DRAWINGS:

BRIDGE DRAWINGS:

ROADWAY DRAWINGS:

REFERENCE DRAWINGS:

1956 ORIGINAL DESIGN DRAWINGS, POBOKTAN CREEK BRIDGE, JASPER NATIONAL PARK

1995 POBOKTAN CREEK BRIDGE DECK REHABILITATION KM 157.74 AS CONSTRUCTED DRAWINGS, PROJECT NO. 668526, ICEFIELD PARKWAY, BANFF-JASPER HIGHWAY 93 NORTH, JASPER NATIONAL PARK

REFERENCE MATERIAL:

Parks Canada Preapproved Routine Impact Assessment – Roads and Related Infrastructure, 2019

Parcs Canada Évaluation d'impact courante préapprouvée – Routes-et-infrastructures-connexes, 2019

Direction for Permitted Users Conducting Water-related Activities in LLYK

Whirling Disease Protocol (French version of Direction for Permitted Users Conducting Water-related Activities in LLYK)

Standard CMS Translations (Jul 2018)

Construction Signage Translation (Jul 2018)

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All sections.

.2 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.2 DEFINITIONS

.1 British Columbia Ministry of Transportation and Infrastructure is referred to as "MoTI".

.1 The latest version of the BC MoTI Standard Specifications for Highway Construction is to be used.

.2 Alberta Transportation is referred to as “AT”.

.1 The latest version of the AT Standard Specifications for Highway Construction is to be used.

.3 Changes in Definition, - The following changes in definitions have been made to the “BC MoTI Specifications”:

.1 Ministry Representative – The word “Ministry Representative” shall mean Parks Canada Departmental Representative or their duly appointed representative.

.2 Ministry – The word “Ministry” shall mean Parks Canada Agency.

.4 Changes in Definition, - The following changes in definitions have been made to the “AT Specifications”:

.1 Consultant – The word “Consultant” shall mean Departmental Representative or their duly appointed representative.

.2 Department – The word “Department” shall mean Parks Canada Agency.

.5 Jasper National Park of Canada is referred to as “JNP”.

.6 Trans-Canada Highway is referred to as “TCH”.

.7 Parks Canada Agency is referred to as “PCA”.

.8 Canadian Pacific Railway is referred to as “CP Rail”.

.9 Environmental Surveillance Officer is referred to as “ESO”.

.10 Watercourse is as defined in the National Parks Act.

.11 Site means the areas on or within the limits of Construction as referenced on the Drawings and/or described in the Contract Documents.

.12 Work means the provision of all labour, services, material, and equipment as necessary for the Contractor to complete and perform its obligations in accordance with the Contract.

1.3 PROJECT LOCATION

.1 The project is located in Jasper National Park, Alberta. Construction work is on the Icefields Parkway/ Highway 93N at km 157.7. The following are key locations relative to the project:

.1 Hwy 93N km 0 – TCH and Hwy 93N Intersection, BNP

.2 HWY 93N km 0.4 – Access Road to Niblock Pit

.3 Hwy 93N km 75.95 – Hwy 93N and Hwy 11 (David Thompson Highway) Intersection

.4 Hwy 11 km 3.2 – David Thompson Pit, BNP

.5 Hwy 93N km 120.9 – Banff and Jasper National Parks Boundary

.6 Hwy 93N km 179.4 – Access Road to Ranger Pit

.7 Hwy 93N km 215 – Access Road to 8 Mile Pit

.8 Hwy 93N km 227.4 – Hwy 93N and Hwy 16 Intersection, JNP

1.4 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises rehabilitation of the Poboktan Creek Bridge and associated roadway works located at km 157.7 of Highway 93N (Icefields Parkway) in Jasper National Park, Alberta, as nominally measured from the Trans-Canada Highway.

.2 Preparation of an Environmental Protection Plan for the Work.

.1 An "Environmental Protection Plan" (EPP) is to be prepared and followed by the successful Contractor to meet the requirements of Section 01 35 43 – Environmental Procedures, to ensure that any adverse effects are minimal. The Contractor's EPP must be approved by the Departmental Representative on behalf of Parks Canada Agency (PCA) prior to the commencement of construction. The Departmental Representative and Parks Canada's Environmental Surveillance Officer (ESO) will refer to the approved EPP and these specifications in determining compliance with the plan and contract specifications. The EPP will form part of this contract.

.3 Without limiting the scope of work, the work of this Contract generally comprises the following:

.1 Mobilization and site preparation.

.2 Project management and coordination.

.3 Traffic management during construction.

.4 Quality control and quality assurance of all construction activities except as noted following:

.1 The Departmental Representative shall complete quality assurance for roadway works.

.5 Environmental management during construction.

.6 Health and Safety management during construction.

.7 Protection of utilities and coordination of utility relocations.

.8 Construction to be completed in two Stages.

.9 Source appropriate site(s) outside of the Park for disposal of waste materials.

.10 Roadway works, including but not limited to:

.1 Clearing and Grubbing of areas designated in the Contract documents in accordance with Section 31 11 00 – Clearing and Grubbing.

.2 Stripping of organic material designated in the Contract documents and in accordance with Section 31 24 13 – Roadway and Drainage Excavation.

.3 Installation and maintenance of temporary barriers and supply and installation of temporary traffic control and other temporary construction facilities required for the Work.

.4 Removal of existing asphalt on approaches by milling and stockpiling material in accordance with Section 02 41 13 – Asphalt Pavement Removal.

.5 Excavating all types of material from the right-of-way cuts, hauling and placing this material in embankments or in stockpiles designated in the Contract Documents and in accordance with Section 31 24 13 – Roadway and Drainage Excavation.

.6 Supply, load, haul and place base course materials in accordance with Section 32 11 24 - Granular Base Course.

.7 Perform mix design for AT Mix Type H1 (16mm) Asphalt Concrete Pavement using PG 58-34 Asphalt Binder.

.8 AT Designation 1 Class 16 Asphalt Aggregate and asphalt binder PG 58-34 is to be supplied by the Contractor from outside of the Park.

.9 Use of processed Reclaimed Asphalt Pavement (RAP) material in hot mix asphalt construction is not permitted in accordance with Section 32 12 16 – Asphalt Concrete Pavement (EPS).

.10 Supply and installation of new CSP culverts/extensions in accordance with Section 33 42 13 – Pipe Culverts.

.11 Placement of topsoil on finished slopes in accordance with Section 32 91 19 – Topsoil Placement and Grading.

.12 Supply and installation of hydroseeding on finished slopes in accordance with Section 32 92 22 – Hydraulic Seeding.

.13 Supply and installation of modified British Columbia Ministry of Highways Precast Concrete Barriers in accordance with Section 33 71 13 – Precast Concrete Barrier.

.14 Supply and install permanent Guide Posts in accordance with Section 32 17 31 – Guide Posts.

.15 Supply and install temporary roadway paint markings during construction as required in accordance with Section 01 55 26 – Traffic Control.

.16 Supply and install Permanent line markings in accordance with Section 32 17 23 – Pavement Marking.

.17 Supply and install regulatory signs in accordance with Section 10 14 53 – Traffic Signage.

.18 Traffic signage, control and other traffic accommodations in accordance with Section 01 55 26 – Traffic Control.

.19 Miscellaneous Additional Work as directed by the Departmental Representative.

.11 Bridge Rehabilitation works, including but not limited to:

.1 Removal and disposal of existing concrete curbs, concrete pylons, approach barriers, and steel railings.

.2 Remove and disposal of asphalt on bridge deck.

.3 Design, supply, fabrication, and installation of temporary soil retaining system(s) to allow for staged construction.

.4 Removal and disposal of existing concrete slab and concrete return walls.

.5 Supply, fabrication, and installation of tiebacks through existing abutments. Including tiebacks and lock-blocks.

.6 Modifications to top of existing abutments and pier.

.7 Supply and construction of new retaining walls.

.8 Supply and installation of new backfill behind abutments.

.9 Supply, fabrication, and installation of new precast concrete girders.

.10 Supply and construction of new concrete diaphragms, new concrete deck and overhangs, and new approach slabs.

.11 Supply and construction of new cast-in-place concrete barriers.

.12 Supply, fabrication, and installation of new steel bicycle railings.

.13 Partial depth concrete repairs on substructure when authorized by department representative.

.12 Demobilization.

.4 The following is a summary of the available pits, intended uses and Owner Furnished Items. To be used in combination with 1.9 – Owner Furnished Items and all other Specifications and Contract Documents. This table is provided for clarification purposes only.

.1 The Contractor may choose to supply any of the available Owner Furnished Items from outside of the Park. No additional payment will be made for supply of materials from outside of the Park.

Location	Material	Quantity Available	Testing Available	Use For
8 Mile Pit	AT Des 2 25mm	Approx. 9,000m3		Backfill, road base
	Stripping / Waste Excavation	-	-	Stockpile in 8 Mile Pit

.5 The Contractor will not be permitted to set up a Mobile Asphalt Plant or use a Stationary Asphalt Plant for this Project within the National Parks.

.1 The asphalt plant to be used on this project, regardless of location, shall be a minimum of 200 tonnes per hour production, equipped with a dry bag system for pollution control, in addition to, or in replacement of standard cyclone dust collectors, to effectively eliminate emissions of dust and smoke pollutants into the atmosphere.

.2 There is no power available at, Ranger, and 8mile Pit.

.6 The Contractor is responsible for sourcing water required for the Works and may be required to obtain it from outside of the National Parks. Accessing local water sources in nearby pits or from other Parks facilities can be coordinated through the Departmental Representative and the ESO but will require the Contractor to obtain a Restricted Access Permit and to adhere to all conditions contained therein.

.7 In preparation for and during construction of this project, an "Environmental Protection Plan" (EPP) is to be prepared by the Contractor to meet the requirements of Section 01 35 43 – Environmental Procedures to ensure the desired minimal adverse effects are achieved. The Contractor's EPP must be approved by Parks Canada Agency prior to the commencement of construction. The Departmental Representative and Parks Canada's Environmental Surveillance Officer (ESO) will refer to the approved EPP in determining compliance with the Plan and Contract Documents. The EPP will form part of the Contract.

.8 Where material and construction specifications for work covered under the Contract, including any Change Orders are not available, AT - Standard Specifications for Highway Construction (latest edition) shall apply unless directed otherwise by the Departmental Representative.

1.5 CONTRACT METHOD

.1 Construct Work under combined price contract.

1.6 WORK BY OTHERS

.1 Other contractors may be working in Jasper National Park. The Contractor shall coordinate his operations with others. No claims for any delays or inconvenience will be entertained.

.2 The Contractor is advised that the following work in the vicinity has been or will be contracted by Parks Canada:

.1 Bridge Rehabilitation km 108, 2024

.2 Line painting at various locations. Summer/Fall 2024

.3 Hwy 93N paving km 0 – 10.

.4 Guardrail installation throughout Hwy 93N corridor.

.5 Other projects and maintenance work may occur along Hwy 93N in 2024.

.3 The Contractor is advised that events may be planned during the anticipated construction season that could impact traffic patterns within Jasper National Park (i.e., annual bike race events).

.4 Where it is necessary that work is to proceed in areas of the project common to both the Contractor and other forces, the Contractor shall cooperate with the other forces and the Owner in reviewing their construction schedules, sharing his work space, and shall coordinate his operations with the other Contractors including traffic management and construction staging.

1.7 WORK SEQUENCE

.1 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.

.2 Schedule work progress to allow Departmental Representative unrestricted access to inspect all phases of the Work.

.3 Required Stages:

.1 Complete all clearing by before 2024 April 14.

.2 The bridge shall be rehabilitated in two stages. One lane of single lane alternating traffic must be provided at all times during construction.

.1 Complete work for Southbound lane (bridge and roadway works) in Stage 1.

.2 Complete work for Northbound lane (bridge and roadway works) in Stage 2.

.3 Stage 1(Southbound) to be completed in entirety prior to beginning Stage 2 (Northbound).

.4 Pre-Mobilization Submittals – To be submitted no later than 14 days after award.

.5 Shop Drawings and Concrete Mix Design(s) – To be submitted no later than 30 days after award.

.6 Substantial Completion – 2024 November 01.

.7 Final Completion – 2024 November 30.

.4 Maintain fire access/control.

.5 Work shall be carried out in accordance with Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.

1.8 CONTRACTOR USE OF PREMISES

.1 Limit use of premises for storage, for Work, and for access, to allow:

.1 Owner occupancy.

.2 Public usage.

.2 Co-ordinate use of premises under direction of Departmental Representative.

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.4 The Contractor and any Subcontractors shall obtain a business license from the Parks Canada Office in Jasper, prior to commencement of the contract.

.5 All Contractor's business and private vehicles are required to obtain a vehicle work pass from Parks Canada. These permits may be obtained at the Parks Canada Administration Office in Jasper.

.6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.9 OWNER FURNISHED ITEMS

.1 Unless specified as an Owner Furnished Item, all materials required to complete the Work are to be supplied by the Contractor. Unless specifically noted otherwise in the specifications, supply of materials required to complete the Work will not be measured but considered incidental to the Work.

.2 Notify the Departmental Representative immediately of any Owner supplied items which may be unfit for purpose.

.3 Owner supplied materials and quantities are in accordance with the table in Section 1.4 – Work Covered by Contract Documents.

.1 Contractor is responsible for any inspections and testing required to determine suitability and confirming available quantity of Owner Furnished Items for use in the Works.

.2 Access to 8 mile Pit for testing of material can be coordinated through Alvin Hemmingson ahemmingson@mcelhanney.com.

.4 The Contractor may choose to supply aggregates from outside of the Park instead of using the Owner Furnished materials. No additional payment will be made for supply of materials from outside of the Park.

1.10 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period for execution of normal operations.

.2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.11 CONSTRUCTION SIGNAGE

.1 No sign or advertisements, other than warning signs, are permitted on site.

.2 Signs and notices for safety and instruction shall be in both official languages.

.1 Graphic symbols shall be diamond grade and shall conform to CAN3-Z321.

.2 Use approved translation list for signage.

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

.4 All temporary traffic control signs that are used for longer than one day shall be mounted on wood posts installed in the shoulder areas at locations accepted by the Departmental Representative.

.5 Signage shall be coordinated with other Contractors.

.6 The Contractor will not be permitted to remove the temporary pavement marking until the final pavement markings have been installed to the satisfaction of the Contract and Departmental Representative.

1.12 SETTING OUT OF WORK

.1 Departmental Representative will establish control points and provide:

.1 Detailed cross-section templates showing design centreline and shoulder grades.

.2 Complete set of construction Drawings.

.3 Alignment notes showing curve data and control point coordinates.

.4 Provide a list of control monuments including coordinates and elevations on request.

.5 Measurements for Payment (Quantity Surveys) and volumes by the surface to surface prismoidal method for roadway and drainage excavation and neat line for all surfaces above the excavated surface at a maximum of 20m intervals. Coordinates unless otherwise stated are UTM Grid and no adjustments will be made to scale the coordinates to ground when calculated volumes by cross-section or setting out of work.

.2 Contractor shall:

.1 Not permanently mark any infrastructure or feature during their setting out of the work. They shall fully remove any set out marks, markers, or other identifiers that they installed, prior to demobilizing from the Work Sites.

.2 Set additional control points as necessary.

.3 Set all work stakes necessary to complete work.

.4 Allow sufficient time for Departmental Representative to take measurements for payment.

.5 Not damage geodetic benchmarks or control monuments unless authorized by Departmental Representative.

.3 No separate payment for setting out work, unless changes are made and approved by the Departmental Representative and additional survey costs are incurred. Payment for additional survey required due to changes by Departmental Representative to be paid for as part under in accordance with Section 01 21 00 – Allowances, **"Lump Sum Price Item 3 – Prime Cost Sum".**

1.13 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy of each document as follows:

.1 Environmental Protection Plan.

.2 Contract Drawings.

.3 Specifications.

.4 Addenda.

.5 Reviewed Shop Drawings.

.6 List of Outstanding Shop Drawings.

.7 Change Orders.

.8 Other Modifications to Contract.

.9 Copy of Traffic Accommodation Strategy (TAS).
.10 Safety Plan.
.11 WHMIS and associated SDS.
.12 Labour conditions and wage schedules.
.13 Applicable current editions of municipal regulations and bylaws.
.14 Field Test Reports.
.15 Copy of Approved Work Schedule.
.16 Health and Safety Plan and Other Safety Related Documents.
.17 Restricted Activity Permits.
.18 Other documents as specified.

1.14 REFERENCE DOCUMENTS

.1 In addition to the Reference Material listed in Section 00 01 10 – Table of Contents, the following reference documents can be provided upon request after Contract Award:

.1 Roadway Sections, including:

.1 Cover Sheet

.2 Section View – Barrier Flares (5 drawings)

Part 2 Products

.1 To be in accordance with AT - Standard Specifications for Highway Construction (latest edition).

.2 Wherever American Society for Testing and Materials (ASTM), Canadian Standards Association (CSA/CAN), Canadian General Standards Board (CGSB) or American Association of State Highway and Transportation Officials (AASHTO) standards are referenced the latest versions of those standards shall apply.

Part 3 Execution

.1 To be in accordance with AT - Standard Specifications for Highway Construction (latest edition).

.2 Wherever American Society for Testing and Materials (ASTM), Canadian Standards Association (CSA/CAN), Canadian General Standards Board (CGSB) or American Association of State Highway and Transportation Officials (AASHTO) standards are referenced the latest versions of those standards shall apply.

END OF SECTION

Part 1 General

1.1 MEASUREMENT PROCEDURES

.1 The cost to the Contractor to meet the requirements described in this section shall be considered incidental to the Work and no additional payment will be made.

1.2 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

.2 Lane closures and other disruptions to traffic shall be performed in accordance with Section 01 55 26 – Traffic Control, and must be done in coordination with the Departmental Representative.

1.3 USE OF SITE AND FACILITIES

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

.2 While the Work Sites are under the Contractor's control, the Contractor shall be entirely responsible for the security of the Work Sites and of the Work, and for the security of the work of Other Contractors located on the Work Sites.

.3 Keep the Work Sites clean and free from accumulation of waste materials and rubbish regardless of source. Remove snow as necessary for the performance and inspection of the work.

.4 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.5 Provide for all traffic. Construct barriers in accordance with Section 01 55 26 – Traffic Control and Section 01 56 00 – Temporary Barriers and Enclosures.

.6 Construction camps inside any National Park are not permitted.

.7 Office/tool trailer may be set up near the bridge sites at a location approved by the Departmental Representative.

.8 Provide sanitary facilities for work force in accordance with governing regulations and the Environmental Procedures for this project. Post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.

.9 Any damage to the Work Sites caused by the Contractor shall be repaired by the Contractor at its expense.

.10 The work may be performed 24 hours a day, seven days per week, with following work restrictions for slowing or stopping of traffic.

.1 Work restrictions related to slowing or stopping of traffic are provided in Section 01 55 26 – Traffic Control.

.11 The Contractor is advised that events may be planned during the anticipated construction season that could impact traffic patterns within Jasper National Park (i.e. annual bike race events).

1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.5 WORK CONDUCTED OVER OR ADJACENT TO WATERWAYS

.1 All components of the Work shall be conducted in accordance with Section 01 35 43 - Environmental Procedures.

.2 All components of the Work shall be conducted without equipment (including any temporary works) entering into wetlands, water bodies, streams and rivers. Refer to Section 01 35 43 - Environmental Procedures for details.

.3 All waste materials from the Work shall be contained and collected in a manner to prevent any contact with the river valleys and waterways. All collected waste materials shall be disposed of in accordance with Section 01 35 43 - Environmental Procedures and the Environmental Protection Plan prepared for the project.

.4 The Contractor is responsible for the development and supply of construction access to the Work as approved by the Departmental Representative.

1.6 EXISTING SERVICES

.1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 The locations of Utilities, if any, shown or not shown on the Drawings, are subject to verification by the Contractor. This includes, but is not limited to:

.1 Telus line.

.3 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.

.4 The Contractor shall assess the possible impact of its operations on all Utilities that may be affected by its operations, and shall protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.

.5 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work.

.1 The Contractor shall advise Utilities of intended Works within fourteen days of Contract Award and obtain written approval for the intended methods of preserving the Utilities during Construction from all Utility Owners a minimum three (3) weeks prior to affecting any Utility.

.2 The Contractor shall be responsible for coordinating work and schedule to accommodate any blackout periods or other restrictions related to the Utilities. No claims for any delays or inconvenience will be entertained.

.3 The Contractor shall keep the Departmental Representative informed of all communications with the Utility companies and authorities at the Construction Progress meetings.

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

1.7 SURVEY OF EXISTING PROPERTY CONDITIONS

.1 Submission of a tender is deemed to be confirmation that the contractor has inspected the site and is completely familiar with all conditions or restrictions affecting execution and completion of work.

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

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

.4 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.

.5 The provision of the records of a survey of existing conditions by the Departmental Representative shall in no way limit or restrict the Contractor’s responsibility to exercise proper care to prevent damage to all properties within or adjacent to the Work Sites, whether all such properties are covered by the survey or not.

1.8 PROTECTION OF PERSONS AND PROPERTY

.1 The Contractor shall comply with all applicable safety regulations of the Workers' Compensation Board of Alberta (WCB of AB), the Provincial OH&S Act and Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.

.2 The Contractor shall comply with the Canada Labour Code, Canada Occupational Safety and Health Regulations.

.3 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or adjacent to the Work Site to the extent that may be affected by conduct of work.

.4 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, or if Parks Canada so directs, shall promptly reimburse to Parks Canada the costs resulting from such loss or damage**.**

1.9 USE OF PUBLIC AREAS

.1 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas.

.2 Steel tracked equipment with cleats will not be allowed on pavement designated for future use. Asphalt, granular, embankment and excavation materials may be hauled on existing highway but this shall be by standard highway trucks not exceeding legal highway load limits.

.3 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.

.4 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. Spill of materials in public areas shall be removed or cleaned immediately by the Contractor at its own expense.

.5 All activities shall be in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.

.6 Hauling units are not to exceed legal highway load limits.

.1 The existing Nigel Creek Bridge Structure located at km 108 of Hwy 93N is load posted with gross vehicle weight limits as follows:

.1 Single-Unit Vehicle: 26t

.2 Two-Unit Vehicle: 35t

.3 Vehicle Train: 39t

.2 **Overweight permits are required for all vehicles crossing Nigel Creek Bridge, including construction vehicles, that are in exceedance of the posted load limits.**

1.10 SUPERVISORY PERSONNEL

.1 Within five Days after award notification, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.

.2 The following personnel shall be included in the list:

.1 Project Superintendent;

.2 Deputy Project Superintendent;

.3 Environmental Representative;

.4 Traffic Control Representative;

.5 Quality Control Representative;

.6 Health and Safety Coordinator.

.3 The Project Superintendent shall be employed full time with full authority to supervise the Work, and who shall be directly available to the Departmental Representative during all active periods of Work. Either they or their designated Deputy shall be present on the Work Site each and every workday that Work is being performed, from the commencement of Work to Total Performance of the Work. Project Superintendent and their designated Deputy should have a minimum of 5 years experience in the type of works being performed. Project Superintendent and their designated Deputy are responsible for supervising all their subcontractors and ensuring each subcontractor has their own foreman onsite during all works.

.4 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence. Deputy Project Superintendent should have a minimum of 5 years experience in the type of works being performed and be approved by the Departmental Representative.

.5 Environmental Representative must:

.1 Be responsible for completing Environmental Protection Plan and ensuring personnel adhere to contract requirements as related to environmental activities.

.6 Traffic Control Representative must:

.1 Be responsible for development, implementation and execution of the Traffic Management Plan.

.7 Quality Control Representative must:

.1 Be responsible for development, implementation and execution of the Quality Management Plan.

.8 Health and Safety Coordinator must:

.1 Have minimum 2 years site-related working experience specific to activities associated with roadway and bridge construction.

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

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily, and monitoring site-specific Contractor's Health and Safety Plan.

.5 Be on site during execution of Work and report directly to and be under direction of the site supervisor.

1.11 MEETINGS

.1 Hold meetings in accordance with Section 01 31 19 – Project Meetings.

.2 The Work includes attending meetings between the Contractor and the Departmental Representative. The meetings will be called and chaired by the Departmental Representative as required. The Contractor shall be represented at such meetings to the satisfaction of the Departmental Representative.

.3 The Departmental Representative will schedule an initial meeting to be held on site after award notification. Senior representatives of Parks Canada, the Departmental Representative, Contractor, major subcontractors, and field inspectors, shall attend this meeting.

.4 Progress and status meetings will be held on a weekly basis or more frequently as directed by the Departmental Representative.

.5 Cost of attending the above meetings shall be considered incidental to the Contract items and no additional payment will be made.

1.12 WASTE DISPOSAL

.1 Refer to Section 01 35 43 – Environmental Procedures.

.2 All surplus, unsuitable, and waste materials shall be removed from the job site to approved sites outside the National Parks unless specified otherwise in other sections of these Specifications.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

.3 Deposits of any construction debris into any waterway are strictly forbidden.

.4 Cost for waste disposal described above shall be considered incidental to the Contract items and no additional payment will be made unless specified otherwise in other sections of these Specifications.

1.13 WORK STOPPAGE

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Prime Cost sum.

.2 Measurement procedures.

1.2 PRIME COST SUM

.1 Include in Contract Price a Prime Cost Sum of $400,000.

.2 Do not include in Contract Price, additional contingency allowances for products, installation, overhead or profit.

.3 The Contract Price, and not the Prime Cost Sum, includes Contractor's head office overhead and profit in connection with such prime cost sum.

.4 Prime Cost Sum provided for in the lump sum arrangement table is not a sum due to the Contractor. Rather, payment will be made against it for miscellaneous work not included in the unit price table under the General Conditions of the Contract.

.5 Any and all additional work must be approved in writing by the Departmental Representative prior to commencement.

.6 Expenditures must be substantiated with verified invoices and/or approved daily extra work reports, if requested by the Departmental Representative.

.7 Prime Cost sum items may include but are not limited to:

.1 Bridge works:

.1 Additional abutment and pier partial depth concrete patch repairs as directed by the Departmental Representative beyond the quantity provided in the unit price table.

.2 Additional asphalt removals on bridge deck in excess of specified average thickness as directed by Departmental Representative.

.3 Removal and re-installation of existing signs or installation of additional signage as directed by the Departmental Representative.

.4 Miscellaneous work and additional repairs as directed by the Departmental Representative.

.2 Roadway works:

.1 Additional supply and delivery of bituminous materials including asphalt tack coat, anti-stripping agents, and warm mix A/C admixtures;

.2 Additional supply and installation of asphalt concrete pavement;

.3 Additional supply and installation of granular sub-base and base course materials;

.4 Installation of integral asphalt curb;

.5 Additional pavement removal;

.6 Crack filling, pot hole patching and other related minor asphalt repairs;

.7 Additional Clearing and Grubbing;

.8 Sale of merchantable timber to a mill or equivalent as directed by the Departmental Representative. Revenue generated from this sale will be credited back to this Contract;

.9 Additional stripping, excavation and disposal of waste materials as directed by the Departmental Representative;

.10 Danger tree assessment and removal;

.11 Additional relocation or removal and disposal of existing signs, guardrail, guide posts and other miscellaneous items;

.12 Design, fabrication, and supply of new highway gate bases;

.13 Supply and installation of permanent signs (not construction signs);

.14 Removal and disposal or plugging of existing culverts;

.15 Cleaning/ debris removal for existing culverts;

.16 Additional supply and installation of lane markings;

.17 Supply and installation of specialty items at Day Use Areas including, but not limited to, dry toilets, picnic tables, and garbage bins;

.18 Additional survey resulting from changes made by the Departmental Representative;

.19 Utility Pole Relocation;

.20 Additional remediation or removal and replacement of unsuitable or contaminated soils not described in the Contract Documents;

.21 Supply and installation of wildlife fencing;

.22 Additional supply and installation of seeding;

.23 Supply and installation of additional landscaping;

.24 Supply and installation of riprap;

.25 Additional road structure repairs;

.26 Additional drainage improvements, ditching, culvert repairs, cleaning or other;

.27 Sub-drainage not specified in the tender documents;

.28 Additional supply and installation of precast concrete barrier;

.29 Supply and installation of barrier drains;

.30 Removal and reinstallation of existing crash attenuator;

.31 Supply and installation of W-Beam Guardrail or Impact Absorbing End Treatment materials;

.32 Additional removal and disposal of existing guardrail or precast concrete barrier;

.33 Additional supply and installation of Guide Posts;

.34 Additional supply and installation of raised reflective road and barrier markers;

.35 Asphalt EPS unit price adjustments;

.36 Additional installation of milled rumble strips;

.37 Rehabilitation work in gravel pits;

.38 Miscellaneous rock scaling as directed by the Departmental Representative;

.39 Supply and installation of rock bolts;

.40 Shoulder graveling;

.41 Traffic control equipment additional to what is required by the applicable regulations and standards;

.42 Relocation of existing structures;

.43 Processing of blast rock as requested by the Departmental Representative;

.44 Removal and disposal of Unexploded Ordnances;

.45 Supply and maintenance of Departmental Representative's office trailer; and

.46 Miscellaneous work as directed by the Departmental Representative.

.8 Once a Prime Cost Sum item has been agreed upon with Parks Canada, it shall be included as an item on the Project Schedule. This shall occur on the next update of the Project Schedule.

1.3 MEASUREMENT PROCEDURES

.1 Payment for work under the Prime Cost Sum will be made using negotiated rates or by material, labour and equipment rates as per the following:

.1 Rental rates will be in accordance with current Alberta Roadbuilders and Heavy Construction Association rate schedule, and will be all inclusive and fully operated. Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits.

.2 Transportation time to and from site to be reimbursed only if equipment is exclusively used for additional work.

.3 Equipment paid on standby will be paid on 50% of the relevant rate less operator rates to a maximum of 10hrs per day.

.4 When based upon actual costs for additional works under Prime Cost Sum, payment will be based upon supplied invoices and other work records.

.5 The Prime Contractor may apply a 10% mark-up to subcontractor or supplier invoices only, as approved by the Departmental Representative. No mark-up will be allowed on relevant equipment and labour rates.

.6 A claim for additional payment will not be considered submitted until all required documentation has been received by the Departmental Representative.

.7 The Departmental Representative's, or their delegate's, signature on extra work reports is only a record of the equipment, materials and labour hours utilized on the task, not an agreement to entitlement or quantification of that Work. Review and acceptance may be based on Contractor submitted finalized extra work reports, which are to include appropriate rates, quantities and applicable invoices. Labour and equipment rates are to be reviewed by the Departmental Representative against the appropriate accepted rates when submitted for payment.

.8 The Contractor shall submit extra work reports to the Departmental Representative within 24 hours of the day of extra work.

.1 Extra work reports not submitted within the specified timelines may be denied payment at the Departmental Representative's sole discretion.

.9 The Departmental Representative's, or their delegate's, signature on any of the Contractor's Daily Extra Work Reports shall not be an agreement to waiver any portion of the Contract regardless of any wording to the contrary.

.10 Unless otherwise provided for in the Contract, payment on a time and materials basis represents complete payment (exclusive of GST) and reimbursement for all impacts, related costs and expenses, including, without limitation: time; labour; materials; equipment; mobilization; subcontracting; overhead; profit; general supervision; occupational tax and any other Federal or Provincial revenue legislation exclusive of GST; premiums for public liability and property damage insurance policies; bonding; for the use of all tools and equipment for which no specific rental payment provision exists; and for all costs incurred by the Contractor in supplying materials.

.11 Reimbursement for Living Out Allowance (LOA), as agreed upon by the Departmental Representative, shall be pro-rated based on the portion of the standard 10-hour work day spent on extra work items up to a maximum of 10 hours. LOA reimbursement will only be considered for extra works completed under Force Account rates and payment for LOA will not exceed the agreed upon daily rate.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Mobilization and Demobilization consists of preparatory work and operations including but not limited to, those necessary for the movement of personnel, equipment, buildings, shops, offices, supplies and incidentals to and from the project sites.

.2 Any protective measures or movement of Contractor trailers necessitated by animal interactions and required by Parks Canada will be paid by the Departmental Representative, and are not to be anticipated in the Lump Sum Contract Price for Mobilization and Demobilization.

1.2 MEASUREMENT PROCESS

.1 Mobilization and Demobilization:

.1 Payment will be made under **"Lump Sum Price Item 1 – Mobilization / Demobilization"**.

.2 50% of the Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.

.3 Only one mobilization and demobilization will be paid for the entire project. No additional mobilization and demobilization will be paid due to any summer or winter shutdown.

.2 The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.

.3 Payment of only 5% of the total price tendered will be scheduled as outlined above. If the amount bid for mobilization and demobilization is greater than 5% of the total price tendered, payment of the remainder of the amount will be authorized when the contract has been completed.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants, affected parties not in attendance, and Departmental Representative.

.8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart.

.3 Schedule of submission of shop drawings. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

.5 Site security in accordance with Section 01 14 00 - Work Restrictions, 01 35 43 - Environmental Procedures, 01 52 00 - Construction Facilities, and 01 56 00 - Temporary Barriers and Enclosures.

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

.7 Owner provided products.

.8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

.9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

.10 Monthly progress claims, administrative procedures, photographs, hold backs.

.11 Close out procedures and submittals in accordance with Sections 01 77 00 - Closeout Procedures and 01 78 00 - Closeout Submittals.

.12 Appointment of inspection and testing agencies or firms.

.13 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

.1 During course of Work and until project completion, schedule progress meetings weekly.

.2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.

.3 Notify parties minimum 5 days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Review Environmental issues.

.4 Review Traffic Control and Emergency Response Protocol issues.

.5 Review site safety and security issues.

.6 Field observations, problems, conflicts.

.7 Problems which impede construction schedule.

.8 Review of off-site fabrication delivery schedules.

.9 Corrective measures and procedures to regain projected schedule.

.10 Revision to construction schedule.

.11 Progress schedule, during succeeding work period.

.12 Review submittal schedules: expedite as required.

.13 Maintenance of quality standards.

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

.15 Other business.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Sunday, inclusive, will provide seven day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by Contractor to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Ensure all of the Work required for the Contract is identified in the Project Schedule. Refer to Section 01 11 00 - Summary of Work for a potential list of activities.

.3 Ensure Master Plan and Detail Schedules clearly identifies all task dependencies as defined in the contract documents.

.4 Plan to complete Work in accordance with prescribed milestones and time frame.

.5 Limit activity durations to maximum of approximately 5 working days, to allow for progress reporting.

.6 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

.7 Include an allowance in Schedule for Work performed under Prime Cost Sum.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

1.4 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule.

.1 Completion of clearing and grubbing.

.2 Relocation of Telus line.

.3 Installation of temporary soil retaining system for each stage of construction.

.4 Completion of each stage of construction.

.5 Substantial Completion: see Section 01 11 00 - Summary of Work.

.6 Final Completion: see Section 01 11 00 - Summary of Work.

1.5 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Departmental Representative will review and return revised schedules within 10 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Award.

.2 Shop Drawings, Samples.

.3 Permits.

.4 Submittals.

.1 Project Schedule.

.2 Contractor Chain of Command including Sub-Contractors.

.3 List of subcontractors and suppliers.

.4 Work Plan.

.5 Construction Staging.

.6 Survey Plan.

.7 Environmental Protection Plans, review and implementation.

.8 Traffic Accommodation Strategy, review and implementation.

.9 Site access.

.10 Quality Management Plan, review and implementation.

.11 Quality Control Plan.

.12 Emergency Response Protocol.

.13 Site Specific Health and Safety Plan, incl. SDS sheets.

.14 On site Contingency and Emergency Response Plan, review and implementation.

.15 Shop Drawings.

.16 Concrete / asphalt mix Designs.

.5 Mobilization.

.6 Bridge Rehabilitation Works:

.1 Removal and disposal of existing concrete curbs, concrete pylons, approach barriers, and steel railings.

.2 Removal and disposal of asphalt on bridge deck.

.3 Design, supply, fabrication, and installation of temporary soil retaining system.

.4 Removal and disposal of existing concrete slab and concrete return walls.

.5 Supply, fabrication, and installation of tiebacks through existing abutments. Including tiebacks and lock-blocks.

.6 Localized modifications to existing abutments and pier.

.7 Supply and construction of new retaining walls.

.8 Supply and installation of new backfill behind abutments.

.9 Supply, fabrication, and installation of new precast concrete girders.

.10 Supply and construction of new concrete diaphragms, new concrete deck and overhangs, and new approach slabs.

.11 Supply and construction of new cast-in-place concrete barriers.

.12 Supply, fabrication, and installation of new steel bicycle railings.

.13 Partial depth concrete repairs on substructure when authorized by department representative.

.7 Roadway Works:

.1 Clearing, grubbing, and stripping.

.2 Removal and disposal of existing asphalt on approaches.

.3 Excavation and disposal of excavated material.

.4 Supply and installation of corrugated steel pipe (CSP) culverts/extensions.

.5 Supply, load, haul, and place base course material.

.6 Supply, load, haul, and place asphalt concrete pavement.

.7 Placement of topsoil and hydroseeding.

.8 Supply and installation of precast concrete barriers.

.9 Application of temporary and permanent lane markings.

.10 Supply and installation of signage.

.8 Demobilization.

.9 Completion.

1.7 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.8 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 78 00 - Closeout Submittals.

1.2 REFERENCE STANDARDS

.1 Not used.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

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

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

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

.7 Verify site measurements and affected adjacent Work are coordinated.

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

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

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

1.4 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

.3 The term "asphalt mix design" means engineering design for proportioning materials in asphalt concrete pavement including all supporting test results and materials properties. Asphalt mix design to be performed by a qualified test laboratory licensed to practice in Alberta.

.4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to Contract drawings and specifications.

.5 Allow fourteen (14) days for Departmental Representative's review of each submission.

.6 Adjustments made on shop drawings 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.

.7 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.8 Submit letter of certification with all mix designs.

.9 Accompany submissions with transmittal letter, 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.

.10 Submissions to 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 Contractor's authorized representative certifying approval of submissions, verification of site measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified site dimensions and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

.11 After Departmental Representative's review, distribute copies.

.12 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.13 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.14 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 3 years of date of Contract award for project.

.15 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of Contract complete with project name.

.16 Submit electronic copies of manufacturer’s instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.17 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.18 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.19 Delete information not applicable to project.

.20 Supplement standard information to provide details applicable to project.

.21 If upon review by 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.

.22 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that Parks Canada approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at the project site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of Work of sub-trades.

1.5 SAMPLES

.1 Not used.

1.6 MOCK-UPS

.1 Not used.

1.7 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

1.8 REQUIRED CONTRACT SUBMITTALS

.1 General

.1 This Clause identifies the plans, programs, and documentation required prior to mobilization on site and during the construction phase.

.2 Pre-Mobilization Submittals

.1 Submit the following plans and programs to the Departmental Representative for review a minimum of fourteen (14) days prior to mobilization to the project site. The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of the submittals in writing. The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Authorizations of the programs shall not relieve the contractor for the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

.1 Project Schedule, detailing the schedule of the workdays and manpower required to complete each phase of the project in accordance with Section 01 32 16.19 Construction Progress Schedule – Bar (GANTT) Chart.

.2 Contractor Chain of Command, listing key Contractor personnel, including names and positions, addresses, telephone, cellular telephone and/or pager numbers. The list shall include the names and telephone/cellular telephone/pager numbers for contact persons who are available on a 24-hour basis in the event of emergencies.

.3 List of Sub-Contractors and Suppliers

.4 Work Plan, describing the Contractor's intended methods of construction including but not limited to the environmental mitigation strategies and projected number of personnel on site.

1. Include work staging plan, including any temporary works required to permit staging of work, including but not limited to temporary soil retaining system, temporary access platforms, debris containment, excavation and backfill, installation of tie backs, and removal and replacement bridge superstructure.
2. Include consideration and description of task dependencies as they relate to the methods of construction and schedule.

.5 Quality Control Plan in accordance with Section 01 45 00 – Quality Control.

.6 Traffic Accommodation Strategy, in accordance with the requirements of Section 01 55 26 - Traffic Control.

.7 Environmental Protection Plans (EPP) which shall meet the requirements of Section 01 35 43 – Environmental Procedures.

.8 Site Access Plan which shall include but not be limited to, engineering Drawings and procedures for accessing all areas of the Work. This shall include access scaffolding, fixed and suspended work platforms, temporary railings, etc.

1. Drawings for temporary works, including but not limited to temporary soil retaining system, access scaffolding, fixed and suspended work platforms, temporary railings, etc., to be stamped and signed by a professional engineer (P. Eng.) registered or licensed in Province of Alberta.

.9 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada.

.10 Health and Safety Plan – The Contractor shall have a Certificate of Recognition (COR) or Registered Safety Plan (RSP) including a site specific Health and Safety Plan acceptable to the Departmental Representative. The Contractor shall implement and maintain the Health and Safety Plan during the Work.

.11 Health and Safety Plan must include:

1. Contractor's safety policy.
2. Identification of applicable compliance obligations.
3. Definition of responsibilities for project safety/organization chart for project.

4. Site specific hazard assessment.
5. General safety rules for project.
6. Job specific safe work procedures.
7. Inspection policy and procedures.
8. Incident reporting and investigation policy and procedures.
9. Occupational Health and Safety meetings.
10. Occupational Health and Safety communications and record keeping procedures.
11. Results of safety and health risk or hazard analysis for site tasks and operation.

.12 Submit copies of Material Safety Data Sheets (SDS).

.13 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 the Departmental Representative.

.14 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

.2 Submit a copy of the filed Notice of Project with Provincial authorities.

.3 The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Authorization of the programs shall not relieve the Contractor from the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

.3 Construction Phase Submittals

.1 Weekly Progress Reports that outline the Work completed to date as well as the anticipated Work to be performed for the following week on a day-to-day basis.

.2 Quality Control Inspection Reports – The Contractor shall maintain daily inspection reports that itemize the results of all Quality Control inspections conducted by the Contractor. The reports shall be made available for review by the Departmental Representative upon request. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each payment request.

.3 Traffic Accommodation logs.

.4 Shop drawings – The Contractor shall submit all shop drawings required to fabricate and conduct the work a minimum twenty-one days (three weeks) prior to fabrication.

.5 Concrete Mix Designs and supporting data.

.6 Asphalt Mix Designs and supporting data.

.7 Product Data Sheets.

.8 Mill certificates.

.9 Deck surveys.

.10 Progress Photographs:

.1 Formats:

1. Electronic: .jpg files
2. Quality: minimum five (5) mega pixels, full-colour, and not scanned.

.2 Identification: spreadsheet listing name and number of project, description of each photograph with the corresponding file name and date taken.

.3 Viewpoints: four (4) viewpoints determined by the Departmental Representative.

.4 Detail Documentation: photographs documenting key details of the construction and as requested by the Departmental Representative.

.5 Submission Frequency: prior to commencement of work and weekly thereafter with progress statement, or as directed by the Departmental Representative.

.6 Submit two (2) copies of CD with all electronic pictures and the associated identification as part of the closeout package.

.11 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative and authority having jurisdiction weekly.

.12 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.

.13 Submit copies of incident and accident reports.

.4 Project Completion Submittals

.1 Record Drawings – The Contractor shall submit copies of all Contractor's Drawings revised as necessary to record all as-built changes to the Work and the Contractor shall submit a set of Contract Drawings clearly marked to record as-built changes to the Work.

.2 Quality Control/Quality Assurance Records – The Contractor shall submit a bound and itemized set of project quality control and quality assurance records.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheet (MSDS)

.3 Province of Alberta

.1 Occupational Health and Safety Act.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.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 meetings.

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

.10 Results of site specific safety hazard assessment.

.11 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and the authority having jurisdiction weekly.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Submit WHMIS SDS - Safety Data Sheets.

.7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 14 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 7 days after receipt of comments from Departmental Representative.

.8 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

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

.10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.4 SAFETY ASSESSMENT

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

1.5 MEETINGS

.1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.6 REGULATORY REQUIREMENTS

.1 Do Work in accordance with National Parks Act.

1.7 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

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

1.8 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.

1.9 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta.

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

1.10 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.11 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

.1 Have site-related working experience specific to activities associated with bridge construction.

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

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.12 POSTING OF DOCUMENTS

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

1.13 CORRECTION OF NON-COMPLIANCE

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

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

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

1.14 BLASTING

.1 Blasting or other use of explosives is not permitted.

1.15 WORK STOPPAGE

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

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All Sections.

1.2 REFERENCE STANDARDS

.1 Alberta Transportation Erosion and Sediment Control Manual (2011), Appendix C, Erosion and Sedimentation Control Best Management Practices (AT Appendix C BMPs).

.2 Direction for Permitted Users conducting water-related activities in LLYK.

.3 Parks Canada Preapproved Routine Impact Assessment (PRIA) – Roads and Related Infrastructure, 2019.

1.3 MEASUREMENT PROCEDURES

.1 The cost to the Contractor to meet the environmental and aesthetic protection requirements described in this Section shall be considered incidental to the Work and no additional payment will be made.

1.4 GENERAL

.1 All Contractor operations shall be performed in such a manner that no detritus from his operations shall enter Poboktan Creek or any other waterway, ditches, or wetlands within Jasper National Park.

.2 If, in the opinion of the Departmental Representative or Parks Canada, full containment of Contractor's detritus is not being achieved, operations may be ordered halted until the situation is rectified.

.3 In addition to the requirements outlined in the project specifications, the Contractor shall adhere to the *Parks Canada Preapproved Routine Impact Assessment – Roads and Related Infrastructure* (PRIA's), and the *Direction for Permitted Users conducting water-related activities in LLYK* (Decontamination Procedure), which are provided as reference documents.

.1 Where there is a discrepancy or inconsistency between the project specifications, the PRIA's, and the Decontamination Procedure, the most rigorous with regard to environmental stewardship shall be followed.

.4 The following key mitigations are highlighted. This list does not replace the comprehensive mitigation requirements and details provided elsewhere in the project specifications, the PRIA's, or the decontamination procedure:

.1 The Environmental Protection Plan (EPP) certified by a Qualified Environmental Professional (QEP) is to be submitted at least 14 days prior to the start of construction. EPP to be approved by Jasper National Park (JNP) Field Unit (FU) prior to start of construction.

.2 All contractor personnel working on site are required to attend an on-site environmental briefing conducted by the JNP FU.

.3 Removal of vegetation used by birds (either migratory or non-migratory) to be completed outside of the nesting period of April 15 to August 31. Pre-clearance nest surveys and potential additional bird-related mitigations will be required with JNP Field Unit (FU) approval regardless of timing of the nesting period.

.4 Bird nesting on existing bridge to be prevented. Active nests cannot be relocated and species specific setback distances will be required until nestlings have fledged.

.5 Work will be conducted outside areas of known historical or cultural significance and there will be no trespass over such areas.

.6 To minimize fire risk, a single location on site for smoking shall be designated and a plan developed for proper disposal of cigarette butts.

.7 No vehicle fueling or servicing permitted within 100 m of Poboktan Creek.

.8 Equipment, propane storage, and fuel lines to be inspected daily for leaks. All equipment stored overnight in staging areas to be stored on tarps with appropriate containment and with drip trays and/or pans under fuel tanks.

.9 Prior to coming on site, all equipment that came into contact with soil at previous site (i.e. clearing, grading, etc.) must be cleaned (blow down/scrape down) and approved by the JNP FU.

.10 To prevent spread of whirling disease, all gear and equipment arriving on site which may be used instream/touching water must be cleaned and decontaminated in accordance with the protocol outlined in the Direction for Permitted Users conducting water-related activities in LLYK. Proof of decontamination to be provided to Departmental Representative and Environmental Surveillance Officer (ESO) prior to commencement of works.

.11 Restricted Activity Permits (RAP) are required for some portions of the work, including but not limited to, clearing of vegetation and use of on-site water as a water source for construction purposes.

.12 Materials laydown shall be on the construction right-of-way. Additionally, the existing cleared area (overflow parking for Poboktan Creek Trail), approximately 75 m south of the bridge adjacent to the southbound lane, may be closed to the public and may be used for laydown/storage for the duration of the project.

.5 Jasper Field Unit (FU) to be kept apprised of timelines, work periods, and construction activities so that their staff can provide information to the public to prevent additional safety risks for recreational users in the vicinity of the Project site during construction. Communication to the FU shall be through the Departmental Representative.

1.5 NATIONAL PARK REGULATIONS

.1 The Contractor shall ensure that all work is performed in accordance with the ordinances, laws, rules, and regulations set out in the Canada National Parks Act and Regulations.

.2 The Contractor and any sub-Contractors shall obtain a business license from Parks Canada Administration Office in Jasper, prior to commencement of the contract.

.3 All Contractor's business and private vehicles are required to obtain a vehicle work pass from Parks Canada. These permits may be obtained free of charge at Parks Administration Office in Jasper.

1.6 IMPACT ASSESSMENT ACT (IAA) 2019

.1 Execution of the work is subject to the provisions within the Impact Assessment Act (IAA) and subsequent amendments.

.2 The Contractor is required to prepare an Environmental Protection Plan (EPP) minimum two weeks prior to commencing construction activities or delivery of materials to site, which will include the topics in the following sub sections. The EPP shall be prepared and certified by a Qualified Environmental Professional (QEP) (such as Professional Biologist or Professional Agrologist) and in accordance with Parks Canada Environmental Procedures. The EPP to include, but not be limited to:

.1 Details on how the work limits will be marked and procedures to keep operations within the clearing boundaries to minimize damage to vegetation and soil.

.2 An overall site Erosion and Sedimentation Control (ESC) Management Plan which outlines areas where erosion and sedimentation are likely to occur and the means by which the Contractor proposed to control these issues. In addition, a localised ESC plan which directs specific mitigation for working in close proximity to Poboktan Creek may be required during construction at the discretion of the Departmental Representative or the ESO.

.3 A Spill Response Plan (SRP), in accordance with this specification and the project BIA and PRIAs.

.4 An Emergency Response Plan that outlines procedures to follow in the case of an emergency (e.g. wildlife encounter, equipment malfunction/failure or fire).

.5 A Fire Prevention Plan which describes the fire prevention equipment (e.g. fire extinguishers) and procedures on-site in the event of a fire. Should a fire occur, the Jasper Dispatch and the Fire Duty Officer shall be notified immediately.

.6 Wildlife and Human Conflict Management Plan: Detail strategies to be implemented to prevent unnecessary interactions with wildlife.

.3 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the Work being suspended pending rectification of the problems.

.4 The Contractor shall notify the ESO (Environmental Surveillance Officer) and the Departmental Representative in a reasonable timely manner of any actual or potential environmental incidents or failure of protection measures, and immediately of any violations of environmental approvals, permits, authorizations, or EPP measures.

1.7 RELICS AND ANTIQUITIES

.1 The *Accidental Finds Protocol* shall be followed in the event that items are found when archaeologists or cultural resource managers are not present on-site during construction activities.

.1 *Accidental Finds Protocol*: There may be cultural resources present in the project area that have not yet been discovered (even after an archaeological assessment has been carried out or no assessment was deemed necessary for the project). **If staff observe any significant cultural resources while working, they should stop work in the immediate area, and contact the Departmental Representative to discuss any protective measures that might be needed**.

.2 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tables, and similar objects found on the site shall remain the property of Parks Canada. Protect such articles and request directives from Parks Canada.

.3 Provide 48 hours notice to Parks Canada prior to commencing any work that may interfere with or affect any identified historical or archaeological site. Commence work only upon written instruction from Parks Canada.

1.8 WILDLIFE

.1 Avoid or terminate activities on site that attract or disturb wildlife.

.2 Allow any wildlife encountered within or near the Project area to passively disperse. Construction vehicles to yield to wildlife.

.3 Pets are not allowed on the work site, or in any administrative or laydown areas.

.4 All personnel will be instructed by Parks Canada's ESO in procedures to follow in the event of wildlife appearance near or intrusion onto the construction site. Personnel are not to attract or approach any wildlife seen near the site, and are to vacate their location in the event of aggressive behaviour or persistent intrusion by bears, cougars, wolves, elk, or moose. The ESO and the Departmental Representative are to be notified about the circumstance immediately. The Warden Service will be called to determine the course of action. The general presence of wildlife observed near the construction site, any carcasses, or unusual wildlife observations shall be reported to the ESO and the Departmental Representative. Contractor's staff shall receive basic training in early response to wildlife events during the "environmental briefing".

.5 Bird nesting shall be prevented on the existing structure in accordance with the PRIA.

.1 Contractor to conduct inspections at least daily, and if partially constructed nests are observed, these shall be removed immediately before they become active. Results of the daily inspections shall be documented and provided to the ESO.

.2 If active nests, roosts, or dens of species protected by SARA or the Migratory Birds Convention Act are identified, immediately notify the Departmental Representative and the ESO to determine appropriate mitigation measures. No active nests to be removed and work activities will be stopped and site shut down at the discretion of the ESO until nestlings have fledged. No claims for any delays or inconvenience related to the discovery of functional bird nest(s) will be entertained.

.1 A nest is considered an active nest if it can function as a nest, i.e. it is able to support a resting bird, eggs or chicks. If the constructed materials look 50% complete or more, or if there is any evidence of nest use (e.g. supporting a resting bird or eggs), it is considered an active nest.

.6 Removal of vegetation to be completed prior to 2024 April 15.

.1 Removal of vegetation after 2024 April 15 only in accordance with requirements in this section (Section 01 35 43 – Environmental Procedures).

.1 Contract QEP to conduct pre-clearance nest-sweeps and pre-disturbance surveys for suitable bat roost trees.

1.9 DRAINAGE

.1 Provide temporary drainage and pumping as required to keep excavations and site free from water. Do not cause erosion of slopes and embankments.

.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.

.4 The Contractor's EPP will detail how the dewatering will be undertaken, with special attention to the environmental sensitivity of the discharge area, freezing conditions operation, overflow avoidance, decanting, and settlement pond reclamation.

1.10 FIRE PREVENTION AND CONTROL

.1 A fire extinguisher will be carried and available for use on each machine in the event of fire (e.g. ignited by a spark) to prevent the fire from burning the unit or spreading to other fuels in the work area. Basic fire fighting equipment – e.g. three shovels, two pulaskis, and two 20 litre backpack pumps shall be maintained at the construction site at a location known and easily accessible to all the Contractor's staff.

.2 Machinery and equipment shall be operated in a manner and with all original manufacturer's safety devices to prevent ignition of flammable materials in the area.

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

.1 Designate a single location on site for smoking and develop a plan for proper disposal of cigarette butts.

.4 The Contractor shall maintain an awareness of the fire danger rating (Index) in the work area by contacting the Parks Fire Duty Officer. Fire prevention care is to be commensurate with the fire Index.

.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 ESO and the Departmental Representative shall be notified of any fire immediately.

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

1.11 SITE ACCESS AND PARKING

.1 A plan detailing access to the construction site shall be prepared by the Contractor and included in the EPP. This includes access off/on the Icefield Parkway (Highway 93N) in the vicinity of the project – see specifications and drawings; access within the work limits, including day-to-day entry/egress, and plans for delivery and approach for large dimension materials will be anticipated and described. The access plan shall describe worker transportation to and from the construction site, and parking of worker's private vehicles.

.2 Restrict vehicle movements to work limits.

.3 Do not park vehicles in areas beyond work limits, unless specifically authorized by the ESO and the Departmental Representative.

.4 A construction office is anticipated for the bridge contract. The construction office may be located on the construction right-of-way, actual location subject to the approval of the Departmental Representative and ESO. It is anticipated the construction office may comprise the Contractor's main office, a materials testing trailer, the Departmental Representative, and ESO trailer and toilets. Special measures are required to ensure that conflict with bears that are known to frequent the whole construction area does not arise. These include, but may not be limited to:

.1 Food, products, lunches, waste food products, or any other materials attractive to bears brought to this office location or to the bridge sites shall be secured within the trailers or by other specified means. Waste shall be secured in the trailers and removed daily from the office location.

.1 Food to be eaten inside vehicles and/or site trailers to minimize wildlife attractants.

.2 In the event of quick or persistent attraction of bears to the office location, the site may require electric fencing, or removal to an alternate location, at the direction of the Departmental Representative.

.5 As an alternative to the above mentioned locations, a Contractor's office and work headquarters may be established at another location at the discretion of Parks Canada. The Contractor shall prepare a plan regarding structures, equipment, waste materials management, water, power and sewage services, materials lay-down area, fuel storage, operations, etc. required at this location. The plan will be subject to review and approval by the Departmental Representative. This site may be shared with other Contractors.

.6 A workers accommodation camp will not be permitted.

.7 Materials lay-down shall be on the construction right-of-way, or in unusual circumstances – e.g. over-size components, at an alternate location to be determined by the Departmental Representative in consultation with ESO.

.1 The existing cleared area (overflow parking for Poboktan Creek Trail), approximately 75 m south of the bridge adjacent to the southbound lane, may be closed to the public and may be used for laydown/storage for the duration of the project.

1.12 CONTRACTOR’S OPERATIONS

.1 Confine all operations to the work limits as staked or designated by the Departmental Representative. No activities of any kind may be carried out beyond those work limits without the written permission of the Departmental Representative.

.2 Do not store or stockpile construction materials in the trees bordering or being preserved on site. Do not unreasonably encumber the site with products.

.3 Provide sufficient sanitary facilities and maintain in a clean condition.

.4 Conduct operations at all times in such a manner as to preserve the natural features and vegetation in the area. Cut and fill slopes shall be blended with adjoining topography. Material from fill slopes shall not be permitted to slough or roll into surrounding tree cover or to bury any plant material designated to be retained.

.5 When in the opinion of Parks Canada, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic facilities beyond the staked or designated work area, the Contractor shall be responsible at his expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of Parks Canada.

.6 Failure to comply with or observe environmental protection requirements as identified in these specifications may result in work being suspended pending rectification of the problems and operators of equipment being charged under the National Park Act.

1.13 SOIL AND LANDFORMS

.1 Plan and schedule Project activities dry weather whenever possible. If significant wet weather is encountered, take additional measures as described below to minimize erosion potential.

.2 Minimize construction and equipment travel during periods of heavy rainfall (50 mm or more in 1 hour). Halt excavation activities during heavy rainfall events.

.3 Identify contingency plans for isolating worksites during high precipitation, high wind and runoff events in the EPP.

.4 Minimize the area of exposed soil at any given time by using techniques such as phased construction activities, retaining vegetation as much as possible.

.5 Following completion of construction works, stabilize the exposed soils as soon as possible using temporary measures (e.g. mulch, erosion sediment control blankets, seeding, plastic sheeting, planting long-term vegetation, etc.).

.1 Hydro seeding within 30 m of Poboktan Creek (or any watercourse) not permitted. Seed by broadcast seeding within 30 m of Poboktan Creek. See Section 32 92 22 – Hydraulic Seeding for seed mix specification.

.2 Any erosion blankets shall be 100% coconut fibres (no straw or hay) and sewn together with biodegradable material.

.6 Have erosion and sediment-control materials readily available on-site. Materials may include but are not limited to rock, gravel, grass seed (see Section 32 92 22 – Hydraulic Seeding for seed mix specification), sediment fencing, staking, and polyethylene sheeting.

.7 Minimize disturbance of existing soils and landforms (stream bank, riprap and similar).

.8 Store all equipment on the road or on previously disturbed or hardened surfaces to minimize soil compaction.

.9 Salvage and cover topsoil at excavation sites for reclamation purposes. Whenever possible, complete stripping under dry conditions only. Cover (tarp) salvaged topsoil to prevent nutrient loss and erosion from wind and rain, and to prevent weeds from becoming established on topsoil stockpiles.

1.14 WATER (SURFACE AND GROUND)

.1 ESC Management plan (included with the EPP) to be implemented and all components to be regularly maintained to guarantee effectiveness. The condition of all active components must be provided in an inspection report for review to the ESO on a weekly basis.

.2 Plan project activities for dry weather to allow easier containment of contaminated runoff and sediment.

.1 If scheduled activity requires working in wet conditions, isolate the area of work and use/install appropriate sediment controls to prevent the release of sediment-laden water or other deleterious substances into surface waters.

.3 If on-site water will be used as a water source for construction purposes, obtain a Restricted Activity Permit (RAP) for water withdrawal and put in place proper intake screening procedures to prevent fish impingement and entrainment.

.4 If accidental spills or leaks occur from equipment, follow procedure in the SRP (submitted as part of the EPP) and notify the JNP ESO immediately.

.5 Fuel management and Spill Containment requirements are explained in the Equipment Fueling, and Spill Containment sub sections respectively.

.6 Locate concrete wash stations away from water sources and identify their locations in the EPP in consultation with the JNP ESO.

.7 Hydro seeding within 30 m of Poboktan Creek (or any watercourse) not permitted. Broadcast seeding to be used within 30 m of Poboktan Creek (or any watercourse).

1.15 WORK AROUND AND OVER WATER

.1 The construction project shall take place outside of the wetted perimeter of Poboktan Creek and any other waterways. Some of the construction will require working over Poboktan Creek and other waterways. In these instances, the Contractor is to describe the measures in the EPP, to be employed to ensure fugitive materials, and especially deleterious substances do not enter Poboktan Creek or any other waterway – e.g. material produced by concrete curing.

.2 Sediment control measures shall be to the satisfaction of the ESO.

.3 Fuel management and Spill Containment requirements are explained in the Equipment Fueling, and Spill Containment subsection respectively.

.4 Avoid or mitigate impacts to fisheries resources through application of PRIAs for working in close proximity to water. Work within 30 m from a water body will adhere to avoidance and mitigation measures as identified by the Department of Fisheries and Oceans and specific Fishers Act criteria so that activities near water do not interfere with fish habitat.

.5 To prevent the spread of whirling disease, all gear and equipment arriving on site which may be used instream/touching water must be cleaned and decontaminated according to the protocol outlined in the Direction for Permitted Users conducting water-related activities in LLYK. Proof of decontamination will be required prior to commencement of works. Decontamination will include all Personal Protective Equipment (boots, gloves, etc.), nets, and heavy equipment. Proof may be supplied in the form of photos or other means which provide documentation.

.6 Install debris netting system as required to prevent debris from falling into the creek during all work activities.

.7 For existing bridge substructure modifications:

.1 Complete abutment and pier modifications (including tieback installation and tensioning) “in the dry”.

.2 Sedimentation and erosion control measures to be in place to prevent release of sediment into the creek.

.8 Minimize disturbance to natural materials and vegetation that contribute to fish habitat or stream channel stability. If vegetation that contributes to fish habitat needs to be removed, a restoration plan that meets PCA requirements for re-vegetation will be complied subject to JNP FU review and approval.

.9 Immediately stabilize shorelines and banks that might be disturbed by the works; if the original gradient of the channel banks cannot be restored, restore to a stable gradient.

.10 If replacement rock reinforcing/armouring is required to stabilize eroding or exposed areas, use appropriately sized, clean rock. Install such rock at a similar slope to maintain a uniform bank/shoreline and natural shoreline alignment.

.11 Store hazardous or toxic products (i.e., fuels, lubricants, etc.), no closer than 100 m from drainage, wetland, watercourse, and water bodies.

.12 Include procedures in the EPP to prevent increased sediment deposition into Poboktan Creek during the following sensitive fish spawning and early development periods:

.1 Bull trout: September 01 to April 30.

.2 Rainbow trout: April 16 to July 15.

.13 Do not operate construction equipment in waterways.

1.16 POLLUTION CONTROL

.1 Maintain all temporary erosion and pollution control features for this project.

.2 Control emissions from equipment and plant to local authorities' emission requirements.

.3 Only use stationary emission sources such as portable diesel generators, compressors, etc. when necessary.

.4 No equipment (motor vehicle or construction equipment) motor to run idle when not in use, unless required under extenuating circumstances, and carpooling is encouraged to reduce air emissions and noise pollution.

.5 Maintain all equipment, vehicles, and stationary emission sources and use at optimal loads for minimal noise and air emissions.

.6 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area by providing suitable, temporary enclosures or mats to the satisfaction of the Departmental Representative and the ESO.

.7 No oils, rubber, or tires to be burned on site. Haul all such material off site and dispose of appropriately.

.8 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and on-site work. Dust generating activities will be minimized as much as possible during windy periods.

1.17 START-UP AND ENVIRONMENTAL BRIEFING

.1 All staff employed at the construction site shall attend a briefing regarding their individual and collective responsibilities lasting approximately 1 hour, to ensure avoidable adverse environmental impact does not arise from their activities and personal choices. Employees must attend this briefing before beginning their work at the site. Employees of other service and materials providers who attend the site – e.g. concrete truck operators, crane operators, and truck drivers must be apprised of their duty not to cause adverse environmental impact.

.2 Parks Canada will have an ESO attending the site to monitor the construction activity for conformance with the EPP. The ESO or alternate designated Parks Canada staff member will present the "environmental briefing". The ESO's main duties are to monitor the progress of the construction on an on-going basis to ensure compliance with environmental protection measures, and to provide guidance through the Departmental Representative, in the event of unanticipated environmental problems. Although the ESO has authority to enforce National Parks Act violations, direction to the Contractor will be the duty of the Departmental Representative.

1.18 HAZARDOUS PRODUCTS AND MATERIALS

.1 A list of products and materials to be used or brought to the construction site that are considered or defined as hazardous to the environment shall be presented in the EPP. Such products include, but are not limited to waterproofing agents, grout, concrete finishing agents, hot poured rubber membrane materials, blasting agents, etc. A plan detailing the containment and storage, security, handling, use, unique spill response requirements, and disposal of empty containers, surplus product or waste generated in the application of these products shall be presented in the EPP. Hazardous products shall be secured in secondary containment and stored no closer than 100 m from any waterway.

.2 Fuels, gases, or other deleterious substances to be contained within appropriate containers.

.3 Equipment stored overnight in staging areas to be stored on tarps with appropriate containment and with drip trays and/or pans under fuel tanks.

.4 Transport fuels, gases, or other deleterious substances according to the federal Transportation of Dangerous Goods Regulations.

.5 Special care to be taken in storage and application of patching and sealing compounds, tar, asphalt, traffic paint, and chemical surface sealants. Dispose of these items outside of the Park.

1.19 SPILL CONTAINMENT PLAN

.1 A spill response plan (SRP) shall be presented in the EPP. Elements to be addressed shall include, but not necessarily limited to:

.1 Detail containment and storage, handling, use and disposal of empty containers, surplus fuels, or other hydrocarbon products in accordance with the applicable federal and provincial legislation.

.2 Include a list of products and materials to be used or brought on site that are considered or defined as hazardous or toxic to the environment (i.e. fuels and lubricants).

.3 Safety Data Sheets (SDS) to be made available on site.

.4 Spill response kit capable of dealing with the 110% of largest possible spill shall be maintained in good working order on the construction site.

.5 Staff shall be informed of the location of the response kit, and be trained in its use.

.6 Hazardous materials are to be stored and used in minimal required quantities in accordance with all applicable federal and provincial legislation.

.7 The SRP will identify and implement special care procedures for the storage and application of patching and sealing compounds, tar, asphalt, and chemical surface sealants.

.8 All spills are to be immediately contained with the source of spill arrested, reported to the Departmental Representative and clean-up initiated. In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment.

.2 Dispose of any absorbent materials used in the clean-up or soils contaminated by the spill in appropriate facilities and transport in accordance with the federal Transportation of Dangerous Goods Regulations.

1.20 EQUIPMENT FUELING AND MAINTENANCE

.1 Equipment used on the project shall be fueled with E10 gasoline and low sulphur diesel fuels.

.2 A fuel delivery, storage, and distribution plan shall be submitted. Topics to be addressed in the EPP will include, but not necessarily be limited to:

.1 Diesel and gasoline supply vehicles, including bulk tankers shall be parked more than 100 metres away from the creek or any other body of water.

.2 Fuel tanks with manual or electric pump delivery systems shall be used, gravity feed is not allowed.

.3 Fueling personnel shall maintain immediate attention to and presence at the fueling operation.

.4 Fueling sites will be identified by the Departmental Representative and the ESO. Any fueling closer than 100 m to the creek or any other body of water will require the authorization and oversight of the ESO or the Departmental Representative.

.5 Equipment fueling to take place at impermeable roadside areas or at staging areas with spill catchment counter measures in place.

.6 Lubricant changes and minor repairs shall be conducted at a location identified by the Departmental Representative in consultation with the ESO. Waste lubricants, used filters and other waste maintenance products shall be removed from Jasper National Park to recycling or certified disposal sites.

.7 Equipment shall be inspected daily for fluid/fuel leaks and maintained in good working order.

.1 Record Inspections.

.2 Immediately address detected leaks.

.3 Inspect tanks, hoses and connections prior to use.

.4 Wrap hose connections and secure with absorbent pads during fuel/oil transfers.

.5 Keep hose, valves, and equipment in a containment area whenever possible.

.6 Hose length and the number of connections shall be minimized and use dripless connections if possible.

.7 Drain hoses when finished.

.8 Fuels, gases, or other deleterious substances to be contained within the appropriate and approved containers and are not to be stored at the Project area where leaks and spills have the potential to seep into groundwater or enter surface watercourses or waterbodies. Secondary containment large enough to hold 110% of the volume of the containers will be used and will not be stored on-site. Fuels, gases, or other deleterious substances will be transported according to the federal Transportation of Dangerous Goods Regulations. Obtain a Restricted Activity Permit (RAP) for the possession and transport of fuel volumes over 250 litres.

.9 All equipment stored overnight in staging areas to be stored on tarps with appropriate containment and with drip trays and/or pans under fuel tanks.

.10 Equipment to be used on the project site shall be thoroughly cleaned of soil, seeds, and any debris or external contaminants outside the national park before delivery to the work site.

1.21 WASTE MATERIAL STORAGE AND REMOVAL

.1 The Contractor shall prepare a Construction and Waste management plan as part of the EPP. The Plan shall include the following basic principle:

.1 Waste reduction which follows the 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.2 Wastes generated at the construction site are to be contained and removed in a timely and approved manner. The EPP shall detail the waste management procedures, including the following:

.1 Describe the management of waste.

.2 Construction wastes shall be stored in containers at an approved location and removed promptly when the containers are 90% full.

.3 A concerted effort to reduce, reuse and recycle materials is expected.

.4 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.5 Provide containers to deposit recyclable materials.

.6 Transport all recyclable materials to an approved recycling facility off site.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

.7 Waste materials are to be disposed of at a certified construction waste landfill outside the National Parks. No burying, burning or discarding of waste materials will be permitted at the construction site, or elsewhere in Jasper National Park.

.8 No materials attractive to wildlife are to be stored at the site overnight – daily removal is mandatory. Human food products are to be contained in a manner so as not to attract animals and waste food stuffs are to be removed from the construction site every day.

.9 Portable container toilets are to be provided in sufficient numbers and locations to ensure convenient usage including frequency of pump out.

.3 All garbage must be stored and handled in conformance with the National Parks' Garbage Regulations.

.4 No food, domestic garbage or hazardous wastes may be deposited in the trade waste site.

.5 Dispose of all hazardous wastes in conformance with the Environmental Contaminates Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.

.6 Provide bear proof garbage containers on-site for domestic garbage generated on-site by Contractor's personnel and make arrangement for collection on a daily basis or when directed by the Departmental Representative.

.7 Maintain the site in a tidy condition, free from the accumulation of waste products, debris and litter.

.8 Do not dispose of or allow to disperse waste or volatile materials such as mineral spirits, oil and paint thinners or other hazardous wastes into waterways. Provide clean-up equipment and adequate supply of absorbent material on-site.

.9 Demolished asphalt shall be disposed of immediately following removal. Stockpiling of demolished asphalt is not permitted on site.

1.22 VEGETATION REMOVAL AND PROTECTION OF THE WORK LIMITS

.1 Follow mitigation measures provided in PRIAs Section 5.

.2 Brushing and clearing to be permitted only within the Project area. Clearing of vegetation at any time requires a Restricted Activity Permit (obtained through the Departmental Representative and ESO).

.3 Vegetation removal during the bird nesting period (April 15 to August 31) requires pre-clearance nest-sweeps to be conducted by QEP.

.4 Store all equipment either on the road or on previously disturbed or hardened surfaces to minimize vegetation disturbance.

.5 Minimize the amount of vegetation cleared or disturbed. Visibly delineate the area to be cleared to avoid unnecessary vegetation removal. Clearly mark area with highly visible materials such as flagging tape to inform equipment operators of the area they are to work in. Equipment operators to ensure no mechanical damage is caused to trees and other vegetation outside the designated clearing area.

.1 Any vegetation damaged outside the designated clearing area to be replaced in size and kind two fold.

.6 Equipment to be used on the project site shall be thoroughly cleaned of soil, seeds, and any debris or external contaminants outside the national park before delivery to the work site.

.7 Minimize migration of invasive species from the Project site:

.1 Prior to entry onto new segments of the Project area, clean (blow down/scrape down) all equipment that came into contact with soil at previous segments (i.e. clearing, grading, decompaction, or restoration equipment) to satisfaction of Departmental Representative, where possible and appropriate.

.2 Construction staff and others to scrape mud off their boots and brush seeds and dirt from their clothing before leaving the Project site.

.8 Disturbance to vegetation in areas temporarily disturbed by heavy equipment and other construction-phase related activities (including lay-down sites, temporary work sites, and material stock pile sites) will be restored as quickly as possible by planting grass seed or seeding (see Section 32 92 22 – Hydraulic Seeding for seed mix specification). Reclamation standards will follow suggested plant density, cover and composition standards specified as follows.

.1 Minimum standard for plant density is 25 plants/m^2, with 90% frequency.

.2 Minimum standard for plant cover is 80% ground cover, with 90% frequency.

.3 Minimum standard for plant community composition standard is 50% cover and 90% frequency of native species.

.9 All vegetation debris to be removed from the National Parks. No other debris management options (piling and burning, mulching, etc.) have been approved for this project. Any change from removing debris will require approval from the Departmental Representative on a case-by-case basis.

1.23 SENSITIVE AND NO-GO ZONES

.1 The ESO may identify sensitive areas and no-go zones in proximity to the work site. Even though these areas may lie outside the construction limit they must not be intruded into by personnel. The Contractor shall describe measures to be employed to achieve that goal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 CONCRETE MANAGEMENT

.1 Wet and uncured concrete is an acutely toxic substance for an aquatic environment. Extra care not to introduce these materials into the environment is required. The Contractor is to prepare an EPP which address concrete plant location, operation, and reclamation where required, to the satisfaction of the Departmental Representative. This plan shall include the following concrete management elements:

.1 During saw-cutting, cooling fluids shall be contained, collected, and disposed of at an approved disposal facility.

.2 Concrete mixer truck washout shall be contained in a buried or above ground tank, with wash products moved back to the concrete batching yard or an approved facility for disposal.

.3 Water contaminated in the placing of cement and curing of concrete shall be contained and removed from the site to an approved disposal facility.

.2 If a concrete batching plant is used it shall be operated pursuant to applicable dust, air emission, and water quality control regulations.

3.2 STORAGE AND CONTAINMENT OF EXCAVATED MATERIAL

.1 The EPP shall detail the plan for both temporary storage and permanent disposal of surplus excavated material.

3.3 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

.1 Removal and storage of snow shall be described, and a plan shall be approved by the ESO and the Departmental Representative.

.2 Within the EPP a contingency plan for control of dust generated from the construction site shall be prepared, with materials availability arranged in the event of their need.

.3 It may be desirable or necessary to maintain security services at the construction site during quiet times. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals.

.4 Develop a response plan for, and be suitable equipped for, fires on and immediately adjacent to the work area.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 The Contractor is responsible for quality control inspection throughout every stage of the Work to ensure that equipment, materials and workmanship comply with the requirements of the Contract Documents.

1.2 MEASUREMENT PROCEDURES

.1 This Work shall be incidental to contract and will not be measured for payment.

.2 All Quality Control is to be done by the Contractor.

1.3 DEFINITIONS

.1 Quality Control (QC): The process of checking specific products or services to determine if they comply with relevant quality standards and identify ways to eliminate causes of unsatisfactory product or service performed.

.2 Quality Assurance (QA): The process of ensuring that the Contractor's Quality Management Plan (QMP) (QC, non-conformances, etc.) is being followed. The results of the QA are provided as feedback to both the Contractor and the Departmental Representative. Where required, the Contractor shall implement changes to the project based on the feedback received from the QA process.

.1 The Contractor is responsible for quality assurance of all construction activities, except as noted following:

.1 The Departmental Representative shall complete quality assurance for the roadway works (scope of work included in the Roadway Drawings and including all backfilling in the Roadway and Bridge Drawings).

1.4 QUALITY MANAGEMENT PROGRAM

.1 The Contractor shall prepare a Quality Management Program. The purpose of the program shall be to ensure the performance of the Work in accordance with Contract requirements.

.2 The Quality Management Program shall be described in a Quality Management Plan. The Contractor shall submit the Quality Management Plan to the Departmental Representative for acceptance in accordance with Section 01 33 00 - Submittal Procedures. The Plan shall develop a logical system for tracking and documenting the Quality Control of the Work as well as the Contractor’s internal Quality Assurance procedures to verify the compliance of the Quality Control process. A systematic format and a set of procedures patterned on a recognized Quality Control Standard will be acceptable, subject to review by the Departmental Representative.

.1 The Contractor is responsible for quality control and quality assurance of all construction activities, except as noted following:

.1 The Departmental Representative shall complete quality assurance for the roadway works and all backfilling.

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

.1 Distribution list, providing a list of names to whom the Manual shall be distributed;

.2 Title page, identifying the Contract, Contractor and copy number;

.3 Revision page, identifying the revision number and date of the Manual;

.4 Table of contents;

.5 Revision control, tabulating the revision number, date of revision, description of revisions and authorized signature;

.6 Details of measuring and test equipment including methods and frequency of calibration;

.7 Purchasing details of all materials and equipment including procurement documents and vendor's Quality Control Program standards;

.8 Procedures for inspection of incoming items, in-process inspection and final inspection and tagging of all supply items;

.9 Details of special processes as identified by the Departmental Representative, including qualifications of personnel and certification;

.10 Procedures for shipping, packaging and storage of materials;

.11 Procedures for maintaining quality records and Statements of Compliance, including filing and storage of documents for a period of one year after Completion of the Works;

.12 Details of any non-conformance, including identification and recording of deficiencies, tagging procedures for "HOLD" or "REJECT" items, and final disposition of non-conformance forms by the Quality Control Manager;

.13 Inspection and test checklists, including tabulated checklists describing all manufacturing and delivery activities such as Inspection or Test, frequency of tests, description of tests, acceptance criteria of tests, such as verification, witnessing or holding tests and sign-off by the Quality Control Manager and the Quality Assurance Manager, if the Quality Assurance Manager witnesses the tests;

.14 Forms used to ensure the application of the inspection and test checklist requirements. These forms shall be identified in the checklists and describe all testing requirements for Specification compliance; and

.15 Details of the Quality Assurance Program including the Contractor's procedures to verify the compliance to the Quality Control process of on-site work and off-site work by fabricators.

.4 The Contractor shall appoint qualified and experienced Quality Control and Quality Assurance Personnel, who are dedicated to quality matters and who will report regularly to the Quality Control Manager and Quality Assurance Manager as well as Contractor's management at a level which shall ensure that Quality Control and Quality Assurance requirements are not to be subordinated to manufacturing, construction or delivery. The Quality Control and Quality Assurance Personnel shall be empowered by the Contractor to resolve quality matters. Personnel involved in Quality Assurance shall be independent of the Quality Control Process.

.5 The Quality Management Plan shall include samples of all forms to be filled in by the Quality Control and Assurance Personnel. All forms shall be signed by the Quality Control Manager and Quality Assurance Manager and submitted promptly to the Departmental Representative.

.6 An independent check of all Work shall be performed by the Contractor. The Contractor shall appoint Quality Control Inspectors to ensure compliance of products and workmanship with Contract requirements. Quality Assurance Inspectors, will periodically (shall be a minimum of 10% of the Quality Control checks) perform a second independent check to assess if the Quality Control process is being followed. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.

.1 A testing agency independent from the Contractor must be engaged by the Contractor to perform either Quality Control or Quality Assurance for a given task as part of the Quality Program.

.7 At completion of the Work a bound and itemized copy of all Quality Control and Quality Assurance documents and reports shall be prepared by the Contractor's Quality Control Manager and Quality Assurance Manager and submitted to the Departmental Representative.

1.5 TESTING

.1 All Quality Control technicians are to be certified by the Canadian Council of Independent Laboratories (CCIL) for testing asphalt, aggregates and concrete, as applicable to the testing requirements for that item of Work.

.2 Testing required to provide Quality Control and Quality Assurance to assure that the Work strictly complies with the Contract requirements shall include, but not be limited to:

.1 Testing of all structural concrete, reinforcing steel, granular material, asphalt, miscellaneous structural elements and metals, utilities installed, and all source acceptance testing;

.2 All testing specified in the Contract Documents; and

.3 Any other testing required as a condition for deviation from the specified Contract procedures.

.3 The quality control testing proposed and testing frequency shall at a minimum, achieve the requirements of the following:

.1 Wherever these standards refer to standards (e.g. CSA, ASTM, and others) the minimum testing frequencies in these standards shall be utilized.

.2 If no testing standard is identified in the specifications, testing proposed shall be in accordance with AT Standard specifications for Highway Construction.

.3 The Contractor and its independent Quality Assurance testing agency that will carry out the testing must satisfy themselves that the test frequencies being completed are sufficient to ensure the quality requirements of the QMP.

.4 The Contractor shall be fully responsible and bear all costs for all quality control testing and shall conduct such testing in the following manner:

.1 Provide testing facilities and personnel for the tests and inform the Departmental Representative in advance to enable the Departmental Representative to witness the tests if it so desired;

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

.3 Within one day after completion of testing, submit test results to the Departmental Representative; and

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

.5 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.

.6 Testing agencies, their inspectors, and their representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the Contract Documents, nor to approve or accept any part of the Work.

.7 The minimum frequency for Quality Control testing during embankment construction, roadway construction, and backfilling will be as follows:

CONSTRUCTION TYPE	**TEST TYPE**	**MINIMUM FREQUENCY OF TESTS**
Embankment construction with fine grained or granular soil	Standard Proctor by: ASTM D698	1 per change in material or 1 per week, whichever is more frequent
	Field density by: ASTM D1556 / D1556M – Sand Cone ASTM D2167 – Balloon ASTM D6938 - Nuclear	1 per 1000 m^2 per lift, spaced randomly across full width of embankment
	Proof Roll and or Rutting Test	As required by the Departmental Representative
Embankment construction with blasted rock or oversize granular	Field observation with daily field report; and a summary report signed and stamped by the Contractor's Engineer	Full time during blasted rock placement
Road structure construction with granular materials, including all backfill behind abutments	Standard Proctor by: ASTM D698 Modified Proctor by: ASTM D1557 (required for top 0.6 m of backfill below approach slabs)	1 for each material type and 1 for each accepted change in material gradation
	Field density by: ASTM D1556 / D1556M – Sand Cone ASTM D2167 – Balloon ASTM D6938 - Nuclear	3 tests per 50 m per lift; on centreline and on left and right fog lines
	Proof Roll and or Rutting Test	As required by the Departmental Representative
Culvert Installation	Field Density	Minimum three per 300 mm lift per culvert, spaced through the length and depth of the culvert backfill

CONSTRUCTION TYPE	TEST TYPE	MINIMUM FREQUENCY OF TESTS
Tests Prior to Concrete Discharge	C 143 / C143M-08 Slump of Hydraulic-Cement Concrete CSA A23.2-7C Air Content of Plastic Concrete by the Volumetric Method	One per truck load.
Tests During Concrete Pour	C 39 / C 39M-05e2 Compressive Strength of Cylindrical Concrete Specimens	Minimum of one cylinder for each pour and at least for every 30 cubic metres of concrete being poured.

	ASTM Test	*Minimum Frequency
Tests During Aggregate Production	ASTM C136 / C136M – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates Or C 117 – Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing	-Split Stockpiles: 1 for each stockpile for every 2 hours of production. - One main stockpile: for every 300 tonnes. - Blend Sand: 1 for every 100 tonnes during stockpiling. - Natural filler: 1 for every 50 tonnes during stockpiling.
Tests During Aggregate Production (cont.)	ASTM D5821 – Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate	Every second coarse aggregate sieve test
	C 117 – Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the crusher
Asphalt Products Tests	Tack and Prime	Mill certifications.

Tests during Asphalt Plant Mixing	C 136 / C 136M – Dry Sieve Analysis of Aggregate	1 of combined aggregate (off the belt) every 300 tonnes.
	D 2216 – Moisture Content	Aggregate: 2 tests/Lot Asphalt mix: 1 on first Sub-Lot and every second day.
	C 117 – Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the plant cold feed.
	D 5581– Resistance to Plastic Flow Using Marshall Apparatus	One set of three briquettes for 1,200 tonnes or Lot, whichever is less.
	D 6307 – Asphalt Extraction, Ignition Method	One/Sub-Lot.
	D 5 / D 5M – 13 Penetration of Bituminous Materials	One per Manufacturer's Batch. Samples should be taken for every 3000 tonnes of mix production.
	D 2171 / D 2171M –Viscosity	Contractor's Option
	D 2041 / D 2041M – Maximum Theoretical Density	One per sub-lot
Test During Asphalt Paving for Density Testing	AASHTO T 245- Resistance to Plastic Flow Using Marshall Apparatus	One 15 kg sample for every Sub-Lot or minimum 1/day for field testing.
	7 Samples	At start, two cores for each Sub-Lot. After rolling pattern established, only one core for each Sub-Lot. All Marshall mix cores to be a minimum of 100 mm diameter, Superpave mixes shall require minimum 150 mm diameter cores.

.1 These are the minimum frequencies and the Contractor is responsible to assess the need to increase testing frequency, where aggregate source is not uniform or any other condition exists that may warrant it. QC frequencies may be reduced below this level, subject to the Departmental Representative's authorization, should the Contractor's QC plan be proven very effective.

.2 Passing the minimum quantity of QC tests does not relieve the Contractor from the obligation of meeting the Contract requirements and any identified non-compliant works or products shall be rectified by the Contractor at their cost.

.8 The contractor shall determine the individual maximum theoretical densities (MTD) per ASTM D 2041 for each of the Sub-Lot samples and average the results to obtain the lot MTD. Lot MTD values are to be reported to department representatives prior to the provision of the coring locations to the contractor.

.1 Acceptance or rejection will be determined for each sub-lot. One opportunity will be provided to the contractor, using non-destructive test methods, to isolate the area of low density and conduct additional compaction providing no damage is incurred to the new pavement. an additional core will be taken in the area of low density to replace the core with previous low density, and a new value will be calculated. the contractor is to communicate with the departmental representative prior to scheduling re-compaction efforts.

.2 Where any Marshall mix core density is less than 96% (91% for Superpave mixes), the contractor shall either overlay or remove and replace reject mix. The Sub-Lot is rejected if the test result for density is outside the acceptance limits. To minimize cost of rejection to the contractor, low density areas can be isolated within the Sub-Lot. The Departmental Representative must verify and accept remedial work to proceed.

.3 Payment adjustment for density will be based on testing of the replacement or overlay material where applicable. where replacement or overlay material does not cover the entire lot of Sub-Lot, prior testing of the uncovered area will be averaged with new tests on the corrective work.

.9 For all Work other than the roadway works (scope of work included in the Roadway Drawings and including all backfilling on the Roadway and Bridge Drawings): Quality Assurance testing will be undertaken by the Contractor through an independent CSA certified testing firm. The independent testing firm will complete random sampling, inspection, and testing for the purposes of determining the compliance with specifications and other contract documents. The frequency, location of the inspections, sampling, and tests shall be a minimum of 10% of the Quality Control testing frequency.

.10 The Contractor shall be responsible for third party testing of materials incorporated into the works.

.11 The Departmental Representative may perform quality audits as desired. Such audits will not relax the responsibility of the contractor to perform work in accordance with Specifications. To facilitate this work the contractor shall:

.1 Notify appropriate agency and Departmental Representative in advance of work which the Departmental Representative may want to test.

.2 Submit samples and/or materials required for testing, as specifically requested in the Specifications or as requested by the Departmental Representative. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the work.

.3 Provide labour and facilities to obtain and handle samples and materials on site.

1.6 INSPECTION

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, Contractor shall uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, the Contractor shall correct such Work and pay cost of examination and correction.

.5 For Roadway Works and backfilling (work described in the Roadway design drawings and all backfilling on Roadway and Bridge drawings):

.1 The Departmental Representative will provide the Contractor with an Approval to Proceed document after performing an audit and confirming all requirements are met, as stated in Section 01 71 00 – Examination and Preparation. The Approval to Proceed must be signed by the Departmental Representative and the Contractor's representative before proceeding to the next layer.

.1 The Contractor shall provide a minimum of 48 hours notice to the Departmental Representative to arrange for an audit and Approval to Proceed.

1.7 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies may be engaged by the Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.

.2 Employment of inspection/testing agencies does not relax responsibility of the Contractor to perform Work in accordance with Contract Documents.

.3 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. The Contractor shall correct the defect and irregularities as advised by the Departmental Representative at no cost to the Departmental Representative. The Contractor shall pay costs for retesting and re-inspection.

1.8 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.9 PROCEDURES

.1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.10 REJECTED WORK

.1 Any instances of unacceptable work discovered by either the Quality Control or Quality Assurance personnel will require the preparation of a non-conformance report (NCR).

.2 If instances of unacceptable work are discovered by the Departmental Representative, the Departmental Representative may issue a non-conformance report (NCR).

.3 The Contractor shall expediently correct any non-conformances, whether the result of poor workmanship, use of defective products or damage; and whether incorporated in the Work or not, the Contractor shall replace or re-execute in accordance with the Contract Documents.

.4 Make good other Contractor's work damaged by such removals or replacements promptly.

.5 Payment for the work itself may be withheld until the NCR issue has been resolved to the satisfaction of the Departmental Representative.

.6 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Departmental Representative may deduct from Contract Price difference in value between Work performed and that called for by the Contract Documents, amount of which will be determined by the Departmental Representative.

1.11 REPORTS

.1 Submit one (1) electronic copy of all inspection and test reports to Departmental Representative in accordance with Section 01 33 00 - Submittals Procedures.

.2 Submit to the Departmental Representative one paper copy and one electronic copy of all Non-Conformance Reports.

1.12 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

1.13 MILL TESTS

.1 Submit mill test certificates as required in specification sections.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 55 26 - Traffic Control.

1.2 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-S269.2, Access Scaffolding for Construction Purposes.

.2 CAN/CSA-Z321, Signs and Symbols for the Occupational Environment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.4 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

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

.5 Remove from site all such work after use.

1.5 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Provide and maintain scaffolding, ramps, temporary stairs, staging, swing staging, ladders, and platforms.

.3 Provide Departmental Representative access to all parts of the work during construction and as required for inspection of the completed works.

1.6 HOISTING

.1 Provide, operate and maintain hoists/cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.

.2 Hoists and/or cranes to be operated by qualified operator.

1.7 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 weight or force that will endanger Work.

1.8 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

1.9 SECURITY

.1 The Contractor shall be entirely responsible for the security of the Work site and of the Work at all times while the Work Sites are under the Contractor's control (including after working hours and during holidays). Provision of security personnel, as determined necessary by the Contractor to maintain a secure site, will not be measured but considered incidental to the work.

1.10 OFFICES

.1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

.2 Provide marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

.4 Departmental Representative's Site office.

.1 Provide temporary office for Departmental Representative with sufficient working space for minimum of two persons and to include.

.1 Minimum (2) desks, (2) office chairs, printer.

.2 Provided office to be at minimum a separate room with a lockable door separate from the Contractor's working area. A separate trailer may be provided.

.3 Provide uninterrupted power supply and heat for office.

.4 Provide air-conditioning for office.

.5 Provide reliable satellite Internet connection with sufficient bandwidth to support phone calls for Departmental Representative usage.

.6 Inside dimensions minimum 3.6 m long x 3 m wide x 2.4 m high, with floor 0.3 m above grade, complete with two 50% opening windows and one lockable door.

.7 Insulate building and provide heating system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.

.8 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.

.9 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10 % upward light component.

.10 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.

.11 Equip office with 1 x 2 m table, 4 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.

.12 Maintain in clean condition.

.13 The contractor shall remove from site all such work after use.

1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.12 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.13 CONSTRUCTION SIGNAGE

.1 No other signs or advertisements, other than warning signs, are permitted on site.

.2 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.14 PROTECTION AND MAINTENANCE OF TRAFFIC

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

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

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

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

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

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

.7 Construct access and haul roads necessary.

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

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

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

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

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

.13 Provide snow removal during period of Work.

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

1.15 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 Alberta Infrastructure and Transportation

.1 Traffic Accommodation in Work Zones - 08.

.2 Traffic Control Standards.

.2 BC MoTI – Standard Specifications for Highway Construction.

.3 BC MoTI – Traffic Control Manual for Work on Roadways.

.4 U.S. Department of Transportation

.1 Manual of Uniform Traffic Control Devices for Streets and Highways (MUTCD).

1.2 MEASUREMENT AND PAYMENT

.1 Traffic Control will be paid under **"Lump Sum Price Item 2 – Traffic Control"** prorated by the portion of overall Contract Work completed.

.1 Payment for traffic control will commence once the Contractor has implemented their accepted Traffic Accommodation Strategy and setup is accepted by the Departmental Representative.

.2 Temporary pavement marking and layout will not be measured but considered incidental to work.

.3 The design and installation of the temporary soil retaining system, needed to stage work as specified (including approach roadway excavation) and provide minimum required traffic lanes, will not be measured but considered incidental to work.

.4 Cost of keeping the existing roadway within the Work limits clean and free of pot holes shall be considered incidental to lump sum and no additional payment will be made.

.5 The cost of snow removal required by the Contractor to complete the work identified in the Contract shall be considered incidental to lump sum and no additional payment will be made.

.6 Cost to maintain traffic control over any summer or winter shut down will be considered incidental to lump sum and no additional payment will be made.

.2 Additional hours of Traffic Control Personnel requested by the Departmental Representative beyond those specified will be paid for separately.

1.3 GENERAL

.1 The Contractor shall design, supply, erect, move and maintain all traffic control devices, signs, temporary pavement marking, other safety measures, and provide staff to ensure safe passage of all traffic from commencement of site work to date of acceptance by the Departmental Representative.

.2 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial type. If bilingual signs are used, the English and French message shall be of equal letter size and at same elevation, with English on left and French on right. Assistance in translation of construction and warning signs to French may be obtained from Parks Canada.

.3 Temporary pavement marking used shall be acceptable to the Departmental Representative. These temporary pavement markings shall be in accordance with AT-Traffic Accommodation in Work Zones. Spacing between temporary line markings to not exceed 10m.

.4 All temporary markings and other associated markings will be removed at the contractor's expense prior to completion of the Contract but not before the final pavement markings have been installed to the satisfaction of the Departmental Representative.

.5 At all work sites, the Contractor shall mark **accurately**, at regular intervals, the location and type of existing painted lines prior to their removal or covering, including start and ends of passing lanes and intersections, with a stake at the side of the roadway and make a written record of markings in a book, in order that painted lines can be accurately re-established after work is completed. If no lines are present the Contractor shall mark **accurately (+ or – 20 mm)** and at regular intervals in accordance with AT – Traffic Control Standards (latest edition).

.6 The Contractor shall develop and implement a Traffic Accommodation Strategy (TAS) in accordance with AT Traffic Accommodation in Work Zones, except where specified otherwise in the Contract Documents. The TAS shall take into account all hazards associated with construction operations on a busy highway and minimize risks to motorists prior to beginning Work. The TAS shall be updated regularly in response to any incidents or changes in conditions, be they weather, work, traffic, or otherwise.

.7 The Contractor shall coordinate traffic management procedures with other Contractors working in the area.

1.4 PROTECTION OF PUBLIC TRAFFIC

.1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 Carry out traffic regulation in accordance with Traffic Accommodation in Work Zones except where specified otherwise.

.3 When working on travelled way:

.1 Place equipment in position to minimize interference and hazard to travelling public.

.2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.

.3 Do not leave equipment on travelled way overnight.

.4 Close lanes of road only after receipt of written approval from Departmental Representative.

.1 Before re-routing traffic erect suitable signs and devices to Traffic Accommodation in Work Zones.

.5 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic.

.6 Except as noted in item 1.4.6.1 of this Section, a minimum of single lane alternating traffic shall be maintained on Highway 93N at all times unless noted otherwise. The minimum Clear Roadway for one lane of normal traffic shall be 4.0 m unless otherwise approved in writing from the Departmental Representative.

.1 Full traffic closures lasting no longer than fifteen (15) minutes will be permitted only for removal of existing slab and for new girder installation.

.1 Allow traffic buildup to clear fully between closures.

.2 Full traffic closures must be scheduled overnight between the hours of 9:00 PM and 5:00 AM and will require minimum one weeks notification (7 days) and approval of the Departmental Representative.

.7 Traffic lane to be separated from Construction Zone using BC MoTI 810 high standard precast concrete median barriers or approved equivalent.

.1 Anchoring of the concrete barriers into the existing structure is permitted.

.2 Anchoring of the concrete barriers into the new concrete deck and girders is not permitted.

.8 Clear roadway shall be measured by extending straight lines parallel to the roadway at the narrowest constriction point in the work zone from inside the faces of construction barriers, or from the faces of other constrictions, on each side of the clear roadway and measuring the perpendicular distance between the lines.

.9 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, except where other means of road access exist that meet approval of Departmental Representative.

.10 Provide competent flag personnel, trained in accordance with, and properly equipped to Traffic Control Manual for Work on Roadways, to manually control portable traffic signal system on the wire (remote control not permitted) or flag to actively manage queues to balance wait times in the two traffic directions while single lane alternating is in effect:

.1 From June 15 to September 15, between the hours of 8:00 and 20:00, and

.2 24 hours/day from 22:00 Thursday to 6:00 Tuesday of long weekends, as defined in Item 1.6.7 of this Section.

.3 Use of automated (timed) portable traffic signal system during these hours is not permitted.

.11 Monitor traffic equipment and queue lengths with on-site personnel at all times (24 hours a day) while single lane alternating traffic is in effect:

.12 Clear snow and ice from the roadway within the work zone.

1.5 INFORMATIONAL AND WARNING DEVICES

.1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.

.2 Supply and erect signs, delineators, barricades and miscellaneous warning devices to Traffic Accommodation in Work Zones.

.3 Signs must be pictorial or in both official languages. Use the approved translation list for signage.

.4 Place signs and other devices in locations recommended in Traffic Accommodation in Work Zones.

.5 All construction signs shall be installed to prevent incidental blow down or displacement and must remain in service throughout the construction period. Construction signage heights to be minimum 1.5m from ground to the bottom of the sign, or as per BC MoTI – Traffic Control Manual for Work on Roadways, whichever is higher.

.6 Supply, install and maintain two (2) flashing arrow boards (FAB), as required for the Works, in accordance with the accepted TAS. All FAB shall be as per MUTCD (latest edition).

.1 Location of the FABs will be agreed with the Departmental Representative.

.2 Removal of FABs will only be permitted upon completion of work.

.3 Payment for FABs will be incidental to the Lump Sum Price Item for Traffic Control.

.7 Supply, install, and maintain two (2) changeable message signs (CMS) to inform the traffic of construction delays. All CMS shall be as per MUTCD (latest edition).

.1 Location of the CMS will be agreed with the Departmental Representative.

.2 Text for CMS will be directed by the Departmental Representative.

.3 Removal of CMS will only be permitted upon completion of work.

.4 Payment for CMS will be incidental to the Lump Sum Price Item for Traffic Control.

.8 Supply, install and maintain two (2) speed reader boards (SRB), as required for the Works, in accordance with the accepted TAS.

.1 Location of the SRBs will be agreed with the Departmental Representative.

.2 Removal of SRBs will only be permitted upon completion of work.

.3 Payment for SRBs will be incidental to the Lump Sum Price Item for Traffic Control.

.9 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.

.10 Continually maintain traffic control devices in use:

.1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.

.2 Remove or cover signs which do not apply to conditions existing from day to day.

1.6 CONTROL OF PUBLIC TRAFFIC

.1 In addition to requirements defined in Item 1.4 of this Section, provide competent flag personnel, trained in accordance with, and properly equipped to Traffic Accommodation in Work Zones for situations as follows:

.1 When public traffic is required to pass workers, materials, working vehicles and/or equipment that block all or part of travelled roadway.

.2 When vehicles are entering or exiting Worksite access points.

.3 When it is necessary to institute one-way traffic system through construction area or other blockage and traffic signals are not in use.

.4 Where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.

.5 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.

.6 Where temporary protection is required while other traffic control devices are being erected or taken down.

.7 For emergency protection when other traffic control devices are not readily available.

.8 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.

.9 At each end of restricted sections where pilot cars are required.

.2 Delays to public traffic due to contractor's operators: 15 minutes maximum when approved by the Departmental Representative. Emergency vehicles (i.e., ambulance, RCMP, Park Warden) must be granted immediate passage at all times. The Departmental Representative reserves the right to reduce delay time for public traffic at times when specified delay results in excessive backup of public traffic. Delay is defined as the total additional time required to pass through a work zone minus the time that would be required at the posted speed. Delay time shall be the maximum time elapsed as measured from the back of the approach queue to the resume speed sign.

.3 The Departmental Representative will monitor the traffic control measures, and may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traveling public and coordination with adjacent contracts. The Contractor shall bear the costs of implementing these requirements so as to ensure the traffic control specifications and associated performance standards are met.

.4 The Contractor shall maintain a dust free construction zone by means of cleaning and watering when required.

.5 During hours of darkness, if permitted under these specifications, Contractor shall determine requirements but as a minimum, flag persons shall be additionally equipped with a red signal hand-light of sufficient brightness to be clearly visible to approaching traffic and flagging stations shall be illuminated by overhead lighting. Signs indicating hazardous conditions and signs requiring increased attention shall be marked with flashers.

.6 Where roadway, carrying two-way traffic, is restricted to one lane, for 24 hours each day, provide portable traffic signal system.

.1 Adjust, as necessary, and regularly maintain system during period of restriction.

.2 Ensure signal system meets requirements of Traffic Accommodation in Work Zones.

.7 Work restrictions related to slowing or stopping of traffic:

.1 During the following long weekend periods, no work is permitted that will stop or slow traffic to slower than 30 km/hr:

.1 From 22:00 2024 March 28 to 06:00 2024 April 02.

.2 From 22:00 2024 May 16 to 06:00 2024 May 21.

.3 From 22:00 2024 June 27 to 06:00 2024 July 02.

.4 From 22:00 2024 August 01 to 06:00 2024 August 06.

.5 From 22:00 2024 August 29 to 06:00 2024 September 03.

.6 From 22:00 2024 September 26 to 06:00 2024 October 01.

.7 From 22:00 2024 October 10 to 06:00 2024 October 15.

.8 From 22:00 2024 November 07 to 06:00 2024 November 12.

.2 Traffic may be stopped or slowed to slower than 30 km/hr during these periods only if and when an exemption request has been approved by the Departmental Representative in writing. Any exemption request shall be submitted in writing and be made at least one week in advance of traffic impact to be considered. Approval of exemption request is not guaranteed and shall not be relied upon. No claims for any delays or inconvenience due to denial of exemption request will be entertained.

.3 At all other times, traffic may be stopped or slowed to slower than 30 km/hr when approved by Departmental Representative and provided maximum delays to public traffic do not exceed allowable as specified in this section.

1.7 OPERATIONAL REQUIREMENTS

.1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted to a reduced speed limit of 30 km/hr.

.2 Maintain existing conditions for traffic crossing right-of-way except when required for construction.

.3 Public access to Parks Canada facility (approximately 50 m north of the bridge adjacent to the northbound lane) to be maintained and provided at all times.

.4 Public access to the Poboktan Creek Trail parking area (approximately 75 m south of the bridge adjacent to the northbound lane) to be maintained and provided at all times.

.5 Existing cleared area (overflow parking for Poboktan Creek Trail, approximately 75 m south of the bridge adjacent to the southbound lane) may be closed to the public and used for laydown area. See further requirements in Section 01 35 43 – Environmental Procedures.

.6 Provide the Departmental Representative with construction advisories for posting to the Official Alberta Traffic Advisor website (http://511.alberta.ca/) and update advisories regularly to reflect the current and planned construction activities and highway closures.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 55 26 - Traffic Control.

.2 Section 01 35 43 - Environmental Procedures.

.3 Section 01 52 00 - Construction Facilities.

1.2 REFERENCE STANDARDS

.1 CSA Group (CSA)

.1 CSA-O121, Douglas Fir Plywood.

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.4 HOARDING

.1 Erect temporary site enclosure using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m on centre. Provide one lockable truck gate. Maintain fence in good repair.

.2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

.3 Provide screening around construction materials and / or equipment as directed by the Departmental Representative for protection of wildlife.

1.5 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs, and bridge decks or girders.

.2 Provide as required by governing authorities.

1.6 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.7 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.8 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.9 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.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All Technical Sections.

1.2 REFERENCE STANDARDS

.1 Within text of each specifications section, reference may be made to reference standards.

.2 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

.5 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

1.3 QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

.3 Defective products, whenever identified up to the end of the warranty period, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber and fabricated metals on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.6 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

1.7 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.8 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.9 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.10 CONCEALMENT

.1 In finished areas conceal ducts in curbs or barriers, except where indicated otherwise.

.2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.11 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.12 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use stainless steel steel fasteners and anchors for securing exterior work, unless non-corrosive hot dip galvanized steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of parts of structure. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

1.14 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work and pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Owner's identification of existing survey control points and property limits.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

.1 This work shall be incidental to the Contract and will not be measured for payment.

1.3 QUALIFICATIONS OF SURVEYOR

.1 Qualified surveyor, licensed to practice in Place of Work, acceptable to Departmental Representative.

1.4 SURVEY REQUIREMENTS

.1 The Departmental Representative shall identify the location of all work sites.

.2 The Contractor shall be responsible for all other survey and layout work identified in the Contract Documents and as required to complete the works including but not limited to:

- .1 Establishing lines and levels, locate and layout, by instrumentation.
- .2 Staking for grading, cut and fill.
- .3 Staking for slopes and top of embankment, sub-base course, base course and centreline for paving.
- .4 Establishing culverts, catch basin structures, invert elevations and locations.
- .5 Incidental field adjustments, such as staking of embankments and culverts to match post-stripping ground lines and actual field drainage patterns.
- .6 Layout for interim and final lane markings, including those for intersection treatments.
- .7 Re-establishing the start and finish of "No Passing Zones", Passing Lanes or at new limits as directed by the Departmental Representative
- .8 Re-establishing Reference Survey Control Points that are in danger of being damaged or destroyed.
- .9 Ensuring survey instruments are properly calibrated prior to commencing Works.

.3 Survey Accuracy:

- .1 All survey work shall be tied into the existing Control Monument Network with grid coordinates in UTM Zone 11 NAD 83. Departmental Representative will provide information on Control Points.
- .2 All traverses will be closed and balanced. All level loops and traverses will be tied into the Control Monument Network.
- .3 Secondary Control Points will be tied into and relative to Control Monument Network. Accuracy for Control Point surveys shall be to second order:
- .4 Horizontal shall be less than $r = 5(d+0.2)$ where "r" is in cm and "d" is in km
- .5 Vertical shall be less than $0.008 \times \sqrt{k}$ where k is distance in kilometres.

.4 Staking accuracy shall be:

.1 In bush areas, all elevations shall be within 100 mm of correct elevation. In open ground, all elevations shall be within 50 mm of correct elevation.

.2 In bush areas, all horizontal locations shall be within 100 mm of Design. In open ground, all horizontal locations shall be within 50 mm of Design.

.3 On highway surface, all elevations shall be within 10 mm of correct elevation.

.4 All structures shall be within 20 mm of Design elevation and horizontal.

.5 The Departmental Representative will complete quality assurance construction survey measurements to verify grades and alignment, interim survey re-measurements for excavation limits and final neat line measurements to verify payment quantities for completed works.

.6 Contractor to provide cut sheet reports for all layers of road template to demonstrate that the defined construction tolerances have been achieved before advancing to the next stage. Departmental Representative to verify that they are correct by performing an audit.

.1 Shots are to be taken at 10m intervals along centreline, mid-points and shoulders.

.2 The Departmental Representative will provide the Contractor with an Approval to Proceed document in accordance with Section 01 45 00 - Quality Control.

1.5 RECORDS

.1 Maintain a complete, accurate log of control and survey work as Work progresses.

.2 Record locations of maintained, re-routed, and abandoned service lines.

1.6 SUBMITTALS

.1 In accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit name and address of Surveyor to Departmental Representative.

.3 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.

.4 On request of Departmental Representative, submit survey data.

.5 Submit certificate signed by surveyor certifying those elevations and locations of completed Work that conform to the Contract Documents.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 CROSS SECTIONS

.1 Cross sections will be taken at a maximum of 20 metre intervals. Additional cross sections will be taken where variations occur, including but not limited to: drainage channels, structures and/or other obstructions.

.1 Cross section intervals will be established on OG and are to be used for the duration of the project.

3.2 LAYOUT REQUIREMENTS

Survey Layout	Maximum Interval	Product	Tolerances
Right-of-way	At each point of deflection and at sufficient points between as to be continuously visible.	Stake showing station and offset, or flagging.	Sufficient accuracy to prohibit encroachment into adjoining properties.
Clearing and Grubbing	Same as Right-of-way.	Same as Right-of-way.	Sufficient accuracy to prohibit encroachment into adjoining properties.
Grading – Slope Stakes	10 m in rock cuts; 20 m in all other cases. (100 m for machine-controlled grading)	One slope stake each side, at top of cut or bottom of fill, showing station, offset, vertical dimension to subgrade, and slope, plus cut/fill transition stake. Non-standard ditches will be staked separately. An additional slope stake, where applicable, at the top of a rock cut after the removal of overburden.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical accuracy 25mm
Grading – Subgrade	20 m. (100 m for machine-controlled grading)	One stake at each side of the subgrade, showing station, offset and grade at the stake location, one at each break point, and one at centreline.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical accuracy per Specifications
Top of Sub-base	20 m. (100 m for machine-controlled grading)	One stake at each side of the sub-base course, showing station, offset and grade at the stake location, one at each break point, and one at centreline.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical accuracy per Specifications
Each Base Course	20 m. (100 m for machine-controlled grading)	One stake at each side of the base course, showing station, offset and grade at the stake location, one at each break point, and one at centreline.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical accuracy per Specifications
Final Base Course only	20 m. (100 m for machine-controlled grading)	One stake at each side of the base course, showing station, offset and grade at the stake location, one at each break point, and one at centreline.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical accuracy per Specifications

Culverts	Inlet and outlet.	One stake at each end of the culvert, plus an offset line, showing invert elevation and station.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical tolerance 0.020m
Storm Drainage, Subdrain, Watermain or Sanitary Sewer		Stakes showing locations of manholes, catch basins and other structures, and invert locations of pipe inlets and outlets, as well as stations.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical tolerance 0.020m
Sawcutting and asphalt pavement milling	5 m	Paint	Offset from CL accuracy required +/- 0.030m
Retaining Walls	Not more than 10 m, and at alignment changes.	One stake showing control line location and either the elevation at the top of the wall or the elevation at the bottom of footing excavation, as well as station.	Per Specifications
Paving	20 m	Stake showing station and offset, reference points (eg. centerline offset, barrier, changes in paint lines etc.)	N/A
Level Course / Profile Paving	5 m grid pattern	5 m grid on pavement break points with cuts / fills.	N/A
Profile Milling	5 m grid pattern	5m grid on pavement break points with cuts / fills.	N/A
Superelevation change	At percentage change points	Stakes showing station and superelevation percentage.	N/A
Concrete Barriers & W-Beam Guardrail	Same as paving.	Same as paving.	Offset from CL accuracy required +/- 0.030m Vertical tolerance +/- 0.010m
Signs, light poles and other structures		Stake at each sign location with stationing and sign designation.	+/- 0.025m – up or down chainage and vertical tolerance Offset from CL accuracy required +/- 0.025m
Curb and Gutter	10 m and at alignment changes. Curb returns: 5 m or at quarter points, whichever is less.	Offset hub and nail with cut/fill to gutter grade, show stationing.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical tolerance +/- 0.010m
Median/Island Curb	Continuous.	Paint line at face/edge of curb	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m
Pavement Marking	10 m, changes in line type, symbols	Paint dots and lines	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m

.1 This table shows layout details for general situations; particular circumstances may require more or less staking.

.2 The right-of-way limit will be laid out only where there is the work, including utility relocation, to be performed within three metres of it.

3.3 MACHINE CONTROLLED GRADING

.1 Machine controlled grading may be used as a substitute for conventional grade staking under the following conditions:

.1 The equipment utilized shall be capable of meeting the Design vertical and horizontal tolerances and the use of machine-controlled equipment will in no way relieve the Contractor of the requirement to meet the specified tolerances.

.2 The Departmental Representative may require the Contractor to revert to conventional staking methods at any point during construction if the machine-controlled grading is producing unacceptable Work and the cost of doing so will be borne by the Contractor.

.3 The Departmental Representative may provide the Contractor the available electronic files of Design information without warrant with respect to the suitability for the purposes intended by the Contractor and the cost of making them suitable shall be borne by the Contractor. The Contractor remains responsible for completing the works as described in the Contract Documents, even in the event that the electronic Design information provided is not consistent with the Contract Documents.

.2 As a minimum the Contractor shall provide an orientation stake every 100 metres showing station, offset and grade.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All Technical Sections.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit written request in advance of cutting or alteration which affects:

- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed and moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

.3 Include in request:

- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.3 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.4 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.5 EXECUTION

.1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.6 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.7 Restore work with new products in accordance with requirements of Contract Documents.

.8 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

.9 Conceal ducts in curbs or barriers, except where indicated otherwise.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.3 Clear snow and ice from work areas.

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

.5 Provide on-site containers for collection of waste materials and debris.

.6 Provide and use marked separate bins for recycling.

.7 Dispose of waste materials and debris off site.

.8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.9 Provide adequate ventilation during use of volatile or noxious substances.

.10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

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 and debris and leave Work clean and suitable for occupancy.

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

.4 Remove waste products and debris including that caused by Owner or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

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

.7 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.9 Remove dirt and other disfiguration from exterior surfaces.

.10 Sweep and wash clean paved areas.

.11 Clean drainage systems.

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

.13 Remove snow and ice.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.2 Request Departmental Representative inspection.

.2 Departmental Representative Inspection:

.1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.3 Completion Tasks: submit written certificates that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Work: complete and ready for final inspection.

.4 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by Departmental Representative and Contractor.

.2 When Work is deemed incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

1.2 FINAL CLEANING

.1 Clean in accordance with Section 01 74 00 - Cleaning.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: Contractor to track and provide proof of tracking of number of material loads to recycling.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 77 00 - Closeout Procedures.

1.2 AS-BUILT DOCUMENTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one record copy of:

- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Change Orders and other modifications to Contract.
- .5 Reviewed shop drawings, product data, and samples.
- .6 Field test records.
- .7 Inspection certificates.
- .8 Manufacturer's certificates.

.2 Store record documents and samples in site office apart from documents used for construction.

- .1 Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.

- .1 Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition.

- .1 Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

1.3 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of black line opaque drawings.

.2 Record information concurrently with construction progress.

- .1 Do not conceal Work until required information is recorded.

.3 Contract Drawings and shop drawings: mark each item to record actual construction, including:

- .1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
- .2 Field changes of dimension and detail.

.3 Changes made by change orders.

.4 Details not on original Contract Drawings.

.5 References to related shop drawings and modifications.

.4 Specifications: mark each item to record actual construction, including:

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

.2 Changes made by Addenda and change orders.

.5 Other Documents: Maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications Sections.

.6 Provide digital photos, if requested, for site records.

1.4 FINAL SURVEY

.1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.5 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.

.3 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.4 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.

.5 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by Subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

.6 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.7 Respond in timely manner to oral or written notification of required construction warranty repair work.

.8 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Removal of existing asphalt pavement on approaches to depths and extents shown in the Contract Documents and as accepted by the Departmental Representative.

.2 This Section does not include asphalt removals (milling) on bridge deck. See Section 02 41 16 – Structure Demolition.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure for payment for Saw cutting will be the linear meters of asphalt cut to full depth in accordance with the Contract Documents or as directed by the Departmental Representative.

.1 Payment for saw cutting shall be made under **"Unit Price Item 1a - Asphalt Pavement Removal on Approaches– Saw Cutting**" and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.2 Payment per metre of saw cutting will remain the same, regardless of the number of passes required to complete the Work, to the depth and extents specified, as per the Contract Documents.

.2 Measure for payment for Milling will be the square metres of asphalt pavement of existing roadway actually removed and stockpiled in accordance with the Contract Document or as directed by the Departmental Representative.

.1 Payment for milling shall be made under **"Unit Price Item 1b– Asphalt Pavement Removal on Approaches – Partial Depth Milling"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.3 Measure for payment for Full depth asphalt removal will be based on the square meters of asphalt removed and disposed of on the approaches in accordance with the Contract Documents or as directed by the Departmental Representative.

.1 Payment for full depth asphalt removal shall be made under **"Unit Price Item 1c - Asphalt Pavement Removal on Approaches– Full Depth Removal**" and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.4 Payment per square metre of asphalt removal, whether partial or full depth, will remain the same, regardless of the number of passes required to complete the Work, to the depth and extents specified, as per the Contract Documents.

.5 Items considered incidental to the Work include, but are not limited to:

.1 All operations involved in milling and pulverizing including but not limited to:

.1 Survey, cold milling or excavating, sweeping, loading, hauling, stockpiling and/or disposal and cleaning of remaining pavement surface.

.2 Survey checks of the milled surface grades.

.3 Removal and disposal of waste asphalt outside of the Park.

.4 Replacement of damaged asphalt from saw cutting or milling.

.5 Overhaul.

.6 Asphalt Concrete Pavement placing and subsequent removal at milled tie-in locations.

.7 Cleaning of existing pavement shoulder, whether via sweeping or other methods.

.8 Maintaining milled areas, including drainage, until completion of asphalt paving.

.9 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

.6 Traffic Control required for this Work shall be incidental to **"Lump Sum Price Item 2 - Traffic Control"** and no separate payment will be made to the Contractor.

.7 Mobilization and demobilization required for this Work shall be incidental to **"Lump Sum Price Item 1 – Mobilization / Demobilization"** and no additional payment will be made for remobilization of equipment if all milling work cannot be completed at once.

1.3 QUALITY CONTROL

.1 In accordance with Section 01 45 00 - Quality Control.

1.4 SUBMITTALS

.1 In accordance with Section 01 33 00 - Submittal Procedures.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 01 35 43 - Environmental Procedures.

1.6 DEFINITIONS

.1 Profile Milling: Removal of asphalt concrete pavement to an accurate depth of cut, profile and cross slope and shall include loading the milled material directly into trucks.

.2 Partial Depth Milling: Removal of asphalt concrete pavement, other than Profile Milling.

Part 2 Products

2.1 MATERIALS

.1 The Contractor is to ensure that the maximum particle size of milled materials is less than 50 mm and shall sieve or otherwise separate/remove larger particles at their cost.

Part 3 Execution

3.1 PREPARATION

.1 Prior to beginning removal operation, the Contractor shall inspect and verify with the Departmental Representative, all areas, depths and lines of asphalt pavement to be removed.

.2 Placement of gravels to level the running surface for the milling machine, if required, will be considered incidental to the Work and no additional payment will be made.

.3 Have appropriate Traffic Control measures in accordance with Section 01 55 26 - Traffic Control.

3.2 PROTECTION

.1 Protect existing pavement not designated for removal, concrete deck, concrete curb and barriers, light units and structures from damage. In event of damage, the Contractor shall immediately replace or make repairs to the satisfaction of the Departmental Representative at no additional cost.

3.3 REMOVAL

.1 Use cold milling, planing or grinding self-powered equipment with automatic grade controls capable of operating from string line, and capable of removing part of pavement surface to depths or grades indicated.

.2 For Full Depth Asphalt Removal, it is anticipated that the depth of the existing pavement is 150 – 250 mm deep. Existing asphalt pavement thickness is not uniform and will vary from one location to the next.

.3 Full depth asphalt pavement removal shall be done to the lines shown on the IFC Drawings or as approved by the Departmental Representative.

.4 Partial Depth Asphalt Pavement Removal by milling to lines and grades shown on the IFC Drawings or as approved by Departmental Representative in field:

.1 Use self-powered equipment and methods of removal and hauling which do not damage or disturb underlying roadway structure.

.2 Milling machine is to have a conveyor for loading the millings directly into trucks.

.5 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

.1 Provide for suppression of dust generated by removal process to ensure a dust free Work Site.

.6 To tie in from existing pavement to new overlay, remove existing asphalt pavement by milling to lines and grades established by Departmental Representative in field or as per the Contract Documents.

.7 If applicable, at mill and fill locations, remove existing asphalt to the depths, lengths and width specified in the Contract Documents and as established by Departmental Representative in field.

.8 If the base course is disturbed by milling operations the Contractor will be required to rectify the base course, to the acceptance of the Departmental Representative, at the Contractor’s cost.

.9 In low areas where water may pond, the Contractor shall cut drainage channels through the shoulders to prevent water from collecting in the milled areas, prior to opening the lane(s) to traffic, as directed by the Departmental Representative.

.10 The maximum delay between the area cold milled and the completion of asphalt paving of the same area will be seven (7) days. The Contractor shall be responsible for maintaining the milled surface for the travelling public as directed by the Departmental Representative.

3.4 STOCKPILING OF MATERIAL

.1 The Contractor shall dispose of removed asphalt material at 8 Mile Pit or as designated by the Departmental Representative.

.2 Removed asphalt material shall remain the property of Parks Canada.

.3 The material shall be stockpiled by a loader and in such a manner as to prevent consolidation which means exercising caution and minimizing running equipment on the stockpiles. Trucks and trailers shall not drive on the pile.

.4 The height of the pile shall not exceed the height of the loader bucket.

.5 The Contractor shall be responsible to remove any contamination of the stockpile millings.

3.5 FINISH TOLERANCES

.1 Finished surfaces in areas where asphalt pavement has been removed shall be within +/- 5 mm of grade specified and shall not be uniformly high or low.

3.6 SWEEPING

.1 Sweeping shall be done using the same lane closures as the milling operation and all loose material must be removed prior to opening the lane(s) to traffic.

.1 A pickup broom or street sweeper approved by the Departmental Representative will be required to remove millings from the road. Sweeping millings into the ditch is not permitted.

.2 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand work and brooming as required. No extra payment will be made for sweeping of associated hand work.

.3 Waste Management: separate waste materials for recycling.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes requirements for the following:

.1 Demolition and removal of existing concrete curbs, concrete pylons, and steel railings.

.2 Removal of existing asphalt on bridge deck.

.3 Demolition and removal of existing concrete slab and concrete return walls.

.4 Local demolition and removal of concrete to existing abutments and pier.

.5 Partial depth substructure removal for patch repairs.

.2 This Section does not include asphalt removals on approaches. See Section 02 41 13 – Asphalt Pavement Removal.

.3 This Section does not include relocation of existing signs and highway gates. See Section 10 14 53 – Traffic Signage.

.4 This Section does not include removal of existing precast approach barriers. See Section 33 71 13 – Precast Concrete Barriers.

.5 Drawings contain details that suggest directions for solving some of the major demolition and removal requirements for this Project; Contractor is required to independently verify and develop these details further by submitting a demolition plan prepared and stamped and sealed by a professional engineer.

1.2 RELATED REQUIREMENTS

.1 Section 02 41 13 – Asphalt Pavement Removal.

.2 Section 03 20 00 – Concrete Reinforcing.

.3 Section 03 31 23.13 – High-performance Structural Concrete for Bridge Decks.

.4 Section 32 12 16 – Asphalt Concrete Pavement (EPS).

1.3 MEASUREMENT AND PAYMENT

.1 Measurement Procedures.

.1 Measure removal of existing concrete curbs, concrete pylons, and steel railings in metres. Payment shall be made under **"Unit Price Item 2a – Structure Demolition – Removal of Curbs, Pylons, and Railings"**.

.1 Payment for removal of existing approach concrete barriers will be made in accordance with Section 33 71 13 – Precast Concrete Barrier.

.2 Measure removal of existing asphalt on bridge deck (up to 90 mm average thickness) in square metres. Payment shall be made under **"Unit Price Item 2b – Structure Demolition – Milling of Asphalt on Bridge Deck"**.

.1 Payment for asphalt removals on bridge deck in excess of specified average thickness as directed by the Departmental Representative will be made in accordance with Section 01 21 00 – Allowances.

.3 Measure removal of existing concrete slab plan area in neat line square metres, calculated from back face of abutment wall to back face of abutment wall. Payment shall be made under **"Unit Price Item 2c – Structure Demolition – Removal of Concrete Slab".**

.1 Removal of existing drains will not be measured but considered incidental to the work.

.2 Associated localized removals at abutments and pier will not be measured but considered incidental to the work.

.4 Measure removal of existing concrete return walls in cubic metres. Payment shall be made under **"Unit Price Item 2d – Structure Demolition – Removal of Concrete Return Walls"**.

.5 Measure partial depth concrete patch repairs (abutments and pier) in square metres. Payment shall be made under **"Unit Price Item 2e – Structure Demolition – Partial Depth Patch Repair"**.

.1 Include costs of concrete removals, surface preparation and supply and placement of concrete into unit price of partial depth removal.

.6 Payment for surface preparation for new concrete materials to be included in above removal items.

.7 Payment for stockpiling and disposal to be included in above removal items.

.8 All demolished materials are considered waste and to be disposed of outside of the National Parks at a certified construction waste landfill unless noted otherwise.

.9 Cost of relocation & protection of existing utilities in accordance with Section 01 14 00 - Work Restrictions shall be considered incidental to the Work and no additional payment will be made.

1.4 DEFINITIONS

.1 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the federal Hazardous Products Act including latest amendments.

1.5 REFERENCE STANDARDS

.1 CSA Group (CSA):

.1 CSA S350, Code of Practice for Safety in Demolition of Structures

.2 CSA S6-19, Canadian Highway Bridge Design Code

.2 Department of Justice Canada (Jus):

.1 Impact Assessment Act (IAA), 2019

.2 Canadian Environmental Protection Act (CEPA), 1999

.1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations

.2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations

.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34

.4 Motor Vehicle Safety Act (MVSA), 1995

.5 Hazardous Substances Information Review Act, 1985

.3 U.S. Environmental Protection Agency (EPA)

.1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.

.1 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.

.2 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

.4 National Fire Protection Association (NFPA)

.1 NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations

.5 American National Standards Institute (ANSI)

.1 ANSI A10.6 – Safety and Health Program Requirements for Demolition Operations

1.6 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate with Departmental Representative for the material ownership as follows:

.1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

.1 All demolished materials considered waste and to be removed and disposed of outside of National Parks. Separate waste materials for recycling.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

.2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during demolition remain Owner's property:

.1 Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Departmental Representative.

.2 Coordinate with Departmental Representative, who will establish special procedures for removal and salvage operations.

.2 Pre-Demolition Meetings:

.1 Convene pre-installation meeting prior to beginning work of this Section, with Departmental Representative in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify project requirements.

.2 Verify existing site conditions adjacent to demolition work.

.3 Coordination with other construction subtrades.

.2 Hold project meetings every week.

.3 Ensure key personnel attendance.

.4 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours before scheduled meeting.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Shop Drawings: Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada as follows:

.1 Submit for review and approval demolition drawings, diagrams or details showing sequence of demolition work and supporting structures.

.2 Submit shop drawings for temporary works stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

.2 Prepare and submit a written procedure for removal of concrete curbs, concrete pylons, steel railings, existing asphalt wearing surface, concrete slab, concrete return walls, and tops of abutments and pier at least two (2) weeks prior to commencement of Work.

.1 Procedure to include description of removal sequences, method, equipment, tools, and containment measures.

.3 Schedule of Demolition Activities: Coordinate with Section 01 32 16.19 - Construction Progress Schedule – Bar (GANTT) Chart, and indicate the following:

.1 Detailed sequence of demolition and removal work, with starting and ending dates for each activity.

.2 Interruption of utility services.

.3 Coordination for shutoff, capping, and continuation of utility services.

.4 Locations of temporary partitions and means of egress.

.4 Demolition Plan: Submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a professional engineer in accordance with requirements of Authority Having Jurisdiction.

.5 Proposed Debris Containment Measures to prevent demolished material from falling: Include in EPP or Work Plan, statements and drawings that indicate the measures proposed for use, proposed locations, and proposed time frame for their operation.

.6 Submit copies of certified receipts from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of Departmental Representative.

.1 Recycling Records: Indicate receipt and acceptance of recycled material.

1.8 QUALITY ASSURANCE

.1 Regulatory Requirements: Ensure Work is performed in compliance with applicable Provincial and Municipal regulations.

.1 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

.2 Standards: Comply with ANSI A10.6 and NFPA 241

.2 Regulatory Requirements: Perform work of this Section in accordance with the following:

.1 Workers' Compensation Board of Alberta.

.2 Occupational Health and Safety Act of Alberta.

1.9 SITE CONDITIONS

.1 Environmental protection:

.1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.

.2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.3 Fires and burning of waste or materials is not permitted on site.

.4 Do not bury rubbish waste materials.

.5 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

.6 Ensure proper disposal procedures are maintained throughout project.

.2 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction and as directed by Departmental Representative.

.4 Protect trees, plants and foliage on site and adjacent properties where indicated.

.5 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.6 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

.7 Demolished asphalt shall be disposed of immediately following removal. Stockpiling of demolished asphalt is not permitted on site.

.8 Departmental Representative assumes no responsibility for buildings and structures being demolished:

.1 Remove, protect and store salvaged items as directed by Departmental Representative before structure demolition.

.2 Salvage items as identified by Departmental Representative.

.3 Deliver to Departmental Representative as directed.

1.10 EXISTING CONDITIONS

.1 Discovery of Hazardous Substances: Immediately notify Departmental Representative if materials suspected of containing hazardous substances are encountered and perform the following activities:

.1 Hazardous substances will be as defined in the Hazardous Products Act.

.2 Stop work in the area of the suspected hazardous substances.

.3 Take preventative measures to limit users' and workers' exposure, provide barriers and other safety devices and do not disturb.

.4 Hazardous substances will be removed by Owner under a separate contract or as a change to the Work.

.5 Proceed only after written instructions have been received from Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 The Contractor is to ensure that the maximum particle size of milled asphalt materials is less than 50 mm and shall sieve or otherwise separate/remove larger particles at their cost.

2.2 EQUIPMENT

.1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

2.3 TEMPORARY SUPPORT STRUCTURES

.1 Design temporary support structures required for demolition work using a qualified professional engineer registered or licensed in Province of the Work.

Part 3 Execution

3.1 EXAMINATION

.1 Survey existing conditions and correlate with requirements indicated to determine extent of structure demolition required.

.2 Review Project Record Documents of existing construction.

.1 Departmental Representative does not guarantee that existing conditions are the same as those indicated in Project Record Documents.

3.2 PREPARATION

.1 Protect demolition work in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

.2 Protection of in-place conditions:

.1 Work in accordance with Section 01 35 43 - Environmental Procedures.

.2 Prevent movement, settlement or damage of adjacent structures, services, paving, trees, adjacent grades, and parts of existing building to remain.

.1 Provide bracing and shoring as required.

.2 Repair damage caused by demolition as directed by Departmental Representative.

.3 Support affected structures and, if safety of structure being demolished, adjacent structures or services appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.

.4 Prevent debris from blocking surface drainage system.

.3 Surface Preparation:

.1 Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.

.2 Do not disrupt active or energized utilities designated to remain undisturbed.

3.3 DEMOLITION

.1 Protect demolition work in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.2 Blasting operations not permitted during demolition.

.3 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

.4 Before start of Work remove contaminated or hazardous materials as defined by authorities having jurisdiction and as directed by Departmental Representative from site and dispose of at designated disposal facilities in safe manner and in accordance with TDGA and other applicable requirements. Refer Existing Conditions in PART 1.

.5 Demolish parts of structure to permit construction of modifications as indicated on the Contract Drawings.

.1 Remove asphalt in approaches adjacent to bridge in accordance with Section 02 41 13 – Asphalt Pavement Removal.

.2 Existing concrete slab to be removed from the bridge in units and transported from the site as a unit (i.e., full span length longitudinal strips of slab). No on-site storage or subsequent demolition of existing concrete slab is permitted within the Park following removal from the bridge.

.3 Remove portions of abutments, return walls, and pier as indicated or as directed by the Departmental Representative.

.4 Partial depth concrete patch repairs:

.1 Provide access scaffolding or other means suitable for close proximity of all above ground/water substructure elements and arrange for inspection with the Departmental Representative to mark out all areas for concrete repair.

.2 Thoroughly clean all substructure surfaces above ground/water prior to close proximity inspection with Departmental Representative.

.1 Surfaces to be free of all debris, dirt and laitance material.

.3 Remove concrete in partial depth patch areas identified by the Departmental Representative.

.1 Do not damage existing reinforcement during the removal process.

.2 Pneumatic hammers heavier than nominal 14 kg class and chipping hammers heavier than nominal 7 kg shall not be used within 150 mm of any existing concrete which is to remain in place.

.3 Repair or replace any structurally compromised reinforcing steel, as determined by the Departmental Representative, during the removal process at no extra cost.

.4 All saw cuts shall be made straight and in accordance with the drawings or as directed by the Department Representative.

.5 Remove, contain, collect, and dispose of all concrete and other materials identified for removal to prevent debris from falling into waterways in accordance with Section 01 35 43 – Environmental Procedures.

.4 Prepare and submit written procedure for the partial depth patch repairs for approval by Departmental Representative prior to commencement of Work.

.1 Procedure to include descriptions of removal sequences, methods, equipment, tools and containment measures.

.5 All repairs to have straight edges only, preferably rectangular in shape.

.6 Cut into existing concrete to a minimum depth of 15 mm.

.7 Remove concrete a minimum of one bar diameter behind existing reinforcement.

.5 No deleterious material is permitted to enter waterway during removals/demolition.

.1

.6 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.

.7 At end of each day's work, leave Work in safe and stable condition.

.8 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.

.9 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

.10 Use natural lighting to do Work where possible.

.1 Shut off lighting except those required for security purposes at end of each day.

3.4 SITE RESTORATION

.1 Below Grade Areas: Rough grade below grade areas ready for further excavation or new construction.

.2 Provide a smooth transition between adjacent existing grades and new grades.

3.5 REPAIRS

.1 General: Promptly repair damage to adjacent construction caused by structure demolition operations.

.2 Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

.3 Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.6 REMOVALS

.1 Removals of asphalt on bridge deck.

.1 Use cold milling, planing or grinding self-powered equipment with automatic grade controls capable of operating from string line, and capable of removing asphalt to depths or grades indicated.

.2 For milling of asphalt on bridge deck, it is anticipated that the average depth of the existing pavement is 90 mm deep or less. Existing asphalt pavement thickness is not uniform and will vary from one location to the next.

.3 Milling of asphalt pavement on bridge deck shall be done to the lines shown on the IFC Drawings or as approved by the Departmental Representative.

.4 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

.1 Provide for suppression of dust generated by removal process to ensure a dust free Work Site.

.2 Removals of concrete at abutments and pier.

.1 Existing reinforcement to be retained as indicated.

.2 Pneumatic hammers heavier than nominal 14 kg class and "Chipping Hammer" heavier than nominal 7 kg shall not be used within 150 mm of any existing concrete which is to remain in place. Only small chipping hammers shall be used for removal of concrete around reinforcing bars.

.3 Pneumatic hammers shall not contact reinforcing steel in a manner that will cause debonding of the reinforcing steel in the adjacent concrete areas that are not being removed.

.4 Limits of concrete removal shall be outlined by 25 mm deep saw cuts.

.5 All saw cuts hall be made straight and in accordance with the drawings or as directed by the Departmental Representative.

.6 Maintain existing reinforcement as indicated.

.7 Do not damage existing reinforcing steel during the removal process.

.8 Repair or replace any reinforcing steel structurally compromised during the removal process, as determined by the Departmental Representative, at no extra cost.

.9 Trim or bend reinforcement as indicated to satisfy cover requirements.

.10 Partially exposed rebar shall be entirely exposed by removal of concrete to a depth of 25 mm behind the bar.

.11 Clean and roughen concrete surfaces as indicated on the drawings.

.3 Removals of concrete return walls.

.1 Cut-off existing reinforcement as indicated.

.2 Pneumatic hammers heavier than nominal 14 kg class and "Chipping Hammer" heavier than nominal 7 kg shall not be used within 150 mm of any existing concrete which is to remain in place. Only small chipping hammers shall be used for removal of concrete around reinforcing bars.

.3 Pneumatic hammers shall not contact reinforcing steel in a manner that will cause debonding of the reinforcing steel in the adjacent concrete areas that are not being removed.

.4 Limits of concrete removal shall be outlined by 25 mm deep saw cuts.

.5 All saw cuts hall be made straight and in accordance with the drawings or as directed by the Departmental Representative.

.6 Do not damage existing abutment wall reinforcing steel that is intended to remain during the removal process.

.7 Repair or replace any reinforcing steel intended to remain that is structurally compromised during the removal process, as determined by the Departmental Representative, at no extra cost.

.8 Trim reinforcement as indicated and patch as indicated to provide minimum 50 mm cover to existing bars.

.9 Partially exposed rebar shall be entirely exposed by removal of concrete to a depth of 25 mm behind the bar.

.4 Existing reinforcement to be retained as identified on the drawings shall be high pressure cleaned to remove all loose concrete and laitance materials.

.5 Place reinforcing steel in accordance with Section 03 20 00 – Concrete Reinforcing.

.6 Place concrete in accordance with Section 03 30 00 Cast-in-Place Concrete and as shown on the drawings.

3.7 WASTE DISPOSAL

.1 All demolished materials are considered waste, except where noted otherwise, and are to be disposed of outside the National Parks at a certified construction waste landfill.

.2 Separate waste materials for recycling.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

.3 Removed asphalt material:

.1 The Contractor shall dispose of removed asphalt material at 8 Mile Pit or as designated by the Departmental Representative.

.2 Removed asphalt material shall remain the property of Parks Canada.

.3 The material shall be stockpiled by a loader and in such a manner as to prevent consolidation which means exercising caution and minimizing running equipment on the stockpiles. Trucks and trailers shall not drive on the pile.

.4 The height of the pile shall not exceed the height of the loader bucket.

.5 The Contractor shall be responsible to remove any contamination of the stockpile millings.

3.8 CLEANING

.1 Develop Construction Waste Management Plan related to Work of this Section.

.1 Separate waste materials for recycling.

.2 Remove recycling materials and bins from site and dispose of materials at appropriate facility.

.2 Designate appropriate security resources / measures to prevent vandalism, damage and theft.

.3 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project construction.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 03 20 00 - Concrete Reinforcing.

.3 Section 03 30 00 - Cast-in-Place Concrete.

.4 Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.

1.2 PRICE AND PAYMENT PROCEDURES

.1 No measurement will be made under this Section.

.2 Include formwork costs in items of concrete work in Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCE STANDARDS

.1 CSA Group (CSA):

.1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-O86, Engineering Design in Wood.

.3 CSA O121, Douglas Fir Plywood.

.4 CSA O151, Canadian Softwood Plywood.

.5 CSA O153, Poplar Plywood.

.6 CAN/CSA-O325.0, Construction Sheathing.

.7 CSA O437 Series, Standards for OSB and Waferboard.

.8 CSA S269.1, Falsework and Formwork.

.9 CAN/CSA-S269.3, Concrete Formwork.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, product literature, and data sheets for proprietary materials used in formwork liners and coatings. Include product characteristics, performance criteria, physical sizes, finishes, and limitations.

.2 Submit WHMIS Safety Data Sheet (SDS) in accordance with Section 01 35 29.06 – Health and Safety Requirements.

.3 Submit shop drawings for formwork and falsework.

.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Alberta, Canada.

.2 Prepare Shop Drawings in accordance with CSA S269.1 for formwork and falsework.

.3 Indicate formwork design data, permissible rate of concrete placement, and temperature of concrete, in forms.

.4 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts.

.5 Indicate sequence of erection and removal of formwork and falsework.

.6 Include the following information on falsework Shop Drawings:

.1 Longitudinal, lateral, vertical, dead, live and impact loads used in design.

.2 Safe bearing capacity of soil underneath mud sills.

.3 Maximum column, post and support loads.

.4 Deflection diagrams for beams with deflection of 10 mm or more.

.5 Deflection diagrams indicating initial and final elevation of deck surfaces, roofs and soffits.

.6 Grade of structural steel.

.7 Indicate steel posts, girders, beams, connections, bracing and welding, providing sufficient detail for safe performance of falsework.

.8 Fully detailed steel frame shoring.

.9 Species, grades and sizes of wood.

.10 Type and weight of equipment (moving or stationary) supported by falsework.

.11 Sequence, methods and rate of concrete placement.

.12 Proprietary equipment, adequately identified for checking purposes.

.13 Full details and locations of splices.

1.5 QUALITY ASSURANCE

.1 Perform in accordance with Section 01 43 00 - Quality Assurance.

.2 Retain a professional engineer registered or licensed in the Province of Alberta, Canada, with experience in formwork and falsework design of comparable complexity and scope, to perform the following services as part of work of this Section:

.1 Design of formwork and falsework.

.2 Review, stamp, and sign fabrication and erection Shop Drawings, design calculations and amendments.

.3 Conduct on-site inspections and prepare and submit inspection reports verifying this part of work is in accordance with Contract Documents and reviewed Shop Drawings.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect formwork from damage.

.3 Replace defective or damaged materials with new.

.4 Waste Management and Disposal:

.1 Separate waste materials for recycling.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

.2 Place materials defined as hazardous or toxic in designated containers.

.3 Divert wood materials from landfill to a composting, recycling or reuse facility outside of the National Parks.

.4 Divert plastic materials from landfill to a reuse or recycling facility outside of the National Parks.

.5 Divert unused form release material from landfill to an official hazardous material collections site outside of the National Parks.

Part 2 Products

2.1 MATERIALS

.1 Formwork materials:

.1 Forms for unexposed surfaces are at the discretion of the Contractor subject to approval of the Departmental Representative.

.2 Forms for exposed surfaces, including the barriers and deck soffit, shall be new materials, made of "Coated Formply", consisting of Douglas Fir substrate with resin-impregnated paper overlay and factory treated chemically active release agent.

.3 All form material for exposed surfaces shall be full-sized sheets, as practical.

.4 The re-use of any forms must have the acceptance of the Departmental Representative.

.2 The minimum acceptable forming for all exposed concrete shall have 18 mm approved plywood, supported at 300 mm maximum on centres. Strong-backs or whalers placed perpendicularly to the supports shall be employed to ensure straightness of the form.

.3 Metal bolts or anchorages within the forms shall be so constructed as to permit their removal to a depth of at least 50 mm from the concrete surface.

.1 Bolts or anchorages intended to be left permanently shall be stainless steel and only as approved by the Departmental Representative.

.4 Break-back type form ties shall have all spacing washers removed and the tie shall be broken back a distance of at least 20 mm from the concrete surface.

.5 All fittings for metal ties shall be of such design that, upon their removal, the cavities which are left will be of the smallest possible size. Torch cutting of steel hangers and ties will not be permitted. Formwork hangers for exterior surfaces of decks and curbs shall be an acceptable break-back type with surface cone, or removable threaded type.

.6 Cavities shall be filled with cement mortar and the surface left sound, smooth, even, uniform in colour.

.7 Form release agent: Proprietary, non-volatile material not to stain concrete or impair subsequent application of finishes or coatings to surface of concrete, derived from agricultural sources, non-petroleum containing, non-toxic, biodegradable, low VOC.

.8 Falsework materials: To CSA S269.1.

Part 3 Execution

3.1 FABRICATION AND ERECTION

.1 Verify lines, levels, and centres before proceeding with formwork/falsework and ensure dimensions agree with Drawings.

.2 Fabricate and erect falsework in accordance with CSA S269.1.

.3 Do not place shores and mud sills on frozen ground.

.4 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.5 Fabricate and erect formwork in accordance with CSA S269.1 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1/A23.2.

.6 Align form joints and make watertight.

.1 Keep form joints to minimum.

.7 Use 20 mm chamfer strips on external corners and/or 20 mm fillets at interior corners, joints, unless specified otherwise.

.8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.9 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other Sections.

.1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

.10 Clean formwork in accordance with CSA A23.1/A23.2, before placing concrete.

3.2 REMOVAL AND RESHORING

.1 Leave formwork in place for the following minimum periods of time after placing concrete. If formwork is removed prior to the end of the curing period required by CSA-A23.1/A23.2, the exposed concrete surfaces shall be protected by other accepted method of curing as provided in CSA-A23.1/A23.2.

.1 Seven (7) days for slabs, decks and other structural members.

.2 Three (3) days for abutments, pier, retaining walls and barriers.

.2 Remove formwork when concrete has reached 50% of its 28 day design strength or minimum period noted above, whichever comes later.

.3 Re-use formwork and falsework subject to requirements of CSA A23.1/A23.2 and approval of Departmental Representative.

3.3 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

.3 Waste Management: separate waste materials for recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.2 Contractor to track and provide proof of tracking of number of material loads to recycling.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 -–Submittal Procedures.

.2 Section 03 10 00 – Concrete Forming and Accessories.

.3 Section 03 30 00 – Cast-in-Place Concrete.

.4 Section 03 31 23.13 – High-Performance Structural Concrete for Bridge Decks.

1.2 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 Measure Grade 420 stainless reinforcing steel in kilograms of steel incorporated into the Work, computed from theoretical unit mass specified in ASTM A276 and A955M for lengths and sizes of bars as indicated or as authorized in writing by Departmental Representative. Payment will be made under **"Unit Price Item 3 – Reinforcing Steel"**.

.1 Installation of reinforcing bars drilled and anchored into existing concrete will not be measured but considered incidental to work.

.2 Do not include costs of reinforcement contained within or projecting from the precast concrete girders or lock-blocks. Include costs in Section 03 41 00 – Precast Structural Concrete.

1.3 REFERENCE STANDARDS

.1 ASTM International (ASTM):

.1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A143/A143M, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

.3 ASTM A276/276M, Standard Specification for Stainless Steel Bars and Shapes.

.4 ASTM A767/A767M, Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.

.5 ASTM A955/A955M, Standard Specification for Deformed and Plain Stainless Steel Bars for Concrete Reinforcement.

.6 ASTM A1064/A1064M, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

.2 CSA Group (CSA):

.1 CSA S6-19, Canadian Highway Bridge Design Code.

.2 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.3 CAN/CSA A23.3, Design of Concrete Structures.

.4 CSA G30.18, Carbon Steel Bars for Concrete Reinforcement.

.5 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.6 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.

.7 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 Reinforcing Steel Institute of Canada (RSIC):

.1 RSIC, Reinforcing Steel Manual of Standard Practice.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings: In accordance with Section 01 31 19 - Project Meetings, convene pre-installation meeting one week prior to beginning concrete works.

.1 Ensure key personnel, Departmental Representative attend.

.1 Verify project requirements.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives. Include product characteristics, performance criteria, physical sizes, finishes, and limitations.

.2 When a chromate solution is used as a replacement for galvanizing non-prestressed reinforcement, submit a product description for review by Departmental Representative before its use.

.3 Submit WHMIS Safety Data Sheet (SDS) in accordance with Section 01 35 29.06 – Health and Safety Requirements.

.3 Shop Drawings:

.1 Submit shop drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

.1 Prepare reinforcement drawings in accordance with RSIC Reinforcing Steel Manual of Standard Practice.

.2 Indicate placing of reinforcement and:

.1 Bar bending details.

.2 Lists.

.3 Quantities of reinforcement.

.4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.

.5 Indicate sizes, spacings and locations of chairs, spacers and hangers.

.3 Detail lap lengths and bar development lengths to CAN/CSA S6-19, unless otherwise indicated.

.4 Quality Assurance Submittals:

.1 Submit in accordance with Section 01 45 00 – Quality Control and as described in PART 2 – SOURCE QUALITY CONTROL.

.2 Mill Test Report: submit to Departmental Representative certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.

.3 Submit in writing to Departmental Representative proposed source of reinforcement material.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Substitute different sized bars only if permitted in writing by Departmental Representative.

.2 Stainless Reinforcing Steel: Shall be of the following designations as defined by the Unified Numbering System (UNS):

.1 S31653

.2 S31603

.3 S31803

.4 S30400

.5 S32304

.3 Stainless reinforcing shall meet the requirements of ASTM A276 and ASTM A955/A955M (including Annex 1.2 or 1.3). The minimum yield strength shall be 420 MPa.

.4 Unless otherwise specified, only one type of stainless reinforcing steel shall be supplied for use throughout the project.

.5 Reinforcing Steel: Billet steel, grade 400W, deformed bars to CSA G30.18, unless otherwise indicated.

.6 Cold-drawn annealed steel wire ties: To ASTM A1064/A1064M.

.7 Chairs, bolsters, bar supports, spacers: To CSA A23.1/A23.2.

.8 Tie wire: 1.5 mm diameter annealed wire.

.9 Mechanical splices: Subject to approval from Departmental Representative.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

.2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 SOURCE QUALITY CONTROL

.1 Provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.

.2 Inform Departmental Representative of proposed source of supplied material.

Part 3 Execution

3.1 FIELD BENDING

.1 Do not bend or weld reinforcement on site except where indicated or when authorized by Departmental Representative.

.2 When field bending authorized, bend without heat, applying slow and steady pressure.

.3 Replace bars, which develop cracks or splits.

3.2 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on placing drawings in accordance with CSA A23.1/A23.2.

.2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.

.3 Maintain cover to reinforcement during concrete pour.

3.3 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

.3 Waste Management: separate waste materials for recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.2 Contractor to track and provide proof of tracking of number of material loads to recycling.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 10 00 - Concrete Forming and Accessories.

.2 Section 03 20 00 - Concrete Reinforcing.

.3 Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.

1.2 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 Measure cast-in-place concrete in cubic metres calculated from neat dimensions as indicated. Payment will be made under the applicable item of **"Unit Price Item 4 – Cast-in-Place Concrete"**.

.1 Concrete placed beyond dimensions indicated not measured.

.2 No deductions will be made for volume of concrete displaced by reinforcing steel, structural steel, or piles.

.3 No deductions made for volume of concrete less than 0.1 m^2 in cross sectional area displaced by individual drainage openings.

.4 Additional concrete volumes caused by removals deeper than specified will not be measured.

.5 Supply and installation of bicycle railing headed anchor bolts, neoprene pads, nuts and washers and grouting at the base plate will not be measured but considered incidental to work.

.6 Supply and installation of joint fillers and joint sealers, asphalt impregnated fibre board, polyethylene sheets below approach slab, elastomeric strip at approach slab seat, EPDM waterproofing membrane, crack inducers, backer rods, Evazote, CIP steel bar for connection to precast barrier, conduits, and junction boxes will not be measured but considered incidental to work.

.2 No measurement for payment will be made under this section for new concrete for partial depth substructure repairs. Include costs in Section 02 41 16 – Structure Demolition.

.3 No measurement for payment will be made under this section for surface preparation. Include costs in Section 02 41 16 – Structure Demolition.

.4 No measurement for payment will be made under this section for abutment bearings, including bearing pads, bearing dowels, and bearing dowel assemblies. Include costs in Section 03 41 00 – Precast Structural Concrete.

1.3 ABBREVIATIONS AND ACRONYMS

.1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement types:

.1 GU, GUb, GUL and GULb - General use cement.

.2 MS, MSb and MSLB - Moderate sulphate-resistant cement.

.3 MH, MHb, MHL and MSLB - Moderate heat of hydration cement.

.4 HE, HEb, HEL and HELb - High early-strength cement.

.5 LH, LHb, LHL LHLb - Low heat of hydration cement.

.6 HS, HSb and HSLb - High sulphate-resistant cement.

.2 Fly ash types:

.1 F - with a maximum CaO content of 8%.

.2 CI - with CaO content of 15% and 20%.

.3 CH - with a minimum CaO content of 20%.

.3 GGBFS - Ground, granulated blast-furnace slag.

1.4 REFERENCE STANDARDS

.1 ASTM International (ASTM):

.1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip galvanized) Coatings on Iron and Steel Products.

.2 ASTM A307M, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.

.3 ASTM C260/C260M, Standard Specification for Air-Entraining Admixtures for Concrete.

.4 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.5 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.

.6 ASTM C881/C881M, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

.7 ASTM C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.

.8 ASTM C1059/C1059M, Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.

.9 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

.10 ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.

.11 ASTM D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.12 ASTM D1752, Standard Specification for Preformed Sponge Rubber, Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

.13 ASTM D2240, Standard Test Method for Rubber Property – Durometer Hardness.

.14 ASTM F1554, Standard Specifications for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

.2 CSA Group (CSA):

.1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA A283, Qualification Code for Concrete Testing Laboratories.

.3 CSA A3000, Cementitious Materials Compendium.

.4 CAN/CSA-G40.20/G20.21, General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.

.5 CSA S6, Canadian Highway Bridge Design Code.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings: In accordance with Section 01 31 19 - Project Meetings, convene pre-installation meeting one (1) week prior to beginning concrete works.

.1 Ensure key personnel, site supervisor, Departmental Representative, speciality contractor - finishing, forming, and concrete producer attend.

.1 Verify project requirements.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit WHMIS Safety Data Sheet (SDS) in accordance with Section 01 35 29.06 – Health and Safety Requirements and 01 35 43 – Environmental Procedures.

.3 Site Quality Control Submittals:

.1 Provide testing results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.

.2 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL of this Section.

.3 Concrete hauling time: provide for review by Departmental Representative deviations exceeding the maximum allowable time of 120 minutes for concrete delivered to site of Work and discharged after batching.

1.7 QUALITY ASSURANCE

.1 Quality Assurance: In accordance with Section 01 45 00 - Quality Control.

.2 Provide Departmental Representative, minimum four (4) weeks prior to starting concrete work, with valid and recognized certificate from the plant delivering the concrete.

.1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture meet specified requirements.

.2 Provide verification from plant delivering concrete that plant and batch capacity meets specified requirements for pour rate.

.1 Minimum pour rate for bridge deck, overhang, diaphragm, and barrier as specified in Section 03 31 23.13 – High-Performance Structural Concrete for Bridge Decks.

.3 At least four (4) weeks prior to beginning Work, inform Departmental Representative of source of fly ash.

.1 Changing source of fly ash without written approval of Departmental Representative is prohibited.

.4 Minimum four (4) weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on the following items:

.1 Falsework erection.

.2 Hot weather concrete.

.3 Cold weather concrete.

.4 Curing.

.5 Finishes.

.6 Formwork removal.

.7 Joints.

.5 Quality Control Plan: Provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS of this Section.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Concrete hauling time: Deliver to site of Work and discharge within 120 minutes maximum after batching.

.1 Modifying maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2 is prohibited.

.2 Deviations submitted for review by Departmental Representative.

.2 Concrete delivery: Ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

1.9 SITE CONDITIONS

.1 Placing concrete during rain or weather events that could damage concrete is prohibited.

.2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2

.3 Cold weather protection:

.1 Maintain protection equipment in readiness on Site.

.2 Use protection equipment when ambient temperature is below 5°C, or when temperature may fall below 5°C before concrete has cured.

.3 Placing concrete upon or against surface at temperature below 5°C is prohibited.

.4 Hot weather protection:

.1 Protect concrete from direct sunlight when ambient temperature is above 27°C.

.2 Prevent forms from getting too hot before concrete is placed. Apply accepted methods of cooling not to affect concrete adversely.

.5 Protect concrete from drying.

Part 2 Products

2.1 DESIGN CRITERIA

.1 Alternative 1 - Performance: To CSA A23.1/A23.2, and as described in MIXES in PART 2 - PRODUCTS of this Section.

2.2 PERFORMANCE CRITERIA

.1 Quality Control Plan: Ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE of this Section.

2.3 MATERIALS

.1 Portland Cement: to CSA A3001, Type GU.

.2 Blended hydraulic cement: Type GUb to CSA A3001.

.3 Supplementary cementitious materials: With maximum 15% Type F fly ash replacement, by mass of total cementitious materials to CSA A3001.

.4 Water: To CSA A23.1.

.5 Aggregates: To CSA A23.1/A23.2.

.6 Admixtures:

.1 Air entraining admixture: To ASTM C260/C260M.

.2 Chemical admixture: To ASTM C494/C494M. Departmental Representative to approve all admixtures, including accelerating or set retarding admixtures during cold and hot weather placing. Contractor to submit certified mix design that contains proposed admixture in proposed dosage. Submitted certification to include verification that the proportions selected will produce concrete of the performance specified.

.7 Shrinkage Compensating Grout: Premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2.

.1 Compressive strength: 20 MPa at 48 hours, 45 MPa at 28 days.

.2 Net shrinkage at 28 days: Maximum 0.01%.

.8 Partial depth concrete patch repair material: high strength shrinkage compensating cementitious repair material suitable for vertical applications, such as Sikacrete-08 SCC or Master Emaco S440 MC, or other approved equivalent.

.9 Non-premixed Dry Pack Grout: Composition of non-metallic aggregate Portland cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing compressive strength of 45 MPa at 28 days.

.10 Curing Compound: To CSA A23.1/A23.2.

.11 Pre-moulded Joint Fillers:

.1 Bituminous impregnated fibreboard: To ASTM D1751.

.12 Epoxy Grout: as indicated.

.13 Galvanized bearing dowels: refer to Section 03 41 00 Precast Structural Concrete.

.14 Anchor Rods and Anchor Bolts: as indicated.

.15 Sealant for barrier control joints: as indicated.

.16 Sealant for barrier joints: as indicated.

.17 Elastomer: as indicated.

.18 Neoprene pad: as indicated.

.19 Galvanizing: hot dipped galvanizing after fabrication to ASTM A123/123M.

.20 Steel plate: as indicated.

.21 Steel: as indicated.

2.4 MIXES

.1 Alternative 1 - Performance Method for specifying concrete: To meet Departmental Representative performance criteria to CSA A23.1/A23.2.

.1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.

.2 Provide concrete mix to meet following plastic state requirements:

.1 Uniformity: as required by CSA A23.1/A23.2.

.2 Workability: Free of surface blemishes, loss of mortar, colour variations, and segregation.

.3 Provide concrete mix to meet the following hard state requirements:

.1 Durability and class of exposure: C-XL.

.2 Compressive strength at 28 days age: 45 MPa minimum.

.3 Intended application: Bridge deck, bridge deck overhangs, diaphragms, approach slabs, and barriers.

.4 Aggregate size

.1 20 mm maximum.

.4 Provide concrete mix to meet the following hard state requirements:

.1 Durability and class of exposure: C-1.

.2 Compressive strength at 28 days age: 35 MPa minimum.

.3 Intended application: Abutment and pier modifications (excluding partial depth concrete patch repairs) and retaining walls.

.4 Aggregate size

.1 20mm maximum.

.5 Provide quality management plan to ensure verification of concrete quality to specified performance.

.6 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

Part 3 Execution

3.1 PREPARATION

.1 Obtain Departmental Representative's written approval before placing concrete.

.1 Provide 24 hours minimum notice prior to placing of concrete.

.2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.

.3 During concreting operations:

.1 Development of cold joints not allowed.

.2 Ensure concrete delivery and handling facilitate placing with minimum of re-handling, and without damage to existing structure or Work.

.4 Pumping of concrete is permitted only after approval of equipment and mix by Departmental Representative.

.5 Disturbing reinforcement and inserts during concrete placement is prohibited.

.6 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing.

.7 Protect previous Work from staining.

.8 Clean and remove stains prior to application for concrete finishes.

.9 Maintain accurate records of poured concrete items to indicate date, location of pour, quantity of concrete placed, quality, workability, air content, temperature and test samples taken.

.10 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.

.1 Holes shall be hammer drilled.

.2 No damage permitted to existing reinforcement during drilling. Use pachometer, or alternate method acceptable to the Departmental Representative, to locate existing reinforcement prior to drilling.

.3 Bearing dowels:

.1 Place smooth round bar stock and pack solidly with grout to anchor and install in accordance with Manufacturer's instructions and hold dowels in positions as indicated.

.4 All other embedded bars:

.1 Place deformed steel reinforcing bars and pack solidly with epoxy to anchor and install in accordance with Manufacturer's instructions and hold bars in positions as indicated.

.11 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 INSTALLATION/APPLICATION

.1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.

.2 Sleeves and inserts:

.1 Do not permit penetrations, sleeves, ducts, pipes or other openings except where indicated or approved by Departmental Representative.

.2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.

.3 Sleeves and openings greater than 100 x 100 mm not indicated, must be approved by Departmental Representative.

.4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Departmental Representative before placing concrete.

.5 Confirm locations and sizes of sleeves and openings shown on drawings.

.6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.

.3 Anchor bolts and rods:

.1 Set anchor bolts and rods to templates in coordination with appropriate trade prior to placing concrete.

.4 Grout under base plates using procedures in accordance with manufacturer's recommendations which result in 100% contact over grouted area.

.5 Finishing and curing:

.1 Finish concrete to CSA A23.1/A23.2.

.1 Schedule:

.1 Concrete deck and approach slab – transverse tined.

.1 The tining shall create transverse grooves 3 mm wide by 1.5 mm to 3 mm deep at 20 mm centre-to-centre spacing.

.2 Concrete deck shall have a steel trowel finish at the gutter, within 300 mm of the inside face of the barrier.

.2 Concrete deck at construction joint with cast-in-place barriers – surface to be kept rough as indicated.

.3 Soffit and fascia of concrete deck – smooth form finish.

.4 Bearing seats – broom finish.

.5 Top and inner surface of barriers – sack rubbed finish.

.6 Abutments, retaining walls, pier, and outer surface of barriers: smooth form finish.

.2 Use procedures as reviewed by Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.

.6 Partial depth concrete patch repairs:

.1 Patch repairs to match existing concrete cover.

.2 Repair areas shall be thoroughly cleaned and free of foreign material to provide a sound bonding surface and to remove corrosion products.

.1 Use compressed air to remove all dust, grit, and concrete debris, or as recommended by the patch repair product manufacturer.

.3 Repair areas shall be "saturated-surface-dry" or as recommended by the patch repair product manufacturer.

.4 Patch material to be a high strength shrinkage compensating cementitious repair material suitable for vertical and overhead applications.

.5 Patch material to be placed by forming and pouring, not trowel applied.

.6 Curing to meet manufacturer requirements.

.7 Joint fillers:

.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative.

.2 When more than one piece required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

.3 Locate and form construction joints as indicated.

.4 Install joint filler.

3.3 SURFACE TOLERANCES

.1 Concrete tolerance to CSA A23.1/A23.2 to tolerance schedule as indicated.

.1 Bearing seats: less than 1 mm gap under a 1 m straightedge.

.2 Deck, approach slab, and barriers: less than 3 mm gap under a 3 m straightedge.

3.4 FIELD QUALITY CONTROL

.1 Site tests: Conduct tests as follows in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS of this Section.

.1 Concrete pours.

.2 Slump.

.3 Air content.

.4 Compressive strength at 7 and 28 days.

.5 Air and concrete temperature.

.6 Other.

.2 Inspection and testing of concrete and concrete materials carried out by testing laboratory designated by Departmental Representative for review to CSA A23.1/A23.2.

.1 Ensure testing laboratory certified to CSA A283.

.3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.

.4 Frequency of testing compressive strength:

.1 Not less than two (2) tests for every 30m^3 concrete placed, with no fewer than two (2) tests for each class of concrete placed on any one day.

.2 A compressive strength test shall consist of a minimum of four standard test specimens, sampled, made, cured, and tested in accordance with CSA Standards.

.1 One cylinder shall be tested at 7 days.

.2 The 28-day test results shall be the average of the strengths of the remaining three specimens.

.5 Take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

.6 Non-Destructive Methods for Testing Concrete: To CSA A23.1/A23.2.

.7 Frequency of testing for slump, air content, and concrete temperature:

.1 Test every load unless approved otherwise by Departmental Representative.

.8 Inspection or testing by Departmental Representative not to augment or replace Contractor quality control nor relieve Contractor of contractual responsibility.

3.5 PROTECTION

.1 Protection and curing for concrete placed between October 01 and May 01 shall comply with following requirements in addition to cold weather requirements of CSA A23.1/A23.2.

.1 Protect concrete with windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete.

.2 Do not let walls of shelter touch formwork.

.3 Provide sufficient space for removal of formwork for finishing.

.4 Use heating equipment approved by Departmental Representative.

.5 Vent products of combustion outside protective shelter: equipment to be capable of keeping inside air at constant temperature sufficiently high to maintain concrete at following curing temperatures:

.1 For initial 3 days: minimum temperature of 15 degrees C, maximum of 27 degrees C at concrete surfaces.

.2 For concrete pier and abutments: cure at 10 degrees C for additional 4 days.

.6 Keep concrete surfaces continually moist while protected.

.7 Provide fogging equipment to allow for mist spray curing before start of deck pour.

.2 Unformed surfaces: cure with burlap and water.

.1 Place two layers of damp burlap on surface of concrete.

.2 Overlap each strip by minimum 75 mm and secure against displacement by wind.

.3 Maintain burlap in place and keep thoroughly wet for seven days after placement.

.3 Formed surfaces:

.1 No additional curing will be required if formwork is left in place for seven days or more.

.2 If formwork removed in less than seven days, cure in manner specified for unformed surfaces for remainder of seven day period.

.4 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.

3.6 CLEANING

.1 Clean in accordance with Section 01 74 00 - Cleaning.

.2 Waste Management: Separate waste materials for recycling.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

END OF SECTION

Part 1 General

1.1 HIGH-PERFORMANCE STRUCTURAL CONCRETE FOR BRIDGE DECKS INCLUDES

.1 Concrete deck.

.2 Approach slabs.

1.2 RELATED REQUIREMENTS

.1 Section 03 10 00 – Concrete Forming and Accessories.

.2 Section 03 20 00 - Concrete Reinforcement

.3 Section 03 30 00 - Cast-in-Place Concrete

1.3 MEASUREMENT PROCEDURES

.1 No measurement will be made under this section.

.1 Include costs of items in Section 03 30 00 – Cast-in-Place Concrete.

1.4 REFERENCE STANDARDS

.1 CSA Group (CSA)

.1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

.2 Place materials defined as hazardous or toxic in designated containers.

.3 Divert unused plasticizers, water-reducing agents and air-entraining agents materials from landfill to official hazardous material collections site as reviewed by the Departmental Representative.

.4 Unused plasticizers, water-reducing agents and air-entraining agents materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

.1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.

.2 Reinforcing steel: in accordance with Section 03 20 00 - Concrete Reinforcement.

Part 3 Execution

3.1 PREPARATION

.1 Support rail elevation for mechanical bridge deck finisher:

.1 Submit for review by Departmental Representative survey of top of girders in accordance with Section 01 33 00 – Submittal Procedures after erection of new precast prestressed concrete girders. Departmental Representative will provide input on setting elevations for rails or headers to provide vertical profile which transitions the deck grades at the abutments as indicated and satisfies minimum concrete deck thickness.

.2 Survey:

.1 Maximum 2 m stations.

.2 Additional shots at ends of girders.

.3 Profiles to include at minimum:

.1 Centreline of bridge and edge of deck adjacent to barrier.

.2 Line along each girder.

.4 Elevations are to be taken perpendicular to centreline of bridge.

.5 Layout points such that they can be re-established within 25 mm of their original locations.

3.2 CONSTRUCTION

.1 Do concrete Work in accordance with Section 03 30 00 - Cast-in-Place Concrete and this section.

.2 Place concrete at temperatures limits to CSA A23.l/A23.2.

.3 Do not place concrete:

.1 When air temperature is above 22 degrees C.

.2 During rain or excessive wind or dust.

.3 When conditions, as reviewed by Departmental Representative seem detrimental to concrete.

.4 When air temperature falls below 5 degrees C, comply with cold weather requirements.

.5 Place deck concrete between hours of 6:00 p.m. and 10:00 a.m. as reviewed by Departmental Representative.

.1 Provide proper lighting for night pours as reviewed by Departmental Representative.

.6 Maintain temperature of concrete during discharge between 10 degrees C and 18 degrees C unless permitted otherwise by Departmental Representative.

.1 Maintain temperature of mix below maximum temperature of 18 degrees C by adding ice to mix which does not alter design water-cement ratio.

.7 Immediately prior to placing concrete, thoroughly wet down substrates with clean water.

.8 Consolidate deck concrete with mechanical vibration even when vibratory drum type finishing machines are used.

.9 Cast and finish deck with mechanical bridge deck finisher, approved by Departmental Representative.

.10 Ensure that rate of placing is sufficient to complete proposed placing, finishing and curing operations within scheduled time.

.11 Ensure that experienced finishing machine operators and concrete finishers are provided to finish deck.

.12 Do not place concrete until rails for support and operation of finishing machines and headers for hand operated strike-off devices are in place and firmly secured.

.1 Rails or headers to be of type, and so installed, that no springing or deflection will occur due to weight of finishing equipment and so located that finishing equipment can operate without interruption over entire bridge roadway deck being finished.

.2 Extend rails for finishing machines beyond both ends of scheduled length of concrete placement sufficient distance to permit float of finishing machine to fully clear concrete to be placed.

.3 Set rails or headers to elevations, with allowance for anticipated settlement, camber, and deflection of falsework, as required to produce bridge roadway deck true to required grade and cross section.

.13 Immediately before placing, check falsework and wedges and make necessary adjustments.

.1 Provide suitable means, such as telltales, to readily permit measurement by Departmental Representative of settlement and deflection.

.14 Place concrete in uniform heading approximately normal to structure centreline, or in case of screed supported on transverse headers, parallel to centreline.

.1 Limit rate of placing to that which can be finished before beginning of initial set.

.15 Immediately after concrete has been placed and consolidated, strike off surface.

.1 Correct immediately improper adjustment and operation which results in unsatisfactory consolidation and smoothness.

.2 Unsatisfactory performance may be cause for rejection of equipment and removal of concrete in place.

.16 Following completion of strike off by hand methods, float roadway slab surface longitudinally to smooth uniform surface with hand-operated wood float boards 3.5 to 5 m long, minimum 25 mm thick, minimum 200 mm wide, ribbed and trussed as necessary to provide rigid float, and equipped with adjustable handles at each end.

.1 Provide adjusting screws spaced at maximum 600 mm centres between float board and rib.

.2 Maintain float board true to line and free of twist.

.17 Use floats to remove roughness and minor irregularities left by strike board or finishing machine and to seal concrete surface to approval of Departmental Representative.

.18 Adjust rails or headers as necessary to correct for settlement or deflection, which occurs during finishing operations.

.1 Operate finishing floats from transverse bridges that span area being floated: provide sufficient number and type of bridges, as reviewed by Departmental Representative, to permit operation of floats without undue delay.

.2 Provide minimum of two bridges when hand operated float boards are used.

.3 When finishing machine is used for longitudinal floating, supply one bridge for use by Departmental Representative.

.19 Finishing bridge deck and approach slab:

.1 When concrete has hardened sufficiently to prevent dislodgement of coarse aggregate particles, give surface uniform broom finish free from porous spots, irregularities, depressions, small pockets or rough spots.

.2 Transverse tine freshly poured deck surface as soon as practicable after floating.

3.3 PROTECTION

.1 Protection and curing shall comply with CSA A23.1/A23.2, including Annex I.

.2 Unformed surfaces: cure with burlap and water.

.1 Burlap must be presoaked by immersing it in water for a period of at least 24 hours immediately prior to placing.

.2 Place two layers of damp burlap on surface of concrete.

.3 Overlap each strip by minimum 150 mm and secure against displacement by wind.

.4 Maintain burlap in place and keep thoroughly wet for seven days after placement.

.3 Formed surfaces:

.1 No additional curing will be required if formwork is left in place for seven days or more.

.2 If formwork removed in less than seven days, cure in manner specified for unformed surfaces for remainder of seven day period.

.4 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.

.5 Protection and curing for concrete placed between October 01 and May 01 shall comply with following requirements in addition to cold weather requirements of CSA A23.1/A23.2.

.1 Protect concrete with windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete.

.2 Do not let walls of shelter touch formwork.

.3 Provide sufficient space for removal of formwork for finishing.

.4 Use heating equipment approved by Departmental Representative.

.5 Vent products of combustion outside protective shelter: equipment to be capable of keeping inside air at constant temperature sufficiently high to maintain concrete at following curing temperatures:

.1 For initial 3 days: minimum temperature of 15 degrees C, maximum of 27 degrees C at concrete surfaces.

.2 For superstructure: maintain concrete at 10 degrees C for additional 14 days.

.6 Keep concrete surfaces continually moist while protected.

.7 Provide fogging equipment to allow for mist spray curing before start of bridge deck pour.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 10 00 – Concrete Forming and Accessories.

.2 Section 03 20 00 – Concrete Reinforcing.

.3 Section 03 30 00 – Cast-in-Place Concrete.

1.2 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 Measure precast elements in units supplied, delivered, stored, and erected. Payment will be made under **"Unit Price Item 5a – Precast Structural Concrete – New SLC510 Girders"**.

.1 Precast elements measured as individual units, to include cost for fabrication, supply, delivery, storage and erection of elastomeric bearing pads, fabrication and installation of bearing dowel assemblies (including galvanized dowels, grout, steel plates, pipes, and Evazote), Rodofoam, and removal and patching of erection devices.

.2 Include costs of reinforcement and strands contained within or projecting from the precast concrete girders.

.2 Measure precast lock-blocks in units supplied, delivered, stored, and erected. Payment will be made under **"Unit Price Item 5b – Precast Structural Concrete – New Concrete Lock-blocks"**.

.1 Include costs of reinforcement contained within the precast lock-blocks.

1.3 REFERENCE STANDARDS

.1 American Association for State Highway and Transportation Officials (AASHTO)

.1 AASHTO M251/M251M, Standard Specification for Plain and Laminated Elastomeric Bridge Bearings.

.1 ASTM International (ASTM):

.1 ASTM A29/A29M, Standard Specification for Steel Bars, Carbon and Alloy, Hot-Wrought

.2 ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

.3 ASTM A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished

.4 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

.5 ASTM A143/A143M, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

.6 ASTM A185/A185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete

.7 ASTM A1064/A1064M, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

.8 ASTM C260/C260M, Standard Specification for Air-Entraining Admixtures for Concrete

.9 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension

.10 ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.

.11 ASTM D2240, Standard Test Method for Rubber Property - Durometer Hardness

.2 CSA Group (CSA):

.1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete

.2 CSA A23.3, Design of Concrete Structures

.3 CAN/CSA-A23.4, Precast Concrete - Materials and Construction

.4 CAN/CSA-A3000, Cementitious Materials Compendium

.5 CAN/CSA-G30.18, Carbon Steel Bars for Concrete Reinforcement

.6 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel

.7 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles

.8 CSA G279-M, Steel for Prestressed Concrete Tendons (Metric version)

.9 CSA S6, Canadian Highway Bridge Design Code

.10 CSA W47.1, Certification of Companies for Fusion Welding for Steel

.11 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding

.12 CSA W59, Welded Steel Construction

.13 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating

1.4 DESIGN REQUIREMENTS

.1 Design precast elements to CSA A23.3 to carry handling stresses.

1.5 PERFORMANCE REQUIREMENTS

.1 Tolerance of precast elements to CAN/CSA-A23.4.

.1 Box Girder Sweep: ± 13 mm.

.2 Location of sleeve at connection to support: ± 16 mm.

.3 Box Girder Length: ± 19 mm.

.4 Box Girder overall width: ± 6 mm.

.5 Box Girder overall depth: ± 6 mm.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, product literature and data sheets for proprietary materials used in precast structural concrete and include product characteristics, performance criteria, physical size, finishes, and limitations.

.2 Submit WHMIS Safety Data Sheet (SDS).

.3 Shop Drawings:

.1 Submit drawings stamped and signed by qualified professional engineer registered or licensed in the Province of Alberta, Canada.

.2 Submit shop drawings prepared in accordance with CAN/CSA A23.4 and include the following items:

.1 Design calculations for items designed by manufacturer, including but not limited to:

i. Girder length allowance for elastic shortening, shrinkage, creep, and longitudinal grade.

ii. Lifting hooks.

iii. Tendon stress and loss calculations.

.2 Details of prestressed and non-prestressed members, reinforcement and connections.

.3 Camber.

.4 Finishing schedules.

.5 Methods of handling and erection.

.6 Openings, sleeves, inserts and related reinforcement.

.3 Submit two (2) weeks prior to manufacture for review by Departmental Representative.

.4 Quality Assurance Submittals:

.1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.

.2 Mill Test Report: submit to Departmental Representative certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.

.3 Upon request submit in writing to Departmental Representative proposed source of reinforcement material.

.4 Provide quality management plan to ensure verification of concrete quality to specified performance.

.5 Submit concrete supplier's certification.

1.7 QUALITY ASSURANCE

.1 Quality Control Plan: Submit written report to Departmental Representative verifying concrete provided meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.8 QUALIFICATIONS

.1 Fabricate and erect precast concrete elements by manufacturing plant certified in appropriate category according to CSA-A23.4.

.2 Precast concrete manufacturer certified in accordance with CSA's certification procedures for precast concrete plants prior to submitting Bid and to verify as part of Bid that plant has current certification in appropriate category, Prestressed.

.3 Only precast elements fabricated in such certified plants to be acceptable to Departmental Representative and plant certification to be maintained for duration of fabrication, erection until warranty expires.

.4 Welding companies certified to CSA W47.1.

1.9 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, and store precast units according to manufacturer's instructions.

.2 Protect corners from contacting soil to prevent from staining.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

Part 2 Products

2.1 MATERIALS

.1 Cement to CAN/CSA-A3001, Type GU.

.2 Blended hydraulic cement: Type GUb to CAN/CSA-A3001.

.3 Supplementary cementitious materials (SCMs): with maximum 25% fly ash replacement, by mass of total cementitious materials to CAN/CSA-A3001.

.4 Water: To CSA 23.1/A23.2.

.5 Reinforcing steel: To CAN/CSA-G30.18.

.6 Prestressing steel tendons and bars: To CAN/CSA S6.

.7 Hardware and miscellaneous materials: To CSA A23.1/A23.2.

.8 Forms: To CAN/CSA-A23.4.

.9 Bearing dowels: To AISI 4140 galvanized.

.10 Bearing dowel assembly plates: To CSA G40.20/G40.21, grade and types as indicated on the Contract Drawings.

.11 Bearing dowel assembly pipes: To ASTM A53, Grade B (Fy = 240 MPa).

.12 Welding materials: To CSA W48.

.13 Welding electrodes: To CSA W48 certified by Canadian Welding Bureau.

.14 Galvanizing: Hot dipped galvanizing to ASTM A123/A123M.

.15 Zinc-rich primer: To CAN/CGSB-1.181.

.16 Post-tensioning ducts: To CSA A23.1/A23.2.

.17 Bearing pads: as indicated.

.18 Air entrainment admixtures: To ASTM C260/C260M.

2.2 MIXES

.1 Concrete:

.1 Alternative 1 - Performance Method for specifying concrete: To meet Departmental Representative performance criteria in accordance with CSA A23.1/A23.2.

.1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance.

.2 Provide concrete mix to meet the following plastic state requirements:

i. Uniformity: as required by CSA A23.1/A23.2.

ii. Workability: free of, surface blemishes, colour variations, segregation.

.3 Provide box girder concrete mix to meet the following hard state requirements:

i. Durability and class of exposure: C-XL.

ii. Minimum compressive strength at 28 days age: 50 MPa.

iii. Intended application: precast, prestressed concrete box girder.

iv. Surface texture: raked finish.

.4 Provide lock-block concrete mix to meet the following hard state requirements:

i. Durability and class of exposure: C-1.

ii. Minimum compressive strength at 28 days age: 20 MPa.

iii. Intended application: precast concrete lock-block.

iv. Surface texture: smooth form finish.

.2 Grout:

.1 Shrinkage compensating grout: as indicated in Section 03 30 00 - Cast-in-Place Concrete.

2.3 FABRICATION

.1 Precast fabrication to meet the requirements of CAN/CSA-A23.4, including Annexes A and B, PCI MNL-116 and CPCQA certification requirements.

.2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast in location not exposed in the finished Work.

.3 Cast members in accurate rigid moulds designed to withstand high frequency vibration. Set reinforcing anchors and auxiliary items to indicated on shop drawings. Cast in anchors, blocking and inserts supplied by other Sections as required to accommodate their work. Vibrate concrete during casting for full thickness. Provide necessary holes and sinkages for flashings, anchors, and cramps. Maintain even and uniform appearance.

.4 Anchors, lifting hooks, shear bars, spacers and other inserts or fittings required for a complete and rigid installation. Each to conform to requirements of local codes. Lift hooks adequately sized to safely handle units according to member dimension and weight. Conceal anchors and inserts where practical.

.5 Galvanize anchors and steel embedments after fabrication and touch-up with zinc-rich primer after welding.

.6 Bearing dowels:

.1 Galvanizing to include chromate treatment.

.1 Duration of treatment: 1 hour per 25 mm of bar diameter.

.2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

2.4 FINISHES

.1 Unless specified otherwise, finish units to standard grade to CAN/CSA-A23.4.

.1 Top of boxes to be finished with a raked surface (full amplitude of about 5mm and spacing of about 15mm) or exposed aggregate.

.2 Finish exterior faces of exterior girders to finish grade B to CAN/CSA-A23.4.

.1 Top of exterior face of exterior girder (at joint with deck overhang) to be finished with cleaned and roughened surface (or exposed aggregate) for bonding of the deck overhang (consistent with preparation for bonded construction joints per CSA A23.1).

.3 End faces of girder at the abutments to be finished with a cleaned and roughened surface (or exposed aggregate) for bonding of the end diaphragm (consistent with preparation for bonded construction joints per CSA A23.1).

.4

2.5 SOURCE QUALITY CONTROL

.1 Provide Departmental Representative with certified copies of quality control tests related to this project as specified in CAN/CSA-A23.4.

.2 Provide records from in-house quality control program based upon plant certification requirements to Departmental Representative for inspection and review.

.3 Provide Departmental Representative with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.

.4 Precast plants to keep complete records of supply source of concrete material, steel reinforcement, prestressing steel and provide to Departmental Representative for review upon request.

Part 3 Execution

3.1 ERECTION

.1 Precast concrete work in accordance with CAN/CSA-A23.4, CSA A23.3, and CSA S6.

.2 Welding in accordance with CSA W59, for welding to steel structures and CSA W186 for welding of reinforcement.

.3 Non-cumulative erection tolerances in accordance with CAN/CSA-A23.4.

.4 Set elevations and alignment between units to within allowable tolerances before connecting units.

.5 Fasten precast units in place as indicated on reviewed shop drawings.

.6 Clean field welds with wire brush and touch-up galvanized finish with zinc-rich primer.

.7 Installation of bearing dowels: See Section 03 30 00 Cast-In-Place Concrete.

3.2 CLEANING

.1 Use cleaning methods as reviewed by Departmental Representative before cleaning soiled precast concrete surfaces.

.2 Waste Management: Separate waste materials for recycling.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

END OF SECTION

Part 1 General

1.1 SUMMARY OF WORK

.1 Work includes:

.1 Steel bicycle railings.

.2 Tiebacks.

.3 Steel plow protection plates.

.2 Does not include bearings, bearing dowels, or bearing dowel assemblies. See Section 03 41 00 Precast Structural Concrete.

1.2 RELATED REQUIREMENTS

.1 Section 03 30 00 – Cast-in-Place Concrete.

.2 Section 03 31 23.13 – High-Performance Structural Concrete for Bridge Decks.

1.3 PRICE AND PAYMENT PROCEDURES

.1 Measure steel for bridge railing in metres of railing incorporated into Work, including posts, brackets, nuts, bolts and washers. Payment will be made under **"Unit Price Item 6a – Structural Steel – Steel Bicycle Railing"**.

.2 Measure supply, fabrication, delivery and installation of threaded bars, including corrugated plastic pipes, cover caps, nuts, washers, and anchor plates in individual units. Payment will be made under **"Unit Price Item 6b – Structural Steel – Tiebacks"**.

.1 Include cost for factory grouting between threaded bars and corrugated plastic pipes.

.2 Include cost of tensioning and re-tensioning tiebacks.

.3 Include supply and installation of grease used for sealing tieback ends.

.3 Measure supply, fabrication, delivery and installation of steel plow protection plate at barriers, including studs and anchors in linear metres. Payment will be made under **"Unit Price Item 6c – Structural Steel – Steel Plow Protection Plate at Barriers"**.

.4 No measurement for payment will be made under this section for bearings, bearing dowels, or bearing dowel assemblies. Include costs in Section 03 41 00 – Precast Structural Concrete.

1.4 REFERENCE STANDARDS

.1 ASTM International (ASTM)

.1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A143/A143M, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

.3 ASTM A449M, Standard Specification for Hex Cap Screws, Bolts and Studs Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use (Metric).

.4 ASTM A500/500M, Standard Specification for Cold-Formed and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

.5 ASTM A780M, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

.6 ASTM A992/A992M, Standard Specification for Structural Steel Shapes.

.7 ASTM F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

.8 ASTM F1554, Standard Specification for Anchor Bolts, Steel 36, 55, and 105-ksi Yield Strength.

.9 ASTM F3125/F3125M, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.

.2 CSA Group (CSA)

.1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.3 CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

.4 CAN/CSA S6, Canadian Highway Bridge Design Code.

.5 CSA S16, Design of Steel Structures.

.6 CSA S269.1, Falsework and Formwork.

.7 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.

.8 CSA W59, Welded Steel Construction, (Metal Arc Welding).

.3 Alberta Transportation Standard Specifications for Highway Construction (latest edition), referred herein as AT Standard Specifications.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work.

.2 Hold project meetings every week.

.3 Ensure key personnel attend.

.4 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours before scheduled meeting.

.5 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for structural steel (including mill certificates) and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit copies of WHMIS Safety Data Sheet (SDS) in accordance with Section 01 35 29.06 – Health and Safety Requirements.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

.2 Shop drawings to include pertinent dimensions, quantities, weights, material grades, fabrication details, connection details, lifting and erection devices, unit identification marks, finishes and erection details.

.3 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, rivets and welds. Indicate welds by CSA W59, welding symbols.

.4 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.

.4 Engineered work plan for installation and tensioning of steel tiebacks to bear stamp and signature of qualified professional engineer registered or licensed in Alberta, Canada.

.1 Submit description of methods, temporary bracing and strengthening, sequence of erection and type of equipment proposed for use in work plan.

.2 Work plan to be in accordance with manufacturer’s instructions and CSA A23.1 Clause 6.8.6.

.3 Include procedure for drilling through abutment wall.

.1 Reinforcement to be located as indicated on the Drawings.

.2 Do not damage existing abutment wall reinforcing steel.

1.7 QUALIFICATIONS

.1 Welding companies shall be certified to CSA-W47.1 (Division 1 or 2) in accordance with CAN/CSA S6, Design of Highway Bridges.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.1 Ensure Departmental Representative has delivery schedules 7 days minimum before shipping.

.3 Storage and Handling Requirements:

.1 Provide protective blocking for lifting, transportation and storing.

.2 Exercise care during fabrication, transportation and erection as not to damage fabricated members.

.1 Do not notch edges of members.

.2 Do not cause excessive stresses.

.3 Mark mass on members weighing more than 3 tonnes.

.4 Ensure that no portion of steel comes into contact with ground.

.1 Replace defective or damaged materials with new.

1.9 QUALITY ASSURANCE

.1 Preconstruction Testing:

.1 Provide suitable facilities and cooperate with Departmental Representative in carrying out inspection and tests required.

1.10 CERTIFICATIONS AND GUARANTEES

.1 In accordance with Section 01 78 00 – Closeout Submittals.

Part 2 Products

2.1 MATERIALS

.1 Structural steel: to CSA G40.20/G40.21, grade and types as indicated on the Contract Drawings or as noted following:

.2 High strength bolts, nuts and washers: to ASTM F3125/F125M.

.3 Anchor bolts, washers and nuts: as indicated.

.4 Anchor rods and dowels: as indicated.

.5 Bearing dowels: See Section 03 41 00 Precast Structural Concrete.

.6 Anchor plates: as indicated.

.7 Bearings: See Section 03 41 00 Precast Structural Concrete.

.8 Welding electrodes: to CSA W48 series.

.9 Stud shear connectors: to CSA W59, Clause 5.5.6 and Appendix H.

.10 Hot dip galvanizing: to ASTM A123/A123M or CSA G164 unless noted otherwise, minimum zinc coating of 600g/m^2.

.11 Shrinkage compensating grout: as indicated in Section 03 30 00 – Cast-In-Place Concrete.

.12 Epoxy: as indicated.

.13 Threaded bar: as indicated. Including factory grouting as indicated.

.14 Corrugated Plastic Pipes: PVC sheathing with the following material properties, or approved equivalent:

.1 Outside diameter = 50mm

.2 Min. wall thickness = 1.2mm

.3 Compressive strength = 102 MPa

.4 Tensile strength = 48 MPa

.15 Grease: permanently plastic micro-wax based corrosion inhibiting compound such as Visconorust 2090P-4 or approved equivalent.

2.2 SOURCE QUALITY CONTROL

.1 In accordance with Section 01 45 00 – Quality Control.

.2 Steel producer qualifications: certified in accordance with CSA G40.20/G40.21

.3 Provide Departmental Representative with certified copies of quality control tests related to this project as specified in CAN/CSA G40.21.

.4 Provide records from in-house quality control programme based upon plant certification requirements to the Departmental Representative for inspection and review.

.5 Provide suitable facilities and co-operate with Departmental Representative in carrying out inspection and tests required.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for structural steel installation in accordance with manufacturer's written instructions.

.1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.

.2 Work near river banks or embankments in accordance in accordance with Section 01 35 29.06 – Health and Safety Requirements.

.3 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any unit.

.1 Enlarge holes if necessary by reaming only after receipt of written approval from Departmental Representative.

.2 Ensure reamed holes are 2 mm maximum larger than bolt size used.

3.3 INSTALLATION

.1 Do falsework in accordance to CSA S269.1

.2 Do fabrication and erection of structural steel in accordance with CAN/CSA S6, Design of Highway Bridges.

.3 Do welding in accordance with CSA W59, except where specified otherwise.

.1 Do welding in shop unless otherwise permitted by Departmental Representative.

.2 Weld only at locations indicated.

.3 Welding of galvanized steel not permitted. Fabricate prior to galvanizing or remove galvanizing where welding will occur. Repair areas damaged by welding by metallizing per ASTM A780, method A3.

.4 High strength bolting: in accordance with CAN/CSA S6. Use 'turn-of-nut' tightening method.

.5 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.

.6 Allowable tolerance for bolt holes:

.1 Matching holes for bolts to line up so that dowel 2 mm less in diameter than hole passes freely through assembled members at right angles to such members.

.2 Finish holes not more than 2 mm in diameter larger than diameter of bolt unless otherwise specified by Departmental Representative.

.3 Centre-to-centre distance between any two holes of group to vary by not more than 1 mm from dimensioned distance between such holes.

.4 Centre-to-centre distance between any two groups of holes to vary not more than maximum of the following:

Centre-to-Centre distance in metres	Tolerance in plus or minus mm
less than 10	1
10 to 20	2
20 to 30	3

.5 Correct mispunched or misdrilled members only as directed by Departmental Representative.

.7 Mark members in accordance with CSA G40.20/G40.21

.1 Do not use die stamping.

.2 Place marking at locations hidden when viewed from exterior after erection when steel is to be left in unpainted condition.

.8 Install tiebacks as indicated on the Drawings, at locations and using dimensions described in reviewed work plan.

3.4 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, protecting and cleaning of steel.

.2 Ensure manufacturer's representative is present before installation, during critical periods of installation and during testing.

.3 Schedule site visits:

.1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.

.2 Upon completion of the Work, after cleaning is carried out.

.4 Perform tensioning of tiebacks to CSA A23.1/A23.2 (specifically CSA A23.1 Clause 6.8.6) to forces as indicated and approved by Departmental Representative.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

.3 Waste Management: separate waste materials for recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.2 Contractor to track and provide proof of tracking of number of material loads to recycling.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Removal and disposal, supply and installation and relocation of permanent regulatory and custom traffic signs as required to complete the Work as specified in the Contract Documents and as directed by the Departmental Representative.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure for payment for relocation of existing signage, hazard markers, hangers, posts, gates, and bases as indicated will be based on each complete unit installed in accordance with the Contract Documents and accepted by the Departmental Representative.

.1 Payment will be made under **"Unit Price Item 7a-i– Traffic Signage – Relocate Double Post Signs"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.2 Measure for payment for relocation of existing gates, posts and bases as indicated will be based on each complete unit relocated in accordance with the Contract Documents and accepted by the Departmental Representative.

.1 Payment will be made under **"Unit Price Item 7a-ii – Traffic Signage – Relocate Highway Gates"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.3 Measure for payment for supply and installation of signs and hazard markers will be based on each completed unit for signs supplied and installed in accordance with the Contract Documents and accepted by the Departmental Representative.

.1 Payment will be made under **"Unit Price Item 7b-i – Traffic Signage – Supply and Install Object Marker Signs"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.4 Items considered incidental to the Work include but are not limited to:

.1 Removal and disposal of existing signs, bases and posts being replaced.
.2 Filling holes as required for removal of existing sign bases.
.3 Survey and layout.
.4 Hot-dipped galvanizing of all metal posts, hangers and miscellaneous hardware.
.5 Hot-dipped galvanized sign shims supply and installation.
.6 Temporary stockpiling and retrieval of signs.
.7 Bilingual signage requirements as detailed in the Contract Documents.
.8 Locating utilities prior to commencing the Works.
.9 Landscaping around sign bases.

.10 Disposal of damaged items as directed by the Departmental Representative.

.11 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

.5 Traffic Control required for this Work shall be incidental to **"Lump Sum Price Item – Traffic Control"** and no separate payment will be made to the Contractor.

.6 Mobilization and demobilization required for this Work shall be incidental to **"Lump Sum Price Item – Mobilization / Demobilization"**, and no additional payment will be made.

1.3 REFERENCES

.1 Parks Canada Exterior Signage Standards and Guidelines (latest edition).

.2 ASTM A276, Specification for Stainless and Heat-Resisting Steel Bars and Shapes.

.3 ASTM B209M, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.4 ASTM B210M, Specification for Aluminum-Alloy Drawn Seamless Tubes.

.5 ASTM B211M, Specification for Aluminum and Aluminum-Alloy Bar, Rods and Wire.

.6 CAN/CSA-G40.21 Structural Quality Steels.

.7 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

.8 CAN/CSA-O80 Series, Wood Preservation.

.9 CSA O121M, Douglas Fir Plywood.

.10 CSA W47.2, Certification of Companies for Fusion Welding of Aluminum.

.11 CGSB1-GP-12c-65, Standard Paint Colours.

.12 CAN/CGSB-1.28, Alkyd, Exterior House Paint.

.13 CAN/CGSB-1.59, Alkyd, Exterior Gloss Enamel.

.14 CAN/CGSB-1.94-M89, Xylene Thinner (Xylol).

.15 CAN/CGSB-1.99-92, Exterior and Marine Phenolic Resin Varnish.

.16 CAN/CGSB-1.104-M91, Semigloss Alkyd Air Drying and Baking Enamel.

.17 CAN/CGSB-1.132-M90, Zinc Chromate Primer, Low Moisture Sensitivity.

.18 CGSB 1-GP-189M-78, Primer, Alkyd, Wood, Exterior.

.19 CGSB 31-GP-3M-88, Corrosion Preventive Compound, Cold Application, Soft Film.

.20 CGSB 62-GP-9M-80, Prefabricated Markings, Positionable, Exterior, for Aircraft Ground Equipment and Facilities.

.21 CGSB 62-GP-11M-78, Marking Material, Retroreflective, Enclosed Lens, Adhesive Backing.

.22 AT – Standard Specifications for Highway Construction (latest edition).

1.4 SUBMITTALS

.1 In accordance with Section 01 33 00 - Submittal Procedures.

1.5 QUALITY CONTROL

.1 In accordance with Section 01 45 00 - Quality Control.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 01 35 43 - Environmental Procedures.

Part 2 Products

2.1 MATERIALS

.1 The Contractor is responsible for supplying all materials associated with the installation of signage.

.2 Traffic signs shall be supplied and installed in accordance with AT Standard Specification for Highway Construction (latest edition), unless specified otherwise in the Contract Documents.

.3 Signs posts and other requirements to be in accordance with the Contract Documents.

.4 All custom signs to be accepted by the Departmental Representative prior to ordering.

.5 All signs (permanent and temporary) shall be in both English and French. Translations to be accepted by the Departmental Representative prior to ordering.

Part 3 Execution

3.1 INSTALLATION

.1 In accordance with AT Standard Specification for Highway Construction (latest edition).

.2 Load, haul and install supplied posts and aluminum signs in the following manner:

.1 Locating power / telephone / gas lines / services / utilities at all proposed sign locations.

.2 Perform layout and verify measurements to ensure signs are installed as per the Contract Documents.

.3 Adjust the post height, as required, by using a pipe cutter or cut off saw in accordance with AT Standard Specification for Highway Construction (latest edition). The Contractor will measure existing elevations at each site and calculate the cuts needed.

.4 The Contractor is responsible for hauling all materials to and from each work site.

.5 Landscape so the top of the base is flush or 50 mm above finished grade.

.6 Remove all excess material from site, including boulders larger than 100 mm.

.3 All signs are to be covered until the Departmental Representative advises to uncover.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This Section defines correction to maximum dry density to take into account aggregate particles larger than 19mm.

1.2 REFERENCE STANDARDS

.1 ASTM International (ASTM)

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

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

.3 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).

.4 ASTM D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

1.3 DEFINITIONS

.1 Corrected maximum dry density is defined as:

.1 D =(D1xD2) / ((F1 x D2) + (F2 x D1)).

.2 D = (F1 x D1) + (0.9 x D2 x F2).

.3 Where: D = corrected maximum dry density kg/m^3.

.4 F1 = fraction (decimal) of total field sample passing 19 mm sieve

.5 F2 = fraction (decimal) of total field sample retained on 19 mm sieve (equal to 1.00 - F1)

.6 D1 = maximum dry density, kg/m^{3}of material passing 19 mm sieve determined in accordance with Method A of ASTM D1557.

.7 D2 = bulk density, kg/m^3, of material retained on 19 mm sieve, equal to 1000G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127.

.2 For free draining aggregates, determine D1 (maximum dry density) to ASTM D4253wet method when directed by Departmental Representative.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Clearing and Grubbing and disposing of woody debris as required to complete the Work as specified in the Contract Documents and as directed by the Departmental Representative.

1.2 REFERENCES

.1 AT – Standard Specifications for Highway Construction (latest edition).

.2 Parks Canada Preapproved Routine Impact Assessment (PRIA) – Roads and Related Infrastructure, 2019.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure for payment for clearing will be the area in horizontal (2D) hectares of clearing that has been acceptably completed in accordance with the Contract Documents and will, unless otherwise specified, be measured from the edge of the existing pavement to 3m past the cut fill line as shown approximately on the IFC Drawings or as directed by the Departmental Representative.

.1 Payment will be made under **"Unit Price Item 8a – Clearing and Grubbing - Clearing"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.2 Measure for payment for grubbing will be the areas in horizontal (2D) hectares of grubbing that has been acceptably completed in accordance with the Contract Documents and will, unless otherwise specified, be measured from the edge of the existing pavement to 1m past the cut fill line as shown approximately on the IFC Drawings or as directed by the Departmental Representative.

.1 Payment will be made under **"Unit Price Item 8b – Clearing and Grubbing - Grubbing"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.3 Cleaning of the site following clearing or danger tree removal.

.4 Items considered incidental to the Work include, but are not limited to:

.1 Loading, hauling and disposal of clearing and grubbing waste outside of the Park.

.2 Overhaul.

.3 Bird surveys must be completed and current for all Works on previously felled timber and grubbing areas in accordance with Section 01 35 43 - Environmental Procedures, when Work is to occur outside of the least risk window. Bird surveys must be completed by a Registered Professional Biologist.

.5 Removal and disposal of previously felled timber.

.6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

.7 If the Contractor is requested to arrange for sale of merchantable timber, any cost / credit for the sale of merchantable timber will be paid under **"Lump Sum Price Item 3 – Prime Cost Sum".**

.8 Mobilization and demobilization required for this Work shall be incidental to **"Lump Sum Price Item 1 – Mobilization / Demobilization"**, and no additional payment will be made.

.9 Traffic Control required for this Work shall be incidental to **"Lump Sum Price Item 2 – Traffic Accommodation"** and no separate payment will be made to the Contractor.

1.4 DEFINITIONS

.1 Flush cutting consists of cutting trees, stumps, or vegetative growth to within 100 mm of the ground, leaving the root structure undisturbed and disposing of felled trees, previously uprooted trees, stumps and clearing wood debris as specified.

.2 Clearing consists of cutting trees and brush vegetative growth to within 300 mm of the ground and disposing of felled trees, previously uprooted trees, stumps, and clearing wood debris as specified.

.3 Grubbing consists of excavation and disposal of stumps, roots and wood debris to a depth of 0.6 m below the ground line.

.4 Chipping consists of chipping wood debris, except merchantable timber, into wood chips. Finished wood chip material shall be able to pass through a 100 mm by 100 mm screen.

.5 Merchantable timber is all timber with butt diameter in excess of 150 mm and top down to 100 mm.

1.5 QUALITY CONTROL

.1 In accordance with Section 01 45 00 – Quality Control.

1.6 SUBMITTALS

.1 In accordance with Section 01 33 00 - Submittal Procedures.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 01 35 43 - Environmental Procedures.

1.8 PROTECTION

.1 Prevent damage to trees, natural features, bench marks, existing pavement, water courses and root systems of trees that are to remain.

.1 No grubbing to be completed with 1m of the tree drip line.

.2 Repair any damaged items to approval of Departmental Representative.

.3 Replace any trees designated to remain, if damaged, as directed by Departmental Representative.

.4 Contractor shall take all measures to ensure that trees do not fall into streams, rivers, wetlands or water bodies or outside the clearing limits as marked by colored flagging. Work within a 30 metre buffer of watercourses, water bodies or wetlands to be in accordance with Section 01 35 43 – Environmental Procedures.

.5 Trees inadvertently felled into streams, rivers, watercourses or outside the clearing limits shall be removed by means (e.g. winch) so as not to damage the substrate or any standing trees left outside the clearing limits. Machinery shall not go outside the clearing limits, or into streams, rivers, watercourses or water bodies to remove felled trees.

.6 Logs and other salvage materials are to be conveyed to and placed at the storage site without spread of debris or damage to other standing trees or landscape resources outside the marked clearing or storage limits. They shall not be skidded through wetlands, waterways or water bodies.

.7 During the grubbing component, stumps, roots, imbedded logs and other non-soil debris shall be pulled and shaken free of loose soil and rocks before transport.

.8 No slash clearing, pickup or grubbing shall occur outside of the designated area or within 1 metre of the drip line of existing forest.

.9 Existing areas of vegetation disturbed as a result of this Contract shall be rehabilitated using approved topsoil from the Park and a native grass seed mix as specified in Section 32 92 22 – Hydraulic Seeding.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 PREPARATION

.1 Inspect site and verify with Departmental Representative, any items designated to remain.

.2 The extent of grubbing shall be as indicated in the Contract Documents and the Contractor shall not commence work on this activity until approval to proceed has been granted by the Departmental Representative.

.3 Locate and protect utility lines: Preserve in operating condition active utilities traversing site.

.1 Notify Departmental Representative immediately of damage to or when unknown existing utility line(s) are encountered.

.2 When utility lines which are to be removed are encountered within area of operations, notify Departmental Representative in ample time to minimize interruption of service.

.4 Notify utility authorities before starting clearing and grubbing.

.5 Keep roads and walks free of dirt and debris.

3.2 CLEARING

.1 Clear as per contract and specifications and as directed by departmental Representative by cutting trees and vegetative growth.

.2 Cut off branches and cut down trees overhanging area cleared as directed by Departmental Representative. No extra payment will be made for this.

.3 Cut off unsound branches on trees designated to remain as per site requirement and as directed by Departmental Representative. No extra payment will be made for this.

.4 All clearing shall be felled in such a manner that surrounding vegetation is preserved along the construction limits. Stumps remaining within 3.0 metres of cleared perimeter are to be cut flush with ground and vegetative mat left undisturbed.

3.3 GRUBBING

.1 Grub out stumps and wood debris including roots and embedded logs up to a depth of 0.6 m below ground surface.

.2 Grubbing ripper teeth depth shall be kept as shallow as possible to minimize contamination of topsoil with subsoils. This may require individual ripping of stumps in some locations. In addition, while removing stumps, roots or embedded logs, the Contractor shall shake them on site to remove as much soil as possible.

3.4 REMOVAL AND DISPOSAL

.1 All cleared and grubbed wood and vegetative materials, excluding merchantable timber, shall be loaded, hauled and disposed of outside of the National Park at a disposal site as agreed with the Departmental Representative at the Contractor's expense.

.2 Merchantable timber shall remain property of PCA and should be cut at the base to the maximum suitable length.

.3 Non-Merchantable Timber shall be processed, cut, loaded and hauled according to Provincial highway regulations at the Contractor's expense.

.4 Stockpiled non-merchantable timber will be retained by the Crown and any requirement to process full-length log decks into firewood length will be the responsibility of the Crown.

.5 Contractor is responsible for ensuring weights of all haul vehicles meet all applicable regulations.

3.5 FINISHED SURFACE

.1 In areas of grubbing, leave ground surface in condition suitable for stripping of topsoil to approval of Departmental Representative.

.2 In areas of flush cutting, leave stumps cut flush with ground elevation and root structure undisturbed.

.3 Finished surface requirements:

.1 Refer to PRIA Section 5 "Roadside Vegetation Removal".

.2 In areas of flush cutting, leave stumps cut flush with ground elevation and root structure undisturbed unless otherwise directed by the Departmental Representative.

.3 Where possible, vegetative debris should not be left to accumulate on site and must either be burned or chipped.

.4 Chips cannot exceed two inches in depth to a maximum coverage of 5% ground cover.

.5 Where accessible, all stems suitable for firewood should be removed from site, hauled and stockpiled at a location designated by the Departmental Representative.

.6 At inaccessible sites or for trees with little firewood value, no more than 50 stems per linear kilometer may be left on site. A stem is defined as any tree with a diameter at breast height (DBH) greater than 15 centimeters.

.7 All retained stems must be limbed and lie flush to the ground.

.8 Accumulation of fine woody fuels is of greatest concern from both a fire management and vegetation re-growth perspective. Fine fuel accumulation cannot exceed 10% ground cover and must be less than 10 centimeters in depth. Fine woody fuels have a diameter less than 3 centimeters.

.9 Medium fuels may accumulate to a maximum of 20% ground cover and shall not exceed 20 centimeters in depth. Medium fuels have a diameter ranging from 3 centimeters to 7 centimeters.

.10 Mechanical distributed areas and burn piles must be seeded with an approved native grass seed mix within 6 months of project completion.

.11 Ground disturbance must be kept to a minimum. Off-highway mechanical equipment must have tire pressure of 7 psi or lower.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This item consists of the excavation and use/disposal of all materials in conformity with the lines, grades and dimension indicated in the Contract Documents and as directed by the Departmental Representative and includes:

- .1 Stripping of organic material.
- .2 Roadway, culvert and borrow excavation.
- .3 Construction of roadway ditches, embankments, permanent access and connecting roads, approaches, entrances, day use areas, berms, approved haul roads and other earthworks necessary for the construction of the road.
- .4 Removal and disposal of waste/unsuitable / surplus materials from excavation, embankment and borrow areas.
- .5 Transportation of excavated materials.
- .6 Finishing of top surfaces and slopes.
- .7 Maintenance of the work set forth under this section in a finished condition until any portion thereof has been accepted as completed by the Departmental Representative.

1.2 REFERENCES

.1 AT - Standard Specifications for Highway Construction (latest edition).

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

- .1 ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft3) (600 kN-m/m3).
- .2 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft3) (2,700kN-m/m3).

1.3 MEASUREMENT AND PAYMENT PROCEDURES

.1 Stripping and placement in stockpiles:

- .1 Measure for payment for Stripping will be the volume in cubic metres measured in its original position from cross section taken by the Departmental Representative in areas of excavation. Work is to be done in accordance with the Contract Documents and accepted by the Departmental Representative.
- .2 Payment will be made under **"Unit Price Item 9a – Roadway and Drainage Excavation – Stripping"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.2 Roadway and Drainage Excavation:

- .1 Measure for payment for Common Excavation will be the volume in cubic metres measured in its original position from cross sections taken by Departmental Representative in areas of excavation. Work is to be done in

accordance with the Contract Documents and accepted by the Departmental Representative.

.1 Payment will be made under **"Unit Price Item 9b - Roadway and Drainage Excavation - Common Excavation"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.2 Do not include costs of design and installation of the temporary soil retaining system. Refer to Section 01 55 26 – Traffic Control.

.2 Measure for payment for Common Excavation material deemed by the Departmental Representative as waste will be the volume in cubic metres measured in its original position from cross sections taken by Departmental Representative in areas of excavation. Work is to be done in accordance with the Contract Documents and accepted by the Departmental Representative.

.1 Payment will be made under **"Unit Price Item 9c – Roadway and Drainage Excavation – Waste"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.3 Written Approval to Proceed must be completed by the Departmental Representative prior to sub-excavation for the removal of unsuitable material(s). Sub-excavation for the removal of unsuitable material(s) to be paid under **"Unit Price Item 9c – Roadway and Drainage Excavation – Waste".**

.4 The Contractor shall take care not to contaminate suitable surplus materials with Waste materials. Waste materials shall be stockpiled separately by type at locations identified in the Contract Documents.

.3 Departmental Representative will take initial cross sections upon completion of grubbing and again upon completion of stripping and immediately prior to excavation of material to be incorporated into work.

.4 Items considered incidental to the Work include, but are not limited to:

.1 General:

.1 Environmental mitigations, including temporary erosion and sedimentation control, required in accordance with Section 01 35 43 – Environmental Procedures.

.2 Survey and layout.

.3 Relocation & protection of existing utilities in accordance with Section 01 14 00 - Work Restrictions.

.4 Excavating, loading, hauling, placing and compacting material within the limits of the Works.

.5 Separating of organic material from non-organic material and stockpiling, as directed by the Departmental Representative.

.6 Loading hauling, placing and compaction of boulders less than 2.0 cubic metres into large embankments.

.7 Scarifying or benching existing slopes or existing road surfaces.

.8 Overhaul.

.9 Embankment construction.

.10 Watering, drying or compacting soils to achieve specified densities inclusive of all compaction efforts.

.11 Proof rolling.

.12 Compaction of material (150 mm) below subgrade horizon in areas of cut.

.13 Placing material in stockpiles, grading, or maintaining the stockpile site.

.14 Finishing.

.15 Shoring, bracing, cofferdams, underpinning and de-watering of excavation, except as noted in 1.3.2.1.2 for the temporary soil retaining system to maintain staging of traffic in accordance with Section 01 55 26 – Traffic Control.

.1 Management of groundwater in excavated area will not be measured but considered incidental to work.

.2 Stripping:

.1 Loading, hauling and stockpiling stripping material on site, or other location(s) as directed by the Departmental Representative.

.3 Waste:

.1 Excavation, loading, hauling, and disposal of material at 8 Mile Pit or as directed by Departmental Representative.

.5 In addition to incidental items, no measure for payment will be made for:

.1 Stripping below the design ditch grade.

.2 Excavating and/or construction embankments unnecessarily beyond design lines established by Departmental Representative, with exception of unavoidable slide material. Do not measure slide material, when such slides are attributable to negligence.

.3 Contractor contaminated suitable surplus materials with unsuitable materials. Contaminated unsuitable materials shall be removed from the Park at the Contractor's expense.

.4 Ditch or backslope overcut below the design grade line and/or filling back to design grade.

.5 If overcut, no payment will be made for filling an area back to grade.

.6 Removing unsuitable material from embankment attributable to negligence.

.6 Excavated material, for re-use in Work, is the Contractor's responsibility for storing, hauling, drying, placement, moisture conditioning, compaction, and other requirements to make the material suitable for reuse.

.7 Mobilization and demobilization required for this Work shall be incidental to **"Lump Sum Price Item 1 – Mobilization / Demobilization"**, and no additional payment will be made.

.8 Traffic Control required for this Work shall be incidental to **"Lump Sum Price Item 2 – Traffic Control"** and no separate payment will be made to the Contractor.

1.4 DEFINITIONS

.1 Common Excavation: excavation of materials that are not Rock Excavation or Stripping.

.2 Borrow:

.1 Suitable material obtained from locations outside the limits of the roadway cut and placed as embankment material.

.2 Suitable material obtained from culvert foundation excavations used for the onsite production of granular material.

.3 Stripping: excavation of organic material covering original ground.

.4 Embankment: material derived from usable excavation and placed above original ground or stripped surface.

.5 Waste Material: material unsuitable for embankment, embankment foundation, and material surplus to requirements.

.6 Topsoil: material passing a 100 mm sieve and capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

1.5 QUALITY CONTROL AND ASSURANCE

.1 Regulatory Requirements:

.1 Adhere to Provincial and National Environmental requirements when potentially toxic materials are involved.

.2 In accordance with Section 01 45 00 – Quality Control.

.3 Submit design and supporting data at least 2 weeks prior to beginning Work.

.4 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Alberta, Canada.

.5 Keep design and supporting data on site.

.6 Engage services of qualified professional Engineer who is registered or licensed in Alberta, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.

.7 Design and supporting data to be submitted in accordance with Section 01 33 00 – Submittal Procedures for temporary soil retaining system to bear stamp and signature of qualified professional engineer registered or licensed in Alberta, Canada.

.8 Do not use soil material until written report of soil test results are approved by Departmental Representative.

.9 Health and Safety Requirements:

.1 Construction occupational health and safety requirements in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 In accordance with Section 01 33 00 - Submittal Procedures.

.2 Quality Control: in accordance with Section 01 45 00 - Quality Control:

.1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.

.2 Submit for review by Departmental Representative proposed dewatering and heave prevention methods as described in PART 3 of this Section.

.3 Submit to Departmental Representative written notice at least seven (7) days prior to excavation work, to ensure cross sections are taken.

.4 Submit to Departmental Representative written notice when bottom of excavation is reached.

.5 Submit to Departmental Representative testing results as described in PART 3 of this Section.

.3 Preconstruction Submittals:

.1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.

.2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, clearance record from utility authority, and location plan of relocated and abandoned services, as required.

.3 Work Plan, including sequencing of excavation, backfilling, tieback installation and stressing, and superstructure removals and replacement.

.4 Samples:

.1 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of backfill materials and provide access for sampling.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 01 35 43 - Environmental Procedures.

.2 Separate waste materials for reuse and recycling.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

.3 Divert excess aggregate materials from landfill to local facility for reuse as directed by Departmental Representative.

1.8 EXISTING CONDITIONS

.1 Existing buildings and surface features:

.1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Embankment materials require acceptance by Departmental Representative.

.1 The Contractor shall provide material test certificates to the Departmental Representative for consideration.

.2 Material used for embankment not to contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps or other unsuitable material.

.3 Borrow material:

.1 AT - Standard Specifications for Highway Construction (latest edition).

.2 Imported from Contractor determined site outside of the Parks. Supply, loading, hauling, temporary stockpiling, placing, compacting and finishing considered incidental to the unit price.

Part 3 Execution

3.1 UTILITY COORDINATION

.1 In accordance with Section 01 14 00 - Work Restrictions.

.2 Before commencing work establish location of buried services on and adjacent to site.

.3 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.

.4 Coordinate relocations or protection of utilities (manholes, ducts, conduits or other associated infrastructure) with utility service providers and perform works required to complete relocation or protection. Work to be in accordance with utility service provider instruction or as directed by the Departmental Representative.

.5 Existing buried utilities are to be located at all new culvert locations and every 100 m along segments of the Work where the utilities may be damaged by the Work, by using low impact excavation such as hydrovac or similar methods which will not damage buried utilities.

.1 Record location of maintained, re-routed and abandoned underground lines.

.6 Remove obsolete buried services and cap cut-offs.

.7 Payment for locating utilities to be incidental to the Works and no additional payment will be made.

.8 Payment for utility relocations or protection to include all coordination efforts, labour, equipment and materials to be incidental to the Works and no additional payment will be made.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Erosion and Sedimentation Control in accordance with Contractor's Erosion and Sedimentation Control Management Plan as per Section 01 35 43 – Environmental Procedures.

.2 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

.3 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 SITE PREPARATION

.1 Remove obstructions, ice, and snow from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.4 PREPARATION/PROTECTION

.1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.

.2 Keep excavations clean, free of standing water and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.5 Protect buried services that are required to remain undisturbed.

3.5 COMPACTION EQUIPMENT

.1 Compaction equipment must equivalent of one 12 tonne vibratory packer capable of obtaining required densities in materials on project. Equipment that does not achieve specified densities must be replaced or supplemented.

3.6 COLD WEATHER WORK

.1 Prepare a Cold Weather Quality Control plan and submit to the Departmental Representative (7) days prior to commencing works when sustained temperature of 5°C and below is expected. The Contractor shall seek advice of their Geotechnical Engineer when planning for cold weather backfilling of structures, culverts, or grade construction.

.1 Monitor for and identify heaving and loosening of the backfill due to frost penetration.

.2 Monitor compaction, soil temperature and moisture content of each lift. Check for frozen material after compaction and prior to construction of the next lift.

.3 If performing structure backfill, monitor for deflection or deformation of the structure.

.2 Aggregates must conform to Contract requirements plus accommodate cold weather construction.

.1 Calcium chloride should not be used as an additive for buried structure installation. Non-corrosive additives shall not be used without completion of laboratory investigations that evaluate the impact on the compaction.

.3 Stockpiles:

.1 Stockpiles should be inspected to confirm the material is consistent gradation resembling the accepted test results.

.2 Stockpiles should be placed on a smooth hard surface that is sloped to promote snow melt run off.

.3 Heating and hoarding of the stockpile may be required.

.4 Take only unfrozen material from the stockpile for incorporating into the Works.

.4 Prior to placement:

.1 Heat and hoard the structure foundation / subgrade areas directly beneath backfill zone to prevent freezing.

.5 For structures, erect vertical hoarding on the structure ends and insert heaters. Monitoring of the air quality should be done in compliance with local work safety regulations.

.1 Provide an air gap between the structure / formwork and hoarding tarps to allow for adequate air circulation.

.6 Backfill / Aggregate installation and monitoring:

.1 Continuously monitor weather conditions and forecast.

.2 Ensure the material is not frozen when placed.

.3 The backfill / placement zone should be protected as described above.

.4 Areas that have material to be placed should be kept to a small footprint to minimize exposure. Minimize delays and interruptions to the placement/compaction process.

.5 The temperature of the material is to be checked at the time of placement to confirm that it is not frozen.

.6 Graders or dozers should be used to scrape off any frozen uncompacted fill before adding additional material. High ruts should be knocked off before they freeze.

.7 Thicker lifts may provide more time before freezing, provided the additional lift thickness is accepted by the Departmental Representative.

.8 Compact the backfill immediately after placement.

.9 Snow and ice should be continuously removed from the placement area, no snow or ice should be allowed to accumulate on the surface. Snow piles should be situated down-grade to prevent saturation of the material.

.10 Frozen material is to be remove and replaced with unfrozen material that is properly compacted.

3.7 WATER DISTRIBUTORS

.1 Apply water with equipment capable of uniform distribution and in accordance with Section 01 35 43 – Environmental Procedures.

3.8 STRIPPING OF TOPSOIL

.1 Commence topsoil stripping of areas on acceptance by the Departmental Representative after clearing and grubbing debris have been removed from these areas.

.2 Stripping depth for the removal of organic material is estimated to be on average 250 mm but will fluctuate from one location to the other. Contamination of non-organic material will not be permitted during stripping.

.3 Strip topsoil to depths as verified by the Departmental Representative. Do not mix topsoil with subsoil. Stripping depth will vary.

.4 Stripping material is to be hauled to and stockpiled onsite, or other location(s) as directed by the Departmental Representative. The Contractor is advised that there is limited storage area for this material.

.1 Stockpile height not to exceed 2 m and should be protected from erosion.

.5 Stripped soil (including fine forest litter) materials shall be placed and stored at locations and in amounts and form as instructed by the Departmental Representative, for later reclamation use on graded slopes. Stripping piles may require erosion control, sedimentation protection or stabilization, depending on the location and anticipated duration of storage. At the Departmental Representatives direction, the Contractor shall prepare a plan for management of each stripping pile.

3.9 STOCKPILING

.1 Stockpile fill materials in areas designated by Departmental Representative.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.10 EXCAVATING

.1 Advise Departmental Representative at least seven (7) days in advance of excavation operations for initial cross sections to be taken.

.2 Excavate to lines, grades, elevations and dimensions as indicated.

.3 Excavation must not interfere with bearing capacity of adjacent foundations.

.4 Keep excavated and stockpiled materials safe distance away from edge of excavations as directed by Departmental Representative.

.5 Restrict vehicle operations directly adjacent to open excavations.

.6 Dispose of surplus and unsuitable excavated material in approved location off site.

.7 Do not obstruct flow of surface drainage or natural watercourses.

.8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.9 Notify Departmental Representative when bottom of excavation is reached.

.10 Obtain Departmental Representative approval of completed excavation.

.11 Remove unsuitable material from bottom of excavations including those that extend below required elevations to extent and depth as directed by Departmental Representative.

.12 Correct unauthorized over-excavation as follows:

.1 Des 2 Class 25 fill compacted to not less than 95% of corrected Modified Proctor maximum dry density in accordance with Section 31 05 10 - Corrected Maximum Dry Density for Fill.

.13 Hand trim, make firm and remove loose material and debris from excavations.

.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

.14 General:

.1 Stockpiling along the ROW outside of the cut/fill slope will not be permitted unless approval has been given by the Departmental Representative.

.2 Notify the Departmental Representative when waste materials are encountered and remove to depth and extent as approved by the Departmental Representative. This material shall be hauled to and stockpile at the designated pit locations.

.3 Subcut below subgrade elevation in cut sections only as approved by the Departmental Representative and replace with acceptable embankment material and compact. Compact top 300 mm below final subgrade elevation to minimum 100% Standard Proctor density, ASTM D698 (AASHTO T99). No subcut in ditches or backslope unless Departmental Representative approved.

.4 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points in accordance with the Contract Documents.

.5 The dimensions of the excavations and embankments shall be, in accordance with the typical sections accompanying these specifications, but the dimensions of any or all excavations and embankments may be increased or decreased at any time by the Departmental Representative as conditions and circumstances may determine.

.15 Drainage:

.1 Maintain profiles, crowns and cross slopes to provide positive surface drainage at all times.

.2 Provide ditches as work progresses for positive drainage.

3.11 SHORING, BRACING AND UNDERPINNING

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29.06 - Health and Safety Requirements and the Health and Safety Act for the Province of Alberta.

.1 Where conditions are unstable, Departmental Representative to verify and advise methods.

.2 During backfill operation:

.1 Unless otherwise indicated or directed by Departmental Representative, remove sheeting and shoring from excavations.

.2 Do not remove bracing until backfilling has reached respective levels of such bracing.

.3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.

.3 Upon completion of substructure construction:

.1 Remove shoring and bracing.

.2 Remove excess materials from site.

3.12 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Provide for Departmental Representative review details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs, as required.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

.1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in a manner not detrimental to public and private property, or to the portion of Work completed or under construction.

.6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to watercourses or drainage areas. Discharge location must be approved by ESO.

3.13 EMBANKMENTS

.1 This item consists of the construction of the subgrade in embankments and cuts to the lines, grades, cross-sections and dimensions as per the Contract Documents.

.2 Scarify or bench existing slopes in side hill or sloping sections to ensure proper bond between new materials and existing surfaces. Method used to be subject to prior approval of the Departmental Representative.

.3 Do not place material that is frozen nor place material on frozen surfaces except in areas authorized.

.4 Maintain crowned surface during construction to ensure ready run-off of surface water.

.5 Drain low areas before placing materials.

.1 Place and compact to full width in layers not exceeding 200 mm loose thickness. The Departmental Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.

.6 Rock Embankments:

.1 Place to full width in layers of sufficient depth to contain maximum sized rocks, but in no case is layer thickness to exceed 0.7 m.

.2 Distribute rock material to fill voids with smaller fragments to form compact mass.

.3 Fill surface voids at design elevation with rock spalls or selected material to form earth-tight surface.

.4 The Contractor may place rock embankments during freezing conditions provided compaction equipment of sufficient size to break large rock particles is used and all snow and ice is removed from fill surface.

.7 Deductions from excavation will be made for overbuild of embankments.

.8 Excess Excavation placed in stockpile in the designated pits:

.1 Material in the quantities specified shall be placed in the designated pits or as otherwise directed by the Departmental Representative.

.2 The Contractor shall place, grade and track pack the material in stockpile as necessary to allow for construction access and the movement of equipment.

.3 The Contractor shall maintain access to the stockpile area and allow for access to the stockpiled material by other.

.4 Materials placed in the designated pits, once accepted by the Departmental Representative, are the property of PCA.

3.14 SUBGRADE COMPACTION

.1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.

.2 Embankment material shall be placed in successive uniform layers over the entire area as follows:

.1 Material containing less that 25 percent by volume of stones larger than 100 mm shall be constructed in successive horizontal layers not exceeding 200 mm in loose thickness except that the top 500 mm shall be constructed in layers not exceeding 100 mm in loose thickness.

.2 Material containing 25 percent or more by volume of stones larger than 100 mm shall be placed in layers not exceeding the maximum size of the stones. Stones larger than 100 mm shall not be placed within 150 mm of the subgrade elevation.

.3 In embankments composed principally of material obtained from rock cuts, the larger stones shall be carefully distributed and the interstices filled with smaller stones and other material to form a compact mass. Such embankments shall be

constructed in layers not exceeding 0.7 metre. The placing of individual rocks and boulders exceeding 0.7 metres in least dimension will be permitted provided they are carefully distributed and the interstices filled with finer material to form a dense and compact mass. Each layer, before starting the next, shall be levelled and smoothed with suitable equipment. Hauling and spreading equipment shall be operated over the full width of each layer.

.3 Each layer shall be brought to its required degree of compaction throughout its entire width before successive layers are placed.

.4 Compact each layer to minimum 95% Standard Proctor density, ASTM D698 (AASHTO T99). Top 300 mm of subgrade to be compacted to 100% Standard Proctor density, ASTM D698 (AASHTO T99).

.5 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

.6 For rock placed as fill, compact with large steel wheeled or tracked equipment of sufficient size to break larger particles. Compact until rock fill is stable under compaction equipment and all voids are filled.

3.15 PROOF ROLLING

.1 Finished subgrade must not rut or deflect when proof rolled with 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. The prepared subgrade shall receive one complete coverage by the tires of a truck as specified.

.2 Proof roll subgrade. If use of non-standard proof rolling equipment is approved, Departmental Representative to accept level of proof rolling.

.3 Where proof rolling reveals areas of defective subgrade:

.1 Remove subgrade material to depth and extent as directed by Departmental Representative.

.2 Backfill excavated subgrade with suitable Common material and compact in accordance with Section 31 24 13 – Roadway and Drainage Excavation.

.3 Replace subgrade material and compact in accordance with the Contract Documents.

.4 All associated Works, including replacing defective material with new materials in accordance with the appropriate Sections is to be done at the Contractor’s cost.

3.16 FINISHING

.1 Shape entire subgrade to within ±15 mm of design elevations but not to be uniformly high or low.

.2 Round top of back slope as shown on the Drawings.

.3 Remove rocks over 150 mm in dimension from slopes and ditch bottoms.

.4 Trim between constructed slopes and edge of clearing to provide drainage.

3.17 PROTECTION

.1 Maintain finished surfaces in condition conforming to this section until acceptance by the Departmental Representative.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 AT Granular Base Course for use in roadway construction and backfill behind abutments as shown in the Contract Documents and as directed by the Departmental Representative.

1.2 RELATED REQUIREMENTS

.1 Section 31 05 10 – Corrected Maximum Dry Density for Fill.

1.3 REFERENCES

.1 Alberta Transportation

.1 Standard Specifications for Bridge Construction (latest edition)

.2 Standard Specifications for Highway Construction (latest edition)

.2 American Society for Testing and Materials (ASTM)

.1 ASTM C117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.

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

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

.4 ASTM D422-63, Standard Test Method for Particle-Size Analysis of Soils.

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

.6 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft3) (2,700kN-m/m3).

.1 ASTM D1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

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

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure for payment of AT Granular Base Course shall be in neat line cubic meter volumes calculated from the Design cross sections for work completed in accordance with the Contract Documents and accepted by the Departmental Representative.

.1 Payment shall be made under the applicable item of **"Unit Price Item 10 – Granular Base Course Aggregate – AT Designation 2 Class 25mm Structural Backfill & Road Base"** and the price(s) bid shall be full

compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.2 Items considered incidental to the Work include, but are not limited to:

.1 Supply, loading, hauling, placing, compacting, water for compaction, drying of material and finishing.

.2 Overhaul.

.3 Any temporary stockpiling of aggregates onsite.

.4 Supply and installation of polyethylene sheet at approach slabs will not be measured but considered incidental to work.

.5 Environmental mitigations, including temporary erosion and sedimentation control, required in accordance with Section 01 35 43 – Environmental Procedures.

.3 Mobilization and demobilization required for this Work shall be incidental to **"Lump Sum Price Item 1 – Mobilization / Demobilization"**, and no additional payment will be made.

.4 Traffic Control required for this Work shall be incidental to **"Lump Sum Price Item 2 – Traffic Control"** and no separate payment will be made to the Contractor.

1.5 QUALITY CONTROL AND ASSURANCE

.1 In accordance with Section 01 45 00 – Quality Control.

.2 Contractor to provide material samples to the Departmental Representative prior to works commencing for Quality Assurance purposes.

.3 Submit design and supporting data at least 2 weeks prior to beginning Work.

.4 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Alberta, Canada.

.5 Keep design and supporting data on site.

.6 Engage services of qualified professional Engineer who is registered or licensed in Alberta, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.

.7 Do not use soil material until written report of soil test results are approved by Departmental Representative.

.8 Health and Safety Requirements:

.1 Construction occupational health and safety requirements in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 In accordance with Section 01 33 00 - Submittal Procedures.

.2 Quality Control: in accordance with Section 01 45 00 - Quality Control:

.1 Submit to Departmental Representative testing results as described in PART 3 of this Section.

.3 Preconstruction Submittals:

.1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.

.2 Work Plan, including sequencing of excavation, backfilling, tieback installation and stressing, and superstructure removals and replacement.

.4 Samples:

.1 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of backfill materials and provide access for sampling.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 01 35 43 - Environmental Procedures.

.2 Divert unused granular material outside of the National Parks as accepted by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 AT - Standard Specifications for Highway Construction (latest edition).

.2 AT Designation 2 Class 25 Base Course Aggregate to be supplied 8 Mile Pit.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Erosion and Sedimentation Control in accordance with Contractor’s Erosion and Sedimentation Control Management Plan as per Section 01 35 43 – Environmental Procedures.

.2 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

.3 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 STOCKPILING

.1 Stockpile fill materials in areas designated by Departmental Representative.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.3 SHORING, BRACING AND UNDERPINNING

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29.06 - Health and Safety Requirements and the Health and Safety Act for the Province of Alberta.

.1 Where conditions are unstable, Departmental Representative to verify and advise methods.

.2 During backfill operation:

.1 Unless otherwise indicated or directed by Departmental Representative, remove sheeting and shoring from excavations.

.2 Do not remove bracing until backfilling has reached respective levels of such bracing.

.3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.

.3 Upon completion of substructure construction:

.1 Remove shoring and bracing.

.2 Remove excess materials from site.

3.4 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Provide for Departmental Representative review details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs, as required.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

.1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in a manner not detrimental to public and private property, or to the portion of Work completed or under construction.

.6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to watercourses or drainage areas. Discharge location to be approved by ESO.

3.5 PLACING

.1 Load, haul and place base aggregate after sub-base aggregate surface is inspected and accepted by Departmental Representative.

.2 Do not proceed with backfilling operations until completion of the following:

.1 Departmental Representative has inspected and approved installations.

.2 Departmental Representative has inspected and approved of construction below finish grade.

.3 Inspection, testing, approval, and recording location of underground utilities.

.4 Removal of concrete formwork.

.5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.

.3 Placing

.1 Construct base aggregate to depth and grade in areas indicated.

.2 Ensure no frozen material is placed.

.3 Place material only on clean unfrozen surface, free from snow and ice. For each lift, material shall be placed on crown line using a Tonne / metre spreadsheet. Contractor shall have a checker to indicate spread distance when material is being placed.

.4 Begin spreading base aggregate on crown line or on high side of one-way slope.

.5 Place material using methods that do not lead to segregation or degradation of aggregate.

.6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds that will place material in uniform layers of required thickness.

.7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Compact each layer before placing succeeding layer. Departmental Representative may authorize thicker lifts if specified compaction can be achieved.

.8 Shape each layer to smooth contour and compact to the specified density before succeeding layer is placed.

.9 Remove and replace that portion of layer in which material becomes segregated during spreading.

.10 For backfill placed behind abutments within 5m of the face of the abutment, maintain a maximum unequal backfill height of 2m between both abutments at all times.

.4 Backfilling around installations:

.1 Place backfill around new lock-blocks and tiebacks carefully to ensure no damage to installations.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative.

.2 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.

3.6 COMPACTION

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Use types of fill as indicated or as specified below. Compaction densities are percentages of maximum densities obtained from ASTM D1557 and ASTM D698, in accordance with Section 31 05 10 – Corrected Maximum Dry Density for Fill.

.1 Des 2 Class 25 fill compacted to 95% of corrected Modified Proctor maximum dry density (ASTM D1557) for top 600mm of backfill under bridge approach slabs.

.2 Des 2 Class 25 fill compacted to density of not less than 100% Standard Proctor density in accordance with ASTM D698 elsewhere.

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted base.

.4 Apply water as necessary during compacting to obtain specified density.

.5 Dry as necessary to obtain specified compaction.

.6 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.

.7 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.7 PROOF ROLLING

.1 Granular Base Course must not rut or deflect when proof rolled with 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. Each compacted course of base course aggregate shall receive one complete coverage by the tires of a truck as specified.

.2 Proof roll Granular Base Course. If use of non-standard proof rolling equipment is approved, Departmental Representative to accept level of proof rolling.

.3 Where proof rolling reveals areas of defective Granular Base Course, Gravel fill or subgrade:

.1 Remove Gravel fill and subgrade material to depth and extent as directed by Departmental Representative.

.2 Backfill excavated subgrade with suitable Common material and compact in accordance with Section 31 24 13 – Roadway and Drainage Excavation.

.3 Replace Gravel fill and/or Granular Base Course material and compact in accordance with the Contract Documents.

.4 All associated Works, including replacing defective material with new materials in accordance with the appropriate Sections is to be done at the Contractor’s cost.

3.8 SITE TOLERANCES

.1 Finished base surface to be within +/- 10 mm of established grade and cross section but not uniformly high or low.

.2 Finished sub-base surface to be within +/- 15 mm of elevation as indicated but not uniformly high or low.

3.9 PROTECTION

.1 Maintain finished base in condition conforming to this Section until succeeding material is applied.

3.10 RESTORATION

.1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.

.2 Reinstate pavements disturbed by excavation to thickness, structure and elevation which existed before excavation.

.3 Clean and reinstate areas affected by Work as directed by Departmental Representative.

.4 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

.5 Seed newly exposed excavated slopes and backfill slopes in accordance with Section 01 35 43 – Environmental Procedures and Section 32 92 22 – Hydraulic Seeding.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Supply and application of a liquid asphalt to ensure a bond between the surface being paved and the Asphalt Concrete Pavement lift, in accordance with the Contract Document and as directed by the Departmental Representative.

1.2 REFERENCES

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

.1 ASTM D140, Standard Practice for Sampling Bituminous Materials.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

.3 AT - Standard Specifications for Highway Construction (latest edition)

1.3 MEASUREMENT AND PAYMENT PROCEDURES

.1 Supply, delivery and application of tack coat will not be measured separately and will be incidental to **"Unit Price Item 11 – Asphalt Concrete Pavement – EPS - AT Mix Type H1 – 16mm"** and shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

1.4 SUBMITTALS

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit two 1 L samples of asphalt tack coat material proposed for use in new, clean, airtight, sealed, wide mouth bottles made with plastic to Departmental Representative, at least 2 weeks prior to beginning Work.

.3 Sample asphalt tack coat material to: ASTM D140.

.4 Provide access on tank truck for Departmental Representative to sample asphalt material to be incorporated into Work, in accordance with ASTM D140.

1.5 QUALITY CONTROL

.1 In accordance with Section 01 45 00 – Quality Control.

.2 Upon request by Departmental Representative, submit manufacturer's test data and certification that asphalt tack coat material meets requirements of this Section.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with ASTM D140.

.2 Provide, maintain and restore asphalt storage area.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 01 35 43 - Environmental Procedures.

.2 Divert unused asphalt materials to facility capable of recycling materials outside of the National Parks.

Part 2 Products

2.1 MATERIALS

.1 Anionic emulsified asphalt: to CAN/CGSB-16.2, grade: SS-1.

.2 Water: clean, potable, free from foreign matter.

2.2 EQUIPMENT

.1 Pressure distributor to be 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 m.

.3 Applied at readily determined and controlled rates from 0.2 to 5.4 L/m2 with uniform pressure, and with an allowable variation from any specified rate not exceeding 0.1 L/m2.

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

.5 Equipped with meter, registering metres of travel per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.

.6 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.

.7 Equipped with an easily read, accurate and sensitive device that registers temperature of liquid in reservoir.

.8 Equipped with accurate volume measuring device or calibrated tank.

.9 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.

.10 Equipped with nozzle spray bar, with operational height adjustment.

.11 Cleaned if previously used with incompatible asphalt material.

Part 3 Execution

3.1 APPLICATION

.1 Obtain Departmental Representative's approval of surface before applying asphalt tack coat.

.2 Apply asphalt tack coat only on clean and dry surface.

.3 Dilute asphalt emulsion with water at 1:1 ratio for application.

.1 Mix thoroughly by pumping or other method accepted by Departmental Representative.

.4 Apply asphalt tack coat evenly to pavement surface at rate as directed by Departmental Representative, of 0.5 L/m² plus or minus 0.2 L/m².

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

.6 Do not apply asphalt tack coat when air temperature is less than 10 degrees Celsius or when rain is forecast within 2 hours of application.

.7 Apply asphalt tack coat only on unfrozen surface.

.8 Evenly distribute localized excessive deposits of tack coat by brooming as directed by Departmental Representative.

.9 Where traffic is to be maintained, treat no more than one half of width of surface in one application.

.10 Keep traffic off tacked areas until asphalt tack coat has set.

.11 Re-tack contaminated or disturbed areas as directed by Departmental Representative.

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

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Work shall consist of supplying, loading, hauling and placing AT Mix Type H1 Asphalt Concrete Pavement (EPS) as per the Contract Documents, or as directed by the Departmental Representative.

.2 For the asphalt mix, asphalt aggregate used shall consist of a 16mm Medium Mix Asphalt Aggregate in accordance with AT Designation1 Class 16 Aggregate in accordance with AT – Standard Specifications for Highway Construction (latest edition).

.3 Production of AT Designation 1 Class 16 (16mm) asphalt aggregate.

.4 Asphalt Cement used shall be PG 58-34 in accordance with AT Designation1 Class 16 Aggregate in accordance with AT – Standard Specifications for Highway Construction (latest edition).

.5 Supply and inclusion of anti-strip, including all required testing and submittals.

.6 Recycled Asphalt Pavement (RAP) will not be permitted in the asphalt pavement mix design in accordance with this Section.

.7 Perform and submit mix designs for AT Mix Type H1 Asphalt Concrete Pavement using Asphalt Cement PG 58-34 and 16mm Asphalt Aggregate. Mix design is subject to acceptance by the Departmental Representative.

.8 Supply and installation of product for various bridge joint.

.9 Supply and installation of asphaltic joint sealant following completion of paving works.

.10 Acceptance and/or rejection of all placed Asphalt Concrete Pavement shall be determined in accordance with the End Product Specifications.

1.2 REFERENCES

.1 AT - Standard Specifications for Highway Construction (latest edition)

.1 Design Bulletin #13 – Revisions to Pavement Design Manual for Selection of ACP Mix Types and Asphalt Binder Grades (March 2017)

1.3 MEASUREMENT AND PAYMENT PROCEDURES

.1 Asphalt Concrete Pavement

.1 Measure for payment of Asphalt Concrete Pavement will be in tonnes by scale tickets submitted to and accepted by the Departmental Representative in accordance with the Contract Documents.

.2 Payment for accepted Asphalt Concrete Pavement will be made under “Unit Price Item 11 - Asphalt Concrete Pavement - EPS – AT Mix Type H1 – 16mm” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.3 Level Course shall not be measured separately for payment but will be paid under "Unit Price Item 11 - Asphalt Concrete Pavement - EPS – AT Mix Type H1 -16mm.

.2 Items considered incidental to the Work include, but are not limited to:

.1 Supply, delivery and incorporation of asphalt cement.

.2 The movement of equipment and crew.

.1 A move is defined as the Contractor moving equipment and crew to the next section to pave after having completed, in its totality, the previous section.

.3 Cleaning of existing pavement prior to paving, whether via sweeping or other methods.

.4 Survey and layout for asphalt concrete paving and milled rumble strips.

.5 Preparing asphalt mix designs (including anti-stripping test), in accordance with Section 01 45 00 Quality Control and Section 01 33 00 Submittal Procedures.

.6 Supply, delivery and incorporation of asphalt cement.

.7 Anti-stripping agent(s) and other additives, if required and accepted by the Departmental Representative.

.8 Supply, installation, maintenance, calibration of weight scales and a scale house, or alternately electronic calibrated silo scales, at the plant by the Contractor.

.1 Contractor shall provide a scale person, as required, at their cost.

.9 Asphalt Concrete Pavement placing at milled tie-in locations.

.10 Cleaning of existing pavement shoulder, whether via sweeping or other methods.

.11 Adjustment of existing catch basin grates and manhole lids as accepted by the Departmental Representative.

.12 Sloped paved shoulders as described in this Section.

.13 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

.14 Collection, storage, removal and disposal of asphalt plant dust outside of the National Parks.

.15 Overhaul.

.3 Traffic Control required for this Work shall be incidental to **"Lump Sum Price Item 2 - Traffic Control"** and no separate payment will be made to the Contractor.

.4 Mobilization and demobilization required for this Work shall be incidental to **"Lump Sum Price Item 1 – Mobilization / Demobilization"** and no separate payment will be made to the Contractor.

1.4 SUBMITTALS

.1 In accordance with Section 01 33 00 - Submittal Procedures.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 01 35 43 - Environmental Procedures.

Part 2 Products

2.1 MATERIALS

.1 PG 58-34 Asphalt Cement shall be used.

.2 0.3% Anti-strip additive is to be added to the Asphalt Cement at the manufacturing plant, not added to the asphalt plant separately at the time of asphalt production.

.3 Asphalt Aggregate:

.1 Materials used shall be in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition).

.2 AT Designation 1 Class 16 Asphalt Aggregate is to be supplied from outside the Park or produced, in whole or in part, from suitable material excavated from within the roadway cuts and structure excavations.

.4 Asphaltic Joint Sealant used shall be TriCor CRF – Restorative Seal (665) or approved alternative in accordance with BC MoTI's Recognized Products List (latest edition), and met by BC MoTI Standard Specifications 952 Contractor Supply Asphalt and Paving Materials for Highway Use. Supplier's delivery slips are to be provided to the Departmental Representative.

.5 Rubberized Asphalt Joint Sealer at ends of approach slab used shall be installed as per the Contract documents and in accordance with the Manufacture's recommendations. Approved products include:

.1 Macseal 6690-1 and 6690-2

.2 Crafco Roadsaver 211

.3 Elastoflex 430 or 450

.4 Departmental Representative approved equivalent

.6 All additives (including anti-stripping agents) to be in accordance with the Approved Products List as published by BC MoTI / AT.

Part 3 Execution

3.1 QUALITY CONTROL

.1 In accordance with Section 01 45 00 - Quality Control.

.2 Contractor is responsible for all Quality Control required in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition) – Asphalt Concrete Pavement (EPS) and Section 01 45 00 – Quality Control.

.3 Contractor is to provide a full time Road Checker during all times of asphalt placement that shall be responsible for providing a daily Road Checker's Summary in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition).

.4 The Road Checker's Summary shall be provided to the Departmental Representative no less than 24 hrs after the relevant shift end.

.5 To assist in the Road Checker's role, the Contractor shall layout and stake stations at the appropriate intervals to achieve the desire accuracy throughout the Work Site. All survey and marking stakes shall be removed prior to completion of the Works.

.6 The method of tests for asphalt appeal samples shall be the same method of tests conducted as during Quality Control / Quality Assurance testing.

3.2 METHODOLOGY

.1 ACP placement:

.1 Asphalt concrete mix shall not be placed when the air temperature is below 4°C, or when rain is forecasted.

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

.3 Unless otherwise shown on the plans, the asphalt concrete mix shall be placed in the following lift thicknesses:

.1 in a single lift when the design compacted total thickness is 75 mm or less.

.2 in two or more lifts when the design compacted total thickness is greater than 75 mm. The lift thickness selection shall be determined by the Contractor except that:

.1 the maximum thickness of any lift shall be 75 mm.

.2 the minimum thickness of a final lift shall be 45 mm.

.3 On widenings, the thickness of asphalt concrete mix up to 75 mm may be placed in one lift. Over 75 mm thickness, the asphalt concrete shall be placed in two or more lifts.

.4 A pickup machine shall be used for all mainline highway lane paving.

.5 Paving machine must be capable of paving 7.4m wide to pave full lane width including shoulder.

3.3 EQUIPMENT, PLANT, AND MIXING REQUIREMENTS

.1 Execution of the Work shall be in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition) – Asphalt Concrete Pavement (EPS).

.2 The Contractor will not be permitted to setup a Mobile Asphalt Plant or use a Stationary Asphalt Plant within the Parks for this Project.

.3 Asphalt plant to be used on this project, regardless of location, shall be a minimum of 200 tonne per hour production plant, equipped with a dry bag system for pollution control, in addition to, or in replacement of standard cyclone dust collectors, to effectively eliminate emissions of dust and smoke pollutants into the atmosphere. Use of secondary dust collection systems, requiring discharge of dust polluted water into settling ponds or drainage system will not be permitted. In addition, Asphalt plant must comply with all environmental pollution control regulations applicable in the asphalt plant area. The plant operator must make daily inspections of the emission control components, to ensure proper working order and provide the most recent stack monitoring results for viewing by the Departmental Representative or their designate.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Supply and installation of Pavement Markings in areas in accordance with the Contract Document and as directed by the Departmental Representative.

.2 The Contractor shall complete a survey of the pre-existing pavement markings prior to their disturbance to ensure their ability to re-instate them accurately.

1.2 REFERENCES

.1 CAN/CGSB 1.5 M99 Low Flash Petroleum Spirits Thinner.

.2 CGSB1 GP 12C 83 Standard Paint Colours.

.3 CGSB1 GP 71 83 Method, of Testing Paints and Pigments.

.4 CAN/CGSB 1.74-01 Alkyd Traffic Paint.

.5 U.S. FED-STD-595B, 1989 – Colours Used in Government Procurement.

.6 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.7 BC MoTI Standard Specification for Highway Construction (current edition)

.8 National Fire Code of Canada 1995.

.9 Transportation of Dangerous Goods Act, 1992 (TDG Act) [1992], (c. 34).

.10 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).

1.3 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure for payment for final line painting shall be in linear metres along the centre of the paint line regardless of width or line-gap ratio in accordance with the Contract Documents and accepted by the Departmental Representative.

.2 Double center lines are to be measured as one line.

.1 Payment will be made under **"Unit Price Item 12 – Pavement Marking - Line Painting"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.3 Removal of existing paint lines shall be incidental to **"Lump Sum Price Item 2 – Traffic Control"**, in accordance with Section 01 55 26 –Traffic Control, and no separate payment will be made to the Contractor.

.4 Items considered incidental to the Work include, but are not limited to:

.1 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

.2 Survey and layout.

.3 Repair or removal and replacement of incorrect pavement markings as directed by the Departmental Representative shall be completed at the Contractor's cost.

.4 Final design Pavement Marking layout by string line, surveyor or other methods accepted by the Departmental Representative.

.5 Temporary Pavement Marking in accordance with Section 01 55 26 – Traffic Control.

.5 Traffic Control required for this Work shall be incidental to **"Lump Sum Price Item 2 - Traffic Control"** and no separate payment will be made.

.6 Mobilization and demobilization required for this Work shall be incidental to **"Lump Sum Price Item 1 – Mobilization / Demobilization"** and no additional payment will be made.

1.4 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit to Departmental Representative following material sample quantities in accordance with Section 01 33 00 – Submittal Procedures.

.1 Two samples of each type of paint.

.2 One sample of glass beads.

.3 Sampling to CGSB1 GP 71.

.3 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, CGSB specification number and formulation number and batch number.

1.5 QUALITY CONTROL

.1 In accordance with Section 01 45 00 – Quality Control.

.2 The Contractor is responsible for quality control inspection throughout every stage of the Work to ensure that equipment, materials and workmanship comply with the requirements of the Contract Documents.

.3 The Contractor to include in the Quality Control Plan actions to address all the elements that affect the quality of the line painting including, but not limited to:

.1 Paint Application Rates.

.2 Glass Bead Application Rates.

.3 Pavement Surface and Atmospheric Conditions.

.4 Line Widths, Line Lengths and Space Lengths.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 01 35 43 - Environmental Procedures.

Part 2 Products

2.1 MATERIALS

.1 Paint:

.1 To CGSB 1.74-2001-CAN/CGSB, alkyd traffic paint.

.2 Colour: to FED-STD-595B, yellow 33538 and white 37925.

.3 Upon request, Departmental Representative will supply qualified product list of paints applicable to work. Qualified paints may be used but Departmental Representative reserves right to perform further tests.

.2 Thinner: to CAN/CGSB-1.4-2000.

.3 Glass beads:

.1 Overlay type: to CGSB1-GP-74M.

2.2 DELIVERY, STORAGE, AND HANDLING

.1 Storage and handling shall meet the requirements of Section 01 35 43 - Environmental Procedures.

.2 The Contractor shall make all arrangements for the supply and delivery of paint and glass beads and shall provide the Departmental Representative with records of all materials received and/or returned, on a daily basis.

.3 Coordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.

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

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

.6 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.7 The Contractor shall provide, maintain and reclaim all material storage sites.

.8 No paint formulation shall be diluted or mixed with a different formulation or with any other material, without the specific approval of the Departmental Representative.

.9 The Contractor shall take all necessary steps to prevent contamination of the materials. Paint shall be protected from freezing.

.10 The Contractor shall be responsible for the proper clean-up of waste or spilled material, and the proper disposition of containers.

Part 3 Execution

3.1 TEMPORARY MARKINGS

.1 The Contractor shall supply and place temporary line markings on newly constructed hard surfaces (pavement, sealcoat, etc.) throughout the project, re-establishing centreline and all lane-dividing lines prior to being opened to traffic, and shall maintain such markings until the earlier of the Actual Completion Date or the date Permanent markings have been placed. Temporary line markings are not required for lane edge lines (fog lines) unless otherwise directed by the Departmental Representative.

.2 Temporary line markings must be placed on an offset from the permanent lane marking and must be removed once permanent markings are in place.

.3 Centreline of undivided highway shall be marked throughout as “no passing” unless otherwise directed by the Departmental Representative.

.4 Painted temporary lines are not permitted on the final surface.

.5 Pavement markings for traffic detours shall be in accordance with Part 2 Products.

3.2 PERMANENT MARKINGS

.1 Prior to any work affecting pavement markings, the Contractor shall pick-up survey all key control points of existing markings at intersections, turn slots, exit tapers and similar features and, upon completion of the final hard surfacing, re-establish those points, unless shown otherwise in the Contract Documents or directed by the Departmental Representative.

.2 Further to the key control pick-up, the Contractor shall also pick-up survey all Transverse and Chevron and Crosshatch Pavement Markings and upon completion of the final hard surfacing, re-establish those points, unless shown otherwise on the IFC drawings or directed by the Departmental Representative.

.3 All layout markings shall be done with white or yellow centreline paint which will be clearly visible after exposure to all Site Conditions for a minimum period of two (2) months past the Actual Completion Date.

.4 Key control points shall be marked at their design location within tolerances of ± 50mm transversely and ± 100mm longitudinally. Longitudinal tolerances for intermediate points, when required, are ± 10mm.

.5 Permanent pavement markings are to be reinstated within two (2) weeks of paving completion, or earlier as acceptable to the Departmental Representative.

3.3 TOLERANCE

.1 All painted lines shall not exceed a dimensional width of 110 mm for specified 100 mm wide line. No tolerance below 100 mm is allowed for the specified 100 mm wide line.

.2 All painted lines shall not exceed a dimensional width of 210 mm for specified 200 mm wide line. No tolerance below 200 mm is allowed for the specified 200 mm wide line.

.3 All painted direction dividing, lane dividing or continuity lines shall not exceed a maximum dimensional length deviation of +/- 100 mm for specified 3 m length of line.

.4 All spaces between painted direction dividing, lane dividing or continuity lines shall not exceed a maximum dimensional length deviation of +/- 100 mm for specified 6 m or 3 m length of space.

.5 All paint shall be applied at the proper locations in accordance with the Contract Documents or as directed by the Departmental Representative.

.6 All paint and glass beads shall be uniformly applied.

.7 All painted lines shall be uniform in thickness and free of tire tracking, with no splatter, excessive overspray or other defects.

.8 Remove incorrect markings as directed by the Departmental Representative at Contractor's cost.

.1 Blackout painting for incorrect lane marking will not be permitted. Incorrect paint work must be eradicated and re-painted by method approved by the Departmental Representative.

3.4 EQUIPMENT REQUIREMENTS

.1 Paint applicator to be an approved pressure type mobile distributor capable of applying paint in 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 shut-off.

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

3.5 CONDITION OF SURFACES

.1 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

3.6 APPLICATION

.1 Pavement markings to be laid out by Contractor.

.2 Apply paint only when air temperature is above 10°C, wind speed is less than 60 km/h and no rain is forecast within next 4 h.

.3 Apply traffic paint evenly at rate of 3 L/m2.

.4 Do not thin paint.

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

.6 Thoroughly clean distributor tank before refilling with paint of different colour.

.7 Apply glass beads at rate of 200 g/m2 of painted area immediately after application of paint.

3.7 REMOVAL, REPAIR OR REPLACEMENT OF UNACCEPTABLE PAVEMENT MARKINGS

.1 All painted lines that do not meet the requirements of the Contract Documents shall be removed and correctly applied or repaired by the Contractor.

.2 In cases where the paint is "tracked" by vehicles tires, the lines may be repaired by reapplying paint and glass beads to the damaged areas.

.3 In cases where incorrectly painted lines need to be removed, the Contractor shall use methods and equipment that will totally eliminate the pattern of the lines without damaging the integrity of the pavement surface. The methods and equipment used for such work shall be reviewed and accepted by the Departmental Representative prior to their use. Obliterating incorrectly painted lines through the sole use of paint, liquid asphalt, slurry seal or other similar materials will not be permitted.

3.8 HIGHWAY OPERATION

.1 Highway operation shall be in accordance with the Contractor's accepted Traffic Management Plan and shall meet the following requirements:

.1 General

.1 Painting shall be carried out in accordance with Section 01 14 00 - Work Restrictions and Section 01 55 26 – Traffic Control.

.2 Operation of the painting truck against the flow of traffic will not be permitted.

.3 Loading glass beads or paint onto the painting truck is not permitted on a roadway surface.

.2 Operation of Companion Vehicles

.1 When the roadway to be painted is open to public traffic, the Contractor shall operate a crash attenuator vehicle and a pilot vehicle in conjunction with the painting truck during the painting of all longitudinal lines. Companion vehicle operators shall not attempt to control traffic from inside the vehicle.

.2 The actual operating parameters of the companion vehicles will be determined by the Contractor to safely accommodate traffic and will be based on site specific conditions such as sight distances, highway geometrics and traffic patterns and volumes. Typical operating parameters are as follows:

.1 The crash attenuator vehicle shall be equipped with a crash attenuator that meets National Cooperative Highway Research Program, Report 350 Test Criterion. Test Level 3 for 100 km/hr. The vehicle shall follow behind the painting truck at a distance of 50 to 400 m.

.2 The pilot vehicle shall be driven in the same travel lane as the paint machine, following it at a constant distance of approximately two kilometres.

.3 The crash attenuator vehicle, pilot truck and the painting truck are to display the same message at all times. The painting truck and the companion vehicles shall be equipped with a two-way radio for communication and overhead revolving beacon with an amber lens of a minimum 180 mm high and 180 mm wide.

3.9 PROTECTION OF COMPLETED WORK

.1 Protect pavement markings until dry.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Removal and disposal and supply and installation of Guide Posts as required to complete the Work as specified in the Contract Documents and as directed by the Departmental Representative.

1.2 REFERENCES

.1 AT - Standard Specifications for Highway Construction (latest edition)

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.28-98, Exterior Alkyd House Paint.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure for payment for supply and installation of plastic Guide Posts will be based on each post installed according to the Contract Documents and as accepted by the Departmental Representative.

.1 Payment will be made under **"Unit Price Item 13 – Supply and Install Guide Posts"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.2 Items considered incidental to the Work include, but are not limited to:

.1 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

.2 Removal, disposal and/or storage of existing guide posts being replaced.

.3 Mobilization and demobilization required for this Work shall be incidental to **"Lump Sum Price Item 1 – Mobilization / Demobilization"**, and no additional payment will be made.

.4 Traffic Control required for this Work shall be incidental to **"Lump Sum Price Item 2 – Traffic Control"** and no separate payment will be made to the Contractor.

1.4 SUBMITTALS

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

1.5 QUALITY Control

.1 In accordance with Section 01 45 00 – Quality Control.

.2 Notify Departmental Representative at least 4 weeks prior to installation of proposed source of guide posts and provide access for inspection.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Stockpile guide posts as recommended by the Supplier.

.2 If required, stockpile guide posts at location determined by the Departmental Representative.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 01 35 43 – Environmental Procedures.

Part 2 Materials

2.1 ROUND PLASTIC POSTS

.1 The flexible guide posts shall return to upright positions following repeated impacts and passages of vehicles over them. Such collisions shall not cause serious damage to the post or vehicle. Failure to conform to the requirements specified herein shall be cause for rejection.

.2 General

.1 The posts shall be of uniform quality and workmanship and be free from defects.

.2 The Contractor shall provide a complete report of the physical properties of the post to the Departmental Representative. This report shall include properties such as low temperature impact resistance, after-impact recoverability and weather resistance.

.3 Specifications - Dimensions, Colour and Construction

.1 The round posts shall have a minimum outer diameter of 90 mm and on overall length of 1.67 metres.

.2 The top 250 mm of the post length shall be black and the remainder shall be white.

.3 The post shall be straight. Straight is defined as having no point along the length of the post any more than 6 mm removed from a perfectly straight edge placed parallel to any side of the post.

.4 Round posts shall be open at the top and bottom.

.5 The surface of the post shall be smooth and free from irregularities or defects. The surface of the post shall not be affected by cleaning using scrapers, detergent and water, or solvent.

.6 The black portion of the post shall accept and hold securely high-intensity reflectorized sheeting applied to its surface area with heavy-duty stainless steel staples, glue or other adhesives deemed suitable by the manufacturer.

.7 If one piece construction is not used, then the connections between the pieces shall be at least as strong as if constructed of a single piece. The strength shall exist at temperatures ranging from -50°C to 50°C.

.8 The reflective portion of round posts shall be visible from all directions and shall be of sufficient size so as to be recognizable in the dark as a guide post reflector. The reflective portion of semi-flat posts shall be visible to traffic.

.4 Weather Resistance and Durability

.1 The post shall not be seriously affected by ozone, exhaust fumes, asphalt or road oils, dirt, vegetation, deicing salts or any other types of air contamination or materials likely to be encountered after installation.

.2 The post shall withstand without serious damage all elements likely to be encountered after installation including hot (50°C) or cold (-50°C) temperatures, rain, snow, hail, abrasion and physical abuse.

.5 Strength and Flexibility

.1 The posts shall resist, without breaking, tearing, shattering or other serious damage, one highway vehicle impact at a speed of 100 km/h at a test temperature of -33°C.

.2 The post shall not bend, warp or distort when installed at temperatures up to 50°C or installed in wind velocities up to 120 km/h.

.6 High-Intensity Reflectorized Sheeting

.1 Each post shall have a 50 mm wide reflective sheeting material fastened between 100 mm and 150 mm from the top of the post. The reflective sheeting shall be green when the Guide Post is used to mark the edges of approaches located on curves, and white in all other instances. When green is required, white sheeting shall be screen printed green using a process recommended by the sheeting manufacturer.

.2 The reflective sheeting material shall be high-intensity encapsulated glass bead reflective sheeting meeting or exceeding the minimum requirements as specified in ASTM-D4956, performance requirement Type III and Class I pressure sensitive adhesive backing requirements.

Part 3 Execution

3.1 INSTALLATION

.1 Install posts to details as straight and plumbed vertically to a uniform depth of 0.6 m below finished grade.

.2 Excavate post holes to minimum diameter of 150 mm and compact bottom of hole to provide firm foundation. Set post plumb and backfill with competent material in 150 mm layers. Compact each layer before placing succeeding layer.

.3 Remove existing posts. Non-damaged posts to be stored at 8 Mile Pit or as directed by Departmental Representative.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Topsoil to be native organic soils stripped from the Contract Work area and placed on finished slopes from stockpile(s) as directed by the Departmental Representative.

1.2 REFERENCES

.1 Agriculture and Agri-Food Canada

.1 The Canadian System of Soil Classification, Third Edition, 1998

.2 Canadian Council of Ministers of the Environment (CCME):

.1 PN1340- 2005, Guidelines for Compost Quality

.3 Canadian Green Building Council (CaGBC)

.1 LEED Canada-NC Version 1.0-[December 2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System For New Construction and Major Renovations.

.4 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832-R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

.5 AT Standard Specifications for Highway Construction (latest edition)

1.3 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure for payment for topsoil placement and finishing will be in cubic metres measured in its original position (from stockpiles) acceptably installed within the areas indicated in the Contract Documents or as approved by the Departmental Representative.

.2 Payment for topsoil placement will be made under **"Unit Price Item 14 – Topsoil Placement and Grading"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.3 Items considered incidental to the Work include, but are not limited to:

.1 Preparing the finished grade.

.2 Loading and hauling from stockpiles.

.3 Placing and fine grading.

.4 Preparing the topsoil materials for planting.

.5 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

.4 Stockpiles will be measured by Departmental Representative and volume of topsoil removed calculated by surface to surface prismoidal method.

.5 Payment for testing of topsoil to be paid under **"Lump Sum Price Item 3 - Prime Cost Sum"**.

.6 Payment for supply and application of soil amendments will be paid under **"Lump Sum Price Item 3 – Prime Cost Sum"**.

.7 Traffic Control shall be incidental to **"Lump Sum Price Item 2 – Traffic Control"** and no additional payment will be made.

.8 Mobilization and demobilization required for this Work shall be incidental to **"Lump Sum Price Item 1 - Mobilization / Demobilization"** and no additional payment will be made.

1.4 DEFINITIONS

.1 Compost:

.1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil amendment.

.2 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

1.5 SUBMITTALS

.1 In accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit erosion and sedimentation control plan for Credit SSp1 in accordance with LEED Canada-NC.

.3 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 01 35 43 – Environmental Procedures.

.2 Separate waste materials for reuse and recycling.

.1 Contractor to track and provide proof of tracking of number of material loads to recycling.

.3 Divert unused soil amendments from landfill to official hazardous material collections site, outside of the Parks, as approved by Departmental Representative.

.4 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 TOPSOIL

.1 Unless otherwise approved by the Departmental Representative, topsoil is to be sourced from onsite stripping and no topsoil from outside of the Park will be permitted.

.2 Topsoil for seeded areas and planting beds: mixture of particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth.

.1 Native topsoil to be stripped from on-site sources.

.2 Contain no toxic elements or growth inhibiting materials.

2.2 QUALITY CONTROL

.1 In accordance with Section 01 45 00 – Quality Control.

.2 Advise Departmental Representative of sources of topsoil and manufactured topsoil to be utilized with sufficient lead time for testing.

.3 Contractor is responsible for amendments to supply topsoil as specified.

.4 Soil testing by recognized testing facility for PH, P and K, and organic matter.

.5 Testing of topsoil will be carried out by testing laboratory designated by Departmental Representative.

.1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 In accordance with Section 01 35 43 – Environmental Procedures.

.2 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of sediment and erosion control Drawings, sediment and erosion control plan, specific to site, that complies with EPA 832-R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

.3 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION OF EXISTING GRADE

.1 Verify that grades are correct.

.1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

.2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

.3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.

.1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.

.2 Remove debris which protrudes more than 75 mm above surface.

.3 Dispose of removed material off site.

.4 Cultivate entire area that is to receive topsoil to minimum depth of 100 mm.

.1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

.1 Place topsoil after Departmental Representative has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 100 mm.

.3 Spread topsoil as indicated to the following minimum depths after settlement.

.1 100 mm for seeded areas.

.2 600 mm for shrub beds.

.4 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.4 FINISH GRADING

.1 Grade to eliminate rough spots and low areas and ensure positive drainage.

.2 Prepare loose friable bed by means of cultivation and subsequent raking.

.3 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.

.4 Leave surfaces smooth, uniform and firm against deep footprinting.

3.5 ACCEPTANCE

.1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.6 SURPLUS MATERIAL

.1 Topsoil not required is to be stockpiled at locations as directed by Departmental Representative.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Supply and application of Hydraulic Seeding as required to complete the work in accordance with the Contract Documents and as directed by the Departmental Representative.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure for payment for Hydraulic Seeding will be by the hectare acceptably installed resulting in full grass growth, 75% germination and growth of specified seed mixture, within the dimensions indicated in the Contract Documents or as approved by the Departmental Representative.

.2 Payment for hydraulic seeding shall be made under **"Unit Price Item 15 – Hydraulic Seeding"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.3 Items considered incidental to the Work include, but are not limited to:

.1 Areas of blending into existing landscape will not be measured for payment.

.2 Maintenance.

.3 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

.4 Mobilization and demobilization required for this Work shall be incidental to **"Lump Sum Price Item 1 – Mobilization / Demobilization"**, and no additional payment will be made.

.5 Traffic Control required for this Work shall be incidental to **"Lump Sum Price Item 2 – Traffic Control"** and no separate payment will be made to the Contractor.

1.3 SUBMITTALS

.1 In accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide product data for:

.1 Seed (Seed Certificates)

.2 Mulch

.3 Tackifier/Soil Stabilizer

.2 Submit in writing to Departmental Representative prior to commencing work:

.1 Volume capacity of hydraulic seeder in litres.

.2 Amount of material to be used per tank based on volume.

.3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

1.4 QUALITY CONTROL

.1 In accordance with Section 01 45 00 – Quality Control.

.2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties to be provided to the Departmental Representative.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 01 35 43 – Environmental Procedures.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Use all means necessary to protect all materials before, during and after installation. Provide adequate protection to materials that may deteriorate if exposed to weather.

.2 Seed to be stored in dry weatherproof place and shall be protected from damage by heat, rodents and other causes. Deliver and store grass seed in original packages with label indicating:

.1 Analysis of seed mixture;

.2 Percentage of pure seed by weight;

.3 Year of production;

.4 Net mass, and

.5 Date tagged and location.

Part 2 Products

2.1 SEED

.1 Seed shall be Certified Canada No. 1 Grade quality seed varieties, in accordance with the Canadian Seeds Act and Regulations, and having a minimum purity of 97% and germination of 75%. Seed shall be free of impurities and disease.

.2 Seed mix for all applications to be the following, by weight:

.1 50% Hairy wildrye (Elymus innovates)

.2 25% Northern Bentgrass (Agrostis mertensii)

.3 25% Spike Trisetum (Trisetum spicatum)

.3 Seeding rate to be 100 kg/ha for hydraulic seeding.

.4 **Seed certificate to be approved by the PCA ESO prior to ordering.**

.5 Seed mix shall be free of Scentless Chamomile, Downy Brome and Canada Thistle.

2.2 WATER

.1 In accordance with Section 01 35 43 – Environmental Procedures.

.2 Water shall be free of impurities that would inhibit germination and growth.

2.3 SOIL STABILIZER/TACKIFIER

.1 Soil stabilizer/tackifier shall be a nontoxic, colourless copolymer emulsion with no less than 52.6% solids. Acceptable product is: Soil Master WR or approved alternate.

2.4 MULCH

.1 Wood fibre mulch shall be manufactured from virgin wood fibres and contain not less than 3% of an organic tackifier by volume. Cellulose type products are not acceptable. Acceptable product is: Eco Fibre Plus or approved alternate.

Part 3 Execution

3.1 GENERAL

.1 No mechanical seeding will be allowed for this project.

.2 Contractor shall advise Departmental Representative prior to the start of seeding operations.

.3 Contractor shall mechanically remove any weeds prior to seeding. Weed removal method to be approved by Departmental Representative prior to commencement. This will be incidental to the work.

.4 Contractor shall ensure that equipment is steam cleaned, free of soil and seed from previous projects to prevent site contamination.

.5 Seeding shall be done upon completion of stripped soil material/chip compost placement.

.6 Contractor shall not perform work under adverse field conditions such as frozen soil, excessively wet or dry soil, or soil covered with snow, ice or standing water.

.7 Contractor shall hydraulic seed only during dry weather conditions with no rain forecasted for the next 24 hours and ensuring a seasonably dry seedbed to provide for proper curing of soil stabilizers/tackifier. Contractor shall check weather conditions to ensure soil stabilizer has sufficient time to cure prior to heavy rainfall.

.8 Seeding shall be done to ensure a catch satisfactory to the Departmental Representative's approval. In areas where seed fails to germinate for whatever reason, the Contractor shall re-cultivate and reseed until acceptable germination takes place.

.9 Contractor shall carry out seeding in locations as per the Contract Documents or, as directed by Departmental Representative.

3.2 HYDRAULIC SEEDING

.1 The following application rates are the minimum required for hydraulic seeding:

- .1 Seed: 100 kg/hectare
- .2 Mulch: 1500 kg/hectare
- .3 Tackifier: As per Manufacturer’s Instructions
- .4 Water: 30,000 L/hectare

.2 The Contractor shall measure quantities of materials by weight, or weight calibrated. Contractor to calculate and submit applicable area of coverage per tank load of slurry in accordance with Section 01 33 00 – Submittal Procedures.

.3 Contractor shall physically stake and identify limits of tank coverage prior to seeding to the satisfaction of Departmental Representative.

.4 Each tank load of slurry shall be fully applied within the designated boundaries for each load as staked volume measurement, to the satisfaction of the Departmental Representative.

.5 The Contractor shall fill the tank half full with required water and add mulch while continuing to fill with water. Seed mix is to be added. All material is to be added into the hydraulic seeder under agitation. The Contractor shall pulverize mulch with tackifier and charge slowly into seeder.

.6 The Contractor shall charge soil stabilizer/tackifier into seeder after all other material is well mixed in seeder. Contractor shall mix slowly to avoid foaming but thoroughly to complete slurry.

.7 The Contractor shall use hydraulic seeding equipment with a minimum slurry tank capacity of 4500 litres.

.8 The Contractor's equipment shall have an agitation system for slurry capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and mechanical method:

.1 Pumps shall be capable of maintaining a continuous non-fluctuating flow of solution.

.2 Equipment shall be capable of seeding up to 150 m distance from hydraulic seeder using hand operated hoses and appropriate nozzles.

.9 The Contractor shall apply slurry when wind velocities will not affect the application and cause the mixture to be blown.

.10 The Contractor shall apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed. Ensure good contact of slurry with soil with minimal air pockets.

.11 The Contractor shall use the correct nozzle(s) for application and use hoses to access difficult to reach surfaces and to control application.

.12 The Contractor shall ensure that the application is uniform and the surface is evenly covered. Contractor shall blend into retained landscape for approximately 1 metre.

.13 The Contractor shall clean all structures, appurtenances and natural features not designated to be seeded of any overspray, to the satisfaction of the Departmental Representative.

.14 The Contractor shall ensure that at all times during the seeding, that no vehicles are parked within the path of public travel and the Contractor shall provide warning devices as directed by the Departmental Representative to ensure safe operations.

.15 Traffic Control to be in accordance with Section 01 55 26 – Traffic Control.

3.3 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Establishment period is a minimum of four months of continuous growing season. Growing season shall not to be divided by winter.

.2 The Contractor shall repair and reseed dead or bare spots, as directed in the Contract Documents, to Departmental Representative's satisfaction, to allow establishment of seed prior to acceptance. In the case of erosion, the Contractor shall be compensated at the specified unit rates for reseeding.

.3 For areas of poor seed germination and growth, as determined by the Departmental Representative, the soil shall be scarified or re-cultivated as directed by the Departmental Representative, and seeding undertaken as specified. This work is incidental to the Contract.

.4 No overspray is to occur into waterbodies or environmentally sensitive areas. When necessary to ensure protection of these areas, dry, hand broadcasting of material will be employed.

3.4 CONSTRUCTION COMPLETION ACCEPTANCE

.1 Seeded areas will be accepted by the Departmental Representative provided that all areas are uniformly established, and turf is not eroded or rutted and relatively free of weeds. Seeded areas to be growing for a minimum of four continuous months prior to construction completion acceptance inspection.

.2 Areas seeded in fall will be accepted in following spring, a minimum of four months after start of growing season, provided acceptance conditions are fulfilled.

.3 Minimum 75% growth by area of coverage of specified seed mixture must be present in order to be acceptable.

3.5 MAINTENANCE DURING WARRANTY PERIOD

.1 Maintenance shall occur for one full year from Construction Completion Acceptance. The estimated period of maintenance within one calendar year shall be from approximately April 1 to October 31. The Contractor will be required to employ all of the necessary measures to establish and maintain all seeding in an acceptable, vigorous and healthy growing condition.

.2 The Contractor shall repair and reseed dead or bare spots, as directed in the Contract Documents, to Departmental Representative's satisfaction, to allow establishment of seed prior to acceptance. In the case of erosion, the Contractor shall be compensated at the specified unit rates for reseeding.

.3 For areas of poor seed germination, or as determined by the Departmental Representative, the soil shall be scarified or re-cultivated as directed by the Departmental Representative, and seeding and fertilizing undertaken as specified. This work is incidental to the Contract.

.4 For small areas of poor seed germination or as determined by the Departmental Representative, the soil shall be scarified to a depth of 25mm and seeding shall be undertaken as specified. This work is incidental to the Contract.

.5 Weed control shall be undertaken as determined by the Departmental Representative. Hand pulling of weeds may be required. This work is incidental to the Contract.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Removal and disposal and supply and installation of Corrugated Steel Pipe (CSP) culverts as required to complete the work in accordance with the Contract Documents and as directed by the Departmental Representative.

1.2 REFERENCES

.1 AT - Standard Specifications for Highway Construction Manual (latest edition)

.2 CSA-G401, Corrugated Steel Pipe Products.

.3 CSA-B182.8, Profile Polyethylene Storm Sewer and Drainage Pipe and Fittings.

1.3 MEASUREMENT AND PAYMENT

.1 Supply and Installation of CSP Culvert Extensions

.1 Supply and Installation of CSP culvert extensions will be measured for payment in linear metres of the types and sizes supplied, assembled, installed in accordance with the Contract Documents and accepted by the Departmental Representative.

.2 Payment will be made under **"Unit Price Item 16 – Pipe Culverts – Supply and Install CSP Culvert Extensions, 900 mm Diameter"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.3 At locations of extensions to existing culverts, thoroughly cleaning and flushing the existing culvert ends and barrel, excavating up to 2m from present exposed end or as directed by the Departmental Representative, cutting off damaged sections of exposed end and painting remaining end with a high zinc dust oxide paint and supplying and placing a joint sealant shall be considered incidental to **"Unit Price Item 16 – Pipe Culverts – Supply and Install CSP Culvert Extensions, 900 mm Diameter"** and shall include all incidentals, equipment, labour and materials required to complete the Work.

.2 Items considered incidental to the Work include, but are not limited to:

.1 The supply of bolt-type corrugated couplers and ancillary materials.

.2 Excavation.

.3 Sawcutting.

.4 Asphalt removal.

.5 Supply, loading, hauling and unloading CSP culverts.

.6 Loading, hauling and disposal of unsuitable material and CSPs.

.7 Backfill Works, including but not limited to; supply, placement and compaction of all backfill materials.

.8 Supply and installation of all culvert bedding and backfill materials.

.9 Cutting of culvert ends to satisfaction of Departmental Representative.

.10 Dewatering as required to complete the Work.

.11 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

.12 Couplings, fittings or end sections for CSP culverts.

.13 Survey and layout.

.14 Disposing of material from cleaning culverts.

.3 Mobilization and demobilization required for this Work shall be incidental to **"Lump Sum Price Item 1 – Mobilization / Demobilization"**, and no additional payment will be made.

.4 Traffic Control during the survey, layout and Construction of the culverts shall be incidental to **"Lump Sum Price Item 2 – Traffic Accommodation"** and no separate payment will be made to the Contractor.

.5 Payment for plugging of existing culverts will be made under **"Lump Sum Price Item 3 - Prime Cost Sum"**.

1.4 QUALITY CONTROL

.1 In accordance with Section 01 45 00 - Quality Control.

.2 Culvert roadway crossings with bumps and dips in the finished asphalt exceeding 12mm over 3m from the design grade will require remedial work to repair the deficiency as acceptable to the Departmental Representative. The Contractor is responsible for all costs associated with repairing bumps and dips from culvert crossings.

1.5 SUBMITTALS

.1 In accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit manufacturer's test data and certification.

.3 Provisions for staged construction shall be shown in the shop drawings, including any temporary support required.

.4 Certification to be marked on pipe.

1.6 DELIVERY, STORAGE AND HANDLING

.1 In accordance with Section 01 61 00 - Common Product Requirements.

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

.3 Store pipes on a clean and flat surface on site or at other location as directed by the Departmental Representative.

.4 Where the material supplied is damaged, the Contractor shall immediately separate nested sections of the plate or pipe to facilitate more detailed inspection. 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.

Part 2 Products

2.1 CORRUGATED STEEL PIPE

.1 Corrugated steel pipe: to CAN/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.

.1 Or greater in accordance with manufactures recommendations in the specific installed conditions.

.4 Corrugations to be 68 mm x 13 mm.

.5 For all exposed culvert ends, 4:1 mitred end sections will be required.

.6 Design Code CHBDC S6-14.

.7 Design Live Load CL-800.

2.2 GRANULAR BEDDING AND BACKFILL

.1 AT Designation 2 Class 25 Base Course Aggregate for pipe bedding and backfill to be supplied by the Contractor from outside the Park.

Part 3 Execution

3.1 METHODOLOGY

.1 Contractor to verify all culvert lengths, weights, diameters and types in the field prior to ordering.

.2 Culvert installation must be coordinated with embankment construction. No payment will be made for re-excavation of embankment material required to install culverts.

.3 Pipe culvert works cannot commence until approved by the Departmental Representative.

.4 Existing culverts within the construction limits, that remain in service must be thoroughly cleaned and flushed; all sediments and bedload must be removed to the satisfaction of the Departmental Representative.

.5 If required, additional permits for pipe culvert works will be provided by Parks Canada at the request of the Contractor.

3.2 CUT ENDS

.1 All exposed ends of CSP culverts to be field cut to match the roadside slope. Cutting of the culvert is to be done with a mechanical saw in the field.

.2 All cut edges shall be made smooth by grinding so that all the burrs are removed. Any damaged galvanizing shall be restored by zinc metallizing in accordance with CSA G401.

.3 Where an existing culvert is extended, up to 2 m of the existing culvert end shall be removed as directed by the Departmental Representative.

3.3 BEDDING

.1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.

.2 Place minimum thickness of 300 mm of approved granular material on bottom of excavation and compact to minimum 98% Standard Proctor 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 camber as indicated or as directed by Departmental Representative, free from sags or high points.

.4 Place bedding in unfrozen condition.

3.4 LAYING CORRUGATED STEEL PIPE CULVERTS

.1 Begin pipe placing at downstream end.

.2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.

.3 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.

3.5 JOINTS: CORRUGATED STEEL CULVERTS

.1 Match corrugations of coupler with pipe sections before tightening.

.2 Insert and tighten bolts.

.3 Tap couplers firmly with a rubber mallet or similar non-marring tool as they are being tightened, to take up slack and ensure snug fit.

.4 Repair spots where damage has occurred to coating in the field by applying two coats of zinc rich paint approved by the CSP supplier. Allow each coat to dry before placing second coat, bedding or backfill.

3.6 BACKFILLING

.1 Backfill around and over culverts as indicated in the Contract Documents or as directed by Departmental Representative.

.2 Place granular backfill material, in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.

.3 Compact each layer to 98% Standard Proctor density to ASTM D698 taking special care to obtain required density under haunches. Hand tamp where necessary to obtain compaction.

.4 Protect installed culvert with minimum 900 mm cover of compacted fill before heavy equipment is permitted to cross. During construction, width of fill, at its top, to be at least twice diameter or span of pipe and with slopes not steeper than 2H:1V.

.5 Place backfill in unfrozen condition.

3.7 CULVERT END TREATMENTS

.1 Culvert end treatments to be completed, as accepted by the Departmental Representative, prior to removing water diversions. Any scour resulting from incomplete end treatments is to be repaired by the Contractor at their cost.

3.8 TRENCHING EXISTING PAVEMENT STRUCTURES

.1 Where trenches are cut into existing pavement structures, backfill will match the existing materials and thickness.

3.9 CLEANING OF CULVERTS

.1 Remove and dispose of material from the culvert barrels and/or ends to restore proper drainage, as directed by the Departmental Representative.

.2 Removed material to be disposed of outside of the Parks.

3.10 CULVERT EXTENSIONS

.1 Extensions to existing culverts shall be as noted in the Contract Documents.

3.11 STREAM AND CHANNEL DIVERSIONS

.1 Temporary stream and channel diversions shall be in accordance with Section 01 35 43 – Environmental Procedures.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Supply and installation of Precast Concrete Barriers in accordance with the Contract Documents. Precast Concrete barrier supplied shall be as per British Columbia Standard Specifications for Highway Construction (latest edition), Section 941 – Precast Reinforced Concrete Barriers. In addition, all end faces to **have 25 mm chamfered edges**.

.2 Removal and disposal of existing Precast Concrete Barriers outside of the Park in accordance with the Contract Documents.

.3 Cleanup, removal and disposal of winter sand following barrier removal in accordance with the Contract Documents.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

.1 Remove and dispose existing Barrier:

.1 Removal and disposal of existing concrete barrier will be measured for payment in linear metres of barrier actually removed and reinstalled in its final location in accordance with the Contract Documents and accepted by the Departmental Representative.

.2 Payment will be made under **"Unit Price Item17a – Precast Concrete Barrier – Remove and Dispose"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.2 Supply and Install Precast Concrete Barrier:

.1 Supply and installation of precast concrete barrier shall be measured per unit of specific type precast concrete barrier including end treatments supplied, loaded, hauled and installed in their final location in accordance with the Contract Documents and accepted by the Departmental Representative.

.2 Payment will be made per the applicable component under "**Unit Price Item 17b – Precast Concrete Barrier – Supply and Install"** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.3 Items considered incidental to the Work include, but are not limited to:

.1 Supply and installation of barrier mounted reflectors on new barrier.

.2 Removal and disposal or removal and reinstallation of barrier signs.

.3 Cleaning of shoulders, by methods accepted by the Departmental Representative, in front and behind barrier locations shall be considered incidental to the Work. Barriers that are to be placed back into their original location must be cleaned of all debris.

.4 Survey, prior to removing barrier including all drainage barrier locations.

.5 Cleaning of barrier prior to removal.

.6 Supply and install of 19mm diameter waterproof gasket (Backer Rod or approved equivalent) between barrier and the pavement in areas where water control is required, or as directed by the Departmental Representative.

.7 All works associated with winter sand cleanup, hauling and stockpiling.

.8 All works associated with spillway/catchbasin barrel and lead cleanout, debris hauling and stockpiling.

.9 Retrieval of barrier for installation from stockpiles.

.10 Removal and reinstallation of barrier signs.

.11 Barriers that are to be placed back into their original location must be cleaned of all debris including the windrow of winter sand along the base of the barrier.

.12 Temporary stockpiling of barrier.

.13 Survey and layout.

.14 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

.15 The placement and removal of Precast Concrete Barriers for use as temporary barricades during construction.

.4 Barrier drain pipes shall be supplied and installed in accordance with the Contract Documents at locations specified by the Departmental Representative. Payment will be made under **"Lump Sum Price Item 3 – Prime Cost Sum"**.

.5 Mobilization and demobilization required for this Work shall be incidental to **"Lump Sum Price Item 1 – Mobilization / Demobilization",** and no additional payment will be made.

.6 Traffic Control for survey, installation, removal or relocation of Precast Concrete Barriers shall be incidental to **"Lump Sum Price Item 2 – Traffic Control"** and no separate payment will be made to the Contractor.

1.3 QUALITY CONTROL

.1 In accordance with Section 01 45 00 – Quality Control.

1.4 SUBMITTALS

.1 In accordance with Section 01 33 00 - Submittal Procedures.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 01 35 43 - Environmental Procedures.

Part 2 Products

2.1 MATERIALS

.1 Precast Concrete barrier shall be manufactured as per British Columbia Standard Specifications for Highway Construction (latest edition), Section 941 - Precast Reinforced Concrete Barriers with the following exceptions:

.1 All end faces to have 25mm chamfered edges.

.2 Synthetic Fiber reinforcing shall be added to the precast concrete barriers in accordance with the Contract Documents.

.2 810mm Special Drainage Barrier to be per manufactured as per the Contract Documents and as directed by Departmental Representative.

.3 Crash attenuator devices shall meet or exceed NCHRP 350 TL-3 crash requirements and be approved for use in the current Products List as published by AT.

.4 Barrier reflectors to be hard plastic type raised pavement markers (RPM) mounted with fast cure construction adhesive.

.1 Reflectors are to be double sided and the colour is to match the proper lane line (white or yellow), as accepted by the Departmental Representative.

.2 Reflectors to be placed at 25m intervals mounted as per the Drawings or as directed by the Departmental Representative.

.5 Acceptable products include:

.1 3M Raised Pavement Marker (RPM)

.2 Stimsonite Raised Pavement Marker (RPM)

.3 Or equivalent as approved by the Departmental Representative

2.2 PRECAST CONCRETE BARRIER

.1 Concrete Quality: to CAN/CSA-A23.1 except where amended below.

.2 Compressive Strength: Compressive strength test result is equal to or exceeds 30 MPa and no individual cylinder strength is less than 27 MPa.

.3 Calcium chloride or admixtures containing calcium chloride are not to be used in concrete.

.4 Cement Content: minimum of 320 kg/m3.

.5 Water/Cement Ratio: maximum of 0.45.

.6 Coarse Aggregate: nominal maximum size not exceeding 28mm.

.7 Slump: 50 mm plus or minus 20mm.

.8 Entrainment Air: 5 to 8%.

.9 Reinforcement:

.1 Fibrillated fiber strand reinforced concrete to be used for production of barriers. Welded wire mesh reinforcement will not be permitted.

.2 50 mm fibrillated polypropylene fibres to be added at the rate of 1.0 kg/m3.

.3 Fibrillated fibres shall meet requirements of ASTM C 1116 Type 3 Synthetic Fibre Reinforced Concrete or shotcrete.

.4 Fibres shall have a minimum tensile strength of 350 MPa and a minimum modulus of elasticity of 4.2 GPa.

.5 Fibres are to be added early in the mixing process following manufacture’s recommendations to ensure evenly distributed fibres.

.6 A single length of 15 mm rebar shall be wire tied to the horizontal sections of the hook or eye assemblies as indicated in the Contract Documents.

.7 Additional 10M rebar shall be installed for drainage barriers as indicated in the Contract Documents.

.10 Concrete Placing and Consolidation:

.1 To CAN/CSA-A23.4, Clause 19.

.11 Concrete Curing and Protection:

.1 Strictly to CAN/CSA-A23.4, Clause 21.

.2 During curing period temperature differential between concrete surface and ambient air not to exceed 20 ^{0} C.

.12 Exposed Concrete Surfaces:

.1 Uniform in texture and colour as produced from well-maintained steel form surfaces and proper vibration methods without excessive surface fines or laitance.

.13 Surface defects will normally be cause for rejection of any unit except where such are within the following permissible limits or area subject to making good within the following permissible limits:

.1 Unobtrusive defects of any kind where their total area is not in excess of 2% of exposed surface area of unit.

.2 Air holes not greater than 3 mm in diameter and not more than 20 in any isolated 300 mm x 300 mm area.

.3 Sharp ridges at edges of exposed concrete surfaces softened where necessary by careful rubbing or grinding.

.4 Patching of isolated small holes, cavities and similar self-confining defects may be permitted when authorized by the Departmental Representative.

.14 Patching, if authorized, to be completed as follows:

.1 Defective are saturated with water and defect prepared with cement paste and filled with mortar.

.2 Mortar to be properly proportioned to same sand and cement as original concrete and reasonably colour-matched to cured dry unit with addition of white cement where necessary, to be pre-shrunk for about one hour before retempering and use.

.3 Patching mortar to be well tooled in, finished flush and smooth and are covered to cure adequately.

.15 Surface tolerance to be +/- 3 mm unless otherwise directed by the Departmental Representative.

.16 Finished Product:

.1 Contractor to notify Departmental Representative in advance of manufacturing of schedule so that inspection can be carried out. All processes are subject to inspection by the Departmental Representative. Inspection or release of units by the Departmental Representative is required prior to shipping.

.2 Identification indicated by embedding manufacturer's name or trademark, year of manufacture, and form number on end of each unit is manner, size and depth that will be permanently legible.

.3 Authorized patching or making good to be inspected by the Departmental Representative before shipment or upon delivery and rejected units replaced at no cost.

.17 Welded Steel Wire Mesh Reinforcement:

.1 Welded wire mesh reinforcement will not be permitted.

.18 Reinforcing Steel for Bent and Hooked Connections:

.1 To CAN/CSA-G40.21-M, Grade 260W.

.19 Bending:

.1 Carefully bend reinforcing steel to radii detailed and install as indicated in the Contract Documents.

.2 Inspect reinforcing steel after bending for evidence of fracture. Fractured pieces to be replaced.

.20 Surface Treatment:

.1 Treatment of exposed surfaces not required.

.21 Pick-up Points:

.1 Form with accurately placed rigid PVC pipe recessed 15 mm from both finished surfaces as indicated in the Contract Documents.

.22 Drainage Slots:

.1 Drainage slots to be cast-in as indicated in the Contract Documents.

Part 3 Execution

3.1 DELIVERY, STORAGE AND HANDLING

.1 Care shall be taken to protect Precast Concrete Barrier from elements and temperature extremes during curing period. Under no circumstances are barrier components to be exposed to freezing conditions until fully cured.

.2 Storage of Precast Concrete Barriers on site to be in single layer, for first seven days.

.3 Stacking of three layers high, with wood blocking between lifts, permitted with Departmental Representative approval, after seven days.

.4 Barriers to be stacked three layers high, with wood blocking between lifts, at delivery location. Cost of supply and installation of wood blocking shall be incidental to the Contract and no separate payment will be made.

.5 All debris from cleaning of shoulders of barrier works and spillway/catch basin cleanup is to be completely removed from site, hauled to and stockpiled at a location approved by the Departmental Representative.

3.2 INSTALLATION

.1 Precast Concrete Barriers shall be installed permanently on asphalt concrete pavement in accordance with the Contract Documents or as directed by the Departmental Representative.

.2 Contractor shall do the layout of the barriers for both removal and installation operations.

.3 The Departmental Representative will determine location of barriers with drainage opening for drainage and for small animal crossings. Some of the roadside drainage barriers will require the installation of drain pipe to control runoff. The drain shall be supplied installed at locations and as directed by the Departmental Representative.

.4 Precast Concrete Barriers shall be installed within seven (7) calendar days following toplift paving.

END OF SECTION