA HIGHWAY**<br>**BRITISH COLUMBIA** | **PRECAST CONCRETE ROADSIDE BARRIER**<br>**690 mm - CRB-E DETAILS** |

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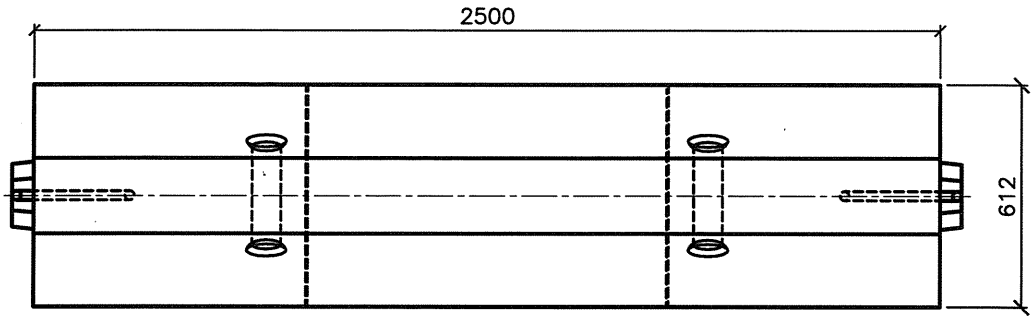
REAL PROPERTY SERVICES
Western Region

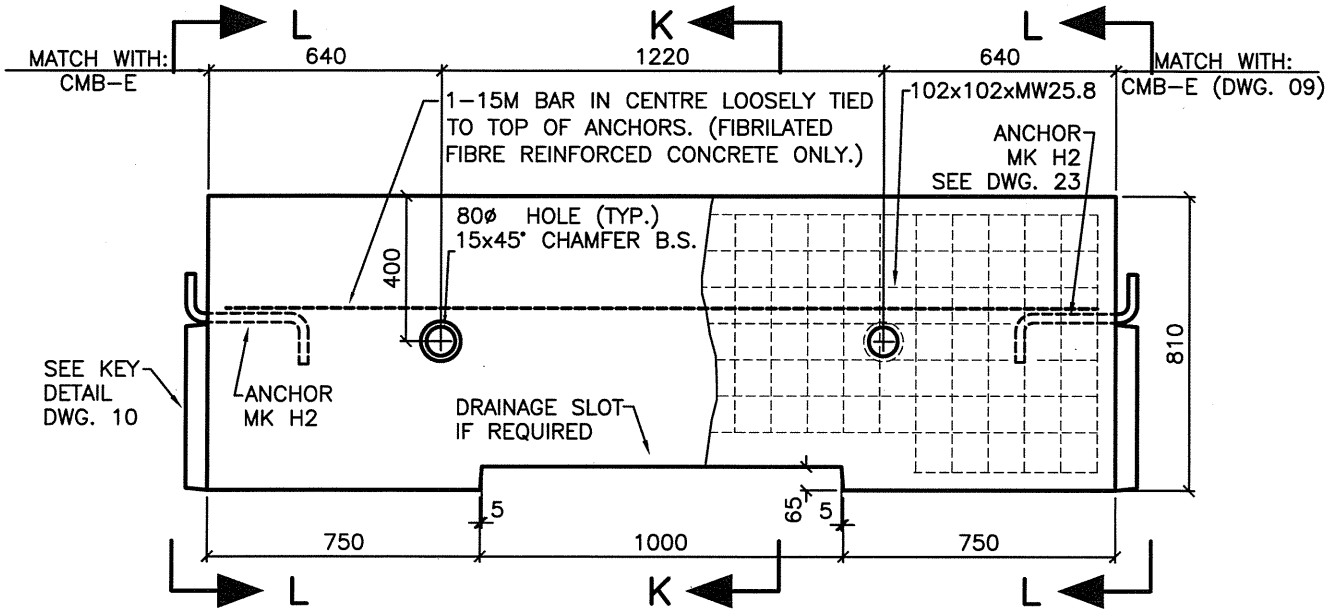
| designed by / concu par | drawn by / dessine par | scale / echelle | date / date |
|---|---|---|---|
| | | N.T.S. | |
| approved by / approuve par | | project no. / projet no. | |
| PWGSC Project Manager / Administrateur de Projets TPSGC | | sheet / feuille | 06 |

A – 8.5x11

S:\CADD STANDARDS\HWY\STD-DWG\BCTH\06




PLAN




ELEVATION

NOTES:

1. FOR SECTION K SEE DWG. 09. FOR VIEW L SEE DWG. 10.
2. FOR GENERAL NOTES SEE DWG. 03.
3. SEE DWG. 09 FOR DETAILS OF EYE UNIT.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

| project title / titre du projet | drawing title / titre du dessin |
|---|---|
| **ALASKA HIGHWAY**<br>**BRITISH COLUMBIA** | **PRECAST CONCRETE ROADSIDE BARRIER**<br>**810 mm - CMB-H** |

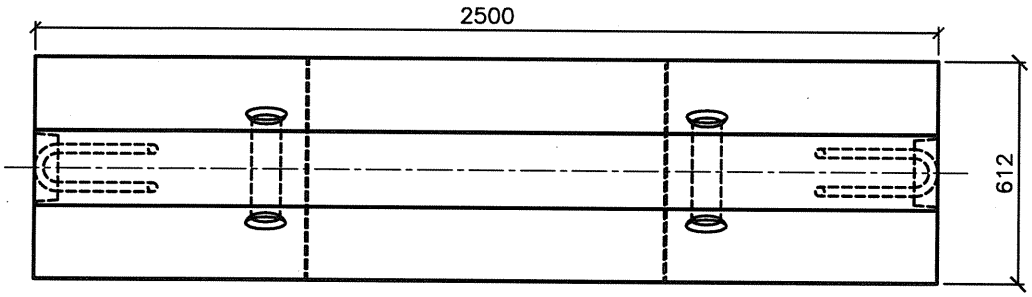
Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

REAL PROPERTY SERVICES
Western Region

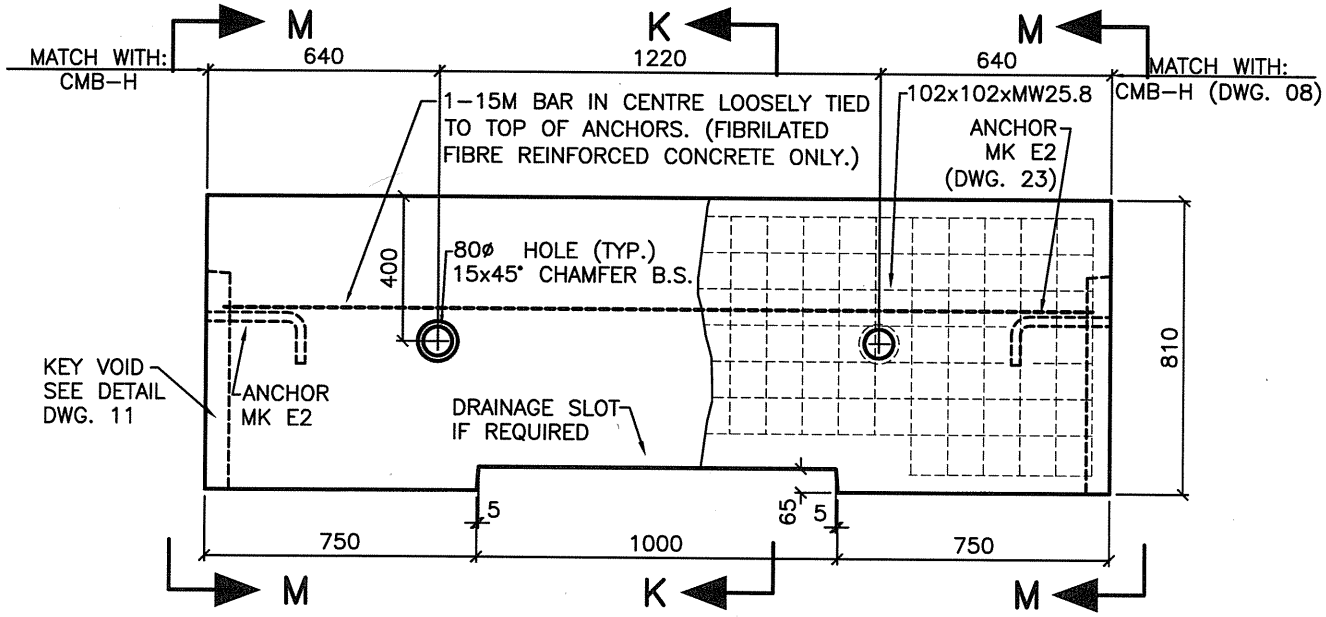
| designed by / concu par | drawn by / dessine par | scale / echelle | date / date |
|---|---|---|---|
| | | N.T.S. | |
| approved by / approuve par | | project no. / projet no. | |
| PWGSC Project Manager / Administrateur de Projets TPSGC | | sheet / feuille | 08 |

A – 8.5x11

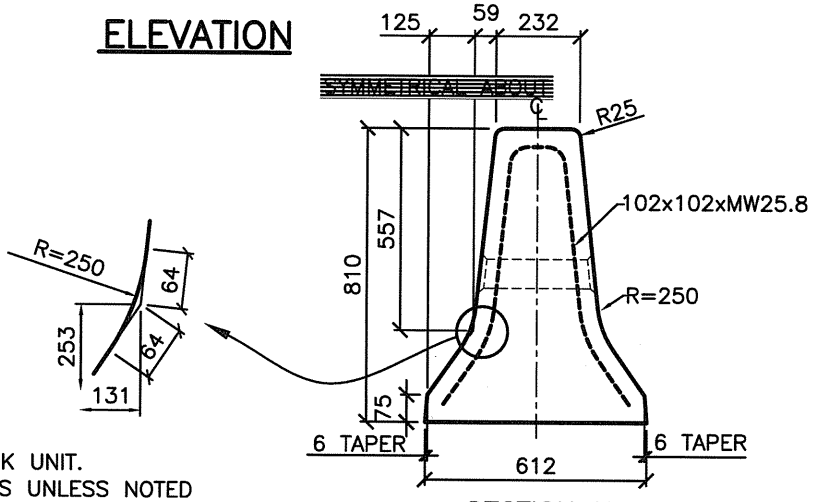
S:CADD STANDARDS\HWY\STD-DWG\BCTH\08




## PLAN




## ELEVATION




## SECTION K

NOTES:

1. FOR VIEW M SEE DWG. 11.
2. FOR GENERAL NOTES SEE DWG. 03.
3. SEE DWG. 08 FOR DETAILS OF HOOK UNIT.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

| project title / titre du projet | drawing title / titre du dessin |
|---|---|
| **ALASKA HIGHWAY**<br>**BRITISH COLUMBIA** | **PRECAST CONCRETE ROADSIDE BARRIER**<br>**810 mm - CMB-E** |

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

REAL PROPERTY SERVICES
Western Region

| designed by / concu par | drawn by / dessine par | scale / echelle | date / date |
|---|---|---|---|
| | | N.T.S. | |
| approved by / approuve par | | project no. / projet no. | |
| PWGSC Project Manager / Administrateur de Projets TPSGC | | sheet / feuille | 09 |

A – 8.5x11

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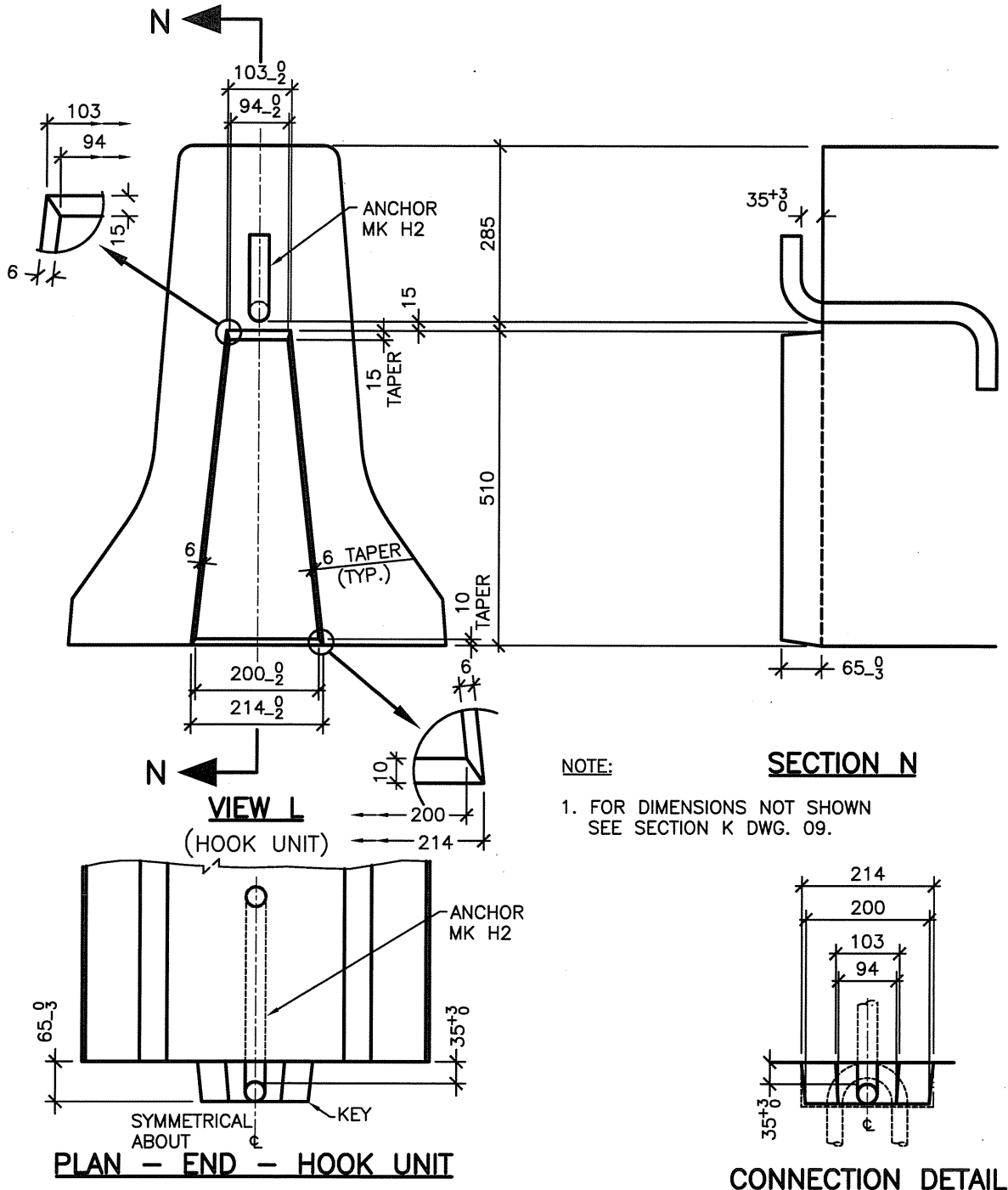


NOTES:

1. FOR LOCATION OF VIEW L, SEE DWG's. 08 & 16.
2. FOR GENERAL NOTES, SEE DWG. 03.
3. FOR DETAILS OF ANCHORS SEE DWG. 23.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

| project title / titre du projet | drawing title / titre du dessin |
|---|---|
| **ALASKA HIGHWAY**<br>**BRITISH COLUMBIA** | **PRECAST CONCRETE ROADSIDE BARRIER**<br>**810 mm - CRB-H DETAILS** |

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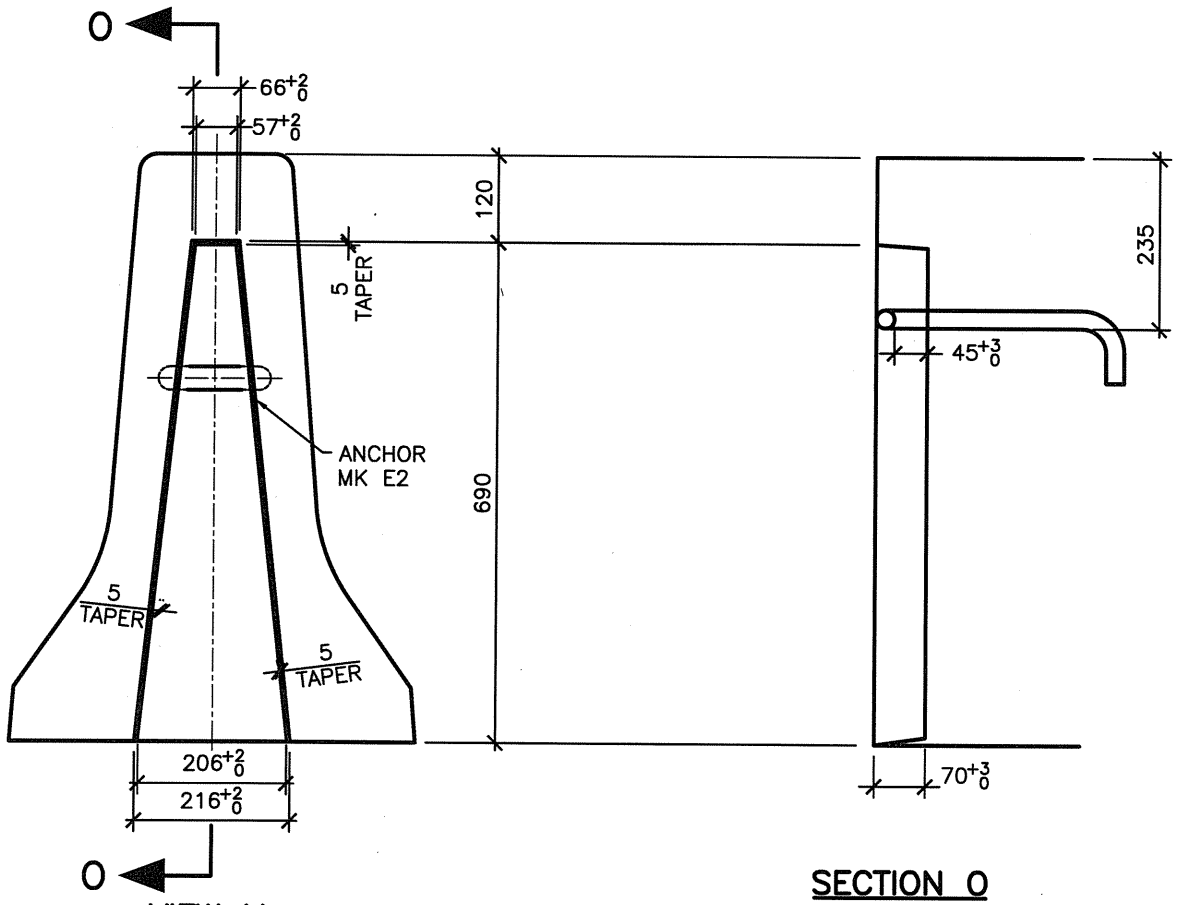
REAL PROPERTY SERVICES
Western Region

| designed by / concu par | drawn by / dessine par | scale / echelle | date / date |
|---|---|---|---|
| | | N.T.S. | |
| approved by / approuve par | | project no. / projet no. | |
| PWGSC Project Manager / Administrateur de Projets TPSGC | | sheet / feuille | 10 |

A – 8.5x11

S:\CADD STANDARDS\HWY\STD-DWG\BCTH\10

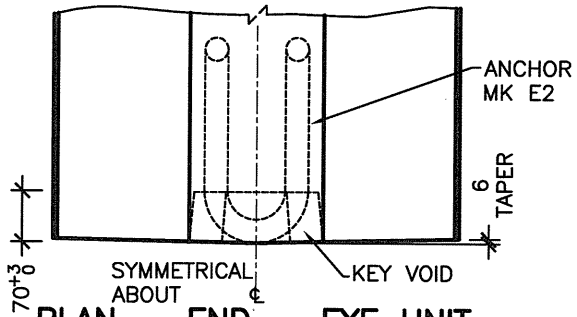



## VIEW M
(EYE UNIT)

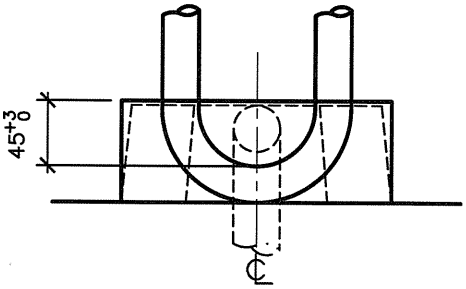
## SECTION 0

NOTE:

1. FOR DIMENSIONS NOT SHOWN SEE SECTION K DWG. 09.




## PLAN – END – EYE UNIT




## CONNECTION DETAIL

NOTES:

1. FOR LOCATION OF VIEW M, SEE DWG. 09.
2. FOR GENERAL NOTES, SEE DWG. 03.
3. FOR DETAILS OF ANCHORS SEE DWG. 23.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

| project title / titre du projet | drawing title / titre du dessin |
|---|---|
| **ALASKA HIGHWAY**<br>**BRITISH COLUMBIA** | **PRECAST CONCRETE ROADSIDE BARRIER**<br>**810 mm - CRB-E DETAILS** |

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| PWGSC Project Manager / Administrateur de Projets TPSGC | | sheet / feuille | 11 |

A – 8.5x11

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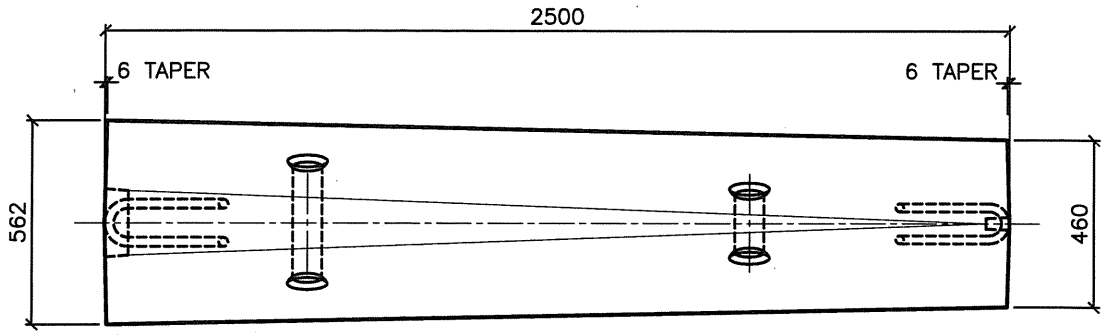
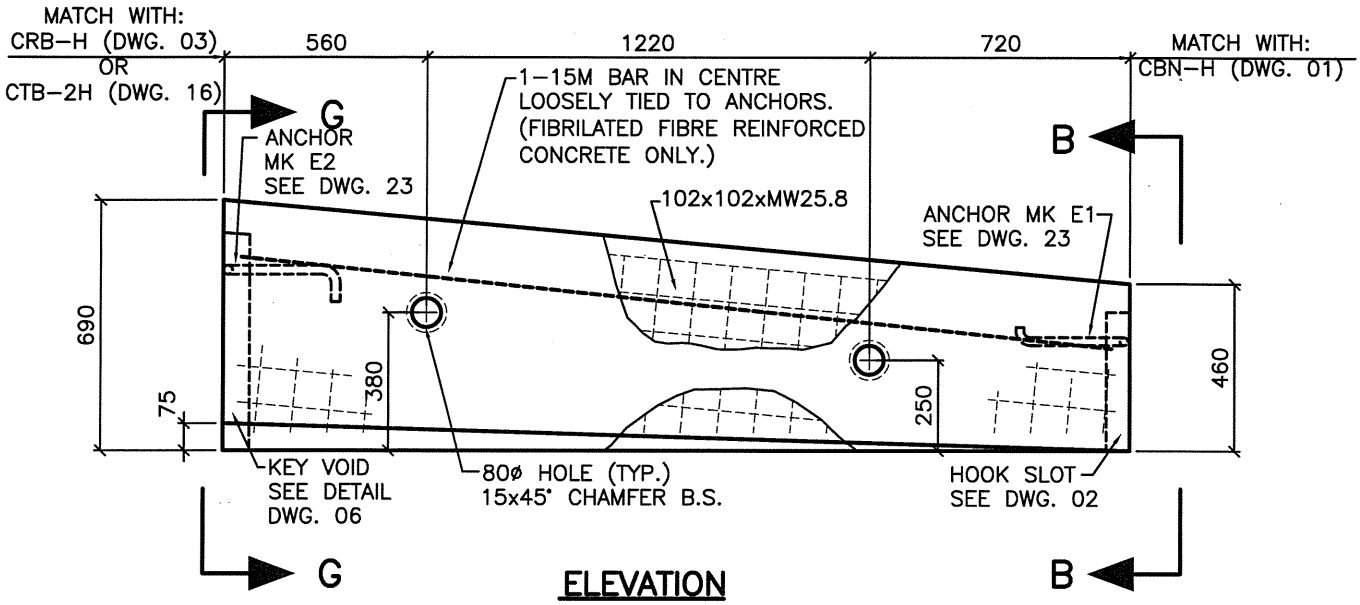



PLAN




ELEVATION

**NOTES:**

1. FOR VIEW B SEE 02. FOR VIEW G SEE DWG. 06.
2. FOR GENERAL NOTES SEE DWG. 03.
3. SEE DWG.'S 01 AND 02 FOR DETAILS OF 460 UNIT AND BULLNOSE.
   SEE DWG. 03 FOR DETAILS OF 690 HOOK UNIT OR
   DWG. 16 FOR DETAILS OF 810 TO 690 TRANSITION UNIT.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

| project title / titre du projet | drawing title / titre du dessin |
|---|---|
| **ALASKA HIGHWAY**<br>**BRITISH COLUMBIA** | **PRECAST CONCRETE TRANSITION BARRIER**<br>**690 mm TO 460 mm - CTB-1E** |

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| PWGSC Project Manager / Administrateur de Projets TPSGC | | sheet / feuille | 15 |

A – 8.5x11

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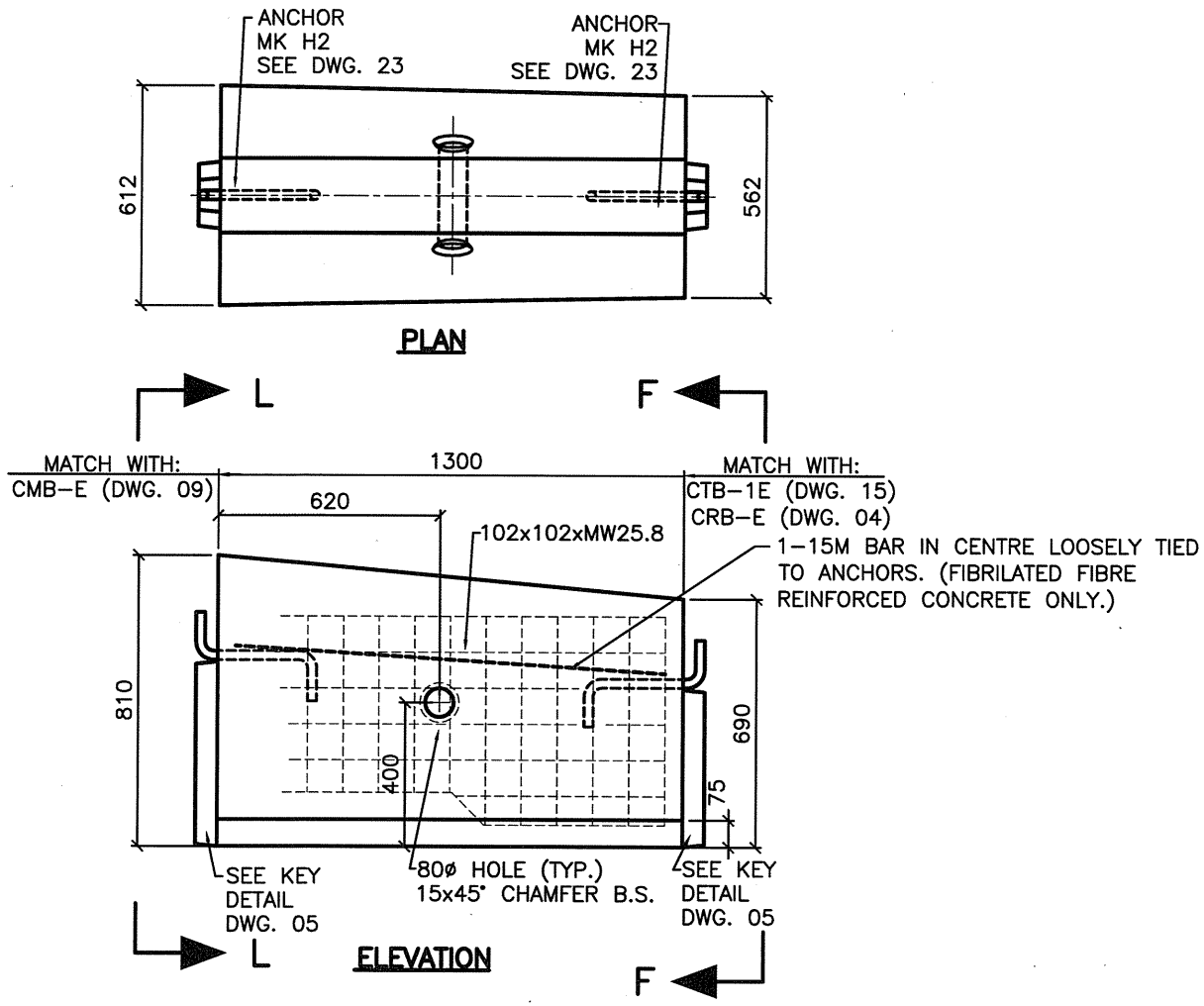


**NOTES:**

1. FOR VIEW F SEE DWG. 05.
   FOR VIEW L SEE DWG. 10.
2. FOR GENERAL NOTES SEE DWG. 03.
3. SEE DWG. 09 FOR DETAILS OF 810 EYE UNIT.
   SEE DWG. 04 FOR DETAILS OF 690 EYE UNIT.
   SEE DWG. 15 FOR DETAILS OF 690 TO 460 TRANSITION UNIT.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

| project title / titre du projet | drawing title / titre du dessin |
|---|---|
| **ALASKA HIGHWAY**<br>**BRITISH COLUMBIA** | **PRECAST CONCRETE TRANSITION BARRIER**<br>**810 mm TO 690 mm - CTB-2H** |

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A – 8.5x11

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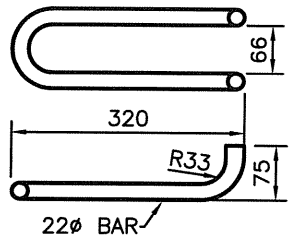
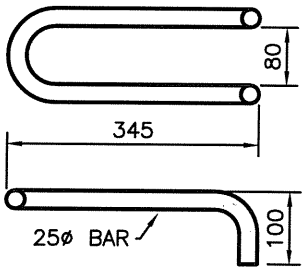
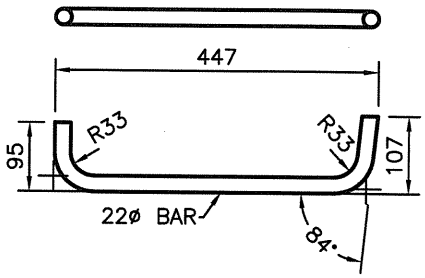


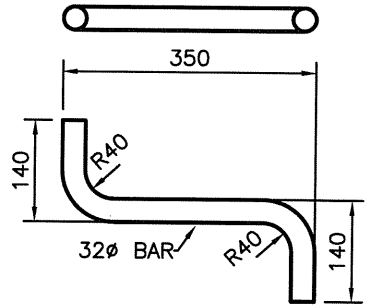

ANCHOR MK E1




ANCHOR MK E2




ANCHOR MK H1

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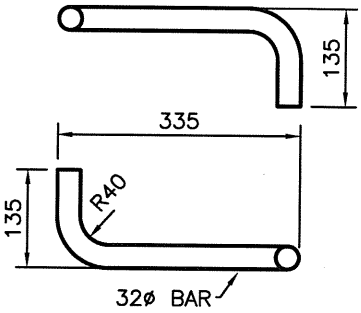


ANCHOR MK H3

# NOTES:

1. STEEL FOR ANCHORS TO CONFORM TO CSA SPECIFICATION CAN3–G40.21M.
2. ANCHORS TO BE GALVANIZED AFTER FABRICATION. GALVANIZING TO BE IN ACCORDANCE WITH CSA SPECIFICATION G164 TABLE 1.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

| project title / titre du projet | drawing title / titre du dessin |
|---|---|
| **ALASKA HIGHWAY**<br>**BRITISH COLUMBIA** | **NO POST BARRIER**<br>**ANCHORING HARDWARE** |

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