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Drawings:

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0	C01 – Cover Sheet	March 14, 2016
0	C02 – Location Map, Key Plans and Drawing Index	March 14, 2016
0	C03 - Legend	March 14, 2016
0	C3 - 101-108 – Plan and Profile	March 14, 2016
0	C3 – 301-302 – Typical Sections	March 14, 2016
0	C3 – 401-408 – Geometrics, Laning, Signing & Pavement Markings	March 14, 2016
0	C4 – 101-102 – Plan and Profile	March 14, 2016
0	C4 – 301-302 – Typical Sections	March 14, 2016
0	C4 – 401-402 - Geometrics, Laning, Signing & Pavement Markings	March 14, 2016
0	CA – 501-503 – Details	March 14, 2016
0	C3 – XS01-XS32	March 14, 2016
0	C4 – XS01-XS14	March 14, 2016

Reference Documents:

1. Geotechnical Engineering Report - Highway 93S – Kootenay Parkway
2. Parks Canada Basic Impact Analysis – Hwy 93S&93N
3. Mannix Pit Plan
4. Settler's Pit Plan

Part 1 General**1.1 PROJECT LOCATION**

- .1 The project is located in Kootenay National Park, British Columbia. Construction work is on Highway 93S at the following locations: southbound and northbound climbing lanes; km 55.8 to km 60.3, Dolly Varden Picnic Area; km 67.4 to km 67.9, and McLeod Meadows Day-Use Area; km 75.9 to km 76.6.
 - Hwy 93S km 0 – Hwy 93S / TCH Intersection Hwy 93S km 55.8 - Beginning of Contract Limits
 - Hwy 93S km 40.8 – Vermilion Crossing
 - Hwy 93S km 55.8 – Beginning of C3 Climbing Lanes
 - Hwy 93S km 57.2 – 4-Mile (Hector) Pit Entrance
 - Hwy 93S km 60.3 – End of C3 Climbing Lanes
 - Hwy 93S km 60.7 – Kootenay Crossing
 - Hwy 93S km 67.7 – Dolly Varden Picnic Area Access
 - Hwy 93S km 76.4 – McLeod Meadows Day-Use Area Access
 - Hwy 93S km 76.6 – End of Contract Limits
 - Hwy 93S km 79.1 – Pit 16
 - Hwy 93S km 87 – Hwy 93S / Settler's Pit Intersections
 - Hwy 93S km 99.0 – Operations Centre and McKay Pit Access
 - Hwy 93S km 103.2 – Kootenay South Gate
 - Hwy 93S km 104.5 – Hwy 93 / 95 Intersection

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 All requirements noted within the Contract Documents shall be completed by the Contractor unless specifically stated otherwise.
- .2 The project work consists of approximately 5.6 kilometers of roadway widening and general safety improvements along highway 93S between Km 55.8 and Km 76.6. Major scope items include: grubbing, stripping, grading, embankment construction, drainage, detours, traffic management, culvert supply and installation, sub-base course, base course, asphalt surfacing, traffic barriers, fencing, signing, and pavement markings.
- .3 Without limiting the scope of work, the work of this Contract generally comprises the following:
 - .1 Clearing and Grubbing of the areas cleared by others, between Km 55.8 and Km 76.6, loading, hauling and placing the grubbed material in Mannix Pit as directed by the Departmental Representative.
 - .2 Strip organic material between Km 55.8 and Km 76.6, screen and stockpile this material alongside the right-of-way outside the cut / fill slopes between Km 55.8 and Km 76.6, as directed by the Departmental Representative. The Contractor is advised that there is limited storage area for this material. Screen waste shall be hauled and placed at Mannix Pit as directed by the Departmental Representative

- .3 Installation and maintenance of temporary barriers and supply and installation of temporary traffic control and other temporary construction facilities required for completion of the Work of the Project.
- .4 Excavating materials from the right-of-way cuts, hauling and placing this material in embankments or in stockpiles at locations shown on the Drawings and as directed by the Departmental Representative.
- .5 Supply and install Corrugated Steel Pipe (CSP) culverts at locations shown on the Drawings and as directed by the Departmental Representative. AT Designation 2 Class 20 Base Aggregate (considered a suitable replacement for 25 mm Well Graded Base) material is available from stockpiles at Settler's Pit and can be stockpiled at 4-mile/Hector Pit.
- .6 Load, haul and place sub-base course materials. AT Designation 6 80mm Granular Sub-Base (GSB) and Pit-Run Gravel (suitable for use as SGSB) materials are available from stockpiles at Mannix Pit and Settler's Pit, respectively, and can be stockpiled at 4-mile/Hector Pit.
- .7 Load, haul and place base course materials. AT Designation 2 Class 20 Base Aggregate (a suitable replacement for 25 mm Well Graded Base) material is available from stockpiles at Settler's Pit and can be stockpiled at 4-mile/Hector Pit.
- .8 Purchase asphalt binder, mix with supplied aggregate, haul and place BC MoTI Class 1 Medium Mix (19mm) asphalt concrete pavement as directed by the Departmental Representative. Asphalt aggregate is available from stockpiles at Settler's Pit. **RAP mix is not permitted.**
- .9 Produce and Stockpile 12.5 mm Winter Abrasive. Settler's Pit in Kootenay National Park is available for Contractor's use for aggregate sourcing and crushing, as directed by the Departmental Representative.
- .10 Produce and Stockpile mixed RAP material utilizing existing ACP waste, Millings and 20 mm Aggregate in Settlers Pit. Settler's Pit in Kootenay National Park is available for the Contractor's use for aggregate sourcing and crushing, as directed by the Departmental Representative.
- .11 Remove and dispose outside of Park existing CSP culverts as shown on the Drawings and as directed by the Departmental Representative.
- .12 Removal, by milling and/or reclaiming, of existing asphalt and stockpile material at Settler's Pit, as directed by the Departmental Representative.
- .13 Remove, stockpile and reinstall modified British Columbia Ministry of Highways Precast Concrete Median Barriers as shown on the Drawings and as directed by the Departmental Representative.
- .14 Removal and relocation of existing wildlife fencing.
- .15 Supply and paint temporary roadway paint markings during construction as required. Permanent line markings to be installed at the completion of the work.
- .16 Supply and Install regulatory signs.
- .17 Traffic signage and traffic control.
- .18 Miscellaneous Additional Work as directed by the Departmental Representative.

- .4 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 (PCA) 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 specifications. The EPP will form part of the contract.

1.3 CONTRACT METHOD

- .1 Construct Work under combined price contract.

1.4 WORK BY OTHERS

- .1 The Contractor is advised that the following Work in the vicinity has been or will be contracted by Parks Canada:
- .1 Km 10 to 17 roadway rehabilitation.
 - .2 Continued work conducted on wildlife crossings throughout corridor.
 - .3 Other projects and maintenance work may occur along highway 93S in 2016.
- .2 Where it is necessary that work is to proceed in areas of this project common to both the Contractor and forces of others, the Contractor shall cooperate with the other Contractors and the Departmental Representative in reviewing their construction schedules and sharing his work space, and shall coordinate their operations with the other Contractors, including traffic management and construction staging. Construction coordination meetings may be required and will be chaired by the Departmental Representative at the Castle Field Office; key contractor personnel will be required to attend.
- .3 The Contractors shall coordinate all work on this project with other Contractors including Site Safety and Traffic Control.
- .4 Mannix and Settler’s Gravel Pits are operational pits used by many contractors and Parks Canada. The Contractor shall cooperate with the other users of the pits.

1.5 PRECEDENCE

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

1.6 DEFINITIONS

- .1 British Columbia Ministry of Transportation and Infrastructure is referred to as “BC MoTI”.
- .1 http://www.th.gov.bc.ca/publications/const_maint/contract_serv/standard_specs.htm
- .2 Alberta Transportation is referred to as “AT”.
- .1 http://www.transportation.alberta.ca/images/Standard_Specifications_for_Highway_Construction_2013.pdf

- .3 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 his duly appointed representative.
 - .2 Department – The word "Department" shall mean Parks Canada Agency.
- .4 KNP means Kootenay National Park of Canada
- .5 BNP means Banff National Park of Canada

1.7 WORK SEQUENCE

- .1 Schedule work progress to allow Owner / Departmental Representative unrestricted access to inspect all phases of the Work.
- .2 Maintain fire and emergency access on Highway 93S at all times.
- .3 Co-ordinate Work with other Contractors / Departmental Representatives doing maintenance, survey / testing work.
- .4 **Complete all work by October 21, 2016 (Contract Completion Date).**
- .5 Work within KNP shall only be allowed to start once all required submittals have been approved.
- .6 The Contractor shall not be permitted to close sections of any roadway to the general visiting public during paving operations unless approved by the Departmental Representative.

1.8 CONTRACTOR USE OF PREMISES

- .1 The Contractor is permitted to extract and process native material for the production of granular aggregate inside the Park at locations as determined by the Departmental Representative.
- .2 Contractor has unrestricted use of site subject to 1.9.1 and 1.9.2 above, Section 01 14 00 and Section 01 29 01, until Contract Completion date.
- .3 Contractor shall limit use of premises for Work, for storage, and for access, to allow:
 - .1 Owner occupancy.
 - .2 Work by other Contractors.
- .4 Coordinate use of premises under direction of the Departmental Representative.
- .5 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .6 All Contractor's business and private vehicles are required to display a vehicle work pass from Parks Canada. These permits may be obtained free of charge from PCA Environmental Surveillance Officer or as directed by the Departmental Representative.

1.9 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.10 OWNER FURNISHED ITEMS

- .1 The following granular materials will be made available to the Contractor for Works specified the in the Contract Documents:
 - .1 AT Designation 6 80mm Granular Sub-Base material, at Mannix Pit;
 - .2 AT Designation 2 Class 20 base aggregate at Settler's Pit;
 - .3 19mm Class 1 Medium Mix Asphalt Aggregate for H1 mix Asphalt Concrete Pavement at Settler's Pit.
- .2 Crushing of furnished aggregate is scheduled to start in November 2015 and to be completed by the end of March 2016.
- .3 Raw rock material is available from Pit 16 for the Contractor to produce Riprap as specified in this Section 31 37 00.

1.11 CONSTRUCTION SIGNAGE

- .1 No signs or advertisements, other than warning signs, are permitted on site.
- .2 Signs and notices for safety and instruction shall be in both official languages. Signs shall be diamond grade and shall conform to CAN3-Z321.
- .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 The Contractor shall supply, install and maintain two (2) portable Changeable Message Signs with a minimum of three (3) lines with eight (8) characters per line, for the duration of the project.
- .5 All temporary traffic control signs that are used for longer than one day shall be mounted on wood posts.
- .6 Signage shall be coordinated with other Contractors.

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 List of control monuments including coordinates and elevations.
 - .5 Measurements for Payment (Quantity Surveys) and volumes by the average end method.
- .2 Contractor to:
 - .1 Set additional control points as necessary.
 - .2 Set all work stakes necessary to complete work.
 - .3 Allow sufficient time for Departmental Representative to take measurements for payment.
 - .4 Not damage geodetic benchmarks or control monuments unless authorized by Departmental Representative.

- .3 No separate payment for setting out work, unless Departmental Representative adjusts alignment in field and additional survey costs are incurred. Payment for additional survey required due to changes by Departmental Representative to be paid for under **“Lump Sum Price Item 3 - Prime Cost Sum”**.

Part 2 Products

- .1 Not used.

Part 3 Execution

- .1 Not used.

END OF SECTION

Part 1 General**1.1 ACCESS AND EGRESS**

- .1 Provide for pedestrian and vehicular traffic for the duration of the construction.

1.2 USE OF THE SITE AND FACILITIES

- .1 The Work Site (limits shown on Drawings) will be specified by Parks Canada and shall only be used for the purposes of the Work. The Work Site 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.
- .1 Office-tool trailer may be set up at 4-Mile (Hector) Pit or other location as directed by the Departmental Representative. See Section 01 35 43 – Environmental Procedures.
- .2 The Contractor shall not store material or park equipment along the Right-of-way between Km 55.8 and Km 76.6 outside the normal hours of work.
- .3 Contractor shall maintain adequate drainage at the Work Site.
- .4 The Contractor shall keep the Work Site clean and free from accumulation of waste materials and rubbish regardless of source. Snow shall be removed by the Contractor as necessary and at his cost for the performance and inspection of the Work.
- .5 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and the Environmental Procedures for this project. The Contractor shall post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.
- .6 Any damage to the Work Site caused by the Contractor shall be repaired by the Contractor at its expense.
- .7 The Contractor may work six days per week subject to the following restrictions:
 - .1 Work in KNP is permitted during daylight hours from 07:00 AM to 07:00 PM, Monday to Saturday inclusive, except within the travelled lanes on Hwy 93S during the months of July and August.
 - .2 No Work shall occur on Sundays unless prior written approval is granted by the Departmental Representative.
 - .3 During July and August no lane closures are permitted and work, if required, will take place overnight from 07:00 PM to 07:00 AM if approved by the Departmental Representative and Field Unit.
- .8 No hauling of material during inclement weather.
- .9 The Contractor will not be permitted to work on the following Civic Holidays or long weekends unless prior written approval is granted by the Departmental Representative:
 - .1 Victoria Day long weekend: From 07:00 PM Thursday, May 19, 2016 to 07:00 AM Tuesday, May 24, 2016.
 - .2 Canada Day long weekend: From 07:00 PM Wednesday, June 29, 2016 to 07:00 AM Tuesday, July 5, 2016.

- .3 Civic Holiday long weekend: From 07:00 PM Thursday, July 28, 2016 to 07:00 AM Tuesday, August 2, 2016.
- .4 Labour Day long weekend: From 07:00 PM Thursday, September 1, 2016 to 07:00 AM Tuesday, September 6, 2016.
- .5 Thanksgiving Day Weekend: From 07:00 PM Thursday, October 6, 2016 to 07:00 AM Tuesday, October 11, 2016.
- .10 The Contractor will not be permitted to adversely impact wildlife or vegetation during critical life stages (breeding, nesting, rearing, and migration) unless prior written approval is granted by the Departmental Representative. The Contractor shall consult with the Departmental Representative and the Parks ESO regarding any localized wildlife concerns.

1.3 INSTALLATION OF CULVERTS

- .1 Contractor shall install culverts at new carriageway prior to placing embankment material.

1.4 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 and the Environmental Protection Plan prepared for the project.
- .2 All components of the Work shall be conducted without equipment entering into wetlands, water bodies, or streams.
- .3 Refer to Section 01 35 43 – Environmental Procedures for details.
- .4 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. One “Bear Proof” garbage container will be provided by PCA.
- .5 The Contractor is responsible for the development and supply of construction access to the Work as approved by the Departmental Representative.

1.5 ACCESS TO ADJACENT PROPERTIES

- .1 Construction operations shall be conducted so as to cause minimal inconvenience to the public and to owners of adjoining property. Existing access to property shall be maintained as far as possible and if new access must be provided, every effort shall be taken to provide the new access before the existing access is removed.

1.6 UTILITIES

- .1 **The Contractor shall become familiar with all utilities and services adjacent to the Work and shall be responsible for cost of repair of any damage resulting from his operations.**
- .2 If it is determined by the Departmental Representative that Utilities affected by the permanent Work will be relocated by Other Contractors, the Contractor shall

co-operate and coordinate as required with Other Contractors engaged in Utility relocation operations on the Work Site.

- .3 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities that may interfere with the Work. The Contractor shall co-operate with them at all times and in all places of Work. The Contractor shall keep the Departmental Representative informed of all communications with the Utility companies and authorities.
- .4 The Contractor shall notify the Departmental Representative and the Utility companies at least seven days in advance of any activities that may interfere with the operation of such Utilities. This also applies to the interference or disruption of any CP Rail access, facilities or operations.
- .5 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the Work, using hand labour as required.
- .6 The Contractor shall assess the possible impact of its operations on all Utilities that may be affected by its operations, and shall, in consultation with Utility owner(s), protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.
- .7 The Contractor shall immediately report any damage to Utilities to the Departmental Representative and to the Utility company or authority affected, and shall promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

1.7 SURVEY OF EXISTING PROPERTY CONDITIONS

- .1 Submission of tender is deemed to be confirmation that the Contractor has inspected the site and is conversant with all conditions affecting execution and completion of 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 Owner if any deterioration in condition is detected. Such monitoring shall cover all pertinent features and property including, but not limited to, buildings, structures, roads, walls, fences, slopes, sewers, culverts and landscaped areas.
- .3 The Departmental Representative may, but shall not be obligated to, survey and record the condition of the Work Site and of property on or adjoining the Work Site prior to the commencement of construction by the Contractor. If 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.
- .5 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.
- .6 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 property within or adjacent to the Work Site, whether all such property is covered by the survey or not.

1.8 PROTECTION OF PERSONS AND PROPERTY

- .1 Comply with Occupational Health and Safety Act British Columbia.
- .2 Comply with 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 near the Work Sites.
- .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 Off-road construction equipment will not be allowed on the existing highway 93S except at designated crossing points and loading areas. 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 by standard highway trucks not exceeding legal highway load limits.
- .2 Flag persons shall be provided when vehicles are entering or exiting Work Site access points and when vehicles are entering or exiting gravel pits in the park.
- .3 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas. All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle. All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner that will prevent dropping of materials or debris on the roadways and, where contents may otherwise be blown off during transit, such loads shall be covered by tarpaulins or other suitable covers. Spills of materials in public areas shall be removed or cleaned immediately by the Contractor at no cost to the Owner. All activities shall be in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.
- .4 Construction areas and construction crossings shall be flood-lit for night operations.

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 Safety Representative.
 - .3 Quality Control Representative
 - .4 Traffic Control Supervisor

- .3 The above personnel shall perform the following duties:
- .1 The Project Superintendent shall be employed full time and 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.
 - .2 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence.
 - .3 The Safety Representative shall possess safety experience in general construction. Duties shall encompass all matters of safety activities from commencement of Work until the Total Performance of the Work.
 - .4 The Quality Control Representative shall be responsible for implementation and record keeping for all aspects of project quality control. The Quality Control Representative shall be the Departmental Representative's single point of contact for project quality control.
 - .5 The Traffic Control Supervisor shall be responsible for the implementation of the approved Traffic Management Plan (TMP) and ensuring general conformance of all traffic control devices.

1.11 MEETINGS

- .1 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.
- .2 The Departmental Representative will schedule an initial meeting to be held on site after award notification. Senior representatives of the Owner, Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors are to be in attendance.
- .3 The Contractor will be required to assemble his site staff and sub-contractors for an environmental briefing to be conducted by Parks Canada. The briefing shall be of approximately 2 hours in duration and held at initial project start-up. The Contractor shall ensure that all his current project staff is in attendance. The Departmental Representative and the Contractor will co-operate in setting the most appropriate time and place for the briefing. Subsequent to the initial environmental briefing, additional briefings will be arranged for new project staff and sub-contractors within 48 hours of reporting for duty on the project.
- .4 Cost of attending the above meetings shall be considered incidental to the Unit Price items and no additional payment will be made.

1.12 WASTE DISPOSAL

- .1 All surplus, unsuitable and waste materials shall be removed from the job site to approved sites outside Kootenay National Park. Refer to Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan.
- .2 Deposit of any construction debris into any waterway is strictly forbidden.
- .3 Cost for Waste Disposal described above shall be considered incidental to the Unit Price items and no additional payment will be made.

- .4 Waste Disposal shall be completed in accordance with Section 01 35 43 – Environmental Procedures.

1.13 WORK STOPPAGE

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

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 General Conditions.

1.2 PRIME COST SUM

- .1 Included in Contract Price a total **Prime Cost Sum of \$250,000.00.**
- .2 Do not include in the Contract Price, additional contingency allowances for products, installation, overhead or profit.
- .3 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.
- .4 Such work may include, but not be limited to:
 - .1 Additional supply and delivery of bituminous materials including asphalt cement, and anti-stripping agent;
 - .2 Additional relocation or removal and disposal of existing signs, guardrail, guide posts and other miscellaneous items;
 - .3 Additional removal and disposal or plugging of existing culverts;
 - .4 Additional supply and installation of permanent signs (not construction signs);
 - .5 Supply and installation of raised reflective road markers and barrier reflectors;
 - .6 Additional supply and installation of wildlife fencing;
 - .7 Additional supply and installation of seeding;
 - .8 Supply and installation of line painting;
 - .9 Testing and additional placement of topsoil;
 - .10 Additional survey resulting from changes made by the Departmental Representative;
 - .11 Additional supply and installation of Riprap;
 - .12 Additional road structure repairs;
 - .13 Additional stripping and excavation as directed by the Departmental Representative;
 - .14 Additional remediation or removal and replacement of unsuitable or contaminated soils not described in the contract documents;
 - .15 Rehabilitation work in Mannix, 4-Mile and Settler's gravel pits;
 - .16 Construction of retention ponds;
 - .17 Sub-drainage not specified in the tender documents;
 - .18 Minor brushing and tree removal on ROW;
 - .19 Supply and installation of anti-stripping and warm mix Asphaltic Concrete mix additives;
 - .20 Additional ditching and drainage improvements;
 - .21 Supply and installation of additional landscaping;

- .22 Additional supply and or production of granular materials; and
- .23 Miscellaneous work as directed by the Departmental Representative.
- .24 The Contract Price, and not Prime Cost Sum, includes Contractor's overhead and profit in connection with the Work.

1.3 MEASUREMENT PROCEDURES

- .1 Payment for Work under the **“Lump Sum Price Item 3 – 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 British Columbia Roadbuilders rate schedule, and will be all inclusive and fully operated.
 - .2 Equipment paid on standby will be paid on 50% of the relevant less operator rates to a maximum of 10hrs per day.
 - .3 Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits.
 - .4 Transportation time to and from site will be reimbursed only for equipment used exclusively for additional work.
 - .5 PST should be added to any material invoices or Subcontractor invoices.
- .2 When based upon actual costs for additional Works under Prime Cost Sum, payment will be based upon supplied invoices and other work records.
- .3 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.
- .4 A claim for additional payment will not be considered submitted until all required documentation has been received, reviewed and approved by Departmental Representative.

Part 2 Products

- .1 Products shall be in accordance with the most recent edition of the BC MoTI Standard Specifications for Highway Construction and the current BC MoTI Recognized Products List, or as directed by the Departmental Representative.

Part 3 Execution

- .1 Work shall be in accordance with most recent edition of the BC MoTI Standard Specifications for Highway Construction, or as directed by the Departmental Representative.

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, camp, 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 PROCEDURES

- .1 Mobilization and Demobilization:
 - .1 Payment will be made under "Lump Sum Price Item 1 – Mobilization / Demobilization".
 - .2 50% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.
 - .3 The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, camp, 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.
 - .4 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

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 PRECEDENCE

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

1.2 DEFINITION OF OCCUPANCY

- .2 Occupancy:
 - .1 The Contractor shall be permitted to lease and occupy sites when working in Kootenay National Parks, free of charge from the date of award of the contract up to and including completion date of construction.
 - .2 The Contractor's occupancy of the sites identified in Contract will be deemed to have ended, when all of the following conditions are met to the satisfaction of Parks Canada:
 - .1 All the work identified under this Contract, has been completed.
 - .2 All sites clean up and any outstanding deficiencies for the work identified under this Contract have been addressed to the satisfaction of the Departmental Representative.
 - .3 Contractor has removed from the park all trailers and equipment and sites have been cleaned-up to the satisfaction of the Departmental Representative.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

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

1.2 COORDINATION

- .1 The Contractor shall perform coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities, and construction Work, with progress of Work of other Contractors, and Work by Owner, under instructions of the Departmental Representative.

1.3 PROJECT MEETINGS

- .1 The contractor shall attend weekly project meetings throughout progress of Work and provide information as determined by the Departmental Representative. Meetings shall be chaired by the Departmental representative who will prepare the minutes of the meetings.
- .2 The Contractor shall attend pre-installation meetings, when specified in specifications and when required to coordinate related or affected Work and provide information, as determined by the Departmental Representative.
- .3 The Contractor shall provide physical space and make arrangements for meetings.

1.4 CONSTRUCTION ORGANIZATION AND START-UP

- .1 Within seven (7) days after award of Contract, the Contractor shall request a meeting of Contract Representatives to discuss and resolve administrative procedures and responsibilities. Meeting shall be chaired by the Departmental representative who will prepare the minutes of the meeting.
- .2 Senior representatives of the Owner, Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors are to be in attendance.
- .3 Agenda to include following:
 - .1 Appointment of official representative of participants in Work.
 - .2 Schedule of Work, progress scheduling in accordance with Section 01 32 16.07.
 - .3 Schedule of submittals in accordance with Section 01 33 00.
 - .4 Requirements for temporary facilities, offices, storage sheds, utilities, fences in accordance with Section 01 52 00.
 - .5 Site safety and security in accordance with Sections 01 14 00, 01 52 00 and 01 35 43.
 - .6 Quality Control in accordance with Section 01 45 00.
 - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.

- .8 Owner-furnished materials.
- .9 Monthly progress claims, administrative procedures, photographs, and holdbacks.
- .10 Close out procedures and submittals in accordance with Sections 01 77 00 and 01 78 00.
- .11 Insurances and transcript of policies.
- .12 Other business.
- .4 The Contractor shall comply with Departmental Representative's allocation of mobilization areas of site, for field offices and sheds, and for access, traffic, and parking facilities.
- .5 During construction, the Contractor shall coordinate use of site and facilities through Departmental Representative's procedures for intra-project communications: submittals, reports and records, schedules, coordination of Drawings, recommendations, and resolution of ambiguities and conflicts.
- .6 The Contractor shall comply with instructions of the Departmental Representative for use of temporary utilities and construction facilities.
- .7 The Contractor shall coordinate field engineering and layout work with the Departmental Representative.

1.5 ON-SITE DOCUMENTS

- .1 The Contractor shall maintain at job site, one copy each of the following:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings and mix designs.
 - .5 Change Orders.
 - .6 Other modifications to Contract.
 - .7 Traffic Management Plan.
 - .8 Safety Plan.
 - .9 Blasting Plan (if applicable)
 - .10 WHMIS (MSDS Sheets shall be maintained at location of product use).
 - .11 Environmental Protection Plan.
 - .12 Field test reports.
 - .13 Copy of approved Work schedule and most recent updated schedule.
 - .14 Labour conditions and wage schedules.
 - .15 Applicable current editions of municipal regulations and by-laws.

1.6 SUBMITTAL SCHEDULE

- .1 The Contractor shall prepare a schedule of the required submissions and the date the submissions will be made. Include columns for Actual Date of Submission, Review Comments Received, Final Submission and Final Acceptance Received.

- .2 The Owner will not be responsible for any construction delays resulting from delays in submission acceptance if the submittal dates shown in the Submittal Schedule are not achieved.

1.7 PROJECT SCHEDULES

- .1 The Contractor shall submit preliminary construction progress schedule in accordance with Section 01 32 16.07 to Departmental Representative coordinated with Owner's project schedule.
- .2 After review, revise and resubmit schedule to comply with revised project schedule.
- .3 During progress of Work revise and resubmit as directed by the Departmental Representative.
- .4 In addition to the project schedule, submit weekly schedules to the Departmental Representative showing Work planned for the following week on a day by day basis.

1.8 CONSTRUCTION PROGRESS MEETINGS

- .1 During course of Work prior to project completion, schedule progress meetings weekly.
- .2 The Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance. Meetings shall be chaired by the Departmental representative who will prepare the minutes of the meetings.
- .3 Agenda to include following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review environmental issues.
 - .3 Review Traffic Control and Emergency response Protocol issues.
 - .4 Review site safety and security issues.
 - .5 Review issues with Prime Contractor and co-ordination with other contractors.
 - .6 Review of Work progress since previous meeting.
 - .7 Discuss field observations, problems, and conflicts.
 - .8 Review off-site fabrication delivery schedules.
 - .9 Review submittal schedules: expedite as required.
 - .10 Corrective measures and procedures to regain projected schedule.
 - .11 Revisions to construction schedule.
 - .12 Review Weekly Progress schedule, during succeeding work period.
 - .13 Review of quality reports since previous meeting.
 - .14 Review construction budget: Progress payments, variances from contract.
 - .15 Other business.

1.9 SUBMITTALS

- .1 The Contractor shall submit product data to Section 01 33 00 for review for compliance with Contract Documents.

- .2 The Contractor shall submit requests for payment for review, and for transmittal to Departmental Representative. Payment request on last day of the month.
- .3 The Contractor shall submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.
- .4 The Contractor shall process substitutions through Departmental Representative.
- .5 The Contractor shall process change orders through Departmental Representative.
- .6 The Contractor shall deliver closeout submittals for review and preliminary inspections, for transmittal to Departmental Representative.

1.10 CLOSEOUT PROCEDURES

- .1 The Contractor shall notify the Departmental Representative when the Work is considered ready for Substantial Performance.
- .2 The Contractor shall accompany the Departmental Representative on a preliminary inspection to determine items listed for completion or correction (deficiencies).
- .3 The Contractor shall comply with the Departmental Representative's instructions for correction of items of Work listed in executed certificate of Substantial Performance.
- .4 The Contractor shall notify the Departmental Representative of completion of the deficiencies list when the work as determined in the Departmental Representative's final inspection has been completed.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

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

1.2 PRECEDENCE

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

1.3 DEFINITIONS

- .1 Activity: An element of Work performed during course of Project. An activity normally has an expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (Gantt Chart): A graphic display of schedule-related information. In a 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, 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 an activity or other Project element. Usually expressed as workdays or work weeks.
- .6 Master Plan: A summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: A significant event in Project, usually completion of a major deliverable.
- .8 Project Schedule: The planned dates for performing activities and the planned dates for meeting milestones. A 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 Departmental Representative to enable monitoring of project work in relation to established milestones.

1.4 REQUIREMENTS

- .1 Ensure the Project Schedule is practical and remains within specified Contract duration.

- .2 Ensure all 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 Include an allowance in the schedule for Work performed and paid for as Prime Cost Sum. Refer to Section 01 21 00 – Allowances for a list of activities.
- .4 Plan to complete Work in accordance with prescribed Project Schedule.
- .5 Limit activity durations to maximum of approximately 14 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 the requirements of Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.

1.5 SUBMITTALS

- .1 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.
- .2 Submit Project Schedule to Departmental Representative within 10 working days of receipt of acceptance of Master Plan.

1.6 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule. Completion of each Stage of Construction:
 - .1 **Completion of all project Works: October 21 2016 (Contract Completion)**

1.7 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 5 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.

1.8 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 Permits.
 - .3 Submittals:
 - .1 Project Schedule

- .2 List of subcontractors, suppliers and Departmental Representative
- .3 Contractor Chain of Command including Sub-Contractors and Departmental Representatives
- .4 Prime Contractor / co-ordination with other Contractors Plan
- .5 Work Plan
- .6 Environmental Protection Plan
- .7 Traffic Management Plan
- .8 Site access / Detour Plan
- .9 Emergency Response Protocol
- .10 Site Specific Health and Safety Plan, incl. MSDS sheets
- .11 On site Contingency and Emergency Response Plan
- .12 Management of Owner supplied material Plan
- .13 Survey Plan
- .14 Quality Control Plan
- .15 Shop Drawings
- .16 Asphalt Mix Designs
- .4 Mobilization
- .5 Work Activities by road segments / locations:
 - .1 Grubbing
 - .2 Stripping
 - .3 Detours / Site Access
 - .4 Excavation
 - .5 Wildlife Underpass construction
 - .6 Embankment construction
 - .7 Sub-base and base material placement
 - .8 Asphalt Concrete Pavement placement
 - .9 Concrete barrier installation
 - .10 Temporary line painting
 - .11 Permanent Signs / Chevron installation
 - .12 Additional Work as and when requested
- .6 Quality Control
- .7 Interim Inspection
- .8 Site Clean Up / Demobilization

1.9 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on monthly basis reflecting activity changes and completions, as well as activities in progress. Provide weekly Progress Reports.
- .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.

1.10 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

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

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

1.2 REFERENCES

- .1 Not used.

1.3 ADMINISTRATIVE

- .1 The Contractor shall submit to the Departmental Representative all submittals listed for review. The submissions shall be prompt and in orderly sequence so as to not cause a delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Work affected by submittals shall not proceed until review is complete and approval has been given by the Departmental Representative.
- .3 The Contractor shall 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 The Contractor shall review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of the Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- .6 The Contractor shall notify the Departmental Representative in writing at the time of submission, identifying any deviations from requirements of the Contract Documents stating reasons for deviations.
- .7 The Contractor shall verify the field measurements and affected adjacent Work is consistent.
- .8 The Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 The Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 The Contractor shall keep one reviewed copy of each submission on site.

1.4 "DESIGN AND BUILD", SHOP DRAWINGS, PRODUCT DATA AND MIX DESIGNS

- .1 "Design and Build": The term "Design" refers to all detailed design activities (survey, investigation, drawings, specifications) based on general requirements contained in these specifications and shown on the drawings. "Build" refers to construction of Contractor's detailed design after design has been reviewed by the Departmental Representative. Contractor's responsibility for error and omissions in submission is not relieved by Departmental Representative's review of submittals.

- .2 The term “shop drawings” means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data that are to be provided by the Contractor to illustrate details of a portion of Work.
- .3 The term “mix design” means engineered design for proportioning materials in concrete or asphalt concrete pavement including all supporting test results, materials properties and Departmental Representative’s letter of recommendation.
- .4 The Design must 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 design drawings and specifications.
- .5 The Contractor shall allow for fourteen (14) calendar days for Departmental Representative’s review of each submission.
- .6 Adjustments made on shop drawings by the Departmental Representative are not intended to change the Contract Price. If adjustments affect the value of Work, state such in writing to the Departmental Representative prior to proceeding with the Work.
- .7 Make changes in shop drawings as the Departmental Representative may require, consistent with the Contract Documents. When resubmitting, notify the Departmental Representative in writing of any revisions other than those requested.
- .8 Submit letter(s) of certification with all mix designs.
- .9 Accompany submissions with a transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor’s name and address.
 - .4 Identification and quantity of each shop drawing, mix design, product and sample.
 - .5 Other pertinent data.
- .10 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor
 - .2 Supplier
 - .3 Manufacturer
 - .4 Contractor’s stamp, signed by Contractor’s authorized representative certifying approval of submissions, verification of field measurements and compliance with the Contract Documents.
 - .5 Drawings and design calculations to bear signature and stamp of qualified professional engineer registered or licensed in the Province of the work.

- .6 Details of appropriate portions of the Work as applicable:
 - .1 Fabrication
 - .2 Performance Characteristics,
 - .3 Standards.
- .11 After the Departmental Representative's review, distribute copies.
- .12 Submit one (1) electronic copy of the shop drawings or mix design for each requirement requested in the Specification Sections and as requested by the Departmental Representative.
- .13 Submit one (1) electronic copy of the product data sheets or brochures for requirements requested in the Specification Sections and as requested by the Departmental Representative where shop drawings will not be prepared due to standardized manufacture of the product.
- .14 Delete information not applicable to project.
- .15 Supplement standard information to provide details applicable to project.
- .16 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.
- .17 The review of shop drawings and mix designs by Departmental Representative is for the sole purpose of ascertaining conformance with general concept. This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for that 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 all requirements of construction and Contract Documents. Without restricting the generality of the foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all 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.
- .2 Submit transcription of insurance immediately after award of Contract.

1.8 REQUIRED CONTRACTOR SUBMITTALS

- .1 General:

- .1 This Clause identifies the plans, programs, and documentation required prior to mobilization on site and during the construction phase.
- .1 Pre-Mobilization Submittals:
 - .1 The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of submittals in writing. Submit the following plans and programs to the Departmental Representative for review a minimum of twenty (20) days prior to mobilization to the project site:
 - .1 Project schedule, detailing the schedule of the workdays required from Contractor, subcontractors, suppliers and consultants to complete each activity of the project by road segment or location in order to meet stages specified in Section 01 11 00. In addition, for each activity critical elements that could impact on the schedule are to be identified. Submission shall include both a paper copy of the schedule and an electronic copy in Microsoft Projects format
 - .2 List of subcontractors, suppliers and consultants, their role and their key personnel, including names and positions, addresses, telephone, cellular telephone and/or pager numbers.
 - .3 Plan describing methods the Contractor will have to meet his responsibilities as the Prime Contractor for Traffic Control in the Work zone.
 - .4 Contractor Chain of Command, listing key Contractor personnel, including for each name, position, qualification, experience, 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.
 - .5 Work Plan, describing in detail for each activity by location, the Contractor's intended methods of construction, and materials, equipment and manpower he will use to meet stages specified in Section 01 11 00. The Work Plan must be linked to the Project Schedule.
 - .6 Quality Control Plan in accordance with Section 01 45 00 – Quality Control.
 - .7 Traffic Management Plan, in accordance with the requirements of Section 01 35 00.06 – Special Procedures for Traffic Control.
 - .8 Environmental Protection Plans (EPP) and Environmental Construction Operations Plans (ECO Plans) that shall meet the requirements of Section 01 35 43 – Environmental Procedures.
 - .9 Site Access and Detour Plans. It shall include, but not be limited to, engineered Drawings and procedures for accessing all areas of the Work or for proposed detours.
 - .10 Management of Owner Supplied Materials Plan describing the Contractor's intended methods of reporting to him regularly on

quantities used and for what purpose, and on managing materials supplied by the Owner to avoid waste or shortfalls.

- .11 Survey Plan describing the Contractor's intended methods of surveying during this project.
 - .12 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada. Parks Canada will supply the Contractor with a template with contact names and numbers to be used for this purpose.
 - .13 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.
 - .14 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 (MSDS).
 - 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 Departmental Representative.
 - 14. On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
 - 15. The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of the submittals in writing.
 - 16. The Contractor shall submit a copy of the filed **Notice of Project with Provincial authorities**.
- .2 Construction Phase Submittals:
- .1 Monthly Progress Reports in accordance with Section 01 32 15.07.

- .2 Weekly Progress Reports that outline the detailed Work (Contractor, subcontractors, suppliers, consultants) completed to date as well as the anticipated Work to be performed for the following week on a day-by-day basis. Work to be linked to activities by location identified in project schedule and to provide information on materials, equipment and manpower. Also, alternate Work to be identified if proposed Work or a portion thereof, cannot be done due to weather, equipment breakdown, delays in delivery, etc.
- .3 Quality Control Inspection Reports - The Contractor shall maintain a daily inspection report that itemizes 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 request for payment.
- .4 "Design and Build" documents, Shop Drawings and Mix Designs - The Contractor shall submit all design drawings, shop drawings and mix designs required to fabricate and / or conduct the work a minimum 30 days prior to fabrication / production.
- .5 Progress Photographs:
 - .1 Formats: Electronic - jpg files, minimum three (3) mega pixels.
 - .2 Submission requirements: One (1) set of electronic files.
 - .3 Identification: Name and number of project, description of photograph and date.
 - .4 Viewpoints: viewpoints determined by Construction Manager or Departmental Representative.
 - .5 Submission Frequency: prior to commencement of Work and weekly thereafter with progress statement, or as directed by Construction Manager or Departmental Representative.
 - .6 Submit memory stick with all electronic pictures as part of closeout package.
- .6 Submit an electronic copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and authority having jurisdiction, weekly.
- .7 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .8 Submit copies of incident and accident reports.
- .9 Project Completion Submittals
- .10 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.
- .11 Quality Control Records – The Contractor shall submit a bound and itemized set of project quality control documentation.
- .12 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 and 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.

Part 2 Products

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

Part 1 General**1.1 PRECEDENCE**

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

1.2 MEASUREMENT PROCEDURES

- .1 Cost of Traffic Control, including temporary pavement marking, described in this Section 01 35 00.06, shall be considered incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**, and no additional payment will be made for the duration of the Contract. 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.
- .2 The Contractor shall receive payment for traffic management on a monthly basis prorated by the number of months working on site divided by the number of months on site identified on Contractor schedule, not to exceed the total lump sum bid price for Traffic Management.
- .3 Cost of keeping existing roadway between Km 55.8 and 76.6, clean, free of pot holes while Contractor is on site shall be considered incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**, and no additional payment will be made for the duration of the Contract.
- .4 Cost of snow removal for Contractor to do the work identified in the Contract while Contractor is on site shall be considered incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**, and no additional payment will be made for the duration of the Contract. This excludes snow removal on Public roads.

1.3 REFERENCES

- .1 The Contractor shall provide traffic control in accordance with current edition of:
 - .1 British Columbia - Traffic Control Manual for Work on Roadways.
 - .2 Manual of Uniform Traffic Control Devices for Canada, (MUTCD) distributed by Transportation Association of Canada.

1.4 QUALITY CONTROL

- .1 All Quality Control by the Contractor.

1.5 GENERAL

- .1 The Contractor shall develop and implement a Traffic Management Plan (TMP) in accordance with BC MoTI Standard Specifications for Highway Construction (Latest Edition), Section 194 – Traffic Management for Work zones, except where specified otherwise. The TMP will include plans specific to each detour and access point required for this project.
- .2 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.

- .3 All temporary signs that are used for longer than one day shall be mounted on wood posts.
- .4 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 the 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.
- .5 All speed limits, traffic control and warning signs shall have an “NPC” adhesive sticker added to bottom right-hand corner. These stickers will be supplied by Parks Canada following the acceptance by the Departmental Representative of the Contractor’s traffic management plan.
- .6 Temporary pavement marking used shall be acceptable to the Departmental Representative. These temporary pavement markings shall be in accordance with the current version of the “BC Ministry of Transportation and Highways – Traffic Control Manual for Work on Roadways” and Section 32 17 23 Clause 3.1.
- .7 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.
- .8 Contractor shall have appropriate traffic control measures in place so that one lane of highway traffic is maintained through the work zone at all times throughout the construction.
- .9 The Contractor shall coordinate traffic management procedures with other Contractors working in the area.
- .10 The Contractor shall supply, install and maintain two Changeable Message Signs (CMS) to inform the traffic of construction delays. Exact installation locations of the CMS to be agreed on site with the Departmental Representative. All cost associated with the supply, installation, maintenance and removal of the two CMS will be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**. Text for the two CMS will be directed by the Departmental Representative. Removal of the two CMS will only be permitted upon completion of the Works.

1.6 PROTECTION OF PUBLIC TRAFFIC

- .1 The Contractor shall 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 The Contractor shall carry out traffic regulation in accordance with the current edition of the BC Traffic Control Manual for Work on Roadways, except where specified otherwise.
- .3 The Contractor shall develop and have in place a completed Traffic Control Plan taking into account all hazards associated with paving operations on a busy highway and minimize risks to motorists prior to beginning Work. This plan shall be updated regularly in response to any incidents or changes in conditions, be they weather, work, traffic, or otherwise.
- .4 A minimum of one travelling lane 4 m wide shall be maintained by the Contractor at all times to provide for safe movement of traveling public through

the work area. The Contractor shall submit a TMP to the Departmental Representative for review and acceptance prior to commencement of work. Short closures may be allowed by the Departmental Representative for some activities such as asphalt removal as long as the delay to motorists does not exceed 20 minutes.

- .5 Regardless of type of traffic control being used, **maximum period of delay to public traffic shall be 20 minutes**. 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.
- .6 The Contractor shall provide competent flag persons, properly equipped, and certified.
- .7 The Contractor shall also provide competent supervision and/or contract personnel as required during non-working hours to ensure that safety flares, flashing beacons, signs, lights, etc. are in proper working order.
- .8 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.
- .9 The Contractor shall maintain a dust free construction zone by means of cleaning and watering when required.
- .10 Traffic control measures will be monitored by the Departmental Representative, who may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traveling public and coordination with adjacent contracts
- .11 Keep travelled way clean, free of pot holes and of sufficient width to accommodate **one 4.0m wide lane for traffic**.
- .12 At paved detours (if required) and at access points, Contractor shall:
 - .1 Have posted speed limit at 50 km/hr with appropriate signage, temporary pavement marking and other safety features necessary.
 - .2 Keep areas clean, free of pot holes, failures, and rutting.
 - .3 Provide and maintain temporary markings.
 - .4 Provide competent supervision and/or contract personnel as required during non-working hours to ensure that safety flares, flashing beacons, signs, lights, etc., are in proper working order.

1.7 INFORMATIONAL AND WARNING DEVICES

- .1 The Contractor shall 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 that requires road user response.
- .2 The Contractor shall supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in the TMP submitted by the Contractor and approved by the Departmental Representative. **All temporary signs that are used for longer than one day shall be mounted on wood posts.**

- .3 The Contractor shall supply, install and maintain two (2) portable Changeable Message Signs with a minimum of three (3) lines with eight (8) characters per line, for the duration of the project.
- .4 The Contractor shall place signs and other devices to standards and in locations recommended in British Columbia - Traffic Control Manual for Work on Roadways. Provide intermittent signage if work zones exceed 2.0 km in length.
- .5 Signs shall be wind resistant.
- .6 As situation on site changes, Contractor to update his TMP outlining signs and other devices required for the project and submit for the approval of the Departmental Representative.
- .7 The Contractor shall continually inspect and maintain traffic control devices in use by:
 - .1 Checking signs daily for legibility, damage, suitability and location.
 - .2 Cleaning, repairing or replacing signs as required ensuring clarity and reflectance.
 - .3 Removing or covering signs that do not apply to conditions existing from day to day or time to time.

1.8 CONTROL OF PUBLIC TRAFFIC

- .1 The Contractor shall provide competent flag persons, trained in accordance with, and properly dressed and equipped as specified in, British Columbia - Traffic Control Manual for Work on Roadways:
 - .1 When public traffic is required to pass working vehicles or equipment, that block all or part of travelled roadway.
 - .2 When vehicles are entering or exiting Work Site access points.
 - .3 When vehicles are entering or exiting gravel pits in the park.
 - .4 When it is necessary to institute one-way traffic system through construction area or other blockage 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: maximum 20 minutes.
- .3 No stoppage of traffic will be allowed for the periods listed in Section 01 14 00 – Work Restrictions.
- .4 During hours of darkness, Contractor shall determine requirements but as a minimum, traffic control personnel 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.

1.9 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 herein and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted as follows:
 - .1 Speed limit reduced to 50 km/h in work zones in non-work periods.
 - .2 Speed limit reduced to 50 km/h in work zones in work periods.
 - .3 Speed limit reduced to 50 km/h on detours (if required) at all times.
- .2 Maintain existing conditions for traffic crossing right-of-way.
- .3 No stoppage of traffic shall be allowed during inclement weather conditions.

Part 2 Products

- .1 Not used.

Part 3 Execution

- .1 Not used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

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

1.2 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System
 - .1 (WHMIS).Material Safety Data Sheets (MSDS).
- .3 Province of British Columbia:
 - .1 Occupational Health and Safety Regulations.
- .4 (WHMIS) Material Safety Data Sheets (MSDS)
- .5 Province of Alberta
 - .1 Occupational Health and Safety Act, R.S.A., 2000.

1.3 SUBMITTALS

- .1 The Contractor shall make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 The Contractor shall submit site-specific Health and Safety Plan: Within seven (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.
 - .12 The Contractor shall submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and authority having jurisdiction, weekly.
 - .13 The Contractor shall submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
 - .14 The Contractor shall submit copies of incident and accident reports.

- .15 The Contractor shall submit copies of Material Safety Data Sheets (MSDS) to Departmental Representative.
- .16 The Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within ten (10) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments from Departmental Representative.
- .17 The 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.
- .18 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.
- .19 The Contractor shall address standard operating procedures to be implemented during emergency situations through an on-site Contingency and Emergency Response Plan.

1.4 FILING OF NOTICE

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

1.5 SAFETY ASSESSMENT

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

1.6 MEETINGS

- .1 The Contractor shall schedule and administer a Health and Safety meeting with Departmental Representative prior to commencement of Work.
- .2 Parks Canada recognizes that federal Occupational Health and Safety legislation places specific responsibilities upon Parks Canada as owner of the work place. In order to meet those requirements, Parks Canada has implemented a contractor safety regime to ensure roles and responsibilities assigned under Part II of the Canada Labour Code and the Canada Occupational Health and Safety Regulations are implemented and observed when involving contractor(s) to undertake work in Parks Canada work places, including on Parks Canada property.
- .3 After contract award and prior to commencement of any work under the contract, the Project Manager will hold a health and safety meeting with the Contractor. At this meeting, the Contractor is required to complete and sign an Attestation to certify the Contractor will comply with the requirements set out in the Attestation and the terms and conditions of the contract.
- .4 A copy of the "Attestation and Proof of Compliance with Occupational Health and Safety (OHS)" form is attached as Appendix A.

1.7 REGULATORY REQUIREMENTS

- .1 The contractor shall perform Work in accordance with National Parks Act.

1.8 PROJECT / SITE CONDITIONS

- .1 Work at site will involve contact with British Columbia and Alberta Occupational Health Safety Act.

1.9 GENERAL REQUIREMENTS

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

1.10 RESPONSIBILITY

- .1 The Contractor shall 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 The Contractor shall 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.

1.11 COMPLIANCE REQUIREMENTS

- .1 The Contractor shall comply with Occupational Health and Safety Regulations, British Columbia and Alberta depending on work location.
- .2 The Contractor shall comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.12 UNFORESEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or conditions 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.

1.13 HEALTH AND SAFETY COORDINATOR

- .1 The Contractor shall employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Co-ordinator must:
 - .1 Have minimum 2 years site-related working experience specific to activities associated with roadway 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.

1.14 POSTING OF DOCUMENTS

- .1 The Contractor shall 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.

1.15 CORRECTION OF NON-COMPLIANCE

- .1 The Contractor shall immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 The Contractor shall provide the Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 The Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.16 WORK STOPPAGE

- .1 The Contractor shall give precedence to safety and health of public and site personnel and protection of the environment over cost and schedule considerations for Work, as shall be included in the Contractor's Health and Safety Plan.

Part 2 Products

- .1 Not used.

Part 3 Execution

- .1 Not used.

END OF SECTION

Part 1 General**1.1 PRECEDENCE**

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

1.2 MEASUREMENT PROCEDURES

- .1 The survey, design, layout, staging, construction, maintenance and removal of detours by the Contractor shall be incidental to the contract and no separate payment will be made to the Contractor.
- .2 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.
- .3 Traffic Control, including temporary marking, required during the survey, layout, construction and maintenance of these detours shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .4 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for construction and maintenance of these detours by the Contractor shall be incidental to the contract and no separate payment will be made to the Contractor.

1.3 SCHEDULE

- .1 The Contractor is prohibited from conducting work that will, in the opinion of the Departmental Representative, interfere with smooth traffic flow on long weekends as described in Section 01 14 00 – Work Restrictions.

1.4 TRAFFIC CONTROL REQUIREMENTS

- .1 The Contractor shall provide traffic control in accordance with Section 01 35 00.06 – Special Procedures for Traffic Control.

1.5 REFERENCES

- .1 BC Supplement to TAC Geometric Design Guide – latest edition.

1.6 DESIGN CRITERIA

- .1 Desired Design Speed: 50 km/hr. However, these criteria may be reduced based on constructability and cost.
- .2 Cleared roadway shall match the laning at the tie-in. Minimum lane width shall be one 4.0 m lane plus 2.0m shoulders.
- .3 Design shall incorporate as much as possible the final roadway layout to avoid removing detour built.

1.7 DESIGN REVIEW

- .1 Provide Departmental Representative with four (4) sets of complete working Drawings and one copy of detailed design calculations, for review at least four (4) weeks prior to beginning construction. Drawing to show both detour and final roadway design at each stage. **Drawings and design calculations to bear signature and stamp of qualified Professional Engineer registered or licensed in the Province of the work.**
- .2 Verify existing site conditions and ground elevations before preparing working Drawings.

1.8 QUALITY CONTROL – TESTING

- .1 All Quality Control testing by the Contractor.
- .2 Testing as per approved Contractor's Quality Control Plan.

Part 2 Products

2.1 MATERIALS

- .1 All materials used in the construction of detours shall be in accordance with the Contract documents or as directed by the Departmental Representative.
 - .1 Pit-Run Gravel (suitable for use as SGSB) material supplied by the owner is available at Settler's Pit.
 - .2 80 mm Granular Sub-Base material supplied by the Owner is available at Mannix Pit.
 - .3 AT Designation 2 Class 20 base aggregate is available to the Contractor from stockpile at Settler's Pit. The AT Designation 2 Class 20 base aggregate is considered a suitable replacement for the 25 mm WGB specified.
 - .4 19mm Class 1 Medium Mix Asphalt Aggregate supplied by the Owner is available in stockpiles at Mannix Pit.

Part 3 Execution

3.1 CONSTRUCTION AND PARTIAL REMOVAL OF DETOURS

- .1 Construction and Partial Removal in accordance with:
 - .1 Section 02 41 13.14 – Asphalt Concrete Pavement Removal.
 - .2 Section 31 24 13 – Roadway and Drainage Excavation.
 - .3 Section 32 11 24 – Granular Base Course.
 - .4 Section 32 12 13.23 – Asphalt Prime.
 - .5 Section 32 12 13.16 – Asphalt Tack Coat.
 - .6 Section 32 12 16 – Asphalt Concrete Pavement (EPS).
 - .7 Section 32 17 23 – Pavement Marking.
 - .8 Section 34 71 13.01 – Precast Concrete Barrier.

3.2 MAINTENANCE OF DETOURS

- .1 Maintenance as per Contractor's Drawings and in accordance with BC MoTI Maintenance Specifications – Latest edition.

END OF SECTION

Part 1 General**1.1 PRECEDENCE**

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

1.2 MEASUREMENT PROCEDURES

- .1 Preparation and implementation of an Environmental Protection Plan in accordance with this Section 01 35 43 – Environmental Procedures will not be measured separately for payment and will be considered incidental to the Work.

1.3 SUBMITTALS

- .1 The Contractor is required to prepare an Environmental Protection Plan in accordance with this Section 01 35 43 – Environmental Procedures.

1.4 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 For Work in Kootenay NP, the Contractor and any sub-Contractors shall obtain a business license from the Parks Canada Administration Office in Lake Louise prior to commencement of the contract.
- .3 All Contractor's vehicles are required to display a vehicle work pass from Parks Canada. These permits may be obtained free of charge from the Departmental Representative or PCA Environmental Officer.

1.5 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

- .1 Execution of the work is subject to the provisions within the *Canadian Environmental Assessment Act* (CEAA) Guidelines Order of 2003 and subsequent amendments.
- .2 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.
- .3 **Refer to the environmental requirements noted in the Basic Impact Analysis (BIA), and BMP – HSC Environmental Procedures included with this tender. The Contractor's EPP is to include these requirements as a minimum.**

1.6 START-UP AND ENVIRONMENTAL BRIEFING

- .1 **All staff employed at the construction site will be subject to an approximately two hour briefing regarding their individual and collective responsibilities to ensure avoidable adverse environmental impact do not arise from their activities and personal choices. Employees must attend this briefing before beginning their work at the site.** Each employee, having received the briefing, will be issued a certification sticker to be displayed on their helmet. It is recognized that new employees may join the Contractors' work force

after the initial round of “Environmental Briefing”. In that case and as required, subsequent “environmental briefings” can be presented as numbers warrant, by arrangement with the ESO through the Departmental Representative. Also, some sub-trades may be present at the site for a short time, to perform once-only duties. In these cases, the “environmental briefing” will be replaced by the Contractor explaining the environmental sensitivity of the work location to the sub-trade worker(s), and reviewing highlights of personal conduct expected, with reference to a one-page briefing summary to be provided to the Contractor by the ESO. A copy of this summary will be provided to each sub-trade worker joining the work force at the site.

- .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.

1.7 CONSTRUCTION SITE ACCESS AND PARKING

- .1 The Contractor shall review both short and long term construction access requirements with the Departmental Representative, both at start-up and on an ongoing basis. In consultation with the Departmental Representative, the Contractor shall formulate an agreement for worker transportation to and from the work sites and where workers shall park their private vehicles. Generally, personal vehicles shall be parked at least 10 metres distance from any watercourse.
- .2 The Contractor shall ensure that the environment beyond the work limits is not negatively impacted or damaged by workers’ vehicles or construction machinery and shall instruct workers so that the “footprint” of the project is kept within defined boundaries.
- .3 Prior to commencing any activity not expressly covered or allowed in the project BMPs the Contractor may be required to first obtain a Restricted Activity Permit (RAP) in consultation with the ESO and Departmental Representative.

1.8 PROTECTION OF WORK LIMITS

- .1 The Contractor is to prepare an EPP that details how the work limits shall be marked and what procedures will be employed to ensure trespass outside these limits does not occur, to the satisfaction of the Departmental Representative and the ESO.

1.9 EROSION CONTROL

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

- .2 If necessary, on-site sediment control measures shall be constructed and functional prior to initiating activities associated with the asphalt plant and the paving. The Contractor shall prepare an Erosion Control Plan to the satisfaction of the Departmental Representative and the ESO.
- .3 The regular monitoring and maintenance of all erosion control measures shall be the responsibility of the Contractor. If the design of the control measures is not functioning effectively they are to be repaired. The Departmental Representative and ESO also will monitor erosion control performance.
- .4 The site will be secured against erosion during any periods of construction inactivity or shutdown.

1.10 POLLUTION CONTROL

- .1 The Contractor shall prevent any deleterious and objectionable materials from entering streams, rivers, wetlands, water bodies or watercourses that would result in damage to aquatic and riparian habitat. Hazardous or toxic products shall be stored no closer than 100 metres from watercourses.
- .2 A Spill Response Plan will be prepared as part of the EPP and shall detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative and the ESO and in accordance with all applicable federal and provincial legislation. The EPP shall include a list of products and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement and sand blasting agents.
- .3 The containment, storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation. Hazardous products shall be stored no closer than 100 metres from watercourses.
- .4 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berms shall be capable of holding 110% of tank storage volumes and shall be to the satisfaction of the Departmental Representative and the ESO before start-up. Measures such as collection / drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double-lined fuel tanks can prevent spills into the environment.
- .5 The Contractor shall prevent blowing dust and debris by covering and/or providing dust control for temporary roads and on-site work by methods that are approved by the Departmental Representative or ESO.
- .6 The Contractor shall provide spill kits at re-fuelling, lubrication, and repair locations that will be capable of dealing with 110% of the largest potential spill and shall be maintained in good working order on the construction site. The ESO and Departmental Representative prior to project start-up must approve these spill kits. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.

- .7 Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. The Departmental Representative and the ESO shall be notified immediately of any spill. In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.
- .8 The costs involved in a spill incident (the control, clean up, disposal of contaminants and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the expected standard and to the satisfaction of the Departmental Representative and ESO.

1.11 EQUIPMENT MAINTENANCE, FUELLING AND OPERATION

- .1 The Contractor shall ensure that all soil, seeds and any debris attached to construction equipment to be used on the project site shall be removed (e.g. power washing) outside the Banff and Yoho National Parks before delivery to the work site.
- .2 Equipment fuelling sites will be identified by the Contractor and approved by the Departmental Representative and the ESO. Except for chain saws, any fuelling closer than 100 metres any streams, wetlands, water bodies or waterways shall require the authorization and oversight of the Departmental Representative.
- .3 Diesel and gasoline delivery vehicles, including bulk tankers shall be parked more than 100 metres from any streams, wetlands, water bodies or watercourses. Gravity fed fuel systems are not allowed. Manual or electric pump delivery systems shall be used. Fuelling personnel shall maintain presence at and immediate attention to the fuelling operation.
- .4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage sites is addressed in # 4 of Pollution Control above.
- .5 Equipment used on the project shall be fuelled with E10, and low sulfur diesel fuels and shall conform to local emission requirements. The Contractor is to ensure that unnecessary idling of vehicles is avoided.
- .6 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations approved by the ESO or the Departmental Representative. Waste lubrication products (e.g. oil filters, used containers, used oil, etc.) shall be secured in spill-proof containers and properly recycled or disposed of at an approved facility. No waste petroleum, lubricant products or related materials are to be discarded, buried or disposed of in borrow pits, turnouts, picnic areas, viewpoints, etc., anywhere within Kootenay National Park.
- .7 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order.
- .8 Fuel containers and lubricant products shall be stored only in secure locations specified by the Departmental Representative. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight in Kootenay National Park. Alternatively, the Contractor may hire a security person employed to prevent vandalism. The access gate to Settler's and Mannix Gravel Pits shall be locked at the end of each working day and during extended periods when the pit is not

being used. The Contractor is to ensure that workers are briefed on proper 'daisy-chain' use of locks to ensure no other contractor or Parks Canada Highways are locked out.

1.12 OPERATION OF EQUIPMENT

- .1 Equipment movements shall be restricted to the 'footprint' of the construction area. The work limits shall be identified by stake and ribbon or other methods approved by the Departmental Representative. Unless authorized by the Departmental Representative, activities beyond the work limits are not permitted. No machinery will enter, work in or cross over streams, rivers, wetlands, water bodies or watercourses, nor damage aquatic and riparian habitat or trees and plant communities. Some of the construction shall require working close to watercourses or water bodies. In these instances, the Contractor is to describe measures to be employed to ensure fugitive materials (e.g. rocks, soil, branches) and especially deleterious substances (e.g. chemicals) do not enter any watercourses, to the satisfaction of the Departmental Representative and ESO.
- .2 The Contractor shall instruct workers to prevent pushing, placement, raveling, storage or stockpiling of any materials (e.g. slash, rock, fill or topsoil) in the trees bordering the right-of-way or into watercourses or water bodies.
- .3 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 features beyond the designated work area, the Contractor shall be responsible, at his or her expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc., to the satisfaction of the Departmental Representative and ESO.
- .4 The Contractor shall restrict vehicle movements to work limits.
- .5 Workers private vehicles are to remain within the construction footprint, or as directed by the Departmental Representative.

1.13 FIRE PREVENTION AND CONTROL

- .1 A fire extinguisher shall be carried and available for use on each machine and at locations within the plant in the event of fire. Basic firefighting equipment recommended (e.g. a water truck; minimum 500 Imperial gallons with 500 feet of fire hose and a pump capable of producing 45 psi water pressure at the nozzle, three shovels, two pulaskis, and two five gallon backpack pumps) shall be maintained at the construction site at a location known and easily accessible to all the Contractors' staff. Contractor's staff shall receive basic training in early response to wildfire events during the "environmental briefing".
- .2 Water can be obtained from Mannix Pit. An excavation to the water table will be required to access groundwater for use by the Contractor. The Departmental Representative will identify a suitable location for this excavation. The contractor will be responsible to make the excavation, and extend it to greater depths in the event that the water table drops.
- .3 A water truck may be necessary and will depend on the timing of the contract (e.g. – not required during winter or snow covered conditions).

- .4 Construction equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.
- .5 Care shall be taken while smoking on the construction site to ensure that the accidental ignition of any flammable material is prevented. Fires or burning of waste materials is not permitted.
- .6 Fires or burning of waste materials is not permitted.

1.14 WILDLIFE

- .1 During the Environmental Briefing all personnel shall be instructed by the ESO on procedures to follow in the event of wildlife appearance near or within the work site and any other wildlife concerns.
- .2 The Contractor shall avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from the immediate location if bears, cougars, wolves, elk or moose display aggressive behaviour or persistent intrusion. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) must be exercised at all times.
- .3 The Contractor shall notify the ESO and Departmental Representative immediately about dens, litters, nests, carcasses (road kills), bear activity or encounters on or around the site or crew accommodation. Other wildlife-related encounters are to be reported within 24 hours.

1.15 RELICS AND ANTIQUITIES

- .1 Artifacts, relics, antiquities and items of historical interest such as cornerstones, commemorative plaques, inscribed tablets and similar objects found on the work site shall be reported to the ESO or the Departmental Representative immediately. The Contractor and workers shall wait for instructions before proceeding with their work.
- .2 All historical or archaeological objects found in Banff and Yoho National Parks are protected under the National Parks Act and Regulations and are the property of Parks Canada. The Contractor and workers shall protect any articles found and request direction from the ESO or the Departmental Representative.

1.16 WASTE MATERIALS STORAGE AND REMOVAL

- .1 The Contractor and workers shall dispose of hazardous wastes in conformance with the Environmental Contaminants Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.
- .2 All wastes originating from construction, trade, hazardous and domestic sources, shall not be mixed, but will be kept separate.
- .3 Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried or discarded at the construction site or elsewhere in Kootenay National Park. These wastes shall be contained and removed in a timely and approved manner by the Contractor and workers, and disposed of at an appropriate waste landfill site located outside the park. Construction waste storage containers, provided by the Contractor, shall be emptied by the

Contractor when 90% full. Waste containers will have lids, and waste loads shall be covered while being transported.

- .4 A concerted effort shall be made by the Contractor and workers to reduce, reuse and recycle materials.
- .5 All efforts to prevent wildlife from obtaining food, garbage or other domestic wastes shall be made by the Contractor and contract staff while undertaking their work in Kootenay National Park. Such wildlife attractants shall not be stored at the work site overnight. Lunches, coolers and food products, including waste food products, shall be securely stored away from access by animals. Daily removal of food scraps, food wrappers, pop cans or other attractive products to bear proof containers, such as the Overflow Campground, is mandatory. It is incumbent on the Contractor to notify Parks Canada and make specific arrangements to have garbage collected by Parks Canada when using existing Parks Canada receptacles.
- .6 The Contractor and workers shall immediately report any circumstances related to food/garbage (e.g. overflowing container or strong smell) and wildlife to the ESO or the Departmental Representative.
- .7 Sanitary facilities, such as a portable container toilet, shall be provided by the Contractor and maintained in a clean condition.

1.17 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

- .1 The Contractor shall prepare an EPP that details how the work limits will be marked and what procedures will be employed to ensure trespass outside these limits does not occur, to the satisfaction of the Departmental Representative and the ESO.
- .2 A Contractor's office, work headquarters, material laydown, equipment parking and storage area will be in locations approved by Parks Canada and the Departmental Representative with the goal of minimizing impacts to visitor experience and safety, motorists, wildlife and water quality.
- .3 The Contractor shall provide toilets and maintain them in a clean and sanitary condition at the camp. These facilities shall not be used for the disposal of anything but human body wastes.
- .4 The National Park Act regulations prohibit anyone working within Kootenay National Park from using public campground facilities.
- .5 Removal and storage of snow shall be arranged with the ESO and the Departmental Representative.
- .6 The Contractor shall control blowing dust and debris generated from the construction site by means such as covering or wetting down dry materials and rubbish. Dust control measures for temporary access roads may also have to be initiated.
- .7 Security services at the construction site may be desirable or necessary during the contract, especially during quiet times. Fuel tanks or other potentially deleterious substance containers must be secured by the Contractor to ensure they are tamperproof and cannot be drained by vandals at his own cost.
- .8 Pets shall not be brought to or maintained at the construction site or worker's camp.

- .9 Should the Contractor require/request a water source the Departmental Representative, in consultation with the ESO may approve a RAP and give direction as to a location to be used. Specific intake measures are required when water is approved to be withdrawn from open watercourses.

Part 2 Products

- .1 Not Used.

Part 3 Execution

3.1 CLEARING AND GRUBBING

- .1 The Contractor shall ensure that the substrate or riparian area of streams, rivers or watercourses, whether open water or frozen over shall not be disturbed by tracked, wheeled or self-propelled equipment, (e.g. a skidder or truck). The ESO or Departmental Representative will provide direction in the case of work occurring near any wetland area or watercourses.
- .2 The 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. Generally, work within a 30 metre buffer of watercourses, water bodies or wetlands requires the close oversight of the ESO or the Departmental Representative.
- .3 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.
- .4 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.
- .5 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 being transported to Hector (4-Mile) or Mannix Pit for disposal.
- .6 No slash clearing, pickup or grubbing shall occur outside of the designated area or within 1 metre of the drip line of existing forest.
- .7 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 – Seeding.

3.2 STRIPPING

- .1 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. In the event of a work program shutdown during inclement weather (e.g. winter conditions unfavourable for construction) erosion control of bared soils or excavated materials stockpiles will be required. The Contractor's EPP will describe measures to be implemented in such a circumstance.

- .2 Stripping close to the any watercourse, water body or wetland shall employ methods to ensure materials are not pushed, fall or are eroded into the water or wetlands. Generally, work within a 30 metre buffer of waterways or wetlands requires the close oversight of the ESO and the Departmental Representative.
- .3 No stripping shall occur outside of the designated area or within 1 metre of the drip line of existing forest.
- .4 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.

3.3 MATERIAL LOADING, HAULING, PLACEMENT AND GRADE BUILDING

- .1 During grade construction conducted close to any watercourse, water body or wetland methods shall be employed to ensure materials are not pushed, fall or are eroded into the water or wetlands. Generally, work within a 30 metre buffer of waterways or wetlands requires the close oversight of the ESO and the Departmental Representative.
- .2 No grade building shall occur outside of the designated area or within 1 metre of the drip line of existing forest. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation at that location. Materials shall be placed at storage sites or on the grade without spillage outside the working limits. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation at that location.

3.4 EXCAVATING AND PLACEMENT

- .1 Excavation will be undertaken according to the design drawings.
- .2 Materials shall be placed at storage sites or on the grade without spillage outside the working limits. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation at that location.
- .3 All sediment control measures shall be implemented by the Contractor prior to the commencement of the work in the vicinity of water bodies, watercourses, and wetlands.
- .4 Special precautions may have to be taken during excavation in the vicinity of intermittent or active drainage channels. See "Specific Concerns".
- .5 If sediments enter watercourses during any excavation nearby or at its banks, the Contractor shall ensure that sediment levels in the waters of the river or creeks do not exceed specified limits and meet the "desired end result" limits outlined. See "Specific Concerns".
- .6 Placement of Riprap and backfill at creeks shall be undertaken without contacting the watercourse or wetted margins of the stream, unless approved by the Departmental Representative.

- .7 Fisheries protection windows shall be observed for any other watercourse in this contract and will guide the timing of the work so that stream disturbance is prevented. See “Specific Concerns”.
- .8 If a pump-out sump to dewater excavation sites will be required, the Contractor is to prepare an EPP that details how the dewatering shall be undertaken, to the satisfaction of the Departmental Representative and the E.S.O. Special attention is to be given to the environmental sensitivity of the discharge area, freezing conditions operation, overflow avoidance, decanting and settlement pond reclamation. Water containing suspended materials shall not be pumped into watercourses, drainage systems or on to land, except with the permission of the Departmental Representative and the E.S.O.

3.5 CULVERT INSTALLATION

- .1 All culverts shall be installed using best management practices for working in or near water that will result in a minimum amount of sedimentation and damage to the riparian area of the watercourse. The Contractor shall prepare a plan for the installation of each culvert, a minimum one (1) week prior to doing the work for approval by the Departmental Representative and ESO.
- .2 The culverts shall be installed using best management practices for placement, including consideration of aquatic ecology.
- .3 It is preferable to install the culvert during periods of low discharge (e.g. during the fall). The use of sediment control measures may be necessary to ensure that excessive amounts of sediments do not enter watercourses.
- .4 It may be necessary to exclude fish from the immediate construction site while the culvert is being installed. If this practice is necessary, fish shall be salvaged from within the exclusion area, and construction should be carried out expediently to minimize the time spent working in the drainage.

3.6 ASPHALT PLANT OPERATION AND PAVING

- .1 Execution of the Work shall be in accordance with BC MoTI Standard Specifications Manual for Highway Construction (Latest Edition) – Specification 502 – End Product specification for Asphalt Concrete Pavement.
- .2 The contractor will be permitted to setup a Mobile Asphalt Plant or use a Stationary Asphalt Plant for this Project.
- .3 The asphalt plant used on this project, regardless of location, shall be a minimum of 100 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 the 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.
- .4 Trucks for hauling asphalt mixture shall have tight, clean, smooth metal beds that have been sprayed with a minimum amount of thin fuel oil to prevent the mixture from adhering and causing waste asphalt. The vehicle covers shall be securely fastened. Excess truck box lubricants such as light oil, detergent or lime solutions

shall not be allowed to contaminate the mix, and shall be disposed of in an environmentally acceptable manner. Truck box lubricant application shall be carried out in a containment berm.

- .5 The asphalt plant must be equipped with pollution control devices in addition to, or in replacement of standard cyclone dust collectors, to effectively eliminate the emission of dust and smoke pollutants into the atmosphere. Use of secondary dust collection systems that require discharge of dust polluted water into natural drainage system will not be allowed. Regardless of requirements stated in above, asphalt plant operation must comply with all environmental pollution control regulations applicable in the plant area.
- .6 The Contractor shall be responsible for the purchase and the safe delivery / storage / handling of asphalt cement and emulsions to the asphalt plant site. Excess hot mix or reject asphalt shall be temporarily stored as directed by the Departmental Representative and removed from Kootenay National Park for proper recycling or disposal.
- .7 Asphalt material shall be removed and stored at a location specified by the Departmental Representative.
- .8 The Contractor shall ensure that there is enough room between the stockpiles and the asphalt plant for a loader in the event of a spill at the asphalt plant. A containment berm with an associated liner made of occlusive material (e.g. plastic of a thickness approved by the Departmental Representative) and covered with absorbent sand or clay shall be installed under the asphalt storage tank to ensure containment of 110% of the tank's capacity.
- .9 The Contractor may wish to protect containment/catchment areas and drip trays at the asphalt plant from rainfall since, if contaminated all of the collected water will have to be disposed of at the expense of the Contractor at an approved disposal facility.
- .10 Sites from which materials have been removed shall be restored to a neat and presentable condition upon the completion of the work.

3.7 CRUSHING

- .1 The substrate in the area between Mannix Gravel Pit and the Bow River, and Settler's Pit and the Kootenay River is permeable. The Contractor shall be prepared for potential spills of fuels, lubricants or hydraulic fluid from the crusher using containment berms with associated occlusive liner of adequate thickness to ensure that these materials do not penetrate underlying soil materials down to the water table and into the Bow River or Kootenay River. In the event of a spill, the Contractor shall ensure timely and effective spill response. **The Contractor is advised that the High Ground Water level in Mannix and Settler's Pits are generally between June and September.**
- .2 The Contractor shall provide drip and spill containment for the crusher, cone, generators and other components where spills may occur (e.g. plastic lined dirt berms, collection/drip trays, and double-walled fuel tanks). Spill response in a timely and effective manner in the event of a spill is mandatory. The measure chosen by the Contractor shall ensure containment of 110% of the capacity of the fuel tank, crankcase, etc.

- .3 Excavation, hauling and placing materials associated with a crushing operation shall be conducted within the approved footprint of the total crushing operation. Crushed materials shall be placed at the designated storage site located within Mannix or Settler's Pits as identified by the Departmental Representative without spillage or ravelling outside the limits of this location. Any material inadvertently falling outside the work limits is to be moved promptly to within the storage limits. Repair of damage outside the work limits will be at the complete expense of the Contractor.
- .4 Access to Mannix and Settler's Gravel Pits work areas is via a locked gate. There is minimal space for parking of workers' private vehicles in the vicinity of the crushing operation. If other Contractors are using the pit at the time of this contract, the Departmental Representative shall address any circulation or parking conflicts, should they arise.

3.8 FINE GRADING, TOPSOIL PLACEMENT AND SEEDING

- .1 This contract involves the final shaping of cut slopes, fills and landscapes disturbed in the construction of the Works. These slopes will be covered by stripped soil and chip compost materials and seeded. Environmental concerns related to these activities largely focus on erosion prevention and sediment control. The Contractor is to present a plan for placement, spreading, and stabilization of reclamation materials that controls erosion and prevents sedimentation, to the satisfaction of the Departmental Representative and ESO.

3.9 PAVEMENT MARKING AND GUARDRAIL PLACEMENT

- .1 Pavement marking shall be undertaken pursuant to standard methods applied in Kootenay National Park for control of paint products, both in transport and handling. The Contractor will present a description of methods to be employed for transporting and controlling paint and hazardous products, application of paint, cleaning of equipment, containment and disposal of waste paint and cleaning products, etc., the satisfaction of the Departmental Representative.

3.10 SPECIFIC CONCERNS RELATIVE TO EROSION CONTROL AND SEDIMENTATION

- .2 The Contractor shall prepare an Erosion and Sedimentation Management Plan for the components of this contract that are undertaken in proximity to watercourses, wetlands or riparian environments. This plan shall be to the satisfaction of the Departmental Representative and ESO. If sediment ponds are required, they shall be designed to settle all sediment particles 0.02 mm or larger. The ponds shall also be designed to handle 1:5 year storm events, with overflow spill capacity for 1:10 year storm events and emergency spillway capacity for 1:100 year storm events.
- .3 An important desired end result is to allow no release into watercourses of sediments in levels that are deleterious to fish or that would harmfully alter, disrupt, or destroy fish habitat. Similarly there is to be no sediment release into areas of vegetation growth or sensitive areas of sediments in levels that would adversely alter growing or hydraulic conditions. The target is 0 mg/L of TSS over background levels. The threshold is a maximum instantaneous increase of 25 mg/L over background levels when background levels are <250 mg/L, or a

maximum instantaneous increase of 10% over background levels when background levels are >250 mg/L. This threshold shall not be exceeded.

3.11 SPECIFIC CONCERNS RELATIVE TO SENSITIVE SITES AND ACTIVITIES

- .1 Grade construction and paving activity near streams, rivers, wetlands, water bodies or watercourses must be undertaken with care to prevent damage to aquatic and riparian habitat or associated tree and plant communities. A large and mobile spill kit shall be kept at hand during construction at these sensitive sites in proximity to watercourses.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

- .1 This work shall be incidental to the contract and will not be measured for payment.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
- .2 CAN/CSA-A23.2-04, Methods of Test and Standard Practices for Concrete
- .3 BC MoTI –Standard Specifications for Highway Construction Manual (Latest Edition)
- .4 AT - 2013 Standard Specifications for Highway Construction

1.3 TESTING BY THE CONTRACTOR

- .1 The Contractor shall perform all Quality Control testing required to assure that the Work strictly complies with the Contract requirements. This shall include, but not be limited to:
- .2 All testing specified in the Contract Documents;
- .3 Any other testing required as a condition for deviation from the specified Contract procedures;
- .4 Testing shall be in accordance with the current edition of BC MoTI Standard Specifications for Highway Construction.
- .5 The Contractor shall be fully responsible and bear all costs for all quality control testing and shall conduct such testing in the following manner:
- .6 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;
- .7 Notify the Departmental Representative when sampling will be conducted;
- .8 Within one Day after completion of testing, submit test results to the Departmental Representative; and
- .9 Identify test reports with the name and address of the organization performing all tests, and the date of the tests.
- .10 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.
- .11 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.

- .12 The minimum frequency for Quality Control testing during embankment construction 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
Embankment construction with fine grained or granular soil	Field density by: ASTM D2922 - Nuclear	1 per 500 m ² per lift, spaced randomly across full width of embankment
Embankment construction with blasted rock or oversize granular	Field observation with daily field report; and a summary report signed and stamped by Professional Departmental Representative	Full time during blasted rock placement
Culvert Installation	Field Density	Minimum two per 200 mm lift per culvert, spaced through the length and depth of the culvert backfill

1.4 CONTRACTOR'S QUALITY CONTROL PROGRAM

- .1 The Contractor shall prepare a Quality Control Program. The purpose of the program shall be to ensure the performance of the Work in accordance with Contract requirements.
- .2 The Quality Control Program shall be described in a Quality Control Manual. The Contractor shall submit the Manual to the Departmental Representative for review in accordance with Section 01 33 00, Submittal Procedures. The Manual shall develop a logical system for tracking and documenting the Quality Control of the Work. 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.
- .3 The Quality Control Manual shall 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 testing 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 Departmental Representative, if the Departmental Representative witnesses the tests; and
 - .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.
- .4 The Contractor shall appoint a full time qualified and experienced Quality Control Manager, 100% of his time dedicated to quality matters and who will report regularly to the Contractor's management at a level that shall ensure that Quality Control requirements are not subordinated to manufacturing, construction or delivery. The Quality Control Manager shall be empowered by the Contractor to resolve quality matters.
- .5 The Quality Control Manual shall include samples of all forms to be filled in by the Quality Control Inspectors. All forms shall be signed by the Quality Control Manager and submitted promptly to the Departmental Representative who will add its review signature.
- .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. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.
- .7 At completion of the Work a bound and itemized copy of all Quality Control documents and reports shall be prepared by the Contractor's Quality Manager and submitted to the Departmental Representative.

1.5 INSPECTION

- .1 Allow the 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 The Contractor shall 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 the Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 The Departmental Representative will 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, correct such Work and pay cost of examination and correction.

1.6 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will 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 to perform Work in accordance with Contract Documents.
- .3 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Departmental Representative at no cost to the Departmental Representative.

1.7 ACCESS TO WORK

- .1 The Contractor shall allow inspection / testing agencies access to Work, off-site manufacturing and fabrication plants.
- .2 The Contractor shall co-operate to provide reasonable facilities for such access.

1.8 PROCEDURES

- .1 The Contractor shall notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 The Contractor shall provide labour and facilities to obtain and handle samples and materials on site.

1.9 REJECTED WORK

- .1 The Contractor shall remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, that has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 The Contractor shall make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of the Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.

1.10 REPORTS

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

1.11 TESTS AND MIX DESIGNS

- .1 Furnish test results and designs as may be requested.

1.12 MILL TESTS

- .1 Submit mill test certificates as required of specification sections.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

- .1 All work of this section shall be incidental to contract and will not be measured for payment.

1.2 INSTALLATION AND REMOVAL

- .1 The contractor shall provide construction facilities in order to execute work expeditiously.
- .2 The contractor shall remove from site all such work after use.

1.3 SITE STORAGE / LOADING

- .1 The Contractor shall restrict work and operations of employees to those necessitated by the Contract Documents. The Contractor shall not unreasonably encumber the premises with products.
- .2 The Contractor shall not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.4 CONSTRUCTION PARKING

- .1 The Contractor shall provide and maintain adequate access and parking at the project site in areas approved by the Departmental Representative.
- .2 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

1.5 SECURITY

- .1 If required by the Contractor, the Contractor shall provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays. For extended shut-downs, the Contractor shall provide the level of security as required to protect the Work. The Contractor is advised that some random acts of vandalism to equipment have occurred within the Park.

1.6 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 The Contractor shall provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 The Contractor shall locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.7 SANITARY FACILITIES

- .1 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations, ordinances and the EPP.
- .2 The Contractor shall post notices and take such precautions as required by local health authorities.
- .3 The Contractor shall keep the worksite and various laydown areas in sanitary condition.

1.8 CONSTRUCTION SIGNAGE

- .1 No other signs or advertisements, other than warning and traffic control signs, are permitted on site.
- .2 Signs and notices for safety and instruction shall be in both official languages
Graphic symbols shall conform to CAN3-Z321.
- .3 The Contractor shall 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.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 PRECEDENCE**

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

1.2 MEASUREMENT PROCEDURES

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

1.3 INSTALLATION AND REMOVAL

- .1 The contractor shall provide temporary controls in order to execute Work expeditiously.
- .2 The contractor shall remove from site all such work after use.

1.4 HOARDING

- .1 The contractor shall provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.5 GUARD RAILS AND BARRICADES

- .1 The contractor shall provide secure, rigid guard rails and barricades around deep excavations.

1.6 WEATHER ENCLOSURES

- .1 Not used.

1.7 DUST TIGHT SCREENS

- .1 Not used.

1.8 ACCESS TO SITE

- .1 The contractor shall provide and maintain access roads, as may be required for access to Work.

1.9 PUBLIC TRAFFIC FLOW

- .1 The contractor shall provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.10 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 The contractor shall protect surrounding public property from damage during performance of Work.
- .2 The contractor shall be responsible for damage incurred.

1.11 PROTECTION OF BUILDING FINISHES

- .1 Not used.

Part 2 Products

.1 Not Used

Part 3 Execution

.1 Not Used

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

- .1 This work shall be incidental to the Contract and will not be measured for payment.

1.2 REFERENCE STANDARDS

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 The Contractor shall conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 The cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 The Contractor shall 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 (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, 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.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

1.4 AVAILABILITY

- .1 Immediately after signing contract, review product delivery requirements and anticipate foreseeable supply delays for any 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 the 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 The contractor shall handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 The contractor shall 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 The contractor shall store products subject to damage from weather in weatherproof enclosures.
- .4 The contractor shall store cementitious products clear of earth or concrete floors, and away from walls.
- .5 The contractor shall 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 The contractor shall store sheet materials, lumber and misc. metals on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 The contractor shall 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 The contractor shall remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 The contractor shall 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 The contractor shall pay costs of transportation of products required in performance of Work.

1.7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, the contractor shall 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 The contractor shall notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may 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 The contractor shall 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 The contractor shall 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 The contractor shall ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 The contractor shall be responsible for coordination and placement of openings, sleeves and accessories.

1.10 CONCEALMENT

- .1 The Departmental Representative will inspect all work prior to any concrete pours. The Contractor shall notify the Departmental Representative 24 hours before any pour for inspection.

1.11 REMEDIAL WORK

- .1 The contractor shall perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 The contractor shall 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 The contractor shall provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 The contractor shall prevent electrolytic action between dissimilar metals and materials.
- .3 The contractor shall use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 The contractor shall 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 The contractor shall keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings that cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 PROTECTION OF WORK IN PROGRESS

- .1 The contractor shall not cut, drill or sleeve any load bearing structural member without written approval of Departmental Representative, unless specifically indicated.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

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

1.2 REFERENCES

- .1 Owner's identification of existing survey control points and property limits.

1.3 QUALIFICATIONS OF SURVEYOR

- .1 Qualified surveyor, licensed to practise in Place of Work, acceptable to Departmental Representative.

1.4 SURVEY LAYOUT REQUIREMENTS

- .1 The Departmental Representative will indicate the beginning and end of the project and sufficient reference points and other information for horizontal and vertical control, to be used by the Contractor for his detailed layout. This information will include, if available, radii and lengths of curves, design superelevations, pavement widths, and centreline deflection points. The Contractor shall protect and shall not remove or destroy, or permit to be removed or destroyed, the stakes or marks set as reference points by the Departmental Representative. Subsequent to the initial reference points staking performed by the Departmental Representative, the Contractor shall perform all layout, survey and construction staking necessary to meet specified requirements for any type of construction.
- .2 The Contractor's detailed survey layout for construction shall include a complete base-line displaying project stationing at 20 m intervals suitable for referencing test locations and for purposes of measurement for payment.
- .3 At all work sites, the Contractor shall mark accurately, at regular intervals, the location and type of existing painted lines and concrete barriers 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.
- .4 The Contractor is responsible for the accurate layout of all painted lines and concrete barriers at all work sites in this contract.
- .5 The Contractor shall provide at his own cost, any survey activities as required and including, but not limited to, the following:
 - .1 Layout for interim lane markings, including those for intersection treatments.
 - .2 Re-establishing the start and finish of "No Passing Zones", or at new limits as directed by the Departmental Representative.
 - .3 String line or other markings for the alignment or grade control of construction equipment.

1.5 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points will be provided by the Departmental Representative.

- .2 The Contractor shall locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3 The Contractor shall make no changes or relocations without prior written notice to Departmental Representative.
- .4 The Contractor shall report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.

1.6 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 Layout for interim and final lane markings, including those for intersection treatments
 - .6 Re-establishing the start and finish of "No Passing Zones", Passing Lanes or at new limits as directed by the Departmental Representative
 - .7 Re-establishing Reference Survey Control Points that are in danger of being damaged or destroyed.
- .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:
 - .1 Horizontal shall be less than $r = 5(d+0.2)$ where "r" is in cm and "d" is in km
 - .2 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 0.1m of correct elevation.
 - .2 In open ground, all elevations shall be within 0.05 m of correct elevation.

- .3 On highway surface, all elevations shall be within 0.01 m of correct elevation
- .4 The Contractor shall provide cut sheet reports to the Departmental Representative for all stages of road construction to demonstrate that the defined construction tolerances have been achieved.
- .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.

1.7 RECORDS

- .1 The Contractor shall maintain a complete, accurate log of control and survey work as it progresses.
- .2 The Contractor shall record locations of maintained, re-routed and abandoned service lines.

1.8 SUBMITTALS

- .1 The Contractor shall submit the name and address of Surveyor to Departmental Representative.
- .2 On request of Departmental Representative, the Contractor shall submit documentation to verify accuracy of field engineering work along with a certificate signed by surveyor certifying those elevations and locations of completed Work conform to the Contract Documents.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 PRECEDENCE**

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

1.2 MEASUREMENT PROCEDURES

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

1.3 PROJECT CLEANLINESS

- .1 The Contractor shall maintain the Work in tidy condition, free from accumulation of waste products and debris, including that caused by the Owner, Departmental Representative, or other Contractors.
- .2 The Contractor shall remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. No burning of waste materials on site is permitted.
- .3 The Contractor shall clear snow and ice from access to work areas during active construction periods and when access to environmental protection facilities required outside active construction times.
- .4 The Contractor shall make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 One bear proof container will be provided by Parks Canada. The Contractor shall provide any additional on-site bear proof containers required for collection of waste materials and debris.
- .6 The Contractor shall remove waste material and debris from site at end of each working day.
- .7 The Contractor shall dispose of waste materials and debris outside of the National Park at an appropriate landfill or disposal facility.
- .8 The Contractor shall store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 The Contractor shall provide adequate ventilation during use of volatile or noxious substances.
- .10 The Contractor shall use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.4 FINAL CLEANING

- .1 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Prior to final review, remove surplus products, tools, construction machinery and equipment.
- .3 The contractor shall remove waste products and debris including that caused by Owner or other Contractors.

- .4 The contractor shall remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .5 The contractor shall make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 The contractor shall inspect finishes, and ensure specified workmanship and operation.
- .7 The contractor shall remove dirt and other disfiguration from exterior surfaces.
- .8 The contractor shall sweep and wash clean paved areas.
- .9 The contractor shall clean drainage systems.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 PRECEDENCE**

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

1.2 MEASUREMENT PROCEDURES

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

1.3 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 The Contractor shall notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 The Contractor shall then request Departmental Representative's Inspection.
- .2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: The Contractor shall submit a written certificate that following have been performed:
 - .1 All work has been completed and inspected for compliance with Contract Documents.
 - .2 All defects have been corrected and deficiencies have been completed.
 - .3 All work is complete and ready for Final Inspection.
- .4 Final Inspection: when items noted above are completed, the contractor shall request a final inspection of Work by Departmental Representative, and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 PRECEDENCE**

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

1.2 MEASUREMENT PROCEDURES

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

1.3 AS-BUILTS AND SAMPLES

- .1 In addition to requirements in General Conditions, maintain at the site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to the Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 The contractor shall store record documents and samples in field office apart from documents used for construction.
- .3 The contractor shall label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 The contractor shall maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 The contractor shall keep record documents and samples available for inspection by Departmental Representative.

1.4 RECORDING ACTUAL SITE CONDITIONS

- .1 The contractor shall record information on set of black line opaque Drawings and in copy of the Project Manual.
- .2 The contractor shall record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: the contractor shall legibly mark each item to record actual construction, including:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by change orders.
 - .3 Details not on original Contract Drawings.
 - .4 References to related shop drawings and modifications.
- .4 The Contractor shall legibly mark each item to record actual construction in the Specifications including but not limited to:

- .1 Changes made by Addenda and change orders

1.5 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.

1.6 WARRANTIES AND BONDS

- .1 The contractor shall separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 The contractor shall list subcontractors, suppliers, and manufacturers, with name, address, and telephone number of responsible principal.
- .3 The contractor shall obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.
- .4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
- .5 The contractor shall verify that documents are in proper form, contain full information, and are notarized.
- .6 The contractor shall co-execute submittals when required.
- .7 The contractor shall retain warranties and bonds until time specified for submittal.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 MEASUREMENT PROCEDURES

- .1 Payment under **“Unit Price Item 1 – Asphalt Concrete Pavement Removal”** shall be the total compensation for all operations involved in saw-cutting, milling, and disposal of waste asphalt including but not limited to, cold milling, sweeping, loading, hauling, and stockpiling in Settler’s, and cleaning of remaining pavement surface. The Contractor shall refer to section 32 01 16.8 for Full Depth Reclamation specifications. Payment shall be made as follows:
 - .1 **“Unit Price Item 1a – Asphalt Concrete Pavement Removal – Partial Depth Milling”** will be measured for payment in square metres of asphalt pavement milled to a depth of 50mm and stockpiled in Settler’s pit or at a location approved by the Departmental Representative. Payment shall include all labour, equipment and material to complete the Work.
 - .2 No overhaul will be paid for Asphalt Pavement Removal.
 - .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 Accommodation”** and no separate payment will be made to the Contractor.
 - .5 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse in accordance with Section 01 35 43 - Environmental Procedures.
- .2 The Contractor shall place milled asphalt material in a stockpile at Settler’s Pit, or at other locations designated by the Departmental Representative.

Part 2 Products

2.1 EQUIPMENT

- .1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated. Maximum particle size of milled materials shall be 50 mm.

Part 3 Execution

3.1 PREPARATION

- .1 Prior to beginning removal operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt pavement to be removed.

- .2 The Contractor shall have appropriate Traffic Control measures in place for this work.

3.2 PROTECTION

- .1 The Contractor shall protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.3 REMOVAL

- .1 Full depth asphalt pavement removal shall be done to the lines shown on the Drawings or as designated by the Departmental Representative.
 - .1 The Contractor shall refer to section 32 01 16.8 for Asphalt Concrete Pavement Removal – Full Depth Reclamation specifications
- .2 Partial Depth Asphalt Pavement Removal by milling to lines and grades established by Departmental Representative in field:
 - .1 The Contractor shall use equipment and methods of removal and hauling that do not damage or disturb underlying roadway structure.
 - .2 The Contractor shall prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
 - .3 The Contractor shall provide for suppression of dust generated by removal process.

3.4 STOCKPILING OF MATERIAL

- .1 The Contractor shall place milled asphalt material in a stockpile at Settler's pit, or at other locations designated by the Departmental Representative. The material shall remain the property of Parks Canada.

3.5 FINISH TOLERANCES

- .1 Finished surfaces in areas where asphalt pavement has been removed to be within +/-5 mm of grade specified but not uniformly high or low.

3.6 SWEEPING

- .1 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using hand cleanup as required.

END OF SECTION

Part 1 General**1.1 PRECEDENCE**

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

1.2 MEASUREMENT PROCEDURES

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

1.3 REFERENCES

- .1 Export and Import of Hazardous Waste Regulations (EIHW Regulations), SOR/92-637.
- .2 National Fire Code of Canada 1995.
- .3 Transportation of Dangerous Goods Act, 1992 (TDG Act) [1992], (c. 34).
- .4 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).

1.4 DEFINITIONS

- .1 Dangerous Goods: Product, substance, or organism that is specifically listed or meets the hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .3 Hazardous Waste: Any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .4 Workplace Hazardous Materials Information System (WHMIS): A Canada-wide system designed to give employers and workers information about hazardous materials used in the workplace. Under WHMIS, information on hazardous materials is to be provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by a combination of federal and provincial laws.

1.5 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.
- .3 Submit hazardous materials management plan to Departmental Representative that identifies all hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.

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 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .4 Storage and Handling Requirements:
 - .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
 - .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
 - .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.
 - .4 All explosives must be mixed outside of the Park and delivered to the site. No storage of explosives shall be allowed within the National Parks.
 - .5 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
 - .6 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
 - .7 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
 - .8 Transfer of flammable and combustible liquids is prohibited within buildings.
 - .9 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
 - .10 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.
 - .11 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
 - .12 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
- .5 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.

- .6 Store hazardous materials and wastes in secure storage area with controlled access.
- .6 Maintain clear egress from storage area.
- .7 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
- .8 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
- .9 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

Part 2 Products

2.1 MATERIALS

- .1 Only bring on site the quantity of hazardous materials required to perform Work.
- .2 Maintain MSDSs in proximity to where the materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

Part 3 Execution

3.1 DISPOSAL

- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes for which there is an approved, cost effective recycling process available.
- .3 Send hazardous wastes only to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited. Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
- .6 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.
- .7 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
 - .1 Hazardous wastes recycled in manner constituting disposal.
 - .2 Hazardous waste burned for energy recovery.
 - .3 Lead-acid battery recycling.
 - .4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Parks Canada Exterior Signage Standards and Guidelines (March 2007)
- .2 ASTM A276-91a, Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
- .3 ASTM B209M-92a, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .4 ASTM B210M-92a, Specification for Aluminum-Alloy Drawn Seamless Tubes.
- .5 ASTM B211M-92a, Specification for Aluminum and Aluminum-Alloy Bar, Rods and Wire.
- .6 CAN/CSA-G40.21-M92, Structural Quality Steels.
- .7 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .8 CAN/CSA-O80 Series-M89, Wood Preservation.
- .9 CSA O121-M1978, Douglas Fir Plywood.
- .10 CSA W47.2-M1987, Certification of Companies for Fusion Welding of Aluminum.
- .11 CGSB1-GP-12c-65, Standard Paint Colours:
- .12 CAN/CGSB-1.28-M89, Alkyd, Exterior House Paint.
- .13 CAN/CGSB-1.59-M89, 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.

1.2 MEASUREMENT PROCEDURES

- .1 Measurement for payment for supply and installation of signs, posts, and bases will be based on each complete unit installed according to these specifications, and shall include all labour, equipment and materials to satisfactorily complete this item of work.

- .2 Payment for the supply and installation of single post signs will be made under **“Unit Price Item 2a – Traffic Signage - Supply and Install Signs”**.
- .3 Payment for the relocation of existing signs and utility markers will be made under **“Unit Price Item 2b – Traffic Signage - Relocate Existing Signs”**.
- .4 Payment for the removal and disposal of existing signs and posts including filling holes will be made under **“Lump Sum Price Item 3 – Prime Cost Sum”**.
- .5 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.
- .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.
- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Divert unused metal and/or plastic materials to recycling facility approved by Departmental Representative.
- .3 Damaged signs and posts from any removals to be transported to recycling facility approved by the Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Traffic signs, posts, and bases shall be supplied and installed in accordance with the BC MoTI Standard Specification for Highway Construction (Latest Edition) Section 635.

Part 3 Execution

3.1 INSTALLATION

- .1 The Contractor shall load, haul and install Contractor supplied single post and aluminum signs (see detail sheet for typical sign) and bases in the following manner:
 - .1 The Contractor is responsible for locating power / telephone / gas lines / services / utilities at all proposed sign locations.
 - .2 The Contractor is responsible for layout and measurements to ensure signs are installed as per Drawings and as directed by the Departmental Representative.

- .3 Concrete bases: Excavate one hole for the concrete base at the location and depth provided by the Departmental Representative. Using some of the excavated material, level and compact bottom of hole. Place base with one side parallel to the edge of asphalt and level. The top of the base is to be flush or 1" above finished grade.
- .4 Adjust the post height by using a pipe cutter or cut off saw. All post cuts will be determined in the field by the Departmental Representative. The Departmental Representative will measure existing elevations at each site and calculate the cuts needed. The Contractor is required to provide the Departmental Representative with a minimum of 48 hours' notice in order to perform the calculations.
- .5 Assemble the signs on the forks on the ground. Slide forks onto posts and place the cap.
- .6 Drill 1 hole in base sleeves and posts for ½ " bolts, as shown in the detail sheet and as verified by the Departmental Representative, and shim to plumb if necessary.
- .7 Bases must be perfectly plumbed. Vertical and horizontal tolerances for the base are 0.075m. Tolerance for the plumb of the posts is 0.01 m per 1.0 m or 1/4" on a two foot carpenters level. Tolerances for the signs are 0.075 m for distance from asphalt and 0.075 m for height above white line.
- .8 The Contractor is responsible for hauling all materials to and from each work site.
- .9 Landscape so the top of the base is flush or 25 mm above finished grade.
- .10 Remove all excess material from site, including boulders larger than 100 mm.
- .11 All signs are to be covered until the Departmental Representative advises to uncover.
- .12 The Contractor is to place NPC/PNC stickers (provided by the Departmental Representative) on all signs as indicated by the Departmental Representative.
- .13 Payment for this item shall be based on the number of signs installed and shall include all material, labour and equipment required to satisfactorily complete this item of work.

3.2 REMOVAL AND SALVAGE

- .1 The Contractor shall carefully dismantle and salvage posts, and aluminum signs where possible.
- .2 Deliver salvaged materials to 4-Mile pit or other locations as directed by Departmental Representative.
- .3 Damaged signs and posts shall be hauled to recycling facility accepted by the Departmental Representative.
- .4 Fill holes with gravel and compact

3.3 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 This Section defines correction to maximum dry density to take into account aggregate particles larger than 19 mm.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
- .2 ASTM C127-[04], Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
- .3 ASTM D698-[00ae1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .4 ASTM D1557-[02e1], Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- .5 ASTM D4253-[00], 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 $D = D1 \times D2 / (F1 \times D2) + (F2 \times D1)$.
 - .2 $D = (F1 \times D1) + (0.9 \times D2 \times F2)$.
 - .3 Where: D = corrected maximum dry density kg/m³.
 - .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/m³ of material passing 19 mm sieve determined in accordance with Method A of ASTM D1557.
 - .7 D2 = bulk density, kg/m³, 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 D4253 wet method when directed by Departmental Representative.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Aggregates shall be produced in accordance with AT – 2010 Standard Specifications for Highway Construction – Specification 3.2 Aggregate Production and Stockpiling.
- .2 AT specifications specified for the work can be found at the following AT website address:
 - .1 **http://www.transportation.alberta.ca/Content/docType245/Producti on/2010_Highway_Construction.pdf**
- .3 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 his duly appointed representative.
 - .2 Department – “Department” shall mean Parks Canada Agency (PCA).

1.2 MEASUREMENT PROCEDURES

- .1 **Unit Price Item 3a – Aggregate Materials - 12.5mm Winter Abrasive:**
Payment will be made at the unit price bid based on the number of cubic metres of 12.5mm Winter Abrasives accepted. Aggregates are to be stockpiled at Settler’s Pit in locations as directed by the Departmental Representative. This payment will be full compensation for excavation, hauling, crushing; stockpiling aggregates; testing; maintaining and plowing access roads and areas in the Work areas; Clean-up; and all labour, equipment, tools and incidentals necessary to complete the Work.
 - .1 All production of 12.5mm Winter Abrasive shall be completed by **July 29, 2016** for hauling by others.
- .2 **Unit Price Item 3b – Aggregate Materials - Mixed RAP Material:** Payment will be made at the unit price bid based on the number of cubic metres of Mixed RAP Material accepted. Aggregates are to be stockpiled at Settler’s Pit in locations as directed by the Departmental Representative. This payment will be full compensation for excavation, crushing; hauling and stockpiling aggregates; testing; maintaining and plowing access roads and areas in the Work areas; Clean-up; and all labour, equipment, tools and incidentals necessary to complete the Work.
- .3 **Crushing, hauling and stockpiling of aggregates will be measured as the volume of the stockpiles, as determined by the Departmental Representative, taking survey measurements before and after stockpiling.** The average end measurement or surface to surface composite method will be used in calculating surveyed stockpiled quantities. Contractor is advised that it is his responsibility to allow for compaction shrinkage, of crushed materials, when placed in stockpiles and no allowance by Departmental Representative is calculated in survey quantity stockpile calculations for this shrinkage. No stockpiling by conveyor shall be permitted.
- .4 Traffic Control when required for this Work shall be incidental to the Contract and no separate payment will be made to the Contractor.

- .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 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.

1.3 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Procedures.

Part 2 Products

- .1 12.5 mm Winter Abrasive shall have the following gradation:

Sieve Size	Percent Passing
12.5 mm	100
10 mm	80 - 92
5 mm	40 - 70
1.25 mm	20 - 45
315 µm	9 - 22
160 µm	5 - 15
80 µm	0 - 10

- .1 All crushed aggregates must pass the maximum size sieve, no tolerance will be permitted.
- .2 At least 40% of the material retained on the 5 mm sieve shall have two or more fracture faces. The plasticity index shall be between 0 and 8.

Part 3 Execution

- .1 Not used

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

- .1 Quantities for payment for grubbing areas cleared by others will be measured based on horizontal measurements in hectares of land acceptably grubbed and disposed of at Mannix Pit or as directed by the Departmental Representative, according to these specifications, and shall include all labour, equipment and material to satisfactorily complete this item of work. Payment shall be made under **“Unit Price Item 4a – Clearing and Grubbing - Grubbing”**
 - .1 The extent of grubbing shall be as directed by the Departmental Representative and the Contractor shall not commence work on this activity until approval to proceed has been granted.
 - .2 Majority of trees have been removed prior to construction. Minor clearing may be required.
- .2 Additional miscellaneous clearing may be required due to field changes. Quantities for payment for flush cutting, clearing will be paid under **“Lump Sum Price Item 3 – Prime Cost Sum”**.
- .3 No overhaul will be paid for grubbing.
- .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 Accommodation”** and no separate payment will be made to the Contractor.
- .6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor

1.2 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 as described in Section 200, Clearing and Grubbing of the latest edition of BC MoTI Standard Specifications for Highway Construction.
- .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.

1.3 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor.

1.4 PROTECTION

- .1 The contractor shall prevent damage to trees, natural features, bench marks, existing pavement, water courses and root systems of trees that are to remain.
- .2 The contractor shall repair any damaged items to approval of Departmental Representative.
- .3 The contractor shall replace any trees designated to remain, if damaged, as directed by Departmental Representative.

Part 2 Products

- .1 Not used.

Part 3 Execution**3.1 PREPARATION**

- .1 Inspect site and verify with Departmental Representative, items designated to remain.

3.2 CLEARING

- .1 Clear 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.
- .3 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.
- .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 to not less than 200 mm 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 grubbed wood materials shall be hauled and disposed of in Mannix Pit or as directed by the Departmental Representative.

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.

END OF SECTION

Part 1 General**1.1 DESCRIPTION**

- .1 This item consists of the excavation and disposal of all materials in conformity with the lines, grades and dimension indicated on the drawings and as directed by the Departmental Representative and includes:
 - .1 Stripping of organic material.
 - .2 Roadway, culvert and borrow excavation.
- .2 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.
- .3 Removal and disposal of unsuitable materials from excavation, embankment and borrow areas.
- .4 Transportation of excavated materials.
- .5 Finishing of top surfaces and slopes.
- .6 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 MEASUREMENT PROCEDURES

- .1 Stripping and Placement in Stockpiles:
 - .1 The Quantity of Stripping materials for which payment will be made shall be the volume in cubic metres measured in its original position from cross-sections taken before and after stripping. Stripping depth is estimated to be on average 300 mm but will fluctuate from one location to the other. Payment will be made under **“Unit Price Item 5a – Roadway and Drainage Excavation - Stripping”** and will include cost to strip, load, haul, screen, dispose of waste at Hector (4-Mile) Pit and stockpile this material adjacent to the work, or as directed by the Departmental Representative.
 - .2 Stripped materials shall not be contaminated by other materials. If contamination does occur the Department Representative at his discretion may require clean topsoil be imported from an approved source and contaminated materials be disposed of at the contractor's expense.
 - .3 No overhaul will be paid for this Work: Stripping and Placement in Stockpiles.
- .2 Excavation - Common and Embankment Construction:
 - .1 The Quantity of Excavation Common for which payment will be made shall be the volume in cubic metres measured in its original position from cross sections taken by Departmental Representative in areas of excavation. Payment will be made under **“Unit Price Item 5b – Roadway and Drainage Excavation - Type D Excavation”** and shall include cost of excavating, hauling, placing and compacting material

- between construction limits for construction of the roadway embankment.
- .2 Included for is the placement and compaction of embankment material to a minimum 95% maximum dry density, ASTM D698 (AASHTO T99). Placed material shall be in a maximum of 200mm loose lift thickness and not be covered until accepted by the Departmental Representative.
- .3 Material produced by Full Depth Reclamation that is to be moved and incorporated into the work at locations other than its origin shall be considered for payment in this item.
- .4 Departmental Representative will take initial cross sections after clearing, grubbing and stripping completed and immediately prior to excavation of material to be incorporated into work.
- .5 No overhaul will be paid for this Work.
- Only material acceptable to the Department Representative shall be used in the construction of embankments incorporated into the work.
- .3 Excavation of Unsuitable Material:
- .1 The Quantity of Excavation of Unsuitable Material that payment will be made shall be the volume in cubic metres measured in its original position from cross sections taken by Departmental Representative in areas of excavation or at the disposal location before and after excavation or placement. Payment will be made under **“Unit Price Item 5c – Roadway and Drainage Excavation – Type D Haul to Waste”** and shall include cost of excavating, hauling, and offsite disposal of the material at a suitable disposal facility as directed by the Departmental Representative, or stockpiling the material as directed by the Department Representative.
- .4 Payment for Rock Removal if deemed necessary by the Departmental Representative shall 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 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.
- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor
- .8 No separate measurement payment will be made for:
- .1 Excavating unnecessarily beyond lines established by Departmental Representative, with exception of unavoidable slide material. Do not measure slide material, when such slides are attributable to negligence.
- .2 Loading hauling, placing and compaction of boulders less than 1.5 cubic metres into large embankments.
- .3 Scarifying or benching existing slopes or existing road surfaces.

- .4 Removing unsuitable material from embankment attributable to negligence.
- .5 Watering, drying or compacting.
- .6 Proof rolling and/or performing the rutting test.
- .7 Compaction of material (150 mm) below subgrade horizon in areas of cut.
- .8 Finishing.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
- .2 ASTM D698-00a, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft³) (600 kN-m/m³).

1.4 DEFINITIONS

- .1 Type A – Solid Rock:
 - .1 All forms of "solid rock in place" occurring in masses, ledges, seams or layers of sufficient hardness to require breaking by continuous drilling and blasting before excavation and removal.
 - .2 Detached masses of rock or boulders individually containing a volume of 2.0 m³ or more.
 - .3
- .2 Excavation Common: excavation of materials that are not Rock Excavation or Stripping.
- .3 Borrow: Suitable material obtained from locations outside the limits of the roadway cut and placed as embankment material.
- .4 Stripping: excavation of organic material covering original ground.
- .5 Embankment: material derived from usable excavation and placed above original ground or stripped surface.
- .6 Waste Material: material unsuitable for embankment, embankment foundation or material surplus to requirements.
- .7 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

- .1 Regulatory Requirements:
 - .1 Adhere to regulations of authority having jurisdiction when blasting is required.
 - .2 Adhere to Provincial and National Environmental requirements when potentially toxic materials are involved.
- .2 All Quality Control testing by the Contractor.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 The Contractor shall separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.

- .2 Waste shall be disposed or at suitable offsite disposal facility as directed by the Departmental Representative, or stockpiled within KNP if directed by the Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Embankment materials require acceptance by Departmental Representative.
 - .1 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.
- .2 Borrow material:
 - .1 Obtained from sources as indicated or as designated by Departmental Representative.
 - .2 Obtained from borrow pit approved by Departmental Representative and ESO.

Part 3 Execution

3.1 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.

3.2 WATER DISTRIBUTORS

- .1 Apply water with equipment capable of uniform distribution.

3.3 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 Strip topsoil to depths as verified by the Departmental Representative. Do not mix topsoil with subsoil. Stripping depth is estimated to be on average 400 mm.
- .3 Contractor to screen stripping material to 100 mm max size prior to placement in stockpile. Load, haul and place screen waste material in 4-Mile (Hector) Pit, as directed by the Departmental Representative.
- .4 Stockpile screened stripped materials adjacent to the Work zone as directed by the Departmental Representative.

3.4 EXCAVATING

- .1 General:
 - .1 Notify the Departmental Representative when waste materials are encountered and remove to depth and extent as approved by the Departmental Representative.

- .2 Subcut below subgrade elevation in cut sections only as approved by the Departmental Representative. Compact top 150 mm below subcut to minimum 95% maximum dry density, ASTM D698 (AASHTO T99). Replace with acceptable embankment material and compact.
 - .3 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points in accordance with the Drawings.
 - .4 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.
- .2 Drainage:
- .1 Maintain profiles, crowns and cross slopes to provide good surface drainage at all times.
 - .2 Provide temporary ditching to control drainage throughout the construction.
- .3 Rock Excavation:
- .1 Notify the Departmental Representative material appearing to conform to classification for rock is encountered, to enable measurements to be made to determine volume of rock. Provide 6 hour notification.
 - .2 The Contractor shall submit statement of qualifications and experience of all personnel assigned to drilling and blasting duties. The driller and the blaster shall have a minimum of 5 consecutive years demonstrated experience in drilling and controlled blasting work on projects involving rock cuts over 8 m height on transportation corridors.
 - .3 The Contractor shall retain a blasting consultant, acceptable to the Departmental Representative, to provide a blast design and quality control. The blast consultant shall not be an employee of the Contractor, explosive manufacturer or explosive distributor. Prior to the pre-construction meeting, the Contractor shall provide the name and qualifications of the blasting consultant. The consultant shall have a minimum of 5 consecutive years demonstrated experience in preparation of successful blast designs along transportation corridors.
 - .4 Submit a Rock Blast Design in accordance with Section 01 33 00 – Submittal Procedures and Section 204.04.07 of the MoTI Standard Specification for Highway Construction, current edition.
 - .5 Shatter rock to 300 mm below subgrade elevation.
 - .6 Contractor shall be responsible for safety of all blasting. Particular attention should be paid to control of rock falls from excavation slopes so there is no hazard to Park users and wildlife during construction. Contractor shall advise PCA 24 hours prior to blasting operations. Contractor shall control blasting so there is no flyrock damaging existing trees and vegetation.
 - .7 All rock on cut face that is loose, hanging or that creates a potentially dangerous situation shall be removed or stabilized during or upon completion of excavation of each lift. Drilling of next lift will not be allowed until this work has been completed. Other methods such as

machine scaling, hydraulic splitters or light blasting may be used in lieu of, or to supplement hand scaling.

.8 Controlled Blasting:

- .1 The purpose of controlled blasting is to minimize damage to rock back slope and to help ensure long-term stability.
- .2 Controlled blasting will involve controlled use of explosives and blasting accessories in carefully spaced and aligned drill holes to produce a free surface or shear plane in rock along specific excavation backs slope. Controlled blasting techniques will be used for this project.
- .3 The slopes of the cut shall be scaled of all loose material and ditches shall be formed and cleaned.
- .4 Subgrade shall be constructed to a true and uniform surface as to line and grade preparatory to application of subbase material.

.4 Borrow Excavation:

- .1 Completely use in embankments, suitable materials removed from right-of-way excavations before considering borrow from offsite locations.
- .2 Obtain embankment materials, in excess of what is available from cut areas, from designated borrow areas.
- .3 Departmental Representative to designate extent of borrow areas and allowable depth of excavation.
- .4 Remove waste and stripping material from borrow pits to designated locations.
- .5 Slope edges of borrow areas to minimum 3:1 and provide drainage as directed.
- .6 Trim and leave borrow pits in condition to permit accurate measurement of material removed.

3.5 EMBANKMENTS

- .1 This item consists of the construction of the subgrade in embankments and cuts to the lines, grades, cross-sections and dimensions shown on the drawings:
 - .1 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.
 - .2 Do not place material that is frozen nor place material on frozen surfaces except in areas authorized.
 - .3 Maintain crowned surface during construction to ensure ready run-off of surface water.
 - .4 Drain low areas before placing materials.
 - .5 Place and compact to full width in layers not exceeding 200 mm loose thickness. 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.
- .2 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.
 - .5 The Departmental Representative has no preference for which embankments are constructed with rock fill.
- .3 Deductions from excavation will be made for overbuild of embankments.

3.6 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 than 25 percent by volume of stones larger than 100 mm shall be placed in 200mm compacted layers.
 - .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 1 metre. The placing of individual rocks and boulder exceeding 1.0 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% maximum dry density, ASTM D698 (AASHTO T99). Top 200 mm of subgrade to be compacted to 98% maximum dry 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.

3.7 PROOF ROLLING

- .1 Proof roll using a loaded tandem truck with tires inflated to normal operation pressures.
- .2 Proof roll subgrade.
- .3 Make sufficient passes with proof roller to subject surface to three separate passes of loaded tire. Departmental Representative to determine level of proof rolling.
- .4 Where proof rolling reveals areas of defective subgrade:
 - .1 Remove subgrade material to depth and extent as directed by the Departmental Representative.
 - .2 Backfill excavated subgrade with common material and compact in accordance with Section 31 24 13 - Roadway and Drainage Excavation.
- .5 Where proof rolling reveals areas of defective subgrade, remove and replace in accordance with the appropriate sections. Removal of defective subgrade material shall be the Contractor's responsibility.

3.8 FINISHING

- .1 Shape entire roadbed to within 100 mm of design elevations without being 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.

3.9 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 MEASUREMENT PROCEDURES**

- .1 The supply and installation of Geotextiles will not be measured directly for payment and shall be considered incidental to the unit price items.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
- .2 ASTM D4491-99a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
- .3 ASTM D4595-86(2001), Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
- .4 ASTM D4716-01, Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
- .5 ASTM D4751-99a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .6 Canadian General Standards Board (CGSB)
- .7 CAN/CGSB-4.2 No. 11.2-M89(April 1997), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
- .8 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
- .9 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.
- .10 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
- .11 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
- .12 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
- .13 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.
- .14 Canadian Standards Association (CSA International)
- .15 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .16 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .17 Ontario Provincial Standard Specifications (OPSS)
- .18 OPSS 1860-March 1998, Material Specification for Geotextiles.

1.3 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative following samples at least 4 weeks prior to beginning Work for each type of geotextile used on the project.
- .3 Minimum length of 2 m of roll width of geotextile.

- .4 Minimum of 1 m seam with at least 300 mm of geotextile on both sides of seam.
- .5 Submit to Departmental Representative 4 copies of mill test data and certificate at least 4 weeks prior to start of Work, and in accordance with Section 01 33 00 - Submittal Procedures.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43, Environmental Procedures.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with the EPP.
- .4 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 MATERIAL

- .1 Nonwoven geotextile shall meet or exceed the specifications of Nilex 4552 Non Woven Geotextile. If the contractor wishes to propose an alternate non-woven geotextile, the approval is subject to the discretion of the Department Representative.

Part 3 Execution

3.1 INSTALLATION

- .1 Filter Fabric for Riprap area requirements:
 - .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with Pins.
 - .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
 - .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
 - .4 Overlap each successive strip of geotextile 600 mm over previously laid strip.
 - .5 Join successive strips of geotextile by sewing.
 - .6 Pin successive strips of geotextile with securing pins at 3m intervals.
 - .7 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.

- .8 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
- .9 Place and compact Riprap in accordance with Section 31 37 00.
- .10 Install as per manufacturers specifications.

3.2 CLEANING

- .1 Remove construction debris from Project site and dispose of debris in an environmentally responsible and legal manner and in accordance with Section 01 35 43 - Environmental Procedures.

3.3 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

- .1 The quantity of placed Riprap that will be measured for payment, shall be the number of cubic metres measured in place and accepted in the completed work, and shall include all labour, equipment and material to satisfactorily complete this item as specified.
- .1 The quantity of splash pads used for culvert outlets that will be measured for payment, shall be measured by each Splash Pad supplied and installed in place and accepted in the completed work and shall include all labour, equipment and material to satisfactorily complete this item as specified. Payment will be under **“Unit Price Item 6a – Riprap - Splash Pad”**.
- .2 The quantity of ditch blocks used for culvert inlets that will be measured for payment, shall be measured by each Ditch Block supplied and installed in place and accepted in the completed work and shall include all labour, equipment and material to satisfactorily complete this item as specified. Payment will be under **“Unit Price Item 6b – Riprap - Ditch Block”**.
- .3 The quantity of Class 10 Riprap used for ditch protection and culvert inlets/outlets that will be measured for payment, shall be the number of cubic metres measured in place and accepted in the completed work and shall include all labour, equipment and material to satisfactorily complete this item as specified. Payment will be under **“Unit Price Item 6c – Riprap - Class 10”**.
- .4 Sorting through rock materials from right-of-way excavations and Pit 16 to produce Riprap material specified, and delivering it to the sites where Riprap material is required, including: materials handling, processing, size reduction and hauling back to the pit any surplus, to be considered incidental to the Work.
- .5 The supply and installation of Geotextiles will not be measured directly for payment and shall be considered incidental to the work.
- .6 Excavation, preparation of Riprap base, hauling and any other related materials will be considered incidental to the work.
- .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 Accommodation”** and no separate payment will be made to the Contractor.
- .9 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43, Environmental Procedures.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Divert leftover geotextiles to recycling facility as approved by Departmental Representative.

Part 2 Products**2.1 STONE**

- .1 Hard, dense with relative density not less than 2.65, free from seams, cracks or other structural defects, to meet following size distribution for use intended:
 - .1 Stone Riprap will be obtained from off-site. The Contractor will be responsible for sorting of Riprap and delivering to the sites where Riprap is required.
 - .2 Hand placed Riprap for Culverts inlet / outlet:
 - .1 BC MoTI Class 10 Riprap
 - .3 Hand placed Riprap for ditches:
 - .1 BC MoTI Class 10 Riprap
 - .4 Supply rock spalls or cobbles to fill open joints.

2.2 GEOTEXTILE FILTER

- .1 Geotextile: in accordance with Section 31 32 19.01 - Geotextiles.

Part 3 Execution**3.1 PLACING**

- .1 Contractor shall do the layout for placement of Riprap.
- .2 Where Riprap is to be placed on slopes, excavate trench at toe of slope to dimensions as indicated.
- .3 Fine grade area where Riprap is to be placed, to a uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .4 Place geotextile on prepared surface in accordance with Section 31 32 19.01- Geotextiles and as indicated. Avoid puncturing geotextile. Vehicular traffic over geotextile not permitted.
- .5 Place Riprap (by machine or by hand) to thickness and details as indicated or as agreed to by the Departmental Representative.
- .6 Place stones in manner accepted by Departmental Representative to secure surface and create a stable mass or to match existing Streambed. On slopes, place larger stones at bottom of slopes.
- .7 Hand placing Riprap:
 - .1 Use larger stones for lower courses and as headers for subsequent courses.
 - .2 Stagger vertical joints and fill voids with rock spalls or cobbles.
 - .3 Finish surface evenly, free of large openings and neat in appearance.

END OF SECTION

Part 1 General**1.1 SUPPLIED PRODUCTS UNDER THIS SECTION**

- .1 Select Granular Sub Base material, or approved equivalent, supplied by the Owner is available at Settler's Gravel Pit.
- .2 AT Designation 6 80mm Granular Sub-Base supplied by the Owner is available at Mannix Gravel Pit.

1.2 MEASUREMENT PROCEDURES

- .1 Quantity of Select Granular Sub Base for which payment will be made shall be the number of metric tonnes incorporated into Work and accepted by Departmental Representative, and shall include all labour, equipment and material required to satisfactorily complete this item of work. If no weigh scales are available, the end area method of volumetric calculation will be used with a conversion factor of 2.2 tonnes/m³. Payment will be under **"Unit Price Item 7a – Granular Sub-Base Course – Select Granular Sub-Base Course"**.
- .2 Quantity of 80 mm Granular Sub-base course for that payment will be made shall be the number of metric tonnes incorporated into Work and accepted by Departmental Representative, and shall include all labour, equipment and material required to satisfactorily complete this item of work. If no weigh scales are available, the end area method of volumetric calculation will be used with a conversion factor of 2.2 tonnes/m³. Payment will be under **"Unit Price Item 7b – Granular Sub-Base Course - 80 mm Granular Sub-Base Course"**.
- .3 Loading, hauling, placing, compacting, and conditioning by wetting or drying will be incidental to the Work.
- .4 No overhaul will be paid for this Work.
- .5 Supply, installation and maintenance and calibration of weight scales and a scale house by the Contractor shall be considered incidental to the contract and no additional payment will be measured for payment.
- .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.
- .7 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.
- .8 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM):
- .2 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
- .3 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

- .4 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .5 ASTM D422-63(1998), Standard Test Method for Particle-Size Analysis of Soils.
- .6 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
- .7 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
- .8 ASTM D1883-14, Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils.
- .9 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .10 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.
- .11 BC MoTI Standard Specifications for Highway Construction – Latest Edition

1.4 QUALITY CONTROL AND QUALITY ASSURANCE

- .1 All Quality Control and quality assurance testing by the Contractor.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Divert unused Select Granular Sub Base material as directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Pit-Run Gravel (Suitable for use as SGSB) material supplied by the owner is available to the Contractor from stockpiles at Settler's Gravel Pit.
- .2 AT Designation 6 80mm Granular Sub-Base supplied by the Owner is available at Mannix Gravel Pit.

Part 3 Execution

3.1 PLACING

- .1 Load, haul and place SGSB after subgrade has achieved the requirements of this specification.
- .2 Construct SGSB to depth and grade in areas indicated on the drawings.
- .3 Ensure no frozen material is placed.
- .4 Place material only on clean unfrozen surface, free from snow or ice. For each lift, material shall be placed on crown line using a Tonne / metre Spread Sheet. Contractor shall have a checker to indicate spread distance when material is being placed.

- .5 Begin spreading SGSB material on crown line or high side of one-way slope.
- .6 Place granular SGSB materials using methods that do not lead to segregation or degradation.
- .7 For spreading and shaping material, use spreader boxes having adjustable templates or screeds that will place material in uniform layers of required thickness.
- .8 Place material to full width in uniform layers not exceeding 200 mm compacted thickness. Incidental boulders in excess of 300mm from the Pit-Run SGSB can be graded to the side of the embankment or used as type D fill.
- .9 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .10 Remove and replace portion of layer in which material has become segregated during spreading.

3.2 COMPACTION

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density of not less than 100% maximum dry density in accordance with ASTM D698.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted subgrade.
- .4 Apply water as necessary during compaction to obtain specified density.
- .5 Dry as necessary to obtain specified density.
- .6 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers.
- .7 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 SITE TOLERANCES

- .1 Finished subgrade surface to be within 50 mm of the grade and cross section but not uniformly high or low.

3.4 PROTECTION

- .1 Maintain finished subgrade in condition conforming to this section until succeeding base is constructed.

END OF SECTION

Part 1 General

1.1 SUPPLIED PRODUCTS UNDER THIS SECTION

- .1 AT Designation 2 Class 20 base aggregate is available to the Contractor from stockpile at Settler's Pit. The AT Designation 2 Class 20 base aggregate is considered a suitable replacement for the 25 mm WGB specified.

1.2 MEASUREMENT PROCEDURES

- .1 Quantity of 25 mm Granular Base course for which payment will be made shall be the number of metric tonnes incorporated into Work and accepted by Departmental Representative, and shall include all labour, equipment and material required to satisfactorily complete this item of work. If no weigh scales are available, the end area method of volumetric calculation will be used with a conversion factor of 2.2 tonnes/m³. Payment will be under **"Unit Price Item 8a – Granular Base Course – 25 mm Well Graded Base Course"**.
- .2 Loading, hauling, placing, compacting, and conditioning by wetting or drying will be incidental to the Work.
- .3 No overhaul will be paid for this Work.
- .4 Supply, installation and maintenance and calibration of weight scales and a scale house by the Contractor shall be considered incidental to the contract and no additional payment will be measured for payment.
- .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 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.
- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM):
- .2 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
- .3 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .4 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .5 ASTM D422-63(1998), Standard Test Method for Particle-Size Analysis of Soils.
- .6 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
- .7 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).

- .8 ASTM D1883-14, Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils.
- .9 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .10 Canadian General Standards Board (CGSB):
- .11 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
- .12 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .13 BC MoTI Standard Specifications for Highway Construction – Latest Edition

1.4 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Divert unused granular material to Mannix Pit as accepted by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 AT Designation 2 Class 20 base aggregate is available to the Contractor from stockpile at Settler's Pit. The AT Designation 2 Class 20 base aggregate is considered a suitable replacement for the 25 mm WGB specified.
- .2 Pit-Run Gravel (Suitable for use as SGSB) material supplied by the owner is available to the Contractor at Settler's Gravel Pit.

Part 3 Execution

3.1 SEQUENCE OF OPERATION

- .1 Load, haul and place granular base after Sub-Base surface is inspected and accepted by Departmental Representative.
- .2 Placing:
 - .1 Construct granular base 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 Spread Sheet. Contractor shall have a checker to indicate spread distance when material is being placed.
 - .4 Begin spreading base material 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. 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 the material becomes segregated during spreading.

3.2 COMPACTION EQUIPMENT

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density not less than 100% maximum dry density in accordance with ASTM D698.
- .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.
- .8 Proof rolling:
 - .1 Before acceptance, each compacted course of base course aggregate shall receive one complete coverage by the tires of a truck having a 9 tonne single axle dual tire or 17 tonne tandem axle group with dual tires with a tire pressure of 600 kPa.
 - .2 Obtain acceptance from Departmental Representative to use non-standard proof rolling equipment.
 - .3 Proof roll granular base. If use of non-standard proof rolling equipment is approved, Departmental Representative to accept level of proof rolling.
 - .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
 - .5 Where proof rolling reveals areas of defective subgrade:
 - .1 Remove base, SGSB and subgrade material to depth and extent as directed by Departmental Representative.
 - .2 Backfill excavated subgrade with common material and compact in accordance with Section 31 24 13 - Roadway and Drainage Excavation, subbase material and compact in accordance with Section 32 11 19 - Granular Subbase.
 - .3 Replace subbase material and compact in accordance with Section 32 11 19 - Granular Subbase.
 - .4 Replace base material and compact in accordance with this Section.

- .5 Where proof rolling reveals defective base, SGSB or subgrade, remove defective the materials to depth and extent as directed by Departmental Representative and replace with new materials in accordance with the appropriate sections at no extra cost.

3.3 SITE TOLERANCES

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.4 PROTECTION

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

- .1 Supply, Delivery and Application of tack coat will be will not be measured separately and will be considered incidental to **“Unit Price Item 9 – Asphalt Concrete Pavement - EPS”**.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
- .2 ASTM D140-01, Standard Practice for Sampling Bituminous Materials.
- .3 Canadian General Standards Board (CGSB)
- .4 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.3 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.

1.4 QUALITY ASSURANCE

- .1 Upon request by Departmental Representative, submit manufacturer's test data and certification that asphalt tack coat material meets requirements of this Section.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with ASTM D140.
- .2 Provide, maintain and restore asphalt storage area.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 35 43 - Environmental Procedures and with the Waste Reduction Work Plan.
- .2 Divert unused asphalt materials to facility capable of recycling materials.

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:
 - .1 Designed, equipped, maintained and operated so that asphalt material can be:
 - .2 Maintained at even temperature.
 - .3 Applied uniformly on variable widths of surface up to 5 m.
 - .4 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.
 - .5 Distributed in uniform spray without atomization at temperature required.
 - .6 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.
 - .7 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.
 - .8 Equipped with an easily read, accurate and sensitive device that registers temperature of liquid in reservoir.
 - .9 Equipped with accurate volume measuring device or calibrated tank.
 - .10 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
 - .11 Equipped with nozzle spray bar, with operational height adjustment.
 - .12 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.
- .4 Mix thoroughly by pumping or other method accepted by Departmental Representative.
- .5 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.
- .6 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt tack coat material.
- .7 Do not apply asphalt tack coat when air temperature is less than 10 degrees C or when rain is forecast within 2 hours of application.
- .8 Apply asphalt tack coat only on unfrozen surface.
- .9 Evenly distribute localized excessive deposits of tack coat by brooming as directed by Departmental Representative.

- .10 Where traffic is to be maintained, treat no more than one half of width of surface in one application.
- .11 Keep traffic off tacked areas until asphalt tack coat has set.
- .12 Re-tack contaminated or disturbed areas as directed by Departmental Representative.
- .13 Permit asphalt tack coat to set before placing asphalt pavement.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

- .1 **Asphalt prime is not required unless otherwise directed by Departmental Representative.**
- .2 Payment for asphalt prime, if requested by the Departmental Representative, will be paid under **“Lump Sum Item 3 – Prime Cost Sum”**.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D140-01, Standard Practice for Sampling Bituminous Materials.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-16.1-M89, Cutback Asphalts for Road Purposes.
 - .2 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.3 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two 1 L samples of asphalt prime proposed for use in new, clean, air tight sealed, wide mouth, bottles made with plastic, to Departmental Representative, at least 2 weeks prior to commencing work.
- .3 Sample asphalt prime coat materials in accordance with 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.

1.4 QUALITY ASSURANCE

- .1 Upon request from Departmental Representative, submit manufacturer's test data and certification that asphalt prime material meets requirements of this Section.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials to ASTM D140.
- .2 Provide, maintain and restore asphalt storage area.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 35 43 – Environmental Procedures and with the Waste Reduction Workplan.
- .2 Divert unused asphalt materials to facility capable of recycling materials.

Part 2 Products**2.1 MATERIAL**

- .1 Asphalt material: to CAN/CGSB-16.1 grade: RM-20, MC-30, MC-250.
CAN/CGSB-16.2 grade: SS-1.

- .2 Sand blotter: clean granular material passing 4.75 mm sieve and free from organic matter or other deleterious materials.
- .3 Water: clean, potable, free from foreign matter.

2.2 EQUIPMENT

- .1 Pressure distributor to be:
 - .1 Designed, equipped, maintained and operated so that asphalt material can be:
 - .2 Maintained at even temperature.
 - .3 Applied uniformly on variable widths of surface up to 5 m.
 - .4 Applied at controlled rates from 0.2 to 5.4 L/m² with uniform pressure, and allowable variation from any specified rate not exceeding 0.1 L/m².
 - .5 Distributed in uniform spray without atomization at temperature required.
 - .6 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.
 - .7 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.
 - .8 Equipped with easily read, accurate and sensitive device that registers temperature of liquid in reservoir.
 - .9 Equipped with accurate volume measuring device or calibrated tank.
 - .10 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
 - .11 Equipped with nozzle spray bar, with operational height adjustment.
 - .12 Cleaned if previously used with incompatible asphalt material.

Part 3 Execution

3.1 APPLICATION

- .1 Obtain Departmental Representative's acceptance of granular base surface and authorization to apply before applying asphalt prime.
- .2 Cutback asphalt:
 - .1 Heat asphalt prime to a temperature for pumping and spraying as recommended by the supplier.
 - .2 Apply asphalt prime to granular base at rate recommended by the supplier and accepted by the Departmental Representative.
 - .3 Apply on dry surface unless otherwise directed by Departmental Representative.
- .3 Anionic emulsified asphalt:
 - .1 Dilute asphalt emulsion with clean water at 1:1 ratio for application.
 - .2 Mix thoroughly by pumping or other method approved by Departmental Representative.

- .3 Apply diluted asphalt emulsion at rate recommended by the supplier and approved by the Departmental Representative.
- .4 Apply diluted asphalt emulsion on damp surface unless otherwise directed by Departmental Representative.
- .4 Apply asphalt prime only on unfrozen surface.
- .5 Do not apply prime when air temperature is less than 10 degrees C or when rain is forecast within 2 hours.
- .6 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt prime material.
- .7 Where traffic is to be maintained, treat no more than one-half width of surface in one application.
- .8 Prevent overlap at junction of applications.
- .9 Do not prime surfaces that will be visible when paving is complete.
- .10 Apply additional material to areas not sufficiently covered as directed by Departmental Representative.
- .11 Keep traffic off primed areas until asphalt prime has set.
- .12 Permit prime to set before placing asphalt paving.

3.2 USE OF SAND BLOTTER

- .1 If asphalt prime fails to penetrate within 24 hours, spread sand blotter material in amounts required to absorb excess material.
- .2 Allow sufficient time for excess prime to be absorbed.
- .3 Apply second application of sand blotter as required.

END OF SECTION

Part 1 General**1.1 SUPPLIED PRODUCTS UNDER THIS SECTION**

- .1 19mm Class 1 Medium Mix Asphalt Aggregate material supplied by the Owner is available at Settler's Pit.
- .2

1.2 WORK DESCRIPTION

- .1 Work shall consist of supplying, loading, hauling and placing BC MoTI Medium Mix Class 1 Asphalt Concrete Pavement at widening locations identified along Highway 93S in Kootenay NP, or as directed by the Departmental Representative
- .2 For the Class 1 mix, asphalt aggregate used shall consist of a 19mm Medium Mix Asphalt Aggregate in accordance with BC MoTI – Standard Specifications for Highway Construction (Latest Edition) Section 502 – Asphalt Pavement Construction (EPS). Asphalt Cement used shall be 150-200A penetration grade in accordance with BC MoTI –Standard Specifications for Highway Construction (Latest Edition) Section 502 – Asphalt Pavement Construction (EPS).
- .3 **The use of Recycled Asphalt Pavement (RAP) in the asphalt mix designs is not permitted.**
- .4 Perform mix designs for BC MoTI Class 1 Asphalt Concrete Pavement using Asphalt Cement 150-200A penetration grade and 19mm Asphalt Aggregate. Mix design is subject to acceptance by the Departmental Representative.
- .5 The asphalt plant used on this project, regardless of location, shall be a minimum of 100 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 the 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.

1.3 MEASUREMENT PROCEDURES AND UNIT PRICE ADJUSTMENTS

- .1 Accepted asphalt concrete pavement will be measured in metric tonnes. Payment shall be made under **“Unit Price Item 9a – Asphalt Concrete Pavement - EPS - BC MoTI Class 1 Medium Mix (19mm)”** and shall be considered full compensation for supply of asphalt concrete mix including all materials, supply and application of tack coat, processing, plant mixing, loading, hauling, paver laying, compacting, finishing surface, raking, interim and final lane marking, quality control testing, safety, and maintenance.
- .2 Applicable payment adjustments (additions or subtractions as applicable) shall not be applied for paving Works completed under this project.
- .3 Supply, installation, maintenance, calibration of weight scales and a scale house, or alternately electronic calibrated silo scales, at the plant by the Contractor shall be considered incidental to **“Unit Price Item 9a – Asphalt Concrete Pavement**

- EPS - BC MoTI Class 1 Medium Mix (19mm)”** and no additional payment will be measured for payment. A scale person will be provided if required.
- .4 Preparing asphalt mix designs (including anti-stripping test), **by a qualified test laboratory licensed to practice in British Columbia** shall be considered incidental to **“Unit Price Item 9a – Asphalt Concrete Pavement - EPS - BC MoTI Class 1 Medium Mix (19mm)”** and no additional payment will be measured for payment.
- .5 The movement of equipment and crew, shall be considered incidental to **“Unit Price Item 9a – Asphalt Concrete Pavement - EPS - BC MoTI Class 1 Medium Mix (19mm)”** for the type of asphalt placed. 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.
- .6 **No overhaul will be considered for payment under this contract.**
- .7 Supply and delivery of asphalt cement, and anti-stripping agent(s), if required and accepted by the Departmental Representative, will be considered incidental to **“Unit Price Item 9a – Asphalt Concrete Pavement - EPS - BC MoTI Class 1 Medium Mix (19mm)”**.
- .8 The quantity of asphalt spillways that will be measured for payment, shall be the number of asphalt spillways supplied, installed and accepted in the completed work and shall include all labour, equipment and material to satisfactorily complete this item as specified. Payment will be under **“Unit Price Item 9b – Asphalt Concrete Pavement (EPS) - Asphalt Spillway”**.
- .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.
- .10 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.
- .11 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

Part 2 Products

2.1 MATERIALS

- .1 Materials used shall be in accordance with BC MoTI –Standard Specifications for Highway Construction (Latest Edition) Section 502 – Asphalt Pavement Construction (EPS).
- .2 Penetration grade 150-200A Asphalt Cement shall be used on the Trans-Canada Highway.
- .3 **The use of a Recycled Asphalt Pavement (RAP) is not permitted for this project.**
- .4 19mm Class 1 Medium Mix Asphalt Aggregate material is available to the contractor in stockpiles at Settler’s Pit.

Part 3 Execution**3.1 METHODOLOGY**

- .1 ACP placement:
 - .1 Asphalt concrete mix shall not be placed when the air temperature is below 4°C, or when the weather is rainy.
 - .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 70 mm. The lift thickness selection shall be determined by the Contractor except that:
 - .1 the maximum thickness of any lift shall be 75 mm machine laid.
 - .2 the minimum thickness of a final lift shall be 50 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 lifts.
- .2 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

3.2 EQUIPMENT, PLANT AND MIXING REQUIREMENTS

- .1 Execution of the Work shall be in accordance with BC MoTI - Standard Specifications for Highway Construction (Latest Edition) Section 502 – Asphalt Pavement Construction and Section 504 – Pavement Drainage
- .2 The contractor will be permitted to setup a Mobile Asphalt Plant or use a Stationary Asphalt Plant for this Project.
- .3 The asphalt plant used on this project, regardless of location, shall be a minimum of 100 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 the 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.

END OF SECTION

Part 1 General**1.1 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).

1.2 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative following material sample quantities at least 4 weeks prior to commencing work.
 - .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.

1.3 MEASUREMENT FOR PAYMENT

- .1 Temporary Pavement Marking including supply of paint and reflective glass beads in accordance with Section 01 35 00.06 - Special Procedures for Traffic Control shall be considered incidental to the contract and will not be measured for payment.
- .2 Payment for final pavement markings if requested by the Departmental Representative shall be made under **“Lump Sum Price Item 3 – Prime Cost Sum”** and will include all labour, equipment and material to satisfactorily complete this item of work.
- .3 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.
- .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 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

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 a 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 SUPPLY, STORAGE AND HANDLING

- .1 Storage and handling shall meet the requirements of Section 01 35 43 - Environmental Procedures and Section 02 81 01 - Hazardous Materials.
- .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 The Contractor shall provide, maintain and reclaim all material storage sites.
- .4 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.
- .5 The Contractor shall take all necessary steps to prevent contamination of the materials. Paint shall be protected from freezing.
- .6 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 Depending on the work, permanent pavement markings must be obliterated or covered by work such as paving, sealcoating, milling, crack sealing, etc. Where it is not practical to replace the permanent markings the same day, some form of temporary delineation must be provided. First priority should be given to directional dividing lines and second priority to lane lines and other markings. If work is progressing rapidly, it may be desirable to install temporary pavement markings periodically throughout the day. Temporary markings may consist of paint with glass bead, preformed adhesive backed tape, road studs, "L" shaped flexible reflectorized markers etc. A marking of a type which will necessitate pavement damage by its removal should not be used on a final pavement lift. Davidson or "L" shaped flexible markers are the only practical marking for sealcoating work and milled pavement; attaching with nails if necessary on rough surfaces. Where for any reason temporary markings cannot be installed,

temporary delineation devices should be used, at a minimum to separate traffic travelling in opposite directions.

- .2 Temporary directional dividing lines, and lane lines formed with paint or plastic shall be 10 cm wide, at least 50 cm long, and separated by gaps not exceeding 8 m. Two yellow markings side by side and approximately 10 cm apart are required wherever passing is prohibited in either direction. Stop lines should be approximately 30 cm wide and pavement arrows at least one third the size of standard arrows. Temporary pavement markings and raised marking devices shall be reflectorized and display the same colour by night as by day and shall also be the same colour as the permanent markings which they replace.
- .3 Raised plastic devices such as reflective road studs or Davidson flexible reflectorized markers, etc., may be used to supplement or be used in place of temporary pavement markings. Where used with paint marks, these raised devices should be installed immediately downstream of every fourth 50 cm dash or approximately 26 m apart. When used without temporary pavement markings, they should also be installed approximately every 26 m. Regardless of the above maximum spacing, raised markers should be installed frequently enough so that a minimum of four individual markers of four pairs of side-by-side markers are visible from any given point.
- .4 The Contractor shall supply and place temporary line markings on newly constructed hard surfaces (pavement, hot-in-place recycled 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.
- .5 Centerline of undivided highway shall be marked throughout as “no passing” unless otherwise directed by the Departmental Representative.
- .6 Painted temporary lines are not permitted on the final surface.

3.2 PERMANENT MARKINGS

- .1 Prior to any work affecting existing 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.
- .2 Further to the key control point pick-up, the Contractor shall also pick-up survey all Transverse and Chevron and Crosshatch Pavement Markings, upon completion of the final hard surfacing, re-establish those points.
- .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 ± 50 mm transversely and ± 100 mm longitudinally. Longitudinal tolerances for intermediate points, when required, are ± 10 m.
- .5 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.
 - .6 Condition of Surfaces:
 - .1 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.
 - .7 Application:
 - .1 Pavement markings to be laid out by Contractor after confirming with the Departmental Representative that there are to be no changes.
 - .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 m²/L.
 - .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.
 - .8 Tolerance:
 - .1 Paint markings to be within plus or minus 12 mm of dimensions indicated.
 - .2 Remove incorrect markings as directed by the Departmental Representative

3.3 TRAFFIC CONTROL

- .1 In accordance with Section 01 35 00.06 and Contractor's TMP.

3.4 QUALITY CONTROL INSPECTION PLAN

- .1 The Contractor is responsible for quality control inspection throughout every stage of the work to ensure that materials and workmanship comply with the requirements of this specification.
- .2 The Contractor shall develop and submit a Quality Control Inspection Program (QCIP) that addresses 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.
- .3 The Contractor shall maintain records of QCIP data, complaints from the public, and other details relevant to the Work and shall provide these records to the Departmental Representative daily.

3.5 HIGHWAY OPERATION

- .1 Highway operation shall be in accordance with the Contractor's approved TMP and shall meet the following requirements:
 - .1 General:
 - .1 Painting shall be carried out during hours of daylight between ½ hour after sunrise and ½ hour before sunset. Generally, the Contractor may paint lines during any day of the week but is cautioned that traffic volumes are usually higher on all highways on Friday, Saturday and Sunday.
 - .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:
 - .3 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.
 - .4 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.
 - .5 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.

3.6 PROTECTION OF COMPLETED WORK

- .1 The Contractor shall protect all pavement markings until dry.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.28-98, Exterior Alkyd House Paint.

1.2 SUBMITTALS

- .1 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Notify Departmental Representative at least 4 weeks prior to installation of proposed source of guide posts and provide access for inspection.

1.3 MEASUREMENT PROCEDURES

- .1 Measurement for payment for Supply and Installation of Plastic Guide Posts will be based on each post installed according to these specifications, and shall include all labour, equipment and material to satisfactorily complete this item of work. **Payment will be made under “Lump Sum Price Item 3 – Prime Cost Sum”**
- .2 Removal, disposal and/or storage of existing posts being replaced will be incidental to the Work.
- .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 Accommodation”** and no separate payment will be made to the Contractor.
- .5 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.4 QUALITY ASSURANCE

- .1 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Storage and Protection:
 - .1 Stockpile guide posts as recommended by the Supplier.
 - .2 Stockpile guide posts at location determined by the Departmental Representative.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Procedures.

- .2 Divert unused metal and/or plastic materials to recycling facility approved by Departmental Representative.
- .3 Damaged posts from the removal of existing posts to recycling facility accepted by the Departmental Representative.

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 guidepost 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 plumb 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 Mannix Pit. Damaged posts to be hauled to recycling facility.

3.2 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General**1.1 DESCRIPTION**

- .1 The existing wildlife fencing shall be removed and reinstalled at locations indicated in the Contract Drawings.

1.2 MEASUREMENT PROCEDURES

- .1 Removal and stockpiling of existing Wildlife Fencing:
 - .1 Work under this item includes all labour, equipment and materials to remove and stockpile existing fencing that will be impacted during construction. All stockpiled material shall be assessed by Departmental Representative for suitability for reinstallation.
 - .2 Measurement shall be per lineal meter of fencing removed and stockpiled during construction as per Drawings. Payment will be under **“Unit Price Item 10a – Wildlife Fencing – Remove and Stockpile Existing Fencing”**.
 - .3 Clean up to be considered incidental to this Work.
- .2 Reinstallation of Wildlife Fencing:
 - .1 Work under this item includes all labour, equipment and materials to reinstall Wildlife Fencing removed and stockpiled during construction. Reinstalled fencing to match dimensions and materials of removed fencing.
 - .2 Measurement shall be made according to the following breakdown of items. Payment will be under **“Unit Price Item 10b – Wildlife Fencing – Reinstall Wildlife Fence”**:
 - .1 Reinstallation of Wood Posts:
 - 1. Work under this item includes all labour, equipment and materials to sharpen, treatment of saw cuts or trimmings, delivery to work areas and installation of wood posts according to this Section and as per Drawings.
 - 2. Payment shall be measured per post installed according to these plans and specifications and accepted by the Departmental Representative. No separate payment will be made for pilot holes, hand excavation, installation, re-setting of loose, leaning or out of alignment posts, replacement of damaged posts due to installation or failure of load tests, trimming, supply and application of CSA 080-97 approved preservative, disposal of post trimmings, and all other items to complete fence post installations as per contract plans and specifications and as accepted by the Departmental Representative. Payment will be under **“Unit Price Item 10b – Wildlife Fencing – Reinstall Wildlife Fence”**.
 - 3. Clean up to be considered incidental to this Work.
 - .2 Reinstallation of Brace systems (Corner or Line Brace) for Wood Posts:

1. The work under this Item includes all labour, equipment and materials for the installation of a Brace System (Corner or Line Brace) to strengthen each Wood corner Post installed or the installation of a Supplied Line brace system.
 2. Payment for reinstallation of brace systems shall be measured per brace system reinstalled according to the Drawings and accepted by the Departmental Representative. Payment will be under **“Unit Price Item 10b – Wildlife Fencing – Reinstall Wildlife Fence”** includes and installation of each Corner or Line brace system.
 3. Clean up to be considered incidental to this Work.
- .3 Reinstallation of Wildlife Wire Mesh Fence and Apron:
1. The work under this Item includes all labour, equipment and materials for the supply and installation of 2.5 m high wildlife game fence and Apron on wood or steel posts, including a buried, 1.2 m wide, attached chain link anti-predator apron, as per contract drawings.
 2. Payment for reinstallation of 2.5 m high wildlife fence and 1.2 m anti-predator apron shall be measured by the linear metre, slope measured and shall include, installation of all components, including trenching and backfilling for anti-predator chain link fence, landscaping to match existing terrain, tightening, weighting fabric bottom and all other items for fence installations as per contract plans and specifications and as accepted by the Departmental Representative. Payment will be under **“Unit Price Item 10b – Wildlife Fencing – Reinstall Wildlife Fence”**. Reinstallation of Staples and chain link apron attachments to be the responsibility of the Contractor and be incidental to this item. Loading and hauling excess and waste materials from trenching to be considered incidental to this item.
 3. Clean up to be considered incidental to this Item.
- .4 Installation of 6 mm Galvanized Top Cable:
1. The work under this Item includes all labour, equipment and materials for the reinstallation of a 6mm - 7x19 galvanized Top Cable on 2.5 m high wildlife game fence as per contract Drawings.
 2. Payment for the supply and installation of 6 mm Galvanized Top Cable shall be measured by the linear meter, slope measured and shall include installation of all components under **“Unit Price Item 10b – Wildlife Fencing – Reinstall Wildlife Fence”**. Supply and installation of staples shall be the responsibility of the Contractor and be incidental to this item.
 3. Clean up to be considered incidental to this item.
- .3 Payment for the replacement of materials deemed unsuitable by the Departmental Representative shall be measured and paid for under **“Lump Sum Price Item 3 – Prime Cost Sum”**.

- .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 Accommodation”** and no separate payment will be made to the Contractor.
- .6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-07, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - .2 ASTM A121-99(2004), Standard Specification for Metallic-Coated (Galvanized) Carbon Steel Barbed Wire.
 - .3 ASTM A603 - 98(2009)e1, Specification for Zinc-Coated (Galvanized) Steel Structural Wire Rope.
 - .4 ASTM D5116-[97], Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.69-[98], Aluminum Paint.
 - .2 CAN/CGSB-1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A23.1-[00]/A23.2-[F00], Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .2 CSA G42-[1964(R1998)], Galvanized (Zinc-Coated) Steel Farm-Field Wire Fencing.
 - .3 CSA-O80 Series-[97], Wood Preservation.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 01 45 00.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures and Section 02 81 01 – Hazardous Materials
- .2 Do not dispose of preservative treated wood through incineration.
- .3 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .4 Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill accepted by Departmental Representative.
- .5 Unused wood preservative material must be disposed of at an official hazardous material collections site as accepted by the Departmental Representative. Unused preservative material may not be disposed of into the sewer system, into streams, lakes, onto the ground or in other locations where they will pose a health or environmental hazard.

Part 2 Products

- .1 All required hardware and miscellaneous products and materials to be supplied by the Contractor. Supply and installation of miscellaneous hardware shall be considered incidental to the Works.

Part 3 Execution

3.1 MANUFACTURERS' INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 GRADING

- .1 Level ground along fence line in order that bottom wire of fence between posts can be maintained at not more than 150 mm above ground.

3.3 ERECTION OF FENCE

- .1 Erect fence along lines as indicated on the Drawings or as directed by Departmental Representative.
 - .1 Installation of wood posts:
 - .2 Posts to be installed by preparing a pilot hole to depth indicated on Drawings approximately 125 mm in diameter, **vibrating post** down to desired height and backfilling with compacted non-organic material around post to level of existing ground. Contractor is forewarned, if mechanical equipment is not able to install post, due to terrain conditions, that hand installation shall be required.

- .3 All saw cuts or trimmings to be treated with two coats of non-supplied CSA 080-97 approved wood preservative.
- .4 Wood trimmings, from post sharpening operation shall be hauled and disposed of, at an approved location outside of the Park.
- .5 Backfill around posts and compact to same density as surrounding ground. Dispose of surplus material as directed by Departmental Representative.
- .2 Installation supplied Brace systems (Corner or Line Brace) for Wood Posts
 - .1 The Corner Brace system includes the installation of a 2.1m Wood post, 2 horizontal Braces, one angle Brace, and connecting hardware.
 - .2 The Line Brace system includes the installation of 1 horizontal Brace, and connecting hardware.
 - .3 At corner post locations, the Contractor shall prepare pilot holes using vibratory hammer equipped with a minimum 125 mm pin at least 1.5m long. Using a backhoe to excavate material for placement of posts is not permitted.
 - .4 Brace system at corner posts, shall be delivered and installed as per these plans and specifications. Corner brace posts are to be cut to length of 2.1m using supplied 3.7 m long non sharpened posts. All posts are to be sharpened, cuts treated with two coats of CSA 080-97 approved preservative, delivered and installed in pilot holes, backfilled to existing ground contours and well compacted with non-organic soil.
- .3 Installation of Wildlife Wire Mesh Fence and Apron
 - .1 Supply and install 2.5 m high wildlife game fence and Apron on wood or steel posts, including a buried, 1.2 m wide, attached chain link anti-predator apron, as per contract Drawings. At locations where in the opinion of the Departmental Representative, the chain link fence apron cannot be buried (i.e. if there is solid rock), it is to be rock secured as accepted by the Departmental Representative.
 - .2 2.5 m high wildlife fence to meet following specifications:
 - .3 Line wires to have tensile strength of between 1170 MPa and 1590 MPa, 12.5 gauge, with a breaking force in excess of 5800N.
 - .4 Stay wires to have tensile strength 850 N/sq. mm, 12.5 gauge. Staple connectors shall be hot dipped to have tensile strength of 525 N/sq. mm. All wires to have Class 111 Zinc Galvanized Coating, minimum of 260 gms/sq. m.
 - .5 Wire tension to conform to:

Temperature (C)	Tension (Kg)
	30105
	20115
	10127
	0 136
 - .6 The 1.2 m anti-predator apron, shall be installed by attaching chain link fence with hog rings at interval of 300mm spacing or by an alternate system accepted by Departmental Representative, to the 2.5 m high

wildlife game fence, against posts, by excavating, where deemed feasible by the Departmental Representative, a 1.2 m wide x 0.5 m deep trench, backfilling of excavated area, to 95 % compaction of original ground, attaching the chain link fence to the wildlife fence, installing and fastening fence fabric to the posts. All ground disturbed during fence installation, including access points and equipment tracks, shall be levelled and contoured to existing ground elevations. All excess boulders and tree stumps to be disposed at Mannix Pit.

- .7 Chain link fence to adhere to the following specifications, breaking strength of 5000 N, mesh size of 50 mm, 9 gauge and shall be hot dipped galvanized with a minimum coating of 490 gms/sq m.
 - .8 Excess and waste materials from trenching operation shall be loaded and hauled to Mannix Pit or area designated by the Departmental Representative.
 - .9 At locations that cannot be excavated for buried chain link apron due to ground conditions, apron to be placed horizontally on ground surface and supplied rocks, stockpiled in Mannix Pit, to be hauled and placed on top of apron to ensure apron is secured and performs as an anti-predator deterrent.
 - .10 Grubbing, and boulder removal required to install 2.5 m high wildlife game fence Apron, and waste generated to be disposed at Mannix Pit or at location provided by Departmental Representative.
- .4 Install 6 mm - 7x19 Galvanized Top Cable
- .1 Stretch 6mm - 7x19 Galvanized top cable along tops of posts and double staple on posts.

END OF SECTION

Part 1 General**1.1 MEASUREMENT PROCEDURES**

- .1 Measurement for the supply and installation of Lock-Block Retaining Walls including Pre-cast Concrete Lock-Blocks and various accessories and minor components needed for installation shall be measured per square metre of wall front face completed and accepted by the Departmental Representative. Payment will be under **“Unit Price Item 11a – Retaining Walls - Supply and Install Lock-Block Retaining Wall”** and shall include all labour, materials and equipment necessary to complete the Works.
- .2 No overhaul will be paid for this Work.
- .3 Measurement for excavation, backfilling and compaction shall be in accordance with Section 31 24 13 Roadway and Drainage Excavation.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CAN/CSA-A3000-98 (April 2001), Cementitious Materials Compendium. Includes:
 - .1 CAN/CSA-A23.5-98, Supplementary Cementing Materials

1.2 DESCRIPTION

- .1 Supply and installation of Lock-Block Retaining Wall.

1.3 STORAGE AND HANDLING

- .1 Prevent chipping and cracking of precast concrete lock-blocks. Replace damaged lock-blocks as directed by Departmental Representative.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products**2.1 MATERIALS**

- .1 Lock-Blocks:
 - .1 Contractor supplied lock-blocks to be cast from minimum 25 MPa concrete.
 - .2 Precast lock-blocks to be manufactured in a single monolithic placement.
- .2 Granular backfill: in accordance with Section 31 24 13 Roadway and Drainage Excavation, with the following additional requirements for wall systems with galvanized steel reinforcing elements:

- .1 pH: 6 to 10.
- .2 Resistivity: min. 1000 ohm-cm.
- .3 Chlorides: max. 200 ppm.
- .4 Sulphates: max. 1000 ppm.

Part 3 Execution

3.1 EXCAVATION AND FOUNDATION PREPARATION

- .1 Excavate, and prepare soil foundation, in accordance with Section 31 24 13 Roadway and Drainage Excavation.

3.2 BACKFILLING

- .1 Backfill behind lock-blocks in accordance with Section 31 24 13 – and Drainage Excavation and to following requirements:
 - .1 Place backfill by closely following erection of each lift of lock-blocks and to requirements of supplier of wall system.
 - .2 Place backfill so as not to displace lock-blocks. Avoid sudden braking and sharp turning of tracked and rubber-tired equipment on backfill. Place backfill in direction away from facing panels.
 - .3 Place and compact backfill without causing displacement or rotation of lock-blocks beyond supplier tolerances. Use only hand-held or hand-guided compacting equipment within 1 m of lock-blocks.
 - .4 Compact backfill at moisture content not exceeding optimum value in accordance with ASTM D698 corrected maximum dry density.
 - .5 Backfill excavation in front of wall as soon as required alignment of facing panels is assured and when approved by Departmental Representative.

3.3 INSTALLATION OF LOCK-BLOCKS

- .1 Install Lock-block retaining wall as per contract Drawings.
- .2 The contractor supplied lock-blocks shall be cast from minimum 25 MPa concrete.

3.4 FINISH TOLERANCES

- .1 Wall verticality: not to deviate more than 15 mm from vertical over 3 m height.
- .2 Wall alignment: horizontal alignment not to deviate more than 18 mm over 3 m distance.

END OF SECTION

Part 1 General**1.1 MATERIAL SUPPLIED BY DEPARTMENTAL REPRESENTATIVE**

- .1 Topsoil to be native organic soils stripped and screened from the contract work area, screened and stockpiled adjacent to the Work.

1.2 MEASUREMENT PROCEDURES

- .1 Measure placing of topsoil in cubic metres removed from stockpile.
- .2 Stockpiles will be measured by Departmental Representative and volume of topsoil removed calculated by average end area method.
- .3 Includes preparation of sub-grade for placing of topsoil.
- .4 Includes finish grading.
- .5 Measure supply and application of soil amendments, including fertilizer, in standard commercial units of weight/volume as determined by Departmental Representative.
- .6 Measure applied in cubic metres of soil amendment supplied.

1.3 PAYMENT PROCEDURES

- .1 Payment for stripping will be made in accordance with Section 31 24 13 - Roadway and Drainage Excavation.
- .2 Topsoil placement and finishing will be measured by the cubic metre, as measured in original position (from stockpiles) acceptably installed within the areas indicated on the Drawings or as approved by the Departmental Representative. Payment for topsoil placement shall be full compensation for all labour, equipment, materials and incidentals required load, haul from stockpiles, place, fine grade, and prepare the topsoil materials for planting in accordance with the requirements of the Specifications, Drawings and direction of the Departmental Representative. Payment will be made under **“Unit Price Item 12a – Topsoil Placement and Grading – Topsoil Placement”**.
- .3 Payment for testing of topsoil to be paid under **“Lump Sum Price Item 3 - Prime Cost Sum”**.
- .4 Payment for supply and application of soil amendments, including fertilizer will be paid under **“Lump Sum Price Item 3 – Prime Cost Sum”**.

1.4 REFERENCES

- .1 Agriculture and Agri-Food Canada
- .2 The Canadian System of Soil Classification, Third Edition, 1998.
- .3 Canadian Council of Ministers of the Environment
- .4 PN1340-[2005], Guidelines for Compost Quality.
- .5 Canadian Green Building Council (CaGBC)
- .6 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.
- .7 U.S. Environmental Protection Agency (EPA)/Office of Water

- .8 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.5 DEFINITIONS

- .1 Compost:
 - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
 - .2 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

1.6 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 LEED Submittals:
 - .1 Submit erosion and sedimentation control plan for Credit SSp1 in accordance with LEED Canada-NC.
- .3 Quality control submittals:
 - .1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.

1.7 QUALITY ASSURANCE

- .1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 31 00 Project Managing and Coordination.01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 35 43 Environmental Procedures.
- .2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Departmental Representative.
- .3 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 Topsoil for seeded areas and planting beds: mixture of particulates, microorganisms and organic matter that 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.
 - .3 Finished surface free from:
 - .1 Debris and stones over 100 mm diameter.

- .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.

2.2 SOIL AMENDMENTS

- .1 Fertilizer:
 - .1 Fertility: major soil nutrients present in following amounts:
 - .2 Nitrogen (N): 45 micrograms of available N per gram of topsoil.
 - .3 Phosphorus (P): 25 micrograms of phosphate per gram of topsoil.
 - .4 Potassium (K): 20 micrograms of potassium per gram of topsoil.
 - .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
 - .6 Ph value: 6.5 to 8.0
 - .7 Revise fertilizer blend as directed by Departmental Representative to comply with soil test analysis.
 - .8 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

2.3 SOURCE QUALITY CONTROL

- .1 Advise Departmental Representative of sources of topsoil and manufactured topsoil to be utilized with sufficient lead time for testing.
 - .1 Contractor is responsible for amendments to supply topsoil as specified.
 - .2 Soil testing by recognized testing facility for PH, P and K, and organic matter.
 - .3 Testing of topsoil will be carried out by testing laboratory designated by Departmental Representative.
 - .4 Soil sampling, testing and analysis to be in accordance with Provincial standards.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 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.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas as directed by Departmental Representative after area has been cleared of brush weeds and grasses and removed from site.
- .2 Strip topsoil to depths as directed by Departmental Representative.
- .3 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.
- .4 Stockpile in locations as directed by Departmental Representative.
- .5 Protect stockpiles from contamination and compaction.

3.3 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
- .2 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
- .3 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .4 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
- .5 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
- .6 Remove debris that protrudes more than 75mm above surface.
- .7 Dispose of removed material off site.
- .8 Cultivate entire area that is to receive topsoil to minimum depth of 100mm.
- .9 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.4 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 following minimum depths after settlement.
 - .1 100mm for seeded areas.
 - .2 600mm for shrub beds.
- .4 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.5 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.

3.6 ACCEPTANCE

- .1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.7 SURPLUS MATERIAL

- .1 Dispose of materials as directed by Departmental Representative.

END OF SECTION

Part 1 General**1.1 DESCRIPTION OF WORK**

- .1 The work covered by this specification shall consist of: hydraulically seeding and fertilizing in the areas within the limits of construction, or as designated by the Departmental Representative.

1.2 MEASUREMENT FOR PAYMENT

- .1 Hydraulic Seeding will be measured by the hectare acceptably installed, complete with fertilizer, and resulting in full grass growth, 75% germination and growth of specified seed mixture, within the dimensions indicated on the Drawings or as approved by the Departmental Representative. Payment for hydraulic seeding shall be full compensation for all labour, equipment, materials and incidentals required to place the materials in accordance with the requirements of the Specifications, Drawings and direction of the Departmental Representative.
Payment shall be paid under “Unit Price Item 13a – Seeding – Hydraulic Seeding”
- .2 Areas of blending into existing landscape will not be measured for payment.
- .3 Maintenance is incidental and will not be paid for separately.
- .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 Accommodation”** and no separate payment will be made to the Contractor.
- .6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Provide product data for:
 - .1 Seed
 - .2 Mulch
 - .3 Tackifier/Soil Stabilizer
 - .4 Fertilizer
 - .2 Submit in writing to Departmental Representative 14 days prior to commencing work:
 - .3 Volume capacity of hydraulic seeder in litres.
 - .4 Amount of material to be used per tank based on volume.

- .5 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

1.4 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

1.5 MATERIAL DELIVERY, HANDLING AND STORAGE

- .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 Fertilizer shall be packaged in waterproof bags labelled clearly, indicating net mass, analysis and manufacturer. Store on pallets and protect from weather.
- .3 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:
 - 15% Adanac Slender Wheatgrass
 - 15% Fringed Bromegrass
 - 15% Nortran Tufted Hairgrass
 - 15% Fowl Bluegrass
 - 10% ARC Plateau Rocky Mountain Fescue
 - 5% ARC Mountain Junegrass
 - 10% ARC Glacier Alpine Bluegrass
 - 10% ARC Sentinel Spike Trisetum
 - 5% Citation III Perennial Ryegrass
- .3 Seeding rate to be 35 kg/ha for mechanical seeding and 100 kg/ha for hydraulic seeding.
- .4 Seed tags to be retained and given to the Landscape Architect.
- .5 Seed mix shall be free of Scentless Chamomile, Downy Brome and Canada Thistle.

2.2 FERTILIZER

- .1 Fertilizer 1 shall be a 45-25-20 mixture. This fertilizer shall be applied at the time of seeding at a rate of 125kg/ha.
- .2 Contractor to verify fertilizer blend and application rate following testing of topsoil.

2.3 WATER

- .1 Water shall be free of impurities that would inhibit germination and growth as available from Mannix Pit.

2.4 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. Supplier: Target Products, Phone: 1-800-575-7700.

2.5 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. Supplier: Professional Gardener, Phone: (403) 263-4200.

Part 3 Execution**3.1 GENERAL SEEDING**

- .1 Contractor shall advise Departmental Representative prior to the start of seeding operations.
- .2 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.
- .3 Contractor shall ensure that equipment is steam cleaned, free of soil and seed from previous project to prevent site contamination.
- .4 Seeding shall be done upon completion of stripped soil material/chip compost placement.
- .5 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.
- .6 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.
- .7 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.
- .8 Contractor shall carry out seeding in locations as shown on Drawings or, as directed by Departmental Representative: Seeding shall be done as follows:

- .1 Hydraulic Seeding: grades between 3:1 and 1.5:1 slopes.

3.2 HYDRAULIC SEEDING

- .1 The following application rates are the minimum required for hydraulic seeding:
- | | | |
|----|---|------------------|
| .1 | Canada Parks Blend Seed: | 100 kg/hectare |
| .2 | Fertilizer 1: 45-25-20 | 125 kg/hectare |
| .3 | Mulch: | 500 kg/hectare |
| .4 | Soil Stabilizer/tackifier: Soil Master WR1300 L/hectare | |
| .5 | Water: | 30,000 L minimum |
- .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 and fertilizer 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 150m 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.

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 these specifications 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 and fertilizing undertaken as specified. This work is incidental to the contract.

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 these specifications 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 25 mm and seeding and fertilizing 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.

3.6 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General**1.1 PRODUCTS SUPPLIED UNDER THIS SECTION**

- .1 80mm Granular Sub-Base for culverts is available to the Contractor from stockpile in Mannix Pit.
- .2 AT Designation 2 Class 20 Base Aggregate (considered a suitable replacement for 25 mm Well Graded Base) for culverts is available to the Contractor from stockpile from Settler's Pit.

1.2 MEASUREMENT

- .1 Supply and delivery of CSP culverts:
 - .1 The quantity of CSP culverts that will be measured for payment shall be the number of linear metres of the types and sizes furnished at the sites of installation or in stockpiles at Mannix if surplus to requirements, in accordance to the plans and specifications and Section 33 42 13 - Pipe Culverts. Payment will be made under **"Unit Price Item 14a – Pipe Culverts - Supply and Install"**.
 - .2 The supply of bolt-type corrugated 600mm wide couplers and ancillary materials will not be measured directly for payment but shall be considered incidental to **"Unit Price Item 14a – Pipe Culverts – Supply and Install"**.
 - .3 Hauling CSP Culverts from storage locations to the culvert sites will not be measured directly for payment but shall be considered incidental to **"Unit Price Item 14a – Pipe Culverts Supply and Install"**.
- .2 Installation of CSP Culverts
 - .1 The quantity of CSP culverts that will be measured for payment shall be the number of linear metres of the types and sizes assembled and accepted by the Departmental Representative, and shall be inclusive of all costs of labour, materials, equipment to satisfactorily complete this item as specified. Payment will be made under **"Unit Price Item 14a – Pipe Culverts – Supply and Install"**.
 - .2 The survey and layout of the CSP Culverts as per requirements identified in this Section and Section 33 42 13 - Pipe Culverts, will not be measured directly for payment but shall be considered incidental to **"Unit Price Item 14a – Pipe Culverts Supply and Install"**.
 - .3 At locations of extensions to existing culverts, thoroughly cleaning and flushing the existing culvert, excavating 1 metre back from present exposed end, 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 14a – Pipe Culverts – Supply and Install"**.
- .3 Work required as part of the installation of CSP Culverts, to be paid under the following items:
 - .1 Excavation for the types of materials encountered will be paid under **"Unit Price Item 5 – Roadway and Drainage Excavation"**, in accordance with Section 31 24 13 - Roadway and Drainage Excavation.

Excavation, removal and disposal of existing culverts at the same location of the new installation shall be considered common material and will be paid under **“Unit Price Item 5 – Roadway and Drainage Excavation”**.

- .2 Asphalt removal will be paid under **“Unit Price Item 1 – Asphalt Concrete Pavement Removal”** in accordance with Section 02 41 13.14 – Asphalt Concrete Pavement Removal.
- .3 Placing supplied granular backfill around the culvert will be paid under **“Unit Price Item 8a – Granular Base Course – 25 mm Well Graded Base Course”** in accordance with Section 32 11 24 - Granular Base Course and Section 33 42 13 - Pipe Culverts
- .4 Trench backfill and compaction of native material shall be considered incidental to **“Unit Price Item 14a – CSP Culvert – Supply and Install”**.
- .5 Placing Sub-base course will be paid under **“Unit Price Item 7b – Granular Sub-Base Course - 80mm Granular Sub-Base”** in accordance with Section 32 11 20 - Granular Sub-Base Course.
- .6 Placing Base course will be paid under **“Unit Price Item 8a – Granular Base Course – 25 mm Well Graded Base Course”** in accordance with Section 32 11 24 –Granular Base Course.
- .7 Placing asphalt will be paid under **“Unit Price Item 9 – Asphalt Concrete Pavement - EPS”** in accordance with Section 32 12 16 – Asphalt Concrete Pavement (End Product Specifications).
- .8 Placing Riprap if required will be paid under **“Unit Price Item 6 - Riprap”**, in accordance with Section 31 37 00 – Riprap.
- .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 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.
- .6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor.
- .7 No separate measurement will be made for couplings, fittings or end sections for CSP.
- .8 Measure removal of or plugging of existing culverts under **“Lump Sum Price Item 3 - Prime Cost Sum”** in metres of invert length for each size, type and class of pipe removed and disposed where the location is not coincidental to new culvert.
- .9 Culvert installation must be coordinated with embankment construction. No payment will be made for re-excavation of embankment material required to install culverts.

1.3 REFERENCES

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

- .2 CSA-B182.8-02 Profile Polyethylene Storm Sewer and Drainage Pipe and Fittings.

1.4 SUBMITTALS

- .1 Submit manufacturer's test data and certification at least one week prior to beginning Work.
- .2 Provisions for staged construction shall be shown in the shop drawings, including any temporary support required.
- .3 Certification to be marked on pipe.

1.5 STORAGE AND HANDLING

- .1 Handle and store pipe products in a manner to avoid damage, alteration, deterioration and soiling.
- .2 Store pipes on a clean and flat surface in Mannix Pit or other location as directed by the Departmental Representative.
- .3 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.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Section 01 35 43 - Environmental Procedures.
- .4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 CORRUGATED STEEL PIPE

- .1 Corrugated steel pipe: to CSA-G401.
- .2 Culverts to be annular or spiral with annular ends. Coupling bands to be two piece annular bolted with minimum width of nine corrugations.
- .3 Minimum wall thickness to be 2.0 mm.
- .4 Corrugations to be 68 mm x 13 mm.
- .5 For all exposed culvert ends, 4:1 mitred end sections will be required.
- .6 Design Code CHBDC S6-06.
- .7 Design Live Load CL-800.

2.2 GRANULAR BEDDING AND BACKFILL

- .1 AT Designation 2 Class 20 Base Aggregates (considered a suitable replacement for 25 mm Well Graded Base) are available from Settler's Pit and 80mm Granular Sub-Base Aggregates are available from Mannix Pit for use as culvert bedding and backfill material. See Section 01 11 00 - Summary of Work, for maximum quantities available to the Contractor.

2.3 RIPRAP

- .1 Riprap shall be installed in accordance with Section 31 37 00 – Riprap.

Part 3 Execution**3.1 CUT ENDS**

- .1 All exposed ends of CSP culverts to have sloped end sections conforming to roadside slope, by cutting culvert with mechanical saw.
- .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 3 m of the existing culvert end shall be removed as directed by the Departmental Representative.

3.2 BEDDING

- .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
- .2 Place minimum thickness of 200 mm of approved granular material on bottom of excavation and compact to minimum 95% maximum density to ASTM D698.
- .3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.
- .4 Place bedding in unfrozen condition.

3.3 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.

3.4 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.

3.5 BACKFILLING

- .1 Backfill around and over culverts as indicated 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% maximum density to ASTM D698 taking special care to obtain required density under haunches. Hand tamp where necessary to obtain compaction.
- .4 Protect installed culvert with minimum 900 mm cover of compacted fill before heavy equipment is permitted to cross. During construction, width of fill, at its top, to be at least twice diameter or span of pipe and with slopes not steeper than 2H:1V.
- .5 Place backfill in unfrozen condition.
- .6 Place Riprap.

3.6 TRENCHING EXISTING PAVEMENT STRUCTURES

- .1 Where trenches are cut into existing pavement structures, backfill will match the existing materials and thickness, payment for backfill and paving will be made at the unit price for the type of material used.

3.7 CULVERT EXTENSIONS

- .1 Extensions to existing culverts shall be as noted on drawings. Payment for installation shall include all hardware and necessary features to attach new sections. Backfill and bedding shall be as per drawings and paid as per the appropriate unit price item.

3.8 CULVERT / STRUCTURE REMOVAL

- .1 Culvert removal shall be as indicated on drawings and shall include disposal of sections to a site outside of the National Parks.
- .2 Bedding and backfill for culvert removal shall be paid as per the appropriate unit price item.

END OF SECTION

Part 1 General**1.1 DESCRIPTION**

- .1 Work includes the installation of precast concrete barriers in accordance to this section and as per drawings. Precast Concrete barrier supplied shall be as per the latest edition of BC MoTI Standard Specifications for Highway Construction, Section 941 – Precast Reinforced Concrete Barriers. **In addition, all end faces to have 25 mm chamfered edges.**
- .2 Barriers will be installed for traffic control and permanent installation. So the same barrier can be installed more than once.
- .3 At some drainage barriers, Barrier Drains shall be supplied and installed in accordance to the drawings to control runoff.

1.2 MEASUREMENT PROCEDURES

- .1 Supply, delivery and installation of Precast Concrete Barriers:
 - .1 The quantity of Precast Concrete Barriers that will be measured for payment shall be the number barrier sections of the types and sizes furnished, hauled and stockpiled at Hector/4-Mile Pit, and installed in accordance to the plans and these specifications. Payment will be made under **“Unit Price Item 15a – Precast Concrete Barrier - Supply Barrier”**.
- .2 Adjustment of Existing Precast Concrete Barriers
 - .1 Relocation of Precast Concrete Barriers measured for payment shall be the number of linear metres disassembled, stockpiled/or reinstalled, regardless of the type of barrier, and shall be inclusive of all costs of labour, materials, equipment to satisfactorily complete this item as specified and in accordance with this Section. Payment will be made under **“Unit Price Item 15b – Precast Concrete Barrier - Move Barrier”**.
- .3 Hauling Precast Concrete Barriers from stockpiles in Hector/4-Mile Pit to the barrier installation sites and hauling barriers back to Mannix Pit, will not be measured directly for payment but shall be considered incidental to **“Unit Price Item 15 – Precast Concrete Barrier”**.
- .4 The survey and layout of the Precast Concrete Barriers as per requirements identified in this Section and the plans, will not be measured directly for payment but shall be considered incidental to **“Unit Price Item 15 – Precast Concrete Barrier”**.
- .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 or relocation of Precast Concrete Barriers shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment will be made to the Contractor

1.3 REFERENCES

- .1 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
- .2 CAN/CSA-A23.4, Precast Concrete – Materials and Construction.
- .3 CAN/CSA-G40.21-98, Structural Quality Steel.
- .4 CAN/CGSB-1-GP-181M, Coating, Zinc-Rich,

1.4 DEFINITIONS

- .1 Compressive Strength Test Result: Average of strengths of three 28 day compressive test cylinder breaks with standard cylinders of 150 mm diameter and 300 mm high size.
- .2 Curing Period: 28 days if test cylinders reach specified 28 day compressive strength not later than 28 days after casting.
- .3 Laitance: soupy mixture of cement, fine sand and water that accumulates on concrete surface when wet concrete mixes that bleed excessively are used.

1.5 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Manufacturer's Instructions: submit manufacturer's storage and installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.6 QUALITY CONTROL

- .1 Concrete test for every pour shall be performed by the contractor. Concrete testing procedures shall be in accordance with the BC MoTI Standard Specification for Highway Construction (Latest Edition).
- .2 The Contractor shall provide certification by an Engineer licensed to practice in the province of the contractor, that precast concrete barrier meets specifications prior to delivery of materials. Certification to include results of concrete testing performed by independent laboratory retained by the Contractor.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Protection:
 - .1 Store materials in accordance with manufacturer's recommendations
 - .2 Replace defective or damaged materials with new.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials in accordance with Section 01 35 43 – Environmental Procedures.

Part 2 Products

2.1 MATERIAL:

- .1 Supply of barrier drain pipe shall be in accordance with Section 33 42 13 – Pipe Culverts and shall include anchor plates and anchors.
- .2 Supply Precast Concrete barrier as per BC MoTI Standard Specifications for Highway Construction (Latest Edition) Section 941 - Concrete Barriers. **In addition all end faces to have 25 mm chamfered edges.**

2.2 PRECAST CONCRETE BARRIER

- .1 Concrete Quality:
 - .1 To CAN/CSA-A23.1 except where amended below:
 - .1 Compressive Strength: Compressive strength test result is equal to or exceeds 30 MPa.
 - .2 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 28 mm.
 - .7 Slump: 50 mm plus or minus 20 mm.
 - .8 Entrained Air: 5 to 8%.
 - .9 Reinforcement: 50 mm fibrillated polypropylene fibres to be added at the rate of 0.9 kg/m³
- .2 Concrete Placing and Consolidation:
 - .1 To CAN/CSA-A23.4, Clause 19.
- .3 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°C.
- .4 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.
- .2 Surface defects will normally be cause for rejection of any unit except where such are within following permissible limits or are subject to making good within 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 Departmental Representative.
- .5 Patching, if authorized, to be completed as follows:
 - .1 Defective area 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 area covered to cure adequately.
- .6 Surface tolerance to be ± 3 mm unless otherwise indicated on drawings.
- .7 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 Departmental Representative. Inspection or release of units by Departmental Representative is required prior to shipping.
 - .2 Identification indicated by embedding manufacturer's name or trademark, year of
 - .3 Manufacture and form number on end of each unit in manner, size and depth that will be permanently legible.
 - .4 Authorized patching or making good to be inspected by Departmental Representative before shipment or upon delivery and rejected units replaced at no cost.
- .8 Welded Steel Wire Mesh Reinforcement:
 - .1 Welded wire mesh reinforcement not to be used. Fibrillated fibre strand reinforced concrete to be used for production of barriers.
- .9 Reinforcing Steel for Bent and Hooked Connections:
 - .1 To CAN/CSA-G40.21-M, Grade 260W.
 - .2 Bending:

- .1 Carefully bend reinforcing steel to radii detailed and install as shown on drawings.
- .2 Inspect reinforcing steel after bending for evidence of fracture. Fractured pieces to be replaced.
- .3 Surface Treatment: Treatment of exposed surfaces not required.
- .10 Pick-up Points:
 - .1 Form with accurately placed rigid P.V.C. pipe recessed 15 mm from both finished surfaces as shown on drawings.
- .11 Drainage Slots: Cast-in as shown on drawings.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 DELIVERY

- .1 Storage of Precast Concrete Barriers on site to be in single layer, for first seven days.
- .2 Stacking of three layers high, with wood blocking between lifts, permitted with Departmental Representative approval, after seven days.
- .3 Deliver Precast Concrete Barriers to Mannix Pit or 4-Mile (Hector) Pit, taking care not to damage or distort concrete or connecting devices.
- .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.

3.3 PREPARATION

- .1 Do grading in accordance with Section 31 24 13 - Roadway and Drainage Excavation and as indicated.
- .2 Install granular base in accordance with Section 32 11 24 - Granular Base Course and as indicated.
- .3 Asphalt paving in accordance with Section 32 12 16 – Asphalt Concrete Pavement (EPS) and as indicated.

3.4 INSTALLATION

- .1 Precast Concrete Barriers shall be installed permanently on asphalt concrete pavement in accordance with Drawings and these Specifications.
- .2 Precast Concrete Barriers will also be installed temporarily for traffic protection as verified by the Departmental Representative. When no longer needed the barriers will be re-installed elsewhere or stored in Mannix Pit or 4-Mile (Hector) Pit as directed by the Departmental Representative.

- .3 Extreme care must be exercised in multiple placement of the new precast concrete barriers; any damage must be rectified to the satisfaction of the Departmental Representative at the Contractors expense.
- .4 Contractor shall do the layout of the barriers.
- .5 Barrier drain pipe shall be supplied installed at locations and in accordance to the drawings and as directed by the Departmental Representative.
- .6 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 in accordance to the drawings and as directed by the Departmental Representative.

3.5 FIELD QUALITY CONTROL

- .1 Contractor shall carry out all the necessary quality control to ensure barrier are supplied and installed as per these specifications.

3.6 CLEANING

- .1 Proceed in accordance with Section 01 74 11 – Cleaning. On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 Removal and disposal of W-Beam Guardrail at various locations in Kootenay National Park.
- .2 Work includes:
 - .1 Mobilization / Demobilization
 - .2 Survey, layout and staging
 - .3 Traffic Accommodation
 - .4 Removal and disposal of existing W-Beam guardrail, posts and hardware
 - .5 Backfilling of holes and incidental grading
 - .6 Cleanup

1.1 REFERENCES

- .1 AT - 2013 Standard Specifications for Highway Construction
http://www.transportation.alberta.ca/images/Standard_Specifications_for_Highway_Construction_2013.pdf
- .2 BC MoTI Standard Specifications for Highway Construction (Latest Edition)
- .3 AT – August 23, 2013 Roadside Design Guide
- .4 CSA G40.20 and G40.21-M87 - Structural Quality Steels
- .5 CSA G164-M - Hot Dip Galvanizing of Irregularly Shaped Articles
- .6 CSA W59-M - Welded Steel Construction (Metal Arc Welding)
- .7 CSA 080-M - Wood Preservation,
- .8 AASHTO Standard Designation M-180-841 "Corrugated Sheet Steel Beams for Highway Guardrail
- .9 ARTBA Technical Bulletin No. 268-B
- .10 NLGA Standard Grading Rules for Canadian Lumber

1.2 MEASUREMENT FOR PAYMENT

- .1 W-Beam Guardrail (rails and posts) removal in Kootenay National Park including end terminals will be measured in linear metres and will be paid for at the unit price for **“Unit Price Item 16a– Guardrail - Remove and Dispose of Existing Guardrail”**. Payment shall be compensation in full for all material, equipment and labour required to dismantle the W-Beam rails, remove posts, dispose of the rails, hardware and posts outside the national parks, backfill post holes, grade the area as necessary and clean up the work sites. Contractor to supply disposal ticket(s) to Departmental Representative for approval of disposal site(s) prior to its disposal.
- .2 Traffic Control required during work identified under this Section shall be included under **"Lump Sum Price Item 2 - Traffic Accommodation"** and no separate payment will be made to the Contractor.

- .3 Mobilization and demobilization required for this Work shall be included under **“Lump Sum Price Item 1 - Mobilization / Demobilization”** and no separate payment will be made to the Contractor
- .4 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the contract and no separate payment shall be made to the Contractor.

1.2 LOCATION

- .1 The Work is located at various locations along Highway 93S in Kootenay National Park.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Manufacturer's Instructions: submit manufacturer's storage and installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.4 QUALITY CONTROL

- .1 Contractor to provide quality control documentation as per Section 01 45 00 – Quality Control

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Storage and Protection:
 - .1 Store materials in accordance with manufacturer's recommendations

Part 2 Products

2.1 GENERAL

- .1 Not Used.

2.2 WASTE MATERIALS

- .1 All existing guardrails, posts and hardware shall become the property of the Contractor who shall dispose of it outside the national parks in an approved facility. Contractor to supply disposal ticket(s) to Departmental Representative for approval of disposal site(s) prior to its disposal.

3.1 MATERIAL

- .1 Not Used.

Part 3 Execution

3.1 CLEANUP

- .1 Cleanup of work sites as accepted by the Departmental representative.

END OF SECTION