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Drawings

Bow Valley Structures 4 drawings

Reference Documents:

1. Environmental Impact Analysis (BNP-000902 *Bow Valley Parkway Entrance Structures*)
2. Directive 17 (*Best Management Practices for Construction Projects in Banff National Park*).

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 29 01 - Site Occupancy.
- .2 Section 01 33 00 - Submittal Procedures.

1.2 PROJECT LOCATION

- .1 The project is located in Banff National Park, Alberta. Construction work is at two separate locations on Highway 1A (Bow Valley Parkway) at km 0.60 east end and at Castle Junction at the “T” intersection TCH km 46. The km 0.60 located near the Highway 1A/Bow Valley Parkway Interchange just west of Banff Townsite and the other locations is right at the Castle Mountain exit from Trans-Canada Highway 1 at the “T” intersection. The following are key locations relative to the project:

Trans-Canada Highway 1 (TCH) km 0 – East Park Gate
BVP km 0 (TCH km 22.3) – Hwy 1A/Bow Valley Parkway Interchange
BVP km 0.3 – East Turnaround Site
BVP km 0.5_ - BVP Log Structure
BVP km 3.1 – Bow Valley Viewpoint
BVP km 5.2 – Mule Shoe Lake Day Use Area
BVP km 16.6 – West Turnaround Site
BVP km 17.9 – Johnston Canyon
BVP km 24.1 (TCH km 46) – Castle Mountain Interchange

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Major scope items include supply and install three Engineered reviewed and stamped log structures, clearing, grubbing, stripping, grading, embankment construction, drainage, traffic management, sub-base course, base course, asphalt paving, line painting and rundle stone face on concrete abutments,
- .2 Load, haul and place select granular sub-base materials as required.
- .3 Supply and install three new information log structures (text for signs to be provided by Parks Canada)
- .4 Supply and install concrete abutments and rundle stone finish
- .5 The work generally comprises the following:
 - .1 Excavation for the footings of three log signs.
 - .2 Forming of concrete bases
 - .3 Concrete placement
 - .4 Rundle stone face
 - .5 Structural steel placement as per drawings
 - .6 Clearing, grubbing, to ensure site lines are adequate in both directions for vehicles travelling at 60 kph.
 - .7 Re-grading of excavated materials
 - .8 Grading, paving and line painting of parking area approximately 150 square metres in size
 - .9 Removal of all logs, brush and associated debris to the Peyto Pit.
 - .10 Raking and cleaning up of site.

- .11 Staining of the logs
 - .12 Metal capping of the logs
 - .13 Supply and install black power coated words as shown and described on the attached drawings, along with the Parks Canada Beaver logo, font to be Helvetica Neue 75 and the size of the font to meet the speed of the highway as per the Parks Canada Exterior signage standards and guidelines, dated March 2007.
 - .14 Metal banding on log structure as shown on drawings
 - .15 Seeding of disturbed areas.
 - .16 Warranty on the structure for 2 full years after completion, including repair and stain touch up as required. Completion is identified once the Engineer has signed off on the structure and as-builts have been received by Parks Canada. Warranty includes repair or replace any defect in or failure of any part of the work within the time set out in this contract. Parks and Engineer will review and provide notice of all defects and failures in the work which have appeared. If the contractor fails to repair or replace the defect or failure as required and identified by the Park and Engineer, Parks Canada may collect the costs for repair from the contractor by any lawful means available to Parks Canada.
 - .17 Completion of a long term maintenance plan.
- .6** All three areas will require miscellaneous items included above such as stripping, grading, drainage, base course, sub base course, concrete, rundle stone, traffic management, and pavement markings.
- .7** At the conclusion of the project Engineered stamped as-builts will supplied to Parks Canada. It is expected that a site survey and site plan will be completed as part of this project and a set of as-builts created. Three hard copies and one electronic version will be submitted at the conclusion of the project.
- .8** 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.

1.4 CONTRACT METHOD

- .1** Construct Work under a lump sum price.

1.5 WORK BY OTHERS

- .1** 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 Owner in reviewing their construction schedules, sharing his work space, and shall coordinate his operations with the other Contractors, including traffic management and construction staging.
- .2** Peyto Pit is an operational pits used by many contractors and Parks Canada. The Contractor shall cooperate with the other users of this area.

1.6 PRECEDENCE

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

1.7 DEFINITIONS

- .1 Alberta Transportation is referred to as "AT"

1.8 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 the Bow Valley Parkway at all times.
- .3 Complete all work, and installation of signs structures by October 1, 2013 (Contract Completion Date).

1.9 CONTRACTOR USE OF PREMISES

- .1 The Contractor is not permitted to extract and process native material for the production of granular aggregate anywhere inside the Park.
- .2 Contractor shall limit use of premises for Work, for storage, and for access, to allow:
 - .1 Owner occupancy.
 - .2 Work by other Contractors.
- .3 Coordinate use of premises under direction of the Departmental Representative.
- .4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .5 The Contractor and any Subcontractors shall obtain a business license from Realty Services in the Banff Park Administration building in Banff townsite, prior to commencement of the 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.

1.10 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.

1.11 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 **All temporary traffic control signs that are used for longer than one day shall be mounted on wood posts.**

1.12 SETTING OUT OF WORK

- .1** Departmental Representative will establish control points and provide:
 - .1 Complete set of construction Drawings.
 - .2 Alignment notes showing curve data and control point coordinates.
 - .3 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 as part of Lump Sum Price.

Part 2 Products

- .1** Not used.

Part 3 Execution

- .1** Not used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 35 00.06 - Special Procedures for Traffic Control.
- .2 Section 01 35 43 - Environmental Procedures.

1.2 ACCESS AND EGRESS

- .1 Provide for emergency traffic flow, pedestrian, railway and vehicular traffic for the duration of the construction.

1.3 USE OF THE SITE AND FACILITIES

- .1 The Work Site 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.
- .2 The Contractor shall not store material or park equipment along the Right-of-way outside the normal hours of work.
- .3 Contractor shall maintain adequate drainage at the Worksite.
- .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 24 hours per day, seven days per week subject to the following restrictions:
 - .1 No hauling of material during inclement weather.
 - .2 No stoppage of traffic will be allowed for the period commencing at 07:00 a.m. on the day before a Statutory Holiday or long weekend to 7:00 a.m. on the day following a long weekend.

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 EAEA prepared for the project.

- .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.

1.6 UTILITIES

- .1 The locations of Utilities and locates, if any, are subject to verification by the Contractor.
- .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 which 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 which may interfere with the operation of such Utilities.
- .5 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the Work, using hand labour as required.
- .6 The Contractor shall assess the possible impact of its 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 all applicable safety regulations of the Workers' Compensation Board of Alberta (WCB) including, but not limited to, WCB's Industrial Health and Safety Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.
- .2 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site.
- .3 The Contractor shall promptly take such measures as are required to repair, replace or compensate for any loss or damage caused by the Contractor to any property 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 Bow Valley Parkway 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 but this shall be by standard highway trucks not exceeding legal highway load limits.
- .2 Flag persons shall be provided when vehicles are entering or exiting Worksite access points.
- .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 which will prevent dropping of materials or debris on the roadways, and where contents may otherwise be blown off during transit such loads shall be covered by tarpaulins or other suitable covers. Spills of 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.
 - . The following personnel shall be included in the list:
 - .1 Project Superintendent;
 - .2 Safety Representative.
 - .2 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.

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 requested 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, briefings will be arranged for new staff and sub-contractors showing up on the project.
- .4 Cost of attending the above meetings shall be considered incidental to the contract price. 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 Banff National Park. Refer to Section 01 35 43 - Environmental Procedures and 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 contract Price 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

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Lump Sum Price.
- .2 Measurement procedures.

1.2 REFERENCES

- .1 General Conditions.

1.3 Lump Sum Price

- .1 Do not include in the Contract Price, additional contingency allowances for products, installation, overhead or profit.
- .2 Lump Sum Price is not a sum due the Contractor. Rather, payment will be made against it for miscellaneous work not included in the Lump Sum price table under the General Conditions of the Contract.
- .3 Such work may include, but not be limited to:
 - .1 Supply and installation of 3 log signs as indicated on the drawings in two different areas.
 - .2 Engineering for all areas to ensure the signs are designed and installed correctly as per engineering standards for the Provincial of Alberta and Alberta Transportation.
 - .3 Site plans, survey and engineered as built at the conclusion of the project.
 - .4 Completion of a maintenance document for the structures
 - .5 Warranty period of 2 years after Engineer sign off.
 - .6 Supply and delivery of bituminous materials including asphalt cement, asphalt prime, asphalt tack and anti-stripping agent for an area of 150 square metres at the junction of the 1A (Bow Valley Parkway and the Fireside access road for approximately 6 to 8 stalls.;
 - .7 Grading of parking areas and leveling of gravel as required to accept asphalt.
 - .8 Supply and installation of topsoil (approved by department representative and seeding;
 - .9 Supply and installation of line painting;
 - .10 Survey resulting from changes made by the Departmental Representative;
 - .11 Contouring of cut slopes as required for the installation of the 3 signs;
 - .12 Tree and brush removal, stripping, excavation and disposal of waste materials as directed by the Departmental Representative;
 - .13 Remediation or removal and replacement of unsuitable or contaminated soils not described in the contract documents;
 - .14 Site occupancy; and
 - .15 Supply and installation of landscaping
 - .16 Responsibility of all locates.

1.4 MEASUREMENT PROCEDURES

- .1 Payment for Work under the **“Lump Sum Price” Supply of Bituminous Materials** will be based on supplier’s invoices and weight tickets without any mark-up by the Contractor and Sub-Contractor.
- .2 Payment for Work under the **“Lump Sum Price”, Items other than Bituminous Materials** will be made using negotiated rates or by material, labour and equipment rates as per the following:
 - .1 Rental rates will be in accordance with current Alberta Roadbuilders and Heavy Construction Association rate schedule, and will be all inclusive and fully operated.
 - .2 Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits.
 - .3 Transportation time to and from site will be reimbursed only for equipment used exclusively for additional work.

Part 2 Products

- .1 Not used.

Part 3 Execution

- .2 Not used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Mobilization and Demobilization.

1.2 RELATED SECTIONS

- .1 Section 01 11 00 – Summary of Work

1.3 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.

1.4 MEASUREMENT PROCEDURES

- .1 Mobilization and Demobilization:
 - .1 Payment will be made under **“Lump Sum Price Item – Transport / Mobilization / Demobilization”**.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Definition of Site Occupancy and Bidding Method.

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 RELATED SECTIONS

- .1 SACC R2850D GC 5.10
.2 Section 01 11 00 – Summary of Work Clause 1.8 - Work Sequence

1.4 DEFINITION OF OCCUPANCY

.1 OCCUPANCY

- .1 Notwithstanding SACC R2850D - GC 5.10, the Contractor shall be permitted to lease and occupy sites where he will be working in Banff National Park, free of charge from the date of award of the contract up to and including the completion date of October 31, 2012 (Section 01 11 00 – Summary of Work Clause 1.10 - Work Sequence). The sites to be leased by the Contractor include all the roads and areas specified in this contract and as directed by the Departmental Representative.
- .2 The Contractor's occupancy of the site will be deemed to have ended, when both of the following conditions are met to the satisfaction of Parks Canada:
- All the work identified under this contract, has been completed.
 - All sites clean up and any outstanding deficiencies have been addressed to the satisfaction of the Departmental Representative.

Part 2 Products

- .2 Not Used.

Part 3 Execution

- .3 Not Used.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 Coordination.
- .2 Progress meetings.
- .3 Construction organization and start-up.
- .4 Submittal schedule.
- .5 Construction progress meetings.
- .6 On-site documents.
- .7 Schedules.
- .8 Submittals.
- .9 Close out procedures.

1.2 RELATED SECTIONS

- .1 Section 01 11 00 - Summary of Work.
- .2 Section 01 14 00 – Work Restrictions.
- . .
- .3 Section 01 33 00 - Submittal Procedures.
- .4 Section 01 35 43 - Environmental Procedures.
- .5 Section 01 45 00 – Quality Control.
- .6 Section 01 52 00 - Construction Facilities.
- .7 Section 01 77 00 – Close out Procedures.
- .8 Section 01 78 00 – Close out Submittals.

1.3 MEASUREMENT PROCEDURES

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

1.4 COORDINATION

- .1 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.

1.5 PROJECT MEETINGS

- .1 Attend 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 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 Provide physical space and make arrangements for meetings.

1.6 CONSTRUCTION ORGANIZATION AND START-UP

- .1** Within seven (7) days after award of Contract, 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.
 - .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** Comply with Departmental Representative's allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
- .5** During construction, 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** Comply with instructions of the Departmental Representative for use of temporary utilities and construction facilities.
- .7** Coordinate field engineering and layout work with the Departmental Representative.

1.7 ON-SITE DOCUMENTS

- .1** Maintain at job site, one copy each of the following:
- .2** Contract Drawings.
- .3** Specifications.
- .4** Addenda.
- .5** Reviewed Shop Drawings and mix designs.

- .6 Change Orders.
- .7 Other modifications to Contract.
- .8 Traffic Management Plan.
- .9 Safety Plan.
- .10 Blasting Plan
- .11 WHMIS.
- .12 Environmental Protection Plan.
- .13 Field test reports.
- .14 Copy of approved Work schedule and most recent updated schedule.

1.8 SUBMITTAL SCHEDULE

- .1 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.

1.9 PROJECT SCHEDULES

- .1 Submit preliminary construction progress schedule to Departmental Representative
- .2 During progress of Work revise and resubmit as directed by the Departmental Representative.
- .3 In addition to the project schedule, submit weekly schedules to the Departmental Representative showing Work planned for the following week.

1.10 CONSTRUCTION PROGRESS MEETINGS

- .1 During course of Work prior to project completion, schedule progress meetings as required by Departmental Representative.
- .2 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.

1.11 SUBMITTALS

- .1 Submit product data to Section 01 33 00 for review for compliance with Contract Documents.
- .2 Submit requests for payment for review, and for transmittal to Departmental Representative. Payment request on last day of the month.
- .3 Submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.
- .4 Process substitutions through Departmental Representative.
- .5 Process change orders through Departmental Representative.
- .6 Deliver closeout submittals for review and preliminary inspections, for transmittal to Departmental Representative.

1.12 CLOSEOUT PROCEDURES

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

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 14 00 - Work Restrictions.
- .2 Section 01 35 00.06 - Special Procedures for Traffic Control.
- .3 Section 01 35 29.06 – Health and Safety Requirements.
- .4 Section 01 35 43 - Environmental Procedures.
- .5 Section 01 45 00 – Quality Control.
- .6 Section 01 78 00 - Closeout Submittals.

1.2 MEASUREMENT PROCEDURES

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

1.3 REFERENCES

- .1 Not used.

1.4 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 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 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.
- .5 Notify Departmental Representative in writing at time of submission, identifying any deviations from requirements of Contract Documents stating reasons for deviations.
- .6 Verify field measurements and affected adjacent Work is consistent.
- .7 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .9 Keep one reviewed copy of each submission on site.

1.5 “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 which 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** 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** Allow seven (7) 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 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 and (3) hard copies of the shop drawings or mix design for each requirement requested in the Specification Sections 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 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 which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of 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.
- 1.6 SAMPLES**
- .1 Not used.
- 1.7 MOCK-UPS**
- .1 Not used.
- 1.8 CERTIFICATES AND TRANSCRIPTS**
- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
 - .2 Submit transcription of insurance immediately after award of Contract.
- 1.9 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.
 - .2 Pre-Mobilization Submittals

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 seven (7) 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, as requested by Departmental Representative .
- .3 Plan describing methods the Contractor will have to meet his responsibilities as the Prime Contractor for Traffic Control in the Work zones.
- .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 Quality Control Plan in accordance with Section 01 45 00 – Quality Control.
- .6 Traffic Management Plan, in accordance with the requirements of Section 01 35 00.06 - Special Procedures for Traffic Control.
- .7 ~~EPP~~ that shall meet the requirements of Section 01 35 43 – Environmental Procedures.
- .8 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.
- .9 Survey Plan describing the Contractor’s intended methods of surveying during this project.
- .10 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.
- .11 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.
- .12 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.

.3 Construction Phase Submittals

- .1 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. Work to be linked to activities by road segment or location identified in project schedule and to provide information on materials, equipment and manpower. Also, alternate Work to be identified if Work or a portion of, proposed cannot be done due to weather, equipment breakdown, delays in delivery, etc.
- .2 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.
- .3 "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 of 7 days prior to fabrication / production.
- .4 Progress Photographs:
 - .1 Formats:
 - .1 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.
- .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 CD with all electronic pictures as part of closeout package.

- .7 Submit an electronic copy of Contractor’s authorized representative’s work site health and safety inspection reports to Departmental Representative and authority having jurisdiction as requested by Departmental Representative.
- .8 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .9 Submit copies of incident and accident reports.

.4 Project Completion Submittals

- .1 Record Drawings -The Contractor shall submit copies of all Contractor's Drawings revised as necessary to record all as-built changes to the Work and the Contractor shall submit a set of Contract Drawings clearly marked to record as-built changes to the Work.
- .2 Quality Control Records – The Contractor shall submit a bound and itemized set of project quality control documentation.

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

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 RELATED SECTIONS

- .1 All Division 01, 02 and 03 Sections.

1.3 MEASUREMENT PROCEDURES

- .1 Cost of Traffic Control, including temporary pavement marking, described in this Section 01 35 00.06, shall be considered incidental to **“the lump sum price” Highway Flagging - Traffic Accommodation**”, and no additional payment will be made for the duration of the Contract. 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.
- .2 Cost of keeping existing roadway clean, free of pot holes while Contractor is on site shall be considered incidental to **“Highways Flagging / Traffic Accommodation”**, and no additional payment will be made for the duration of the Contract.
- .3 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– Highways Flagging / Traffic Accommodation**”, and no additional payment will be made for the duration of the Contract. This excludes snow removal on Public roads.

1.4 REFERENCES

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

1.5 QUALITY CONTROL

- .1 All Quality Control by the Contractor.

1.6 GENERAL

- .1 The Contractor shall develop and implement a Traffic Management Plan in accordance with the requirements of the current edition of the AT - Traffic Accommodation in Work Zones, except where specified otherwise. The Traffic Management Plan 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 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 shall be in accordance with Section 32 17 23 – Pavement Marking
- .7** Contractor shall have appropriate traffic control measures in place so that at least one lane measuring 3.7m wide of highway traffic is maintained through the work zone at all times throughout the construction.
- .8** The Contractor shall coordinate traffic management procedures with other Contractors working in the area.

1.7 PROTECTION OF PUBLIC TRAFFIC

- .1** Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2** When working on existing travelled way:
 - .1** Place equipment in a position presenting a minimum of interference and hazard to traveling public.
 - .2** Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3** Do not leave equipment on travelled way overnight.
- .3** Do not close any lanes of road without approval of Departmental Representative. Before re-routing traffic erect suitable signs and devices in accordance with the requirements of the current edition of the AT - Traffic Accommodation in Work Zones, except where specified otherwise.
- .4** Keep travelled way clean, free of pot holes and of sufficient width to accommodate at least one 3.7 m wide lane for traffic.
- .5** The Contractor shall 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.
- .6** The 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.
- .7** 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

1.8 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in the Traffic Management Plan submitted by the Contractor and approved by the Departmental Representative. **All temporary signs that are used for longer than three days shall be mounted on wood posts.** All temporary signs will be removed at end of each construction day.
- .3 Place signs and other devices to standards and in locations recommended in AT - Traffic Accommodation in Work Zones.
- .4 Signs shall be wind resistant.
- .5 As situation on site changes, Contractor to update his Traffic Management Plan outlining signs and other devices required for the project and submit for the approval of the Departmental Representative.
- .6 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 which do not apply to conditions existing from day to day or time to time.

1.9 CONTROL OF PUBLIC TRAFFIC

- .1 Provide competent flag persons, trained in accordance with, and properly dressed and equipped as specified in, Alberta Transportation - Traffic Accommodation in Work Zones:
 - .1 When public traffic is required to pass working vehicles or equipment, which block all or part of travelled roadway.
 - .2 When vehicles are entering or exiting Worksite 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.
- .2 Delays to public traffic due to Contractor's operators: maximum 10 minutes.

- .3 No stoppage of traffic will be allowed for the period commencing at 07:00 a.m. on the day before a Statutory Holiday or long weekend to 7:00 a.m. on the day following a long weekend. Unless pre- approved in advance.
- .4 During hours of darkness, Contractor shall determine requirements but as a minimum, flagpersons 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.

1.10 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 maintained at 60 km/h in work zones in non-work periods.
 - .2 Speed limit reduced to 50 km/h in work zones in work periods.
- .2 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 SECTION INCLUDES**

- .1 Submittals.
- .2 Filing of notice.
- .3 Safety assessment.
- .4 Meetings.
- .5 Regulatory requirements.
- .6 Project/site conditions.
- .7 General requirements.
- .8 Responsibility.
- .9 Compliance requirements.
- .10 Unforeseen hazards.
- .11 Health and safety coordinator.
- .12 Posting of documents.
- .13 Correction of non-compliance.
- .14 Work stoppage.

1.1 RELATED SECTIONS

- .1 Section 01 14 00 – Work Restrictions
- .2 Section 01 33 00 – Submittal Procedures
- .3 Section 01 35 43 - Environmental Procedures
- .4 Section 02 81 01 - Hazardous Materials: Submission Requirements for WHMIS MSDS.

1.2 MEASUREMENT PROCEDURES

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

1.3 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 Alberta.
 - .1 Occupational Health and Safety Act, R.S.A. 2000.

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 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 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and authority having jurisdiction, as requested by Departmental Representative.
- .13 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .14 Submit copies of incident and accident reports.
- .15 Submit copies of Material Safety Data Sheets (MSDS) to Departmental Representative.
- .16 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within five (5) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within three (3) days after receipt of comments from Departmental Representative.
- .17 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 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.5 FILING OF NOTICE

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

1.6 SAFETY ASSESSMENT

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

1.7 MEETINGS

- .1 Schedule and administer 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.

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.

A copy of the "Attestation and Proof of Compliance with Occupational Health and Safety (OHS)" form is attached as Appendix A.

1.8 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with National Parks Act.

1.9 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.10 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.11 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

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

- Have minimum 2 years site-related working experience specific to activities associated with roadway construction.
- Have working knowledge of occupational safety and health regulations.
- 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.
- Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.14 POSTING OF DOCUMENTS

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

1.15 CORRECTION OF NON-COMPLIANCE

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

1.16 WORK STOPPAGE

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

Part 2 Products

- .1 Not used.

Part 3 Execution

- .1 Not used.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 Measurement procedures.
- .2 National Park regulations.
- .3 Canadian Environmental Assessment Act (CEAA).
- .4 Start-up and environmental briefing.
- .5 Site access and parking.
- .6 Protection of work limits.
- .7 Erosion control.
- .8 Pollution control.
- .9 Equipment maintenance, fuelling and operation.
- .10 Operation of equipment.
- .11 Fire prevention and control.
- .12 Wildlife.
- .13 Relics and antiquities.
- .14 Waste materials storage and removal.
- .15 Miscellaneous site management contingencies.
- .16 Clearing and grubbing.
- .17 Stripping.
- .18 Material loading, hauling, placement and grade building.
- .19 Excavating and placement.
- .20 Culvert installation.
- .21 Asphalt plant operation and paving.
- .22 Crushing.
- .23 Fine grading, topsoil placement and seeding.
- .24 Pavement marking.
- .25 Specific concerns.

1.2 RELATED SECTIONS

- .1 All Divisions 01, 02, 03, 05, 10, 31, 32, 33 and 34 Sections

1.3 MEASUREMENT PROCEDURES

- .1 Preparation and implementation of an Environmental Protection Plan (EPP) 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.

1.4 SUBMITTALS

- .1 The Contractor is required to prepare an Environmental Protection Plan in accordance with this Section 01 35 43 – Environmental Procedures , the project specific mitigations outlined in the environmental impact analysis (BNP-000902 *Bow Valley Parkway Log*

Entrance Structures), and Directive 17 (*Best Management Practices for Construction Projects in Banff National Park*).

1.5 NATIONAL PARK REGULATIONS

- .1 The Contractor shall ensure that all work is performed in accordance with the ordinances, laws, rules and regulations set out in the Canada National Parks Act and Regulations.
- .2 The Contractor and any sub-Contractors shall obtain a business license from the Parks Canada Administration Office in Lake Louise or Banff, 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, PCA Environmental Officer or at the Park Gate.

1.6 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 2012, subsequent amendments, and Parks Canada's Interim Directive on Implementation of the Canadian Environmental Assessment Act 2012.
- .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.

1.7 START-UP AND ENVIRONMENTAL BRIEFING

- .1 All staff employed at the construction site will be subject to a 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 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.

1.8 CONSTRUCTION SITE ACCESS AND PARKING

- .1 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.

1.9 PROTECTION OF WORK LIMITS

- .1 The Contractor is to prepare an EPP which 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.

1.10 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.

1.11 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 E.S.O. 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. Unless pre-authorized.

- .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. If not available, Banff Dispatch will be contacted at (403) 762 – 4506. Spill response cards will be distributed during the initial Environmental Briefing with basic instructions and phone numbers.
- .8 In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.
- .9 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.

1.12 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 National Park 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 Banff 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 Banff National Park. Alternatively, the Contractor may hire a security person employed to prevent vandalism.

1.13 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 Restrict vehicle movements to work limits.
- .5 Workers private vehicles are to remain within the construction footprint.

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

- .2 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.
- .3 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The ESO and the Departmental Representative shall be notified of any fire immediately. If not available, Banff Dispatch shall be contacted at (403) 762 – 4506.
- .4 Fires or burning of waste materials is not permitted.

1.15 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 Construction activities will take place during daylight hours and, and if necessary, the construction activity may be scheduled around important wildlife windows (e.g. Harlequin duck breeding and bird nesting). Any work prior to May 1 and after September 30 has little effect on Harlequins in the Bow Valley. Critical times are during flightless movements of Harlequin broods during the months of July and August (See Specific Concerns in the Harlequin Duck section below). Fisheries windows for avoidance of stream disturbance work will apply – see Fish and Fish Habitat Considerations section below.
- .3 All site workers will observe posted speed limits and 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. The contractor will ensure that the work site is properly secured during non-work hours with excavations fenced and covered as required to prevent injury to wildlife.
- .4 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. If the ESO or Departmental Representative are not available, Banff Dispatch will be contacted at (403) 762 – 4506.

1.16 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 National Park 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.

1.17 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 Banff 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 Banff 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. If neither can be reached, the Contractor/worker shall immediately contact Banff Dispatch at (403) 762 – 4506 and report the details.
- .7 Sanitary facilities, such as a portable container toilet, shall be provided by the Contractor and maintained in a clean condition.

1.18 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

- .1 The Contractor shall prepare an EPP which 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 E.S.O.
- .2 If required, a Contractor's office and work headquarters material laydown, equipment parking and storage area will be permitted at the Fireside access road pull out.
- .3 Removal and storage of snow shall be arranged with the ESO and the Departmental Representative.
- .4 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.
- .5 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..
- .6 Pets shall not be brought to or maintained at the construction site or worker's camp.

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, water bodies, roads, 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 E.S.O. 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 transport to Peyot Pit
- .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 approved grading plan as per discussion with departmental representative.
- .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 rip rap 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 the Bow River, and 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 which 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 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 E.S.O.

3.6 PAVEMENT MARKING as required

- .1 Pavement marking shall be undertaken pursuant to standard methods applied in Banff 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. to the satisfaction of the Departmental Representative.

3.7 SPECIFIC CONCERNS RELATIVE TO EROSION CONTROL AND SEDIMENTATION

- .1 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, if required. This plan shall be to the satisfaction of the Departmental Representative and ESO.
- .2 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.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 Measurement procedures.
- .2 Testing by the Contractor.
- .3 Contractor' Quality Control Program.
- .4 Inspection.
- .5 Independent Inspection Agencies.
- .6 Access to Work.
- .7 Reports.
- .8 Tests and mix designs.
- .9 Mill tests.

1.2 RELATED SECTIONS

- .1 All Division 01, 02 and 03 Sections

1.3 MEASUREMENT PROCEDURES

- .1 This work shall be incidental to contract, form part of the lump sum and will not be measured for payment.

1.4 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A23.2-04, Methods of Test and Standard Practices for Concrete

1.5 TESTING BY THE CONTRACTOR

- .1 Testing required to provide quality control to assure that the Work strictly complies with the Contract requirements shall include, but not be limited to:
 - testing all structural concrete, grout, reinforcing steel, asphalt concrete pavement, structural backfill, corrugated steel culverts, misc metals, concrete barriers, and all source acceptance testing ; and
 - all testing specified in the Contract Documents; and
 - any other testing required as a condition for deviation from the specified Contract procedures.
- .2 Testing proposed shall be based on testing requirements in the current AT Standard Specifications for Highway Construction or as stated below.
- .3 The Contractor shall be fully responsible and bear all costs for all quality control testing and shall conduct such testing in the following manner:
 - 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;
 - notify the Departmental Representative when sampling will be conducted;

- within one Day after completion of testing, submit test results to the Departmental Representative; and
 - identify test reports with the name and address of the organization performing all tests, and the date of the tests.
- .4** Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.
- .5** 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
- .6** The minimum frequency for Quality Control testing during embankment construction will be as follows if required:

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 D1556 – Sand Cone ASTM D2167 – Balloon ASTM D2922 - Nuclear	1 per 1000 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 300 mm lift per culvert, spaced through the length and depth of the culvert backfill

1.6 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** 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.
- .3** 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.

1.7 INSPECTION

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

- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 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.

1.8 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies may be engaged by the Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
- .2 Employment of inspection/testing agencies does not relax responsibility 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.

1.9 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.10 PROCEDURES

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

1.11 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of 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.

1.12 REPORTS

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

1.13 TESTS AND MIX DESIGNS

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

1.14 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 SECTION INCLUDES**

- .1 Installation and removal.
- .2 Site storage/loading.
- .3 Construction parking.
- .4 Security.
- .5 Offices.
- .6 Equipment, tools and material storage.
- .7 Sanitary facilities.
- .8 Construction signage.

1.2 RELATED SECTIONS

- .1 Section 01 35 00.06 - Special Procedures for Traffic Control.

1.3 MEASUREMENT PROCEDURES

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

1.4 INSTALLATION AND REMOVAL

- .1 Provide construction facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.5 SITE STORAGE/LOADING

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

1.6 CONSTRUCTION PARKING

- .1 Provide and maintain adequate access and parking at the project site in areas approved by the Departmental Representative.
- .2 Build and maintain temporary roads and provide snow removal during period of Work.
- .3 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.

1.7 SECURITY

- .1 If required by the Contractor, 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.

1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

1.9 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations, ordinances and the EPP.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.10 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 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 SECTION INCLUDES**

- .1 Installation and removal.
- .2 Fencing.
- .3 Guardrails and barricades.
- .4 Access to site.
- .5 Public traffic flow.
- .6 Fire Routes.
- .7 Protection for off-site and public property.

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 MEASUREMENT PROCEDURES

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

1.4 RELATED SECTIONS

- .1 Section 01 35 00.06 - Special Procedures for Traffic Control.
- .2 Section 01 52 00 - Construction Facilities.

1.5 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.6 HOARDING

- .1 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.7 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations.

1.8 WEATHER ENCLOSURES

- .1 Not used.

1.9 DUST TIGHT SCREENS

- .1 Not used.

1.10 ACCESS TO SITE

- .1 Provide and maintain access roads, as may be required for access to Work.

1.11 PUBLIC TRAFFIC FLOW

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

1.12 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.13 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 SECTION INCLUDES**

- .1** Quality.
- .2** Availability.
- .3** Storage, handling and protection.
- .4** Transportation.
- .5** Manufacturer's instructions.
- .6** Quality of work.
- .7** Coordination.
- .8** Concealment.
- .9** Remedial work.
- .10** Fastenings.
- .11** Protection of work in progress.

1.2 RELATED SECTIONS

- .1** Section 01 45 00 - Quality Control.

1.3 REFERENCE STANDARDS

- .1** Within text of each specifications section, reference may be made to reference standards.
- .2** Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3** If there is question as to whether 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** 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** 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.

1.4 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.

1.5 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.

1.6 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber and misc metals on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.7 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

1.8 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative 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.

1.9 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative whose decision is final.

1.10 CO-ORDINATION

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.11 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.

1.12 REMEDIAL WORK

- .1 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 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.13 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.

- .3 Use 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 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.14 PROTECTION OF WORK IN PROGRESS

- .1 Do 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 SECTION INCLUDES**

- .1 Qualifications of Surveyor.
- .2 Survey reference points.
- .3 Survey / layout requirements.
- .4 Survey accuracy.
- .5 Notification.
- .6 Records Submittals.

1.2 MEASUREMENT PROCEDURES

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

1.3 REFERENCES

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

1.4 QUALIFICATIONS OF SURVEYOR

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

1.5 SURVEY / LAYOUT REQUIREMENTS

- .1 The Departmental Representative will indicate the beginning and end of the project and visual reference points and other information for horizontal and vertical control, to be used by the Contractor for his detailed layout. 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.

Layout for interim lane markings, including those for intersection treatments, shall be performed by the Contractor at his own cost.

The Contractor shall provide at his own cost, any survey activities as required and including, but not limited to, the following:

- Layout for interim lane markings, in the area of construction. Including those for intersection treatments
- String line or other markings for the alignment or grade control of construction equipment as required.

1.6 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points will be provided by the Departmental Representative.
- .2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

- .3 Make no changes or relocations without prior written notice to Departmental Representative.
- .4 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.

1.7 SURVEY REQUIREMENTS

- .1 Contractor will be responsible for all staking and layout including but not limited to:
 - .1 Establish lines and levels, locate and lay out, by instrumentation.
 - .2 Stake for grading, cut and fill.
 - .3 Stake slopes and top of embankment, sub-base course, base course and centreline for paving.
 - .4 Establish culverts, catch basin structures, invert elevations and locations.
 - .5 Accuracy:
 - .1 All survey work shall be tied into the existing Control Monument Network with 3TM coordinates in 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 PWGSC Control Monument Network.
 - .6 Secondary Control Points will be tied into and relative to PWGSC Control Monument Network.
 - .7 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.
 - .8 Reference Survey Control Points that are in danger of being damaged or destroyed.
- .2 Departmental Representative will review/approve all measurement surveys.

1.8 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 Record locations of maintained, re-routed and abandoned service lines.

1.9 SUBMITTALS

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

Part 2 Products

- .1 Not Used.

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Entrance Structure
Banff National Park

Part 3 **Execution**
 .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Progressive cleaning.
- .2 Final cleaning.

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 MEASUREMENT PROCEDURES

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

1.4 RELATED SECTION

- .1 Section 01 35 00.06 - Special Procedures for Traffic Control.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 01 77 00 - Closeout Procedures.

1.5 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .3 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 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Remove waste material and debris from site at end of each working day.
- .6 Dispose of waste materials and debris off site.
- .7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8 Provide adequate ventilation during use of volatile or noxious substances.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.6 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 Remove waste products and debris including that caused by Owner or other Contractors.
- .4 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 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Inspect finishes, and ensure specified workmanship and operation.
- .7 Remove dirt and other disfiguration from exterior surfaces.
- .8 Sweep and wash clean paved areas.
- .9 Clean drainage systems.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 Inspection and declaration.

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 MEASUREMENT PROCEDURES

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

1.4 RELATED SECTIONS

- .1 Section 01 74 11 - Cleaning.
- .2 Section 01 78 00 - Closeout Submittals.

1.5 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 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: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Work is complete and ready for Final Inspection.
- .4 Final Inspection: when items noted above are completed, request 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 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 71 00 - Examination and Preparation.
- .4 Section 01 77 00 - Closeout Procedures.

1.4 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 Store record documents and samples in field office apart from documents used for construction.
- .3 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 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.5 RECORDING ACTUAL SITE CONDITIONS

- .1 Contractor to provide as built drawings to Departmental Representative at project completion.
- .2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

- .3 Contract Drawings and shop drawings: 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 Specifications: legibly mark each item to record actual construction, including:
 - .1 Changes made by Addenda and change orders.

1.6 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.

1.7 WARRANTIES AND BONDS

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of 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 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 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 SECTION INCLUDES**

- .1 Measurement procedures.
- .2 Waste management and disposal.
- .3 Equipment.
- .4 Preparation.
- .5 Protection.
- .6 Removal.
- .7 Stockpiling of material.
- .8 Finish tolerances.
- .9 Sweeping.

1.2 RELATED SECTIONS

- .1 Section 01 35 00.06 – Special Procedures for Traffic Control
- .2 Section 01 35 43 - Environmental Procedures

1.3 MEASUREMENT PROCEDURES

- .1 Payment for asphalt shall be captured under the lump sum price as follows;
- .2 **Asphalt Pavement Removal**” will be measured for payment in cubic metres of asphalt pavement removed and shall include all labour, equipment and material to break up, excavate, and dispose of asphalt pavement.
- .3 **Sawcutting**” will be measured for payment in linear metres of asphalt cut and shall include all labour, equipment and materials required to complete the Work.
- .4 **No overhaul will be paid for Asphalt Pavement Removal**
- .5 Traffic Control required for this Work shall be incidental to **“Lump Sum Price** 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** 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.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Place milled asphalt material in stockpile if required, at location designated by the Departmental Representative.

Part 2 Products**2.1 EQUIPMENT**

- .1 The Contractor may use any method to cut the pavement provided that the methods and equipment result in a clean and straight vertical cut. Jagged or rough edges will not be acceptable.

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 Have appropriate Traffic Control measures in place for this work.

3.2 PROTECTION

- .1 Protect existing pavement not designated for removal. 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 by contractor and as designated by the Departmental Representative.
- .2 Saw cutting to lines established by Departmental Representative in field:

3.4 SWEEPING

- .1 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 Definitions.
- .2 Submittals.
- .3 Storage and handling.
- .4 Transportation.
- .5 Materials.
- .6 Disposal.

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 MEASUREMENT PROCEDURES

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

1.4 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 43 – Environmental Procedures.

1.5 REFERENCES

- .1 Export and Import of Hazardous Waste Regulations (EIHWR 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).

1.6 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.

1.7 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.

1.8 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.
 - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
 - .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
 - .6 Transfer of flammable and combustible liquids is prohibited within buildings.
 - .7 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
 - .8 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.
 - .9 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
 - .10 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
 - .11 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.
- .7 Maintain clear egress from storage area.
- .8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
- .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
- .10 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 SECTION INCLUDES**

- .1 Measurement procedures.
- .2 Shop drawings.
- .3 Waste management and disposal.
- .4 Materials.
- .5 Fabrication and erection.
- .6 Removal and reshoring.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 03 30 00 - Cast-in-Place Concrete.

1.3 MEASUREMENT PROCEDURES

- .1 This work will not be measured for payment. Include costs in Lump Sum Price Items for which concrete formwork and falsework as required.

1.4 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA-A23.1-[04]/A23.2-[04], Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-O86S1-[05], Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
 - .3 CSA O121-[M1978(R2003)], Douglas Fir Plywood.
 - .4 CSA O151-[04], Canadian Softwood Plywood.
 - .5 CSA O153-[M1980(R2003)], Poplar Plywood.
 - .6 CSA O437 Series-[93(R2006)], Standards for OSB and Waferboard.
 - .7 CSA S269.1-[1975(R2003)], Falsework for Construction Purposes.
 - .8 CAN/CSA-S269.3-[M92(R2003)], Concrete Formwork, National Standard of Canada
- .2 Council of Forest Industries of British Columbia (COFI)
 - .1 COFI Exterior Plywood for Concrete Formwork.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings for formwork and falsework in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

- .2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework Drawings. Comply with CAN/CSA-S269.3 for formwork Drawings.
- .3 Indicate formwork design data, such as permissible rate of concrete placement, and temperature of concrete, in forms.
- .4 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.

1.6 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 waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low volatile organic compounds (VOC's).
- .5 Dispose concrete waste in the roadway embankment as approved by the Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Formwork materials:
 - .1 Forms for exposed surfaces including the cast in place concrete shall be new material, made of "Coated Formply", consisting of Douglas Fir substrate with resin-impregnated paper overlay and factory treated chemically active release agent,
 - .2 Acceptable Product:
 - .3 "ULTRAFORM",
 - .4 "POURFORM 107",
 - .5 Or equal.
 - .6 All form material for exposed surfaces shall be full-sized sheets, as practical. The re-use of any forms must have the acceptance of the Departmental Representative.
- .2 The minimum acceptable forming for all exposed concrete where the pour height is 1.5 m or less shall have 18 mm approved plywood, supported at 300 mm maximum on centres. Where the pour height is greater than 1.5 m the minimum acceptable forming for all exposed concrete shall have 18 mm approved plywood, supported at 200 mm maximum on centres. Strong-backs or walers placed perpendicularly to the supports shall be employed to ensure straightness of the form.
- .3 Metal bolts or anchorages within the forms shall be so constructed as to permit their removal to a depth of at least 20 mm from the concrete surface.
- .4 Break-back type form ties shall have all spacing washers removed and the tie shall be broken back a distance of at least 20 mm from the concrete surface.

- .5 All fittings for metal ties shall be of such design that, upon their removal, the cavities which are left will be of the smallest possible size. Torch cutting of steel hangers and ties will not be permitted. Formwork hangers for exterior surfaces of decks and curbs shall be an acceptable break-back type with surface cone, or removable threaded type.
- .6 Cavities shall be filled with cement mortar and the surface left sound, smooth, even and uniform in color.
- .7 Form release agent shall be non-toxic, biodegradable, low VOC.
- .8 Falsework materials to CSA-S269.1.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with Drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1 and COFI Exterior Plywood for Concrete Formwork.
- .3 Do not place shores and mud sills on frozen ground.
- .4 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1.
- .6 Align form joints and make watertight. Keep form joints to minimum.
- .7 Use 20 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .9 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Assure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

3.2 REMOVAL AND RESHORING

- .1 Remove formwork when concrete has reached 75% of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
- .2 Provide all necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .3 Reuse formwork and falsework subject to requirements of CAN/CSA-A23.1.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 Measurement procedures.
- .2 Certificates.
- .3 Quality assurance.
- .4 Waste management and disposal.
- .5 Materials.
- .6 Mixes.
- .7 Aggregate tests.
- .8 Preparation.
- .9 Construction.
- .10 Protection.
- .11 Field quality control.

1.2 RELATED SECTIONS

- .1 Section 01 35 43 - Environmental Procedures.
- .2 Section 03 10 00 - Concrete Forming and Accessories.

1.3 MEASUREMENT PROCEDURES

- .1 **Supply and Install Concrete Bases**” shall be measured as part of the lump sum price for the required number of concrete bases poured as bases for the log structures. Payment shall include all materials, formwork, labour and other incidental items.
 - .1 An interim payment of 80% of the full value will be made if the concrete has been placed acceptably, and the 7 day test cylinder strength indicates that the concrete will reach the specified strength. Partial payment in advance of the 28 day test will not be deemed to constitute acceptance of the concrete. Full payment will not be made until the specified concrete finish meets the strength requirements of the specifications.
 - .2 Supply and installation of anchor bolts, nuts and washers and bolt grouting will not be measured but considered incidental to work.
- .2 Heating of water and aggregates and providing cold weather protection will not be measured but considered incidental to work. Include costs in lump sum price for which concrete is required.
- .3 Cooling of concrete and providing hot weather protection will not be measured but considered incidental to work. Include costs in Lump Sum Price items for which concrete is required.
- .4 Supply and installation of miscellaneous hardware, anchors, nuts and washers, bolt grouting, PVC ducts/tubing, waterstops or any other material encased in the concrete will not be measured but considered incidental to the work. Include costs in Lump Sum Price for which concrete is required.

- .5 Supply and application of concrete sealer will not be measured but considered incidental to the work. Include costs in lump sum price for which concrete is required.

1.4 REFERENCES

- .1 American Society for Testing and Materials (ASTM). In all cases the latest edition of the specified code shall apply.
 - .1 ASTM C109/C109M, Test Method for Compressive Strength of Hydraulic Cement Mortars using 50-mm Cube Specimens.
 - .2 ASTM C260, Specification for Air-Entraining Admixtures for Concrete.
 - .3 ASTM C309, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .4 ASTM C494, Specification for Chemical Admixtures for Concrete.
 - .5 ASTM C827 Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures.
 - .6 ASTM D1751, Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A3000, Cementitious Materials Compendium.
 - .2 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
 - .3 CAN/CSA-A23.2, Methods of Test for Concrete.
 - .4 CAN/CSA-A23.5-M86(R1992), Supplementary Cementing Materials.
 - .5 CAN/CSA A363-M88(R1996), Cementitious Hydraulic Slag.

1.5 CERTIFICATES

- .1 Submit certificates in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
 - .1 Portland cement.
 - .2 Supplementary cementing materials.
 - .3 Admixtures.
 - .4 Aggregates.
 - .5 Water.
- .3 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.
- .4 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.

- .5 Provide certification that the alkali-aggregate reactivity and iron content of the materials has been examined and meets the requirements.

1.6 QUALITY CONTROL

- .1 Minimum 1 week prior to starting concrete work, submit proposed quality control procedures in accordance with Section 01 45 00 - Quality Control for Departmental Representative's approval for following items:
 - .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
 - .7 Contractor's Quality Control Procedures shall ensure that the Owner's and Contractor's performance requirements will be met for Class C1 exposure.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 35 43, Environmental Procedures.
- .2 Use trigger operated spray nozzles for water hoses.
- .3 Designate a cleaning area for tools to limit water use and runoff.
- .4 Carefully coordinate the specified concrete work with weather conditions.
- .5 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .6 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.
- .7 Choose least harmful, appropriate cleaning method which will perform adequately.

Part 2 Products

2.1 MATERIALS

- .1 General Use (GU0 or General Use Blended (GUB) hydraulic cement to CAN/CSA-A3001-3..
- .2 Supplementary cementing materials: to CAN/CSA-A3001-3.
- .3 Water: to CAN/CSA-A23.1.
- .4 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal density.
- .5 Chemical admixtures: to ASTM C494.
- .6 Calcium Chloride, Accelerators and Air-reducing agents shall not be used.
- .7 Weep hole tubes: PVC plastic.
- .8 Shredable bags shall not be mixed into concrete.

2.2 MIXES

- .1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, Alternative 1
- .2 Use Type GU Portland Cement for all mixes, unless otherwise noted.
- .3 Proportion all concrete mixes in accordance with the following Table:

USE	28 Day Max Compressive Strength (MPa) *see below	Nominal Aggregate (mm)	Entrained Air Content (%)	Supplementary Materials	Slump Range (mm)	Max W/C Ratio
Concrete Bases	30	25	6+/- 2	Max 15% Fly Ash	10±15	0.45

* Before adding superplasticizer. Slump to not exceed 150 mm with superplasticizer. Minimum cement content of 335 kg/m³.

- .4 Gradation limit for the fine aggregate shall conform to CSA A23.1 except that the amount of material passing the 160 µm shall not exceed 5%.
- .5 Gradation limits for the 20 mm aggregate shall conform to CSA A23.1 and the maximum combination of flat and elongated particles (3:1 ratio), as determined by CSA A23.2-13A, shall not exceed 10% of the mass of coarse aggregate.
- .6 An air-void spacing factor shall be determined in accordance with ASTM C457, modified point-count method at 100 times magnification. The average of all tests shall not exceed 230 µm with no single test greater than 260 µm.
- .7 The temperature of the centre of the in-situ concrete shall not fall below 10°C or exceed 60°C and the temperature difference between the centre and the surface shall not exceed 20°C.
- .8 If, during the progress of the work, the mix design is found to be unsatisfactory for any reason including poor workability, the Contractor shall make the necessary adjustments. Notwithstanding the Departmental Representative's review of the design mix, it remains the Contractor's responsibility that the concrete meets all the requirements of this Specification.

Part 3 Execution**3.1 PREPARATION**

- .1 Obtain Departmental Representative's acceptance before placing concrete. Provide 48 hours notice prior to placing of concrete.
- .2 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .3 Prior to placing of concrete obtain Departmental Representative's acceptance of proposed method for protection of concrete during placing and curing.
- .4 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .5 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 CONSTRUCTION

- .1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1 or these specifications, whichever is more onerous.

- .2 The Contractor's attention is drawn to Clause 7.2.2 of CAN/CSA-A23.1 regarding the bonding of fresh concrete to hardened concrete.
- .3 Sleeves and inserts.
 - .1 Where accepted by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
 - .2 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain acceptance of modifications from Departmental Representative before placing of concrete.
 - .3 Check locations and sizes of sleeves and openings shown on Drawings.
- .4 Delivery.
 - .1 Concrete shall be delivered and discharged within 90 minutes from the time of batching.
 - .2 Truck mixers may be used to batch concrete on site provided they are of the revolving drum type, watertight, and so constructed that uniform distribution of the materials is ensured.
- .5 Temperature of deck concrete at discharge shall be between 10° C and 20° C
- .6 Temperature of other concrete at discharge shall be between 10° C and 22° C.
- .7 After properly placing and consolidating the concrete, it shall be struck off to conform to the required cross-section and grade.
 - .1 Areas that do not meet the required surface accuracy shall be clearly marked out and the Contractor shall, at his own expense:
 - .1 Grind down any areas higher than 5 mm but not higher than 10 mm above the correct surface.
 - .2 Correct any areas lower than 5 mm but not lower than 10 mm below the correct surface, by grinding down the adjacent high areas.
 - .3 When the deviation exceeds 10 mm from the correct surface, the deck slab shall be removed and replaced at the Contractor's expense.
 - .4 Grinding shall be carried out by an approved machine, of a type and capacity suitable for the total area of grinding involved, until the surface meets the specified requirements.
 - .5 All corrective work will require the Contractor to submit a proposal for review and acceptance by the Departmental Representative, prior to commencement of any work.
 - .2 Use procedures acceptable to the Departmental Representative to remove excess bleed water. Ensure surface is not damaged.
 - .3 Use curing compounds compatible with applied finish on concrete surfaces.
- .8 Sealers
 - .1 An approved sealer shall be applied to all exposed concrete surfaces to 600 mm below grade wherever possible.
 - .2 Acceptable commercially available products are as follows:
 - .1 Dry-Trete 1000L by DRE Industries Inc. (minimum application rate 193 ml/m²)

- .2 Sealmaster 100% by Technical Barrier Systems Inc. (minimum application rate 199 ml/m²)
- .3 Hydrozo 100 by BASF (minimum application rate 155 ml/m²)
- .4 Protectosil 300 by Evonik/Degussa (minimum application rate 185 ml/m²)
- .5 Sikagard SN-100 by Cappar Ltd. (minimum application rate 158 ml/m²) or Departmental Representative approved equivalent.
- .3 Install as per the manufacturer's recommendations and at the minimum application rates shown above.
- .4 Allow minimum 3 days of continuous drying since last heavy rain prior to application.
- .5 Allow 28 days continuous drying after burlap is removed from new concrete prior to application.
- .6 Flood coat top surfaces and repeat the process on high spots and areas that dry quickly.
- .7 Depending upon drying conditions, drying time may have to be extended.

3.3 PROTECTION

- .1 Protection and curing for concrete placed between September 30 and March 1 shall comply with following requirements in addition to the cold weather requirements of CAN/CSA-A23.1.
 - .1 Protect concrete with windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete. At no point let walls of shelter touch formwork.
 - .2 Keep concrete surfaces continually moist while protected.
- .2 Curing shall be in accordance with CAN/CSA-A23.1.
- .3 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.

3.4 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials shall be carried out by a Testing Laboratory in accordance with CAN/CSA-A23.1 and Section 01 45 00 - Quality Control.
- .2 Frequency and testing of concrete and concrete materials shall be in accordance with CAN/CSA-A23.1.
- .3 Contractor shall pay for costs of QC testing.
- .4 Contractor shall take additional sets of test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .5 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.2.
- .6 Inspection or testing by the Departmental Representative will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 Measurement procedures.
- .2 Waste management and disposal.
- .3 Materials.
- .4 Installation.
- .5 Removal and salvage.
- .6 Cleaning.

1.2 RELATED SECTIONS

- .1 Section 01 35 00.06 - Special Procedures for Traffic Control.
- .2 Section 01 35 43 - Environmental Procedures.

1.3 REFERENCES

- .1 ASTM A276-91a, Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
- .2 ASTM B209M-92a, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .3 ASTM B210M-92a, Specification for Aluminum-Alloy Drawn Seamless Tubes.
- .4 ASTM B211M-92a, Specification for Aluminum and Aluminum-Alloy Bar, Rods and Wire.
- .5 CAN/CSA-G40.21-M92, Structural Quality Steels.
- .6 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .7 CAN/CSA-O80 Series-M89, Wood Preservation.
- .8 CSA O121-M1978, Douglas Fir Plywood.
- .9 CSA W47.2-M1987, Certification of Companies for Fusion Welding of Aluminum.
- .10 CGSB1-GP-12c-65, Standard Paint Colours:
- .11 CAN/CGSB-1.28-M89, Alkyd, Exterior House Paint.
- .12 CAN/CGSB-1.59-M89, Alkyd, Exterior Gloss Enamel.
- .13 CAN/CGSB-1.94-M89, Xylene Thinner (Xylol).
- .14 CAN/CGSB-1.99-92, Exterior and Marine Phenolic Resin Varnish.
- .15 CAN/CGSB-1.104-M91, Semigloss Alkyd Air Drying and Baking Enamel.
- .16 CAN/CGSB-1.132-M90, Zinc Chromate Primer, Low Moisture Sensitivity.
- .17 CGSB 1-GP-189M-78, Primer, Alkyd, Wood, Exterior.
- .18 CGSB 31-GP-3M-88, Corrosion Preventive Compound, Cold Application, Soft Film.
- .19 CGSB 62-GP-9M-80, Prefabricated Markings, Positionable, Exterior, for Aircraft Ground Equipment and Facilities.
- .20 CGSB 62-GP-11M-78, Marking Material, Retroreflective, Enclosed Lens, Adhesive Backing.

1.4 MEASUREMENT PROCEDURES

- .1 Measurement for payment for Supply and Installation of Regulatory Signs form part of the lump sum price. It shall include all labour, equipment and material to satisfactorily complete this item of work.
- .2 Removal and Reinstallation of the existing sign shall be paid under **Lump Sum price**
- .3 Removal and disposal of existing signs and posts being replaced, and filling the holes, shall from part of the lump sum price.
- .4 Traffic Control required for this Work shall be incidental to “**Lump Sum Price**”, 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**”, and no additional payment will be made.

1.5 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 – not used****Part 3 Execution****3.1 SUPPLY AND INSTALLATION OF SIGNS**

- .1 The Contractor shall supply, load, haul and install temporary regulatory signs as required and as per Alberta Transportation standard in the following manner:
 - .1 The Contractor is responsible for locating power / telephone / gas lines / services / utilities at all proposed sign locations.
 - .2 Installation of temporary traffic control signage measures are to be in compliance with Alberta Transportation specifications.

3.2 CLEANING

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

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 Summary.
- .2 Definitions.

1.2 SUMMARY

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

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C127-[04], Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
 - .2 ASTM D698-[00ae1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .3 ASTM D1557-[02e1], Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - .4 ASTM D4253-[00], Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

1.4 DEFINITIONS

- .1 Corrected maximum dry density is defined as:
 - .1 $D = D1xD2/(F1 \times D2) + (F2 \times D1)$
 - .2 $D = (F1 \times D1) + (0.9 \times D2 \times F2)$
 - .3 Where: D = corrected maximum dry density kg/m³
 - .1 F1 = fraction (decimal) of total field sample passing 19 mm sieve
 - .2 F2 = fraction (decimal) of total field sample retained on 19 mm sieve (equal to 1.00 - F1)
 - .3 D1 = maximum dry density, kg/m³ of material passing 19 mm sieve determined in accordance with Method A of ASTM D1557
 - .4 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
 - .4 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 SECTION INCLUDES**

- .1 Measurement procedures.
- .2 Definitions.
- .3 Protection.
- .4 Preparation.
- .5 Clearing.
- .6 Grubbing.
- .7 Removal and disposal.
- .8 Finished surface.

1.2 RELATED SECTIONS

- .1 Section 01 35 00.06 – Special Procedures for Traffic Control.
- .2 Section 01 35 43 - Environmental Procedures.

1.3 MEASUREMENT PROCEDURES

- .1 Some additional miscellaneous clearing may be required due to field changes. Quantities for payment for flush cutting, clearing and grubbing will be paid under **Lump Sum Price** and will be measured based on horizontal measurements in hectares of land acceptably grubbed and disposed of at the Peyto Pit, according to these specifications, and shall include all labour, equipment and material to satisfactorily complete this item of work.
- .2 No overhaul will be paid for grubbing.
- .3 Traffic Control required for this Work shall be incidental to “**Lump Sum Price**”, 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**”, 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

1.4 DEFINITIONS

- .1 Flush cutting consists of cutting trees, stumps or vegetative growth to within 100 mm of the ground, leaving the root structure undisturbed and disposing of felled trees, previously uprooted trees, stumps and clearing wood debris as specified.
- .2 Clearing consists of cutting trees and brush vegetative growth to within 300 mm of the ground and disposing of felled trees, previously uprooted trees, stumps, and clearing wood debris as specified.
- .3 Grubbing consists of excavation and disposal of stumps, roots and wood debris as specified.

- .4 Chipping consists of chipping wood debris, except merchantable timber, into wood chips. Finished wood chip material shall be able to pass through a 100 mm by 100 mm screen.
- .5 Merchantable timber is all timber with butt diameter in excess of 150 mm and top down to 100 mm.

1.5 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor.

1.6 PROTECTION

- .1 Prevent damage to trees, natural features, bench marks, existing pavement, water courses and root systems of trees which are to remain.
- .2 Repair any damaged items to approval of Departmental Representative.
- .3 Replace any trees designated to remain, if damaged, as directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .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 Peyto Pit 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 RELATED SECTIONS**

- .1 Section 01 35 00.06 – Special Procedures for Traffic Control.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 01 56 00 - Temporary Barriers and Enclosures.
- .4 Section 31 11 00 - Clearing and Grubbing.
- .5 Section 32 11 19 – 50 mm Granular Sub-base Course.
- .6 Section 32 91 19.13 – Topsoil Placement and Grading.
- .7 Section 33 42 13 - Pipe Culverts.

1.2 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 Roadway 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.

1.3 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 400 mm but will fluctuate from one location to the other. Payment will be made under the **“Lump Sum Price”** and will include cost to strip, load, haul, screen, dispose of at the Peyto Pit and stockpile this material alongside the right-of-way or where directed by the Departmental Representative.
 - .2 **No overhaul will be paid for this Work: Stripping.**

- .2 Placement of Stripping on finished slopes:
 - .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 by Departmental Representative taken before and after at stripping stockpile areas. Payment will be made under **“Lump Sum Price”** and will include cost of excavating, hauling and placing stripping material on finished slopes where directed by Departmental Representative.
- .2 Departmental Representative will take initial and final cross sections of stockpiles.
 - .3 **No overhaul will be paid for this Work: Placement of Stripping on finished slopes.**
- .3 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 **“Lump Sum Price”** and shall include cost of excavating, hauling, placing and compacting material for construction of the roadway embankment.
 - .2 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.
 - .3 **No overhaul will be paid for this Work: Excavation Common.**
- .4 Embankment:**
- .1 Embankment construction will not be measured for payment directly, rather it should be considered incidental to **“Lump Sum Price”**
- .5** Traffic Control required for this Work shall be incidental to **“Lump Sum Price”** 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”** 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
- .8** No 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 Scarifying or benching existing slopes or existing road surfaces.
 - .3 Removing and disposing of roots, stumps and other materials excavated during waste operation.
 - .4 Removing unsuitable material from embankment attributable to negligence.
 - .5 Shattering rock to 300 mm below subgrade elevation.
 - .6 Scaling and removing loose rock from rock face.
 - .7 Watering, drying or compacting.
 - .8 Proof rolling.
 - .9 Compaction of material (150 mm) below subgrade horizon in areas of cut.
 - .10 Finishing.

1.4 REFERENCES

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

1.5 DEFINITIONS

- .1 Rock Excavation: excavation of:
 - .1 Material from solid masses of igneous, sedimentary or metamorphic rock which, prior to removal, was integral with parent mass. Material that cannot be ripped with reasonable effort from Caterpillar D9L or equivalent to be considered integral with parent mass.
 - .2 Boulder or rock fragments measuring in volume 1.5 cubic metre or more.
- .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 placed as embankment material.
- .4 Free Haul: distance that excavated material is hauled without compensation. **Free haul distance is within Banff National Park.**
- .5 Stripping: excavation of organic material covering original ground.
- .6 Over Haul: authorized hauling in excess of free haul distance that excavated material is moved. No overhaul will be paid for materials hauled under this Contract, except borrow.
- .7 Embankment: material derived from usable excavation and placed above original ground or stripped surface.
- .8 Waste Material: material unsuitable for embankment, embankment foundation or material surplus to requirements.
- .9 Topsoil: material passing a 100 mm sieve and capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

1.6 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.

1.7 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 MATERIALS

- .1 Embankment materials require acceptance by Departmental Representative.

- .2 Material used for embankment not to contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps or other unsuitable material.
- .3 Borrow material:
 - .1 Obtained from sources as indicated or as designated by Departmental Representative.
 - .2 Obtained from borrow pit approved by Departmental Representative.

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 150 mm.
- .3 Screen and stockpile stripped materials alongside the right-of-way outside the cut/fill slopes, as directed by the Departmental Representative.
- .4 Contractor to screen stripping material to 100 mm max size prior to placement in stockpile. Load, haul and place screen waste material in the designated Cells at Peyto Pit as directed by the Departmental Representative.

3.4 EXCAVATING

- .1 General:
 - .1 Notify the Departmental Representative when unsuitable roadway embankment materials are encountered and remove to depth and extent as verified by the Departmental Representative. This material shall be placed on the side slope outside the 2:1 slope.
 - .2 Sub-cut below sub-grade elevation in cut sections only as verified by the Departmental Representative. Compact top 150 mm below sub-cut to minimum 95% maximum dry density, ASTM D698 (AASHTO T99). Replace with acceptable embankment material and compact.
 - .3 Treat ground slopes, where sub-grade 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 ditches as work progresses to provide drainage.

3.5 EMBANKMENTS

- .1 This item consists of the construction of the sub-grade in embankments and cuts to the lines, grades, cross-sections and dimensions shown on the drawings.
- .2 Scarify or bench existing slopes in side hill or sloping sections to ensure proper bond between new materials and existing surfaces. Method used to be subject to prior approval of the Departmental Representative.
- .3 Do not place material which is frozen nor place material on frozen surfaces except in areas authorized.
- .4 Maintain crowned surface during construction to ensure ready run-off of surface water.
- .5 Drain low areas before placing materials.
 - .1 Place and compact to full width in layers not exceeding 200 mm loose thickness. The Departmental Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.
- .6 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 sub-grade 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 300 mm of sub-grade 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 sub-grade.
- .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 sub-grade:
 - .1 Remove sub-grade 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 Embankments.
- .5 Where proof rolling reveals areas of defective sub-grade, remove and replace in accordance with the appropriate sections. Removal of defective sub-grade material shall be the Contractor's responsibility.

3.8 FINISHING

- .1 Shape entire roadbed to within 100 mm of design elevations.
- .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 RELATED SECTIONS**

- .1 Section 01 35 00.06 – Special Procedures for Traffic Control,
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 31 24 13 - Roadway Embankments.
- .4 Section 32 11 24 - Granular Base Course.

1.2 MEASUREMENT PROCEDURES

- .1 Payment for supply, install, loading and hauling 50 mm Granular Sub Base Course shall be made under “**Lump Sum Price - 50 mm Granular Sub Base Course**” and will be measured in cubic metres.
- .2 Quantity of 50 mm Granular Sub-base course for which payment will be made shall be the number of 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. Payment will be under “**Lump Sum Price**. Placing, compacting, water for compaction and drying will be incidental to the Work.
- .3 No overhaul will be paid for this Work.
- .4 If required , 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. Other means of providing weights may be negotiated with the Departmental Representative.
- .5 Traffic Control required for this Work shall be incidental to “**Lump Sum Price** 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**” 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 REFERENCES

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

- .6 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
- .7 ASTM D1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
- .8 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.4 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 Peyto Pit as approved by Departmental Representative.

Part 2 Products – Not Used

2.1 MATERIALS – Not Used

Part 3 Execution

3.1 PLACING

- .1 Supply, install, load, haul and place granular sub-base after sub-grade is inspected and accepted by Departmental Representative.
- .2 Construct granular sub-base to depth and grade in areas indicated.
- .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 subbase material on crown line or high side of one-way slope.
- .6 Place granular subbase materials using methods which do not lead to segregation or degradation.
- .7 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
- .8 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.
- .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 98% maximum dry density in accordance with ASTM D1557.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
- .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 approved by Departmental Representative.
- .7 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 **SITE TOLERANCES**

- .1 Finished subbase surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.4 **PROTECTION**

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Departmental Representative.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 35 00.06 – Special Procedures for Traffic Control,
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 31 24 13 - Roadway Embankments.
- .4 Section 32 11 24 - 20 mm Granular Base Course.

1.2 MEASUREMENT PROCEDURES

- .1 Payment for supply, install, loading and hauling of supplied Select Granular Sub Base shall be made under “Lump Sum Price” as required.
- .2 Quantity of Select Granular Sub Base for which payment will be made shall be the number of 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. Payment will be under “**Lump Sum Price**”.
- .3 Placing, compacting, water for compaction and drying will be incidental to the Work.
- .4 No overhaul will be paid for this Work.
- .5 If required, supply, installation and maintenance and calibration of weigh scales and a scale house by the Contractor shall be considered incidental to the contract and no additional payment will be measured for payment. Other means of providing weights may be negotiated with the Departmental Representative.
- .6 Traffic Control required for this Work shall be incidental to “**Lump Sum Price**” and no separate payment will be made to the Contractor.
- .7 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price**” and no additional payment will be made.
- .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)
 - .1 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D422-63(1998), Standard Test Method for Particle-Size Analysis of Soils.
 - .5 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).

- .6 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
- .7 ASTM D1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
- .8 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.4 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 to Peyto Pit.

Part 2 Products

Part 3 Execution

3.1 PLACING

- .1 Load, haul and place SGSB after sub-grade has achieved the requirements of this specification.
- .1 Construct SGSB to depth and grade in areas indicated on the drawings.
- .2 Ensure no frozen material is placed.
- .3 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.
- .4 Begin spreading SGSB material on crown line or high side of one-way slope.
- .5 Place granular SGSB materials using methods which do not lead to segregation or degradation.
- .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
- .7 Place material to full width in uniform layers not exceeding 300 mm compacted thickness.
- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .9 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 98% maximum dry density in accordance with ASTM D1557.
- .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 sub-grade surface to be within 50 mm of elevation as indicated but not uniformly high or low.

3.4 PROTECTION

- .1** Maintain finished sub-grade 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 Not used.

1.2 RELATED SECTIONS

- .1 Section 01 35 00.06 – Special Procedures for Traffic Control.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 31 24 13 - Roadway Embankments.
- .4 Section 32 11 19 – 50 mm Granular Sub-base Course.

1.3 MEASUREMENT PROCEDURES

- .1 Payment for supply, install, loading and hauling of 20 mm Granular Base Course shall be made under “Lump Sum Price” for **Granular Base Course**
- .2 Quantity of 20 mm Granular Base course for which payment will be made shall be the number of 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. Payment will be under **“Lump Sum Price” for 20 mm Granular Base Course**.
- .3 Placing, compacting, water for compaction and drying will be incidental to the Work.
- .4 No overhaul will be paid for this Work.
- .5 If required, supply, installation and maintenance and calibration of weigh scales and a scale house by the Contractor shall be considered incidental to the contract and no additional payment will be measured for payment. . Other means of providing weights may be negotiated with the Departmental Representative.
- .6 Traffic Control required for this Work shall be incidental to **“Lump Sum Price”** and no separate payment will be made to the Contractor.
- .7 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item”** and no additional payment will be made.
- .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.

1.4 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

- .4 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
- .5 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
- .6 ASTM D1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
- .7 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.5 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor.

1.6 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 Peyto Pit as accepted by Departmental Representative.

Part 2 Products

2.1 MATERIALS – Not Used

Part 3 Execution

3.1 SEQUENCE OF OPERATION

- .1 Supply, install, load, haul and Place granular base after granular 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 which do not lead to segregation or degradation of aggregate.
 - .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which 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 specified density before succeeding layer is placed.
- .9 Remove and replace that portion of layer in which 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 98% maximum dry density in accordance with ASTM D1557.
- .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 For proof rolling use a loaded tandem dump truck or equivalent is acceptable.
 - .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 sub-grade:
 - .1 Remove base, SGSB and sub-grade material to depth and extent as directed by Departmental Representative.
 - .2 Backfill excavated sub-grade with common material and compact in accordance with Section 31 24 13 - Roadway Embankments, sub-base material and compact in accordance with Section 32 11 19 – 50mm Granular Sub Base Course.
 - .3 Replace sub-base material and compact in accordance with Section 32 11 19 – 50mm Granular Sub Base Course.
 - .4 Replace base material and compact in accordance with this Section.
 - .6 Where proof rolling reveals defective base, SGSB or sub-grade, remove defective 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 SECTION INCLUDES**

- .1 Materials and application of asphalt tack coat to an existing asphalt or concrete surface prior to asphalt paving.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 32 12 16 – Asphalt Concrete Pavement

1.3 MEASUREMENT PROCEDURES

- .1 Supply, Delivery and Application of tack coat will be will not be measured separately and will be considered incidental to **“lump sum price”**.

1.4 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-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.5 SUBMITTALS

- .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.

1.6 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.

1.7 DELIVERY, STORAGE AND HANDLING

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

1.8 WASTE MANAGEMENT AND DISPOSAL

- .3 Separate waste materials for reuse and recycling in accordance with Section 01 35 43 - Environmental Procedures and with the Waste Reduction Work Plan.
- .4 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:
 - .1 Maintained at even temperature.
 - .2 Applied uniformly on variable widths of surface up to 5 m.
 - .3 Applied at readily determined and controlled rates from 0.2 to 5.4 L/m² with uniform pressure, and with an allowable variation from any specified rate not exceeding 0.1 L/m².
 - .4 Distributed in uniform spray without atomization at temperature required.
 - .2 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.
 - .3 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.
 - .4 Equipped with an easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
 - .5 Equipped with accurate volume measuring device or calibrated tank.
 - .6 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
 - .7 Equipped with nozzle spray bar, with operational height adjustment.
 - .8 Cleaned if previously used with incompatible asphalt material.

Part 3 Execution**3.1 APPLICATION**

- .1 Obtain Departmental Representative's approval of surface before applying asphalt tack coat.
- .2 Apply asphalt tack coat only on clean and dry surface.
- .3 Dilute asphalt emulsion with water at 1:1 ratio for application.
 - .1 Mix thoroughly by pumping or other method accepted by Departmental Representative.
- .4 Apply asphalt tack coat evenly to pavement surface at rate as directed by Departmental Representative, of 0.5 L/m² plus or minus 0.2 L/m².
- .5 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt tack coat material.

- .6** Do not apply asphalt tack coat when air temperature is less than 10 degrees C or when rain is forecast within 2 hours of application.
- .7** Apply asphalt tack coat only on unfrozen surface.
- .8** Evenly distribute localized excessive deposits of tack coat by brooming as directed by Departmental Representative.
- .9** Where traffic is to be maintained, treat no more than one half of width of surface in one application.
- .10** Keep traffic off tacked areas until asphalt tack coat has set.
- .11** Re-tack contaminated or disturbed areas as directed by Departmental Representative.
- .12** Permit asphalt tack coat to set before placing asphalt pavement.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 Asphalt prime is required unless otherwise directed by Departmental Representative.
- .2 Materials and application of asphalt prime to granular base surface prior to asphalt paving where approved by the Departmental Representative.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 32 12 16 – Asphalt Concrete Pavement

1.3 MEASUREMENT PROCEDURES

- .1 Supply, Delivery and Application of asphalt prime will not be measured separately and shall be considered incidental to **"Lump Sum Price" A1 Mix Asphalt**.

1.4 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.

1.5 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.

1.6 QUALITY ASSURANCE

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

1.7 DELIVERY, STORAGE AND HANDLING

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

1.8 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:
 - .1 Maintained at even temperature.
 - .2 Applied uniformly on variable widths of surface up to 5 m.
 - .3 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.
 - .4 Distributed in uniform spray without atomization at temperature required.
 - .2 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.
 - .3 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.
 - .4 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
 - .5 Equipped with accurate volume measuring device or calibrated tank.
 - .6 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
 - .7 Equipped with nozzle spray bar, with operational height adjustment.
 - .8 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. Apply second application of sand blotter as required.**

END OF SECTION

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

- .1 The Contractor shall obtain AT Designation Class 16 Asphalt Aggregate from outside the Park.
- .2 **The addition of recycled asphalt pavement (RAP) is not permitted.**

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 00.06 – Special Procedures for Traffic Control.
- .3 Section 01 35 43 - Environmental Procedures.
- .4 Section 02 41 13.14 - Asphalt Pavement Removal.
- .5 Section 31 24 13 - Roadway Embankments.
- .6 Section 32 11 19 – 50 mm Granular Sub-base Course.
- .7 Section 32 11 24 – 20 mm Granular Base Course.
- .8 Section 32 12 13.16 - Asphalt Tack Coat.
- .9 Section 32 12 13.23 - Asphalt Prime.

1.3 DESCRIPTION

- .1 Hot Mix Asphalt Concrete Pavement (HMACP) shall consist of supplied AT Designation Class 16 Asphalt Aggregate and asphalt cement, combined in a hot mix plant as hereinafter specified, placed and compacted to the specified density on a prepared surface in conformity to the lines, grades, dimensions and cross-sections as shown on the Drawings or as directed by the Departmental Representative or:
 - .1 The Contractor may obtain AT Designation Class 16 Asphalt Aggregate from outside the Park.
 - .2 Adding RAP to the asphalt mix is not permitted.

1.4 MEASUREMENT PROCEDURES, AND PENALTY ASSESSMENTS

- .1 Accepted HMACP will be paid for as a lump sum price for Asphalt Concrete Pavement Payment shall be compensation in full for supply of aggregates, asphalt concrete mix including all materials, supply and application of prime/tack coat, processing, Plant mixing, loading, hauling, paver laying, compacting, finishing surface, raking, interim lane marking, quality control testing, safety, and maintenance. Payment will be under **“Lump Sum Price for -AT H1 Mix Asphalt”**.
- .2 Supply, installation and maintenance and calibration of weight scales and a scale house at the Plant by the Contractor shall be considered incidental to the contract and no additional payment will be measured for payment. Other means of providing weights may be negotiated with the Departmental Representative.
- .3 Preparing an asphalt mix design from supplied aggregate shall be considered incidental to the contract and no additional payment will be measured for payment.

- .4 Supply of asphalt cement, and anti-stripping agent(s) if required and accepted by the Departmental Representative, will be paid under **“Lump Sum Price”**.
- .5 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price”**, and no additional payment will be made.
- .6 Traffic Control required for this Work shall be incidental to **“Lump Sum Price”** 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 Removal and Disposal of Fillet and Ramp Material. The removal and disposal of fillet and/or ramp material will be considered incidental to the Work and will not be paid for separately. Material is to be disposed of as directed by the Departmental Representative.
- .9 Sawcutting of asphalt concrete pavement and crack filling at bridge locations is incidental to the work.
- .10 The following end product properties of the HMACP will be measured for acceptance in accordance with Section 2.3 - Acceptance Sampling and Testing.
 - .1 Density.
 - .2 Actual Asphalt Content.
 - .3 Gradation.
 - .4 Smoothness.
 - .5 Segregation.
- .11 Preliminary Levelling. Accepted material used for preliminary levelling will be measured and paid for at the lump sum price. No payment will be made for unacceptable preliminary levelling material that must be removed and disposed of.

1.5 DEFINITIONS

- .1 Asphalt Cement: specified type and grade of asphalt binder used in HMACP.
- .2 Asphalt Concrete Mix Aggregates: aggregates after the combination of all processed aggregates used in HMACP.
- .3 Asphalt Concrete Mix: high quality, carefully controlled, hot plant mix of asphalt cement and dense graded, high quality crushed coarse aggregate, and RAP (if applicable), blend sand material(s) as required, used in HMACP.
- .4 Hot Mix Asphalt Concrete Pavement (HMACP): paver laid, asphalt concrete mix placed and compacted on a prepared surface in conformity to the lines, grades, dimensions and cross-sections as shown on the Drawings or as directed by the Departmental Representative.
- .5 Preliminary Levelling: Asphalt concrete mix used to improve cross fall, level, infill, and/or strengthen existing pavements.
- .6 Job Mix Formula: the job mix formula establishing the aggregate proportioning, target aggregate gradation, and approved design asphalt cement content to be used for production of HMACP which requires the written approval of the Departmental Representative, on the basis of a Contractor submitted mix design.
- .7 Quality Control: The sum of all Contractor activities to ensure a product meets contract specification requirements which may include material handling and construction

procedures, calibration and maintenance of equipment, production process control and any sampling, testing and inspection that is done for these purposes. The Contractor is entirely responsible for quality control.

- .8 Quality Assurance: The Departmental Representative's sampling and testing of the end product for the purpose of determining acceptance/rejection and payment. Unless otherwise specified, the latest edition of the following standard Alberta Transportation test methods (ATT) indicated below will be used:

	TEST DESCRIPTION	TEST METHOD
1	Sampling Mixes	ATT-37
2	Coring	ATT-5
3	Extraction	ATT-12
4	Correction Factor, Extracted Asphalt Content	ATT-12 Part III
5	Percent Fracture	ATT-50
6	Sieve Analysis	ATT-26
7	Density, Immersion Method, Waxed Asphalt Concrete Specimens	ATT-6
8	Density, Immersion Method, Saturated Surface Dry Asphalt Concrete Specimens	ATT-7
9	Voids Calculations, Asphalt Concrete Specimens	ATT-36
10	Percent Compaction, Asphalt Concrete Pavement	ATT-67
11	Forming Marshall Specimens, Field Method	ATT-13
12	Moisture Content, Oven Method Asphalt Concrete Mixes	ATT-15
13	Smoothness of Pavements, Profilograph Method	ATT-59
14	Stratified Random Test Sites for A.C.P. Projects	ATT-56
15	Appeal Testing, Asphalt Content, Density and Gradation	ATT-68
16	Asphalt Content, Ignition Method	ATT-74
17	Correction Factor, Ignition Asphalt Content	ATT-74 Part II
18	Asphalt Content	AASHTO T164 , T287 or ATT-12 or ATT-74
19	Segregation	Paving Guidelines and Segregation Rating Manual
20	Theoretical Film Thickness (Ft)	TLT-311

Acceptance limits for Density are the limiting values of the Lot Mean within which a Lot will be accepted at full, increased, or reduced payment for Density, as shown in Table No. 1.

- .2 Acceptance limits for Actual Asphalt Content are the limiting values of the Lot Mean within which a Lot will be accepted at full, or reduced payment, as shown in Table No. 2.

- .3 Acceptance limits for Gradation are the limiting values of the Lot Mean within which a Lot will be accepted at full or reduced payment as shown in Table No. 3.
- .4 Acceptance limits for Smoothness are the limiting values of the Profile Index (PrI) within which a Sublot will be accepted with or without penalty assessment, as shown in Table No. 4.
- .10 Asphalt Content:**
 - .1 Design Asphalt Content: the asphalt cement content as established by the submitted mix design, and as accepted in writing by the Departmental Representative.
 - .2 Approved Asphalt Content: the design asphalt cement content or subsequent adjustments to it, as accepted in writing by the Departmental Representative.
 - .3 Actual Asphalt Content: The amount of asphalt cement in the asphalt concrete mix as determined by testing done under the Departmental Representative's quality assurance program and includes an amount to correct for the asphalt cement lost due to absorption by the aggregates. This correction will be determined for each change in aggregate or asphalt binder.
- .11 End Product Specification (EPS):**

A specification that does not specify methods of construction. Under EPS, the end product will be accepted or rejected according to a specified acceptance plan. The Departmental Representative will monitor the Contractor's control of process that produces the items of construction. The Contractor is entirely responsible for quality control during production and placement of HMAACP. The end product acceptance is the responsibility of the Departmental Representative and includes a statistically oriented program of acceptance testing.
- .12 Stratified Random Sample**

A set of test measurements taken one each from five or more separate (stratified) areas or segments within a Lot, in an unbiased way.
- .13 Segregated Area**
 - .1 An area of the pavement where the texture differs visually from the texture of the surrounding pavement. For the purposes of classifying pavement segregation, only segregated areas greater than 0.1 sq. m. and centre-of-paver streaks greater than 1 m in length will be considered. Moderate or severe segregated areas which do not meet these size parameters will be considered obvious defects.
- .14 Segregation Severity**
 - .1 None - Completely uniform surface texture; the matrix of asphalt and fine aggregate is in place between the coarse aggregate.
 - .2 Slight - The matrix, asphalt cement, and fine aggregate is in place between the coarse aggregate. However there is more stone in comparison to the surrounding acceptable mix.
 - .3 Moderate - Significantly more stone is visible than in the surrounding acceptable asphalt concrete; moderately segregated areas usually exhibit a lack of continuous contact with the surrounding matrix.
 - .4 Severe - Appears as an area of very stony mix, with stone against stone with very little or no matrix.

- .5 Centre-of- Paver Streak - Appears as a continuous or semi-continuous longitudinal “streak” typically located in the middle of the paver “mat”.

.15 Surface Defects are identified as:

- .1 Individual bumps and dips that are 12 mm or greater. Bumps and dips between 8 and 12 mm will be subject to a penalty per bump or dip.
- .2 Areas of segregation greater than 0.1 sq. m.
- .3 Areas containing excess or insufficient asphalt cement.
- .4 Improper matching of longitudinal and transverse joints on the final lift of the HMA CP.
- .5 Roller marks in final lift of the HMA CP.
- .6 Cracking or tearing of the HMA CP.
- .7 Tire marks in the surface of the HMA CP.
- .8 Sampling locations not properly repaired.
- .9 Improperly constructed patches.

1.6

REFERENCES

.1 ASTM International (ASTM).

- .1 ASTM C 88, Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
- .2 ASTM C 117, Test Method for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
- .3 ASTM C 123, Test Method for Lightweight Pieces in Aggregate.
- .4 ASTM C 127, Test Method for Specific Gravity and Absorption of Coarse Aggregate.
- .5 ASTM C 128, Test Method for Specific Gravity and Absorption of Fine Aggregate.
- .6 ASTM C 131, Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .7 ASTM C 136, Method for Sieve Analysis of Fine and Coarse Aggregates.
- .8 ASTM D 995, Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
- .9 ASTM D 1559, Test Method for Resistance to Plastic flow of Bituminous Mixtures Using Marshall Apparatus.
- .10 ASTM D 2419, Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
- .11 ASTM D 3203, Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.
- .12 ASTM D 4791, Test Method for Flat and Elongated Particles in Coarse Aggregate.
- .13 ASTM D 6373, Standard Specification for Performance Graded Asphalt Binder.
- .14 ASTM E1274, Standard Test Method for Measuring Pavement Roughness Using a Profilograph

- .2 Asphalt Institute (AI).
 - .1 Asphalt Institute MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types Sixth Edition.
- .3 Association of American State Highway and Transportation Officials (AASHTO).
 - .1 AASHTO M320, Performance-Graded Asphalt Binder
 - .2 AASHTO T40, Standard Method for Sampling Bituminous Materials
 - .3 AASHTO T164, Quantitative Extraction of Bitumen from Bituminous Paving Mixtures

1.7 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 and toxic in designated containers.
- .3 Remove from site and dispose of hazardous or toxic materials at appropriate recycling facility.

Part 2 Products

2.1 MATERIALS

- .1 Aggregate:
 - .1 The contractor is responsible to ensure the contractor's supplied aggregates meet the requirements of Table No. 11, Asphalt Concrete Mix Characteristics.
 - .2 Contractor has to carry out its own mix design using the aggregate supplied.
- .2 Asphalt Cement:
 - .1 Supply asphalt cement in accordance with Table No. 11.
 - .2 Any change in asphalt cement type or grade must be accepted by the Departmental Representative. The Owner has the discretion to increase the percentage of asphalt cement by up to 0.3%. If requested, this increase in asphalt cement by up to 0.3% will not constitute a Contract price adjustment to Lump Sum Price.
 - .3 Asphalt cement shall conform to all applicable requirements of this specification and AASHTO M320, Performance-Graded Asphalt Binder
 - .4 Obtain competitive bids for the supply and delivery of the asphalt cement and forward to the Departmental Representative copies of all bids, substantiating that price is competitive, fair, and reasonable, and recommend a supplier. Receive written acceptance of the supplier and asphalt price from the Departmental Representative prior to issuing a purchase order for supply and delivery of asphalt cement.
 - .5 Provide necessary facilities and qualified staff to unload, store, and sign for all ordered asphalt cement as it arrives at the storage site, regardless of the day or time of day, and be responsible for unloading of asphalt into storage at the asphalt plant site.

- .6 Provide the Departmental Representative with records of all asphalt cement received and/or returned, on a daily basis.
 - .7 Weigh each delivery of asphalt cement. Weigh ticket to show gross and tare weights (before and after unloading). Provide the Departmental Representative with copies of weigh tickets and delivery slips for each load.
 - .8 The Departmental Representative may check quantities of asphalt cement delivered by weighing delivery vehicles before and after unloading.
 - .9 Supply quality control tests from supplier for each production run of asphalt cement delivered to the asphalt plant site.
 - .10 Provide safe, convenient access for inspection and sampling of asphalt cement. Sampling valves shall be designed and located to enable safe, representative sampling into one litre containers.
 - .11 Sampling and testing for compliance verification purposes will be in accordance with AASHTO T40, Standard Method for Sampling Bituminous Materials.
- .3 Interim Lane Markings**
- .1 Supply and pay for the interim lane marking paint and glass beads as per Section 32 17 23, Pavement Markings.
 - .2 The Contractor has the option of supplying reflectorized temporary pavement markers or self-adhesive reflectorized pavement marking tape subject to the approval of the Departmental Representative.
- .4 Anti-Stripping Agent(s)**
- .5** If the retained stability testing reveals a requirement for an anti-stripping agent, subject to the acceptance of the Departmental Representative, arrange for purchase, delivery, and incorporation of the anti-stripping material. The supply and delivery of anti-stripping agent will be paid under the Lump Price Sum, Addition of anti-stripping material at the Plant shall be considered incidental to the work and will not be measured for payment.
- .6** Reclaimed Asphalt Pavement (RAP) shall not be used in the asphalt concrete mix.

2.2 ASPHALT CONCRETE MIX AND JOB MIX FORMULA

- .1 Responsibility for Mix Design**
- .1 All costs incurred in mix design formulation are the responsibility of Contractor. Shipping costs for samples sent to the Departmental Representative for verification and acceptance of the mix design(s) are responsibility of Contractor.
 - .2 The Contractor shall use a professional engineering company and a qualified testing laboratory, licensed to practice in Alberta, to assess the aggregate materials proposed for use and to carry out the design of the asphalt concrete mix. Average sieve analysis from crushing operation of supplied asphalt aggregate is available.
- .2 Requirements for Mix Design(s)**
- The asphalt concrete mix design shall follow Marshall Method of Mix Design as outlined in latest edition of the Asphalt Institute Manual Series No. 2 (MS-2). Mix design, at the Design Asphalt Content, shall meet all the requirements in Table No. 11 for the asphalt concrete mix indicated.

.3 Approval of Mix Design.

The Contractor shall submit the mix design(s) to the Departmental Representative for acceptance. The Contractor's submission shall include the following information:

- .1 Aggregate source name(s) and location(s).
- .2 Gradation of each aggregate to be used in the asphalt concrete mix.
- .3 Percentage by mass of each aggregate to be used in the asphalt concrete mix.
- .4 Mix design gradation of the combined aggregates.
- .5 Aggregate characteristics including sand equivalent, percentage of fractured faces, bulk specific gravity, L.A. Abrasion Loss, and Plasticity Index when combined at the mix design gradation.
- .6 All Marshall mix design characteristics, including all mix void properties and graphs used in arriving at the final mix design, bulk specific gravity of combined aggregates, and asphalt absorption of combined aggregates.
- .7 Recommended Design Asphalt Content expressed as a percentage by dry weight of aggregate.
- .8 Maximum theoretical specific gravity of the asphalt concrete mix, at the recommended design asphalt content, and at asphalt contents considered above and below design asphalt content.
- .9 Identification of each asphalt supplier by name, location and type and grade of asphalt cement to be supplied.
- .10 For each asphalt cement supplied, a current typical analysis, temperature-viscosity chart, the specific gravity, and the recommended mixing and compaction temperatures for the preparation of the mix design specimens.
- .11 The laboratory determined correction factor to account for the un-extracted asphalt cement due to absorption by the aggregates.

.4 Verification of Mix Design.

- .1 Provide representative samples of each of the aggregate components and asphalt cement for verification purposes. A sufficient quantity of each component shall be provided to result in a 100 kg sample of combined aggregate at design proportions. The Departmental Representative will require up to five working days from time of receipt of sample to verify the mix design. Cost of such mix design verification will be borne by the Departmental Representative.
- .2 As a part of asphalt mix design evaluation, the Departmental Representative may determine the following properties:
 - .1 Bulk Specific gravity for asphalt mix aggregate.
 - .2 Marshall Density.
 - .3 Theoretical maximum specific gravity of asphalt mix at design asphalt content and at each asphalt content considered by Contractor above and below design asphalt content.
- .3 Difference between property values submitted by Contractor and property values as determined by the Departmental Representative shall not exceed the amounts shown in Table 11.
- .4 The asphalt mix design(s) shall be rejected if maximum permissible variations are exceeded.

- .5 Any change in nature or sources of aggregate(s), or where a new mix design is desired by the Contractor, a complete mix design will be required. This new mix design shall be subject to the acceptance of the Departmental Representative.
- .6 The Departmental Representative will not accept any asphalt concrete mix produced prior to the Contractor receiving written acceptance of the mix design from the Departmental Representative.
- .7 Aggregate proportioning and asphalt content for the accepted mix design will form the job mix formula for the production of asphalt concrete mix.
- .8 The Contractor shall be totally responsible for production of aggregates and asphalt concrete mixes in conformance with the specifications.
- .5 Variation from Approved Job Mix Formula**
 - .1 After the job mix formula gradation and proportioning of various aggregate sizes have been established and approved, no alteration will be permitted.
 - .2 The Lot Mean Marshall air voids shall not vary from accepted mix design air voids by more than 0.5%.
 - .3 If there are any deviations from the approved job mix formula, or any alterations of aggregate proportioning, the Departmental Representative will determine if a new mix design is required.
 - .4 Any deviation whatsoever from the accepted job mix formula shall require the prior written acceptance of the Departmental Representative and the Departmental Representative will not accept any asphalt mix produced prior to this acceptance.
 - .5 If the sum of any accepted deviations are in excess of any one of the following limits away from the approved job mix formula, a new mix design is required:
 - .1 +/-5% passing the 5,000 μ m sieve;
 - .2 +/-1.0% passing the 80 μ m sieve;
 - .3 +/-0.3% asphalt cement content; and/or
 - .4 +/- 1.0% in target proportion of RAP.
 - .6 Any change in the approved job mix formula shall not result in a Theoretical Film Thickness value less than specified in Table No. 11.

2.3 ACCEPTANCE SAMPLING AND TESTING

- .1 General**
 - .1 During the progress of the Work, tests will be carried out on materials and workmanship in order to ensure compliance with the requirements of the specifications.
 - .2 Where it is required in these specifications that the Contractor submit samples of materials or mixtures to the Departmental Representative for acceptance, these samples shall be submitted in sufficient time for proper testing.
 - .3 The Departmental Representative's acceptance of any materials or mixture shall in no way relieve the Contractor from his obligation to provide materials, mixtures, and workmanship in accordance with the specifications.
 - .4 Where specified, random sampling procedures shall be followed, and where no specific random sampling procedure is specified the sampling procedure shall be

as identified by the Departmental Representative in the case of acceptance testing and by the Contractor in the case of quality control testing.

- .5 The Departmental Representative shall have access to the Work at all times for taking samples. The Contractor shall provide any assistance necessary for taking samples and shall reinstate pavement layers or other structures to the satisfaction of the Departmental Representative at the positions where samples have been taken. Compensation for providing assistance with sampling and for reinstatement where samples are taken shall be included in the lump sum price bid for the various items of Work tested and no separate payment will be made.
- .6 The Contractor shall provide and prepare, to the satisfaction of the Departmental Representative, a suitable site for the parking of a mobile laboratory trailer. The Contractor shall provide a continuous supply of water and power to the mobile laboratory trailer, at his own expense.
- .2 **Methods of Testing for Acceptance and Appeal Testing**
 - .1 Unless otherwise specified, the latest edition of the applicable ASTM or AASHTO standards will be used to determine material characteristics.
 - .1 In all test methods used as reference in this specification, metric sieves as specified in Canadian General Standards Board Specification 8-GP-2M shall be substituted for any other specified wire cloth sieves Table No. 13.
 - .2 In all cases the latest amendment or revision current at the closing date of the tender is implied when reference is made to one of the above standards in the specification.
- .3 **Quality Control Testing**
 - .1 Quality control testing is the responsibility of the Contractor throughout every stage of the Work from the crushing and production of aggregates to the final accepted product. Tests performed by the Departmental Representative will not be considered to be quality control tests.
 - .2 The Contractor shall provide and pay for equipment and qualified personnel to obtain all quality assurance core samples and perform all quality control testing necessary to determine and monitor the characteristics of the materials produced and incorporated into the work, and the final product produced.
 - .3 Results of all quality control tests shall be submitted to the Departmental Representative as they become available. In addition, the quality control test results for mix asphalt content and aggregate gradation shall be provided to the Departmental Representative no later than 12:00 noon of the day following placement.
 - .4 The Contractor shall bear the cost of all consulting services retained by him.
 - .5 The Contractor shall be totally responsible for production of aggregate and mixes that meet all the specified requirements.
- .4 **Acceptance Sampling and Testing**
 - .1 **General:** Within this specification, certain requirements, limits, and tolerances are specified regarding the quality of materials and workmanship to be supplied. Compliance with these requirements where so specified, shall be determined by statistical testing as described in this section.

- .2 Acceptance testing is the responsibility of the Departmental Representative.
 - .3 The Contractor shall provide to the Departmental Representative all quality assurance density cores and any additional cores requested by the Departmental Representative for quality assurance testing for asphalt content and gradation by 12:00 noon of the day following placement, unless otherwise permitted by the Departmental Representative.
 - .4 Prior to the Contractor obtaining the cores, the Departmental Representative may provide the Contractor with new or different random sample locations. The Departmental Representative may have the Contractor obtain cores for quality assurance testing at any time throughout the project for any Lot.
 - .5 All cores provided to the Departmental Representative shall be in their original condition. Core preparation or sawing shall be done by the Departmental Representative.
 - .6 All costs associated with pavement coring for both quality control and quality assurance testing shall be the responsibility of the Contractor.
 - .7 Initial acceptance testing will be performed free of cost to the Contractor. The Contractor shall be responsible for the cost of all quality assurance testing performed on material that is used to replace or overlay material that has been previously rejected.
 - .8 The Contractor shall be responsible for the cost of all quality assurance retesting performed following attempts to improve smoothness or to remove bumps or dips.
 - .9 After all quality control tests for the Lot are reported to the Departmental Representative, the Departmental Representative will provide the Contractor with a copy of the results of acceptance tests within one working day of their availability.
 - .10 If the Departmental Representative determines that certain test results are faulty due to testing equipment malfunction, improper testing procedures, or calculations, he will replace the faulty tests with new tests.
- .5 Acceptance Sampling and Testing Procedures**
- .1 Density, Asphalt Content and Gradation
 - .1 Pavement sampling will be done using stratified random sampling procedures. A minimum of five tests per Lot will be selected as follows:
 - .1 The Lot will be divided into five or more segments of approximately equal quantity.
 - .2 In each segment a test site will be located by using random numbers to determine the longitudinal distance from the end of the segment and the lateral distance from the edge of the segment. In no case will a lateral distance be less than 0.5 m from the shoulder or 0.3 m from any other edge of a mat except when matching mats, in which case the test site may be within 0.3 m of the joint.
 - .2 For lifts of 20 mm or less, samples for asphalt content and gradation may be obtained by the Departmental Representative using the Sampling Mix Behind Paver method. If sufficient numbers of mix samples cannot be

obtained in this manner, stratified random core samples shall be taken by the Contractor as determined by the Departmental Representative in order to perform the minimum five tests per Lot.

- .2 Smoothness
 - .1 Smoothness testing will extend completely across all transverse joints between existing pavement and HMA CP placed under this Contract. Penalty assessments and acceptance/rejection criteria will apply to all such bumps and dips identified.
 - .2 Weather permitting, acceptance testing for smoothness will normally be completed within two weeks following the completion of all paving work subject to smoothness testing.
- .3 Asphalt Concrete Mix Sampling
 - .1 Sampling of the asphalt mixture for Marshall compaction comparison will be done by the Departmental Representative using the procedures identified AASHTO T40, Sampling Bituminous Materials.
- .4 Exclusions to Random Sampling
 - .1 Random sampling methods will not be applied when the Departmental Representative samples mix behind the paver on lifts of 20 mm or less; nor to small areas such as tapers, approaches, areas of handwork, gores; nor for asphalt mix used for isolated levelling and repair of failed areas.
- .5 Retesting Following Attempts to Improve Smoothness
 - .1 When the test results on a Sublot of HMA CP indicate the unacceptability of smoothness, the Contractor, at his option, may make one attempt to improve the smoothness on the Sublot by additional work in which case the following shall apply:
 - .1 the Contractor shall notify the Departmental Representative in writing that he will make one attempt to improve smoothness.
 - .2 additional work on a Sublot to improve smoothness shall be completed within 10 calendar days from the time the Contractor receives written notification from the Departmental Representative indicating the smoothness test results for that Sublot.
 - .2 The Contractor shall not undertake any method of repair that is detrimental to the quality of the pavement. Any method of heating that has a detrimental effect on the pavement, in the opinion of the Departmental Representative, will not be allowed.
- .6 Inspections for Pavement Segregation
 - .1 Inspection by the Contractor
 - .1 The Contractor shall perform a daily inspection of the paving operations on all lifts of pavement to identify any instances of pavement segregation.
 - .2 If segregation is evident, the Contractor shall take immediate corrective action to his operations to prevent any further occurrence of segregation.
 - .2 Inspection by the Departmental Representative During Construction

- .1 The Departmental Representative shall inspect the lower lifts of pavement to identify any instances of pavement segregation. If segregation is evident, the Departmental Representative shall immediately notify the Contractor so that corrective action can be taken to prevent further occurrence of segregation.
- .2 The Departmental Representative shall also inspect the top lift of pavement. Typically, each pavement Lot would be inspected, as soon as possible after the Lot is placed. During the inspection(s) of the top lift, the Departmental Representative will identify and record any areas of moderate and severe segregation and any areas of center-of-paver streak. Areas requiring repair shall be marked. The Departmental Representative will provide the Contractor with a written assessment (location and severity) of the segregated areas as soon as possible following each inspection.
- .3 Inspection by the Departmental Representative Following Construction
 - .1 The Departmental Representative shall conduct a second inspection of the top lift, normally two weeks after the completion of all paving work. During this inspection, the Departmental Representative will identify and record any areas of slight, moderate, and severe segregation and any areas of centre-of-paver streak which were not identified in the inspections during construction. The Departmental Representative will provide the Contractor with a written assessment (location and severity) of the segregated areas as soon as possible following this inspection.
 - .2 Requests by the Contractor to have the second inspection conducted on portions of the work prior to the completion of all paving work will be considered subject to the availability of the Departmental Representative's engineering staff and seasonal weather conditions. This is meant to apply for projects that are not anticipated to be completed prior to winter shut down or where the Contractor has moved his paving operations offsite for an extended period of time. For such inspections the Contractor will be invoiced by PCA at a rate of \$750 per inspection to cover the extra mobilization and travel costs associated with each occurrence.
- .7 Repairing Pavement Segregation
 - .1 Pavement segregation identified during the inspection performed two (2) weeks after the completion of paving operations will not require repair. However, this shall not relieve the Contractor from his responsibility to repair any obvious defects, deteriorated repairs, or failures which become evident within the warranty period.
 - .2 Pavement segregation identified in the inspections performed during construction shall be repaired by the Contractor at his expense and in accordance with the following:

- .1 Moderate and severe segregation in the top lift of pavement and on entrances and intersections shall require repair.
- .2 For entrances and the portion of intersections outside the through travel lanes and shoulders, areas of moderate and severe segregation shall be repaired in accordance with the methods of repair listed for moderate segregation. Intersections and entrances shall also be neatly shaped, smooth, and free of surface defects and depressions.
- .3 Slight segregation on any lift of pavement will not require repair.
- .4 Moderate segregation on lower lifts will not require repair.
- .5 Severe segregation on lower lifts will only require repair in instances where, in the opinion of the Departmental Representative, the segregated area will affect the long term structural integrity of the pavement structure. Such repair will not be required in instances where the Departmental Representative determines that the paver screed is "dragging" due to distortion of the existing surface.
- .3 Only moderate and severely segregated centre-of-paver streak on the top lift of pavement will require repair.
- .4 The following methods of repair are pre-approved:
 - .1 Moderate Segregation - The Contractor has the option of using a slurry patch or a hot mix patch.
 - .2 Severe Segregation - The Contractor has the option of removal and replacement or overlay.
- .5 Any other methods of repair proposed by the Contractor will be subject to the acceptance of the Departmental Representative with the exception that the application of asphalt (by distributor, hand spraying, squeegeeing, etc.) shall not be permitted as a method of repair under any circumstances.
- .6 Pavement width.
- .7 Repairs for segregation using removal and replacement shall be for the full lane width, full lane width and shoulder or the shoulder only as applicable, depending on the extent of the segregated area. The full depth of the asphalt lift shall be removed and replaced with new HMA CP using an appropriate paver and cold milling equipment.
- .8 All HMA CP material used for overlay and removal and replacement repairs shall have a tack coat applied prior to placement and will be subject to the requirements of Section 1.7, End Product Acceptance or Rejection.
- .9 The Departmental Representative will mark out the area of repair. The "marked area" shall extend a minimum of 0.5 metres beyond the segregated area. For centre-of-paver streak, the "marked area" shall extend a minimum of 100 mm laterally and 0.5 metres longitudinally beyond the streak.

- .10 All repairs shall be regular in shape and finished using good workmanship practises to provide an appearance suitable to the Departmental Representative.
- .11 Traffic shall be kept off all repairs for a sufficient period of time to ensure that tracking does not occur.
- .12 All hot mix and other repairs for which compaction is normally required shall be properly compacted.
- .13 In the event repairs cover existing roadway lines or markings, the Contractor shall reinstate the lines and markings at his expense and to the satisfaction of the Departmental Representative.
- .14 Repairing pavement segregation will not affect the assessment of segregation payment adjustments.
- .15 Repairs shall be completed during construction or shortly after construction, except when prevented by inclement weather or seasonal shutdown. In these cases, the Contractor shall complete the repairs prior to June 15 of the following year.

Part 3 Execution

3.1 EQUIPMENT, PLANT AND MIXING REQUIREMENTS

- .1 All equipment shall be designed and operated to produce an end product HMA CP complying with all the requirements of this specification.
- .2 Mixing plants shall be operated in accordance with manufacturer's recommendations and shall be calibrated prior to commencing production of the specified mix. Contractor shall provide the Departmental Representative with a certificate of calibration which certifies that plant has been calibrated to produce uniform mixture in accordance with job mix formula.
- .3 Storage facilities for asphalt cement shall be capable of heating material under effective and positive control and shall contain provision for measuring and sampling. Each tank shall contain only one asphalt cement type and grade.
- .4 Contractor shall supply all the equipment necessary to add liquid anti-stripping agent or lime when specified by the Departmental Representative. If liquid anti-stripping agent is specified it shall be added in-line with liquid asphalt cement when it is being pumped into the storage tank. If lime is specified as an anti-stripping agent the following shall apply:
 - .1 Hydrated lime shall be blended by pugmill into the cold aggregate feed.
 - .2 Sufficient water shall be added at pugmill to ensure a minimum of 3% moisture content in the aggregate.
 - .3 Addition of the liquid anti-stripping agent is considered incidental to the Work and no separate payment will be made.
- .5 Mix Production
 - .1 Aggregate and asphalt shall be combined to produce a uniform mixture of specified gradation at an asphalt content in accordance with the approved job mix formula and in which all particles of aggregate are uniformly coated.

- .2 Unless otherwise specified, the maximum mixing temperature for all grades of asphalt cement shall be 155°C.
- .3 Plant emissions shall not exceed the limits set by Alberta Environment.
- .4 The asphalt plant must be equipped with pollution control devices in addition to, or in replacement of the standard cyclone dust collectors, to effectively eliminate the emission of dust and smoke pollutants into the atmosphere. The use of secondary dust collection systems which require the discharge of dust polluted water into natural drainage system will not be allowed. Regardless of the requirements stated in the above, the asphalt plant operation must comply with all environmental pollution control regulations applicable in the work area.
- .5 A uniform mixture shall be produced in which all particles are thoroughly coated. Aggregate particles shall not be coated with residue from fuel combustion.
- .6 The Contractor shall dispose of rejected asphalt concrete mix or removed asphalt concrete pavement in a manner acceptable to the Departmental Representative.
- .6 Pavers**
 - .1 Pavers shall be self propelled and operated with automatic electronic screed controls to maintain required levels, cross fall, and joint matching.
- .7 Rollers**
 - .1 Rollers shall have a compaction capability to match plant production rates in order to achieve the minimum specified compaction.
- .8 Preparation of Existing Surface**
 - .1 Failed areas in existing surfaces shall be repaired as directed by the Departmental Representative. Areas requiring repair will be identified by the Departmental Representative in consultation with Contractor. This work will be paid from the Lump Sum Price.
 - .2 Before asphalt mix is placed, dirt and other objectionable material shall be removed from the surface to be paved, by brooming or other methods and is considered incidental to the Work and no separate payment will be made.
 - .3 Where new surfacing materials are placed against an existing pavement structure, the joint shall be of a vertical butt type, well bonded, sealed, and finished to provide a continuous, smooth profile across the joint. To accomplish this, the existing pavement shall be cold-milled to expose a vertical surface, of a depth equal to the thickness of the lift, against which new pavement is to be placed. In longitudinal section the minimum slope of the milled area shall be 200:1. In plan the Contractor shall cut the joint in any of the following ways:
 - .1 The joint shall be cut at 45° to the centreline of the roadway across the full width of the mat; or
 - .2 The joint shall be cut at 45° to the roadway centreline across the travel lanes and contiguously at 90° to the roadway centreline elsewhere; or
 - .3 For median cross-overs and bridges the joint shall be cut parallel to the crossing.
 - .4 When the existing pavement has been removed in advance of the paving of the joint area, the Contractor shall construct a smooth taper at the joint area to a slope of at least 50:1. The taper may be placed on tar paper and

shall be removed when paving is resumed. The traverse joint shall be straight and have a vertical face when the taper is removed.

- .5 Contact edges of existing mats and contact faces of curbs, gutters, manholes, sidewalks and bridge structures shall be coated with a thin film of liquid asphalt material before placing the asphalt mix.
- .6 Tack coat or a prime coat in accordance with Section 32 12 13.23, Asphalt Prime and Section 32 12 13.16, Asphalt Tack Coat.
- .7 The tack or prime coat shall be allowed to cure prior to placing asphalt concrete mix.
- .8 Areas that require preliminary levelling will be identified by the Departmental Representative. Generally, areas that show depressions, rutting or other deformations to a depth of 15 mm or greater will be designated by the Departmental Representative for preliminary levelling and all the following shall apply:
 - .1 material for preliminary levelling shall be the same designation and class as specified for the subsequent lift of HMA CP.
 - .2 asphalt concrete mix for preliminary levelling shall be spread by means of a motor grader or other methods approved by the Departmental Representative.
 - .3 only pneumatic tired rollers will be allowed for compaction, and a minimum density of 91% of the Marshall density, as determined by the Departmental Representative, is required.
 - .4 preliminary levelling is intended to be a separate operation and shall not be done as part of the construction of the subsequent lift of HMA CP.
 - .5 For the purposes of determining the Lump Sum Price adjustments, preliminary levelling is not considered a lift.
- .9 Transportation and Delivery of Mixtures**
 - .1 Truck boxes shall be clean, free from accumulations of asphalt concrete mix and foreign material.
 - .2 Excess truck box lubricants such as light oil, detergent, or lime solutions shall not be allowed to contaminate the asphalt concrete mix, and shall be disposed of in an environmentally acceptable manner. Petroleum based truck box lubricants shall not be used.
 - .3 During transport, the mix shall be completely covered to protect it from precipitation and excessive heat loss by securely fastened waterproofed tarpaulins, unless otherwise approved by the Departmental Representative.
 - .4 No loads shall be sent out so late in the day as to prevent completion of the spreading and compaction of the mixture during daylight, unless artificial light satisfactory to the Departmental Representative is provided.
- .10 Placing the Asphalt Concrete Mix**
 - .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 70 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 100 mm.
 - .2 the minimum thickness of a final lift shall be 50 mm.
 - .3 On widenings, the thickness of asphalt concrete mix up to 70 mm may be placed in one lift. Over 70 mm thickness, the asphalt concrete shall be placed in two lifts.
- .4 If, during construction, it is found that the spreading and finishing equipment in operation leaves tracks or indented areas that are not satisfactorily corrected by the subsequent operations, or if it produces other permanent blemishes, the use of such equipment shall be discontinued and other satisfactory spreading and finishing equipment shall be provided by the Contractor.
- .5 Longitudinal joints shall not be permitted in any lane on the final lift of asphalt concrete.
- .6 Longitudinal joints shall be offset a minimum of 150 mm from one lift to the next.
- .7 Longitudinal and transverse joints shall be vertical butt type, well bonded and sealed, and finished to provide a continuous, smooth profile across the joints. Surplus material will be disposed of in a manner acceptable to the Departmental Representative.
- .8 If required by the Departmental Representative the contact edge of any mat placed by the Contractor shall be coated with a thin film of liquid Tack Coat before placing the adjacent mat and is considered incidental to the Work and no separate payment will be made.
- .9 When paving is discontinued in any lane or in any lift, the mat shall be tapered to a slope of 10 horizontal to 1 vertical. The taper may be placed on tar paper and shall be removed when paving is resumed. The transverse joint shall be straight and have a vertical face when the taper is removed.
- .10 Transverse construction joints from one lift to the next shall be separated by at least 2 metres.
- .11 Where the construction of a final lift of pavement next to a concrete curb section or curb and gutter section will be delayed, the Contractor shall construct a temporary asphalt concrete mix fillet next to the concrete section in accordance with the plans or as directed by the Departmental Representative. These fillets shall be removed when paving is resumed.
- .12 Road intersections and entrances shall be paved in accordance with the plans or as directed by the Departmental Representative. Unless otherwise permitted by the Departmental Representative, the asphalt mix shall be spread on intersections by means of a paver as paving of the main lanes passes by.

- .13 Contact faces of curbs, gutters, manholes, and sidewalks shall be coated with asphalt Tack Coat using a hand applicator before placing the asphalt mix and is considered incidental to the Work with no separate payment being made.
- .14 All longitudinal joints shall be straight and uniform with no lateral waviness. Any mat contact that is not straight or uniform, as determined by the Departmental Representative, shall be trimmed by saw-cutting or using some other method acceptable to the Departmental Representative prior to placing the adjacent mat. The material removed shall be disposed of to the satisfaction of the Departmental Representative and is considered incidental to the Work and will not be paid for separately.
- .15 Any mat with a contact edge that has deteriorated, cracked, or slumped due to improper compaction or vehicle traffic shall be trimmed by saw-cutting or some other method acceptable to the Departmental Representative prior to placing the adjacent mat. The length of the contact edge to be trimmed, removed, and disposed of will be as determined by the Departmental Representative and is considered incidental to the Work and will not be paid for separately.

.11 Compacting the Mix

- .1 All asphalt concrete mix, shall be thoroughly compacted, and after final rolling the finished surface of the mat shall be free from segregation, waves, hairline cracks, and other obvious defects.
- .2 After final rolling is complete, the Contractor shall ensure that the finished mat has cooled for a minimum of two hours before opening the section of traffic.

.12 Interim Traffic Markings

- .1 On projects that have existing paint and traffic markings, the end points of no passing zones shall be preserved by referencing these points to stakes located off the paved shoulder area. The chainage shall be recorded on each stake and also in a field book. This book will become the property of the Departmental Representative after completion of the Work.
- .2 The Contractor shall provide daily interim centerline painted traffic markings (spotting) on all newly constructed or "tacked" pavement to be exposed to traffic overnight and is considered incidental to the Work and will not be paid for separately.
- .3 All spotting must be applied using the same color of paint as the permanent marking.
- .4 All spots are to be 100 mm wide and 300 mm long, applied lengthwise to the road surface.
- .5 On all lifts prior to the final lift, the paint spots shall be spaced 15 metres on centre in tangent sections and 7.5 m apart on curves.
- .6 When self-adhesive, reflectorized pavement marking tape is approved for use by the Departmental Representative, the spacing shall be the same as is used for paint spots. Tape on lower lifts does not need to be removed prior to placement of the next lift. If tape is used on the top lift, it shall be removed immediately prior to painting of the permanent lane markings and is considered incidental to the Work and will not be paid for separately.
- .7 When temporary pavement markers are approved for use by the Departmental Representative, they shall be placed at 25 m intervals on tangents and at 15 m

intervals on curves. Temporary pavement markers used on lower lifts shall be removed immediately prior to placement of the next lift. Temporary pavement markers used on top lift shall be removed immediately prior to painting of the permanent lane markings and is considered incidental to the Work and will not be paid for separately.

Table No. 11 - Asphalt Concrete Mix Characteristics

% MF, -5000 (Min) (Note 1)	% Fractures +5000 (2 Faces) (min)	Asphalt Cement Grade	Marshall Stability N (min)	No. of Blows	Air Voids	VMA % (min) by % Air Voids 3.5, 4.0	Voids filled with Asphalt %	Flow (mm)	Retained Stability % (min)
75	98 (one face) 90	150-200A	12,000	75	see Note 2	13.0, 13.5	65 to 75	2.0 to 3.5	70

Note 1: The percentage of Manufactured Fines in the -5,000 micron sieve portion of the combined aggregate.

Note 2: The design air voids will be chosen as the lowest value, within the range of 3.5 to 4.0% inclusive, such that all other mix design criteria are met.

Note 3: The minimum Theoretical Film Thickness requirement shall be as follows:

3.9 and 4.0 % = 6.0 μ m

3.7 and 3.8% = 6.1 μ m

3.5 and 3.6% = 6.2 μ m

Note 4: To meet the current requirements of AASHTO M320, Performance-Graded Asphalt Binder

END OF SECTION

Part 1 General**1.1 RELATED WORK**

- .1 Section 01 35 00.06 - Special Procedures for Traffic Control.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 02 81 01 - Hazardous Materials.
- .4 Section 32 12 16 - Asphalt Concrete Pavement (End Product Specifications).

1.2 REFERENCES

- .1 CAN/CGSB-1.5-M99, Low Flash Petroleum Spirits Thinner.
- .2 CGSB1-GP-12C-83, Standard Paint Colours.
- .3 CGSB1-GP-71-83, Method, of Testing Paints and Pigments.
- .4 CAN/CGSB 1.74-01, Alkyd Traffic Paint.
- .5 U.S. FED-STD-595B, 1989 - Colours Used in Government Procurement.
- .6 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 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.

1.4 MEASUREMENT FOR PAYMENT

- .1 Temporary Pavement Marking including supply of paint and reflective glass beads, if required, 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 will be made in accordance with Section 01 21 00 - Allowances, form part of the lump sum price.

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 EQUIPMENT REQUIREMENTS

- .1 Paint applicator to be an approved pressure type mobile distributor capable of applying paint in single, double and dashed lines. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off.
- .2 Distributor to be capable of applying reflective glass beads as an overlay on freshly applied paint.

3.2 CONDITION OF SURFACES

- .1 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

3.3 TRAFFIC CONTROL

- .1 In accordance with Section 01 35 00.06 and Contractor's Traffic Management Plan.

3.4 APPLICATION

- .1 Pavement markings to be laid out by Contractor.
- .2 Apply paint only when air temperature is above 10°C, wind speed is less than 60 km/h and no rain is forecast within next 4 h or as accepted by the Departmental Representative.
- .3 Apply traffic paint evenly at rate of 3 m²/L or as accepted by the Departmental Representative.
- .4 Do not thin paint.
- .5 Paint lines to be of uniform colour and density with sharp edges.

- .6 Thoroughly clean distributor tank before refilling with paint of different colour.
- .7 Apply glass beads at rate of 200 g/m² of painted area immediately after application of paint.

3.5 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

3.6 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, and
 - .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.

3.7 HIGHWAY OPERATION

- .1 Highway operation shall be in accordance with the Contractor's Traffic Management Plan 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:

- .1 The crash attenuator vehicle shall be equipped with a crash attenuator which meets National Cooperative Highway Research Program, Report 350 Test Criterion. Test Level 3 for 100 km/hr. The vehicle shall follow behind the painting truck at a distance of 50 to 400 m.
- .2 The pilot vehicle shall be driven in the same travel lane as the paint machine, following it at a constant distance of approximately two kilometres.
- .3 The crash attenuator vehicle, pilot truck and the painting truck are to display the same message at all times. The painting truck and the companion vehicles shall be equipped with a two-way radio for communication and overhead revolving beacon with an amber lens of a minimum 180 mm high and 180 mm wide.

3.8 PROTECTION OF COMPLETED WORK

- .1** Protect pavement markings until dry.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 00.06 - Special Procedures for Traffic Control.
- .3 Section 01 35 43 - Environmental Procedures.
- .4 Section 31 24 13 - Roadway Embankments.

1.2 MATERIAL SUPPLIED BY DEPARTMENTAL REPRESENTATIVE

- .1 Topsoil to be native organic soils stripped and screened from the contract work area stockpiled at locations of the Bow Valley Parkway and Fireside turn out.

1.3 MEASUREMENT PROCEDURES

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

1.4 PAYMENT PROCEDURES

- .1 Payment for stripping will be made in accordance with Section 31 24 13 - Roadway Embankments.
- .2 Payment placing screened stripping material on slopes and finishing will be made in accordance with Section 31 24 13 - Roadway Embankments.
- .3 Payment for testing of topsoil to be paid under "**Lump Sum Price**".
- .4 Payment for supply and application of soil amendments, including fertilizer will be paid under "**Lump Sum Price**".

1.5 REFERENCES

- .1 Agriculture and Agri-Food Canada
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment
 - .1 PN1340-[2005], Guidelines for Compost Quality.
- .3 Canadian Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-[December 2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System For New Construction and Major Renovations.
- .4 U.S. Environmental Protection Agency (EPA)/Office of Water

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

1.6 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).

1.7 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.

1.8 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, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
 - .1 Native topsoil to be stripped from on site sources.
 - .2 Contain no toxic elements or growth inhibiting materials.
 - .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.
- .2 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.
- .2 Contractor is responsible for amendments to supply topsoil as specified.
- .3 Soil testing by recognized testing facility for PH, P and K, and organic matter.
- .4 Testing of topsoil will be carried out by testing laboratory designated by Departmental Representative.
 - .1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 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 .
 - .1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.
- .3 Stockpile in locations as directed by Departmental Representative.
- .4 Protect stockpiles from contamination and compaction.

3.3 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.

- .1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .2 Remove debris which protrudes more than 75mm above surface.
 - .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 100mm.
 - .1 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 sub-grade.
- .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.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.
 - .1 Leave surfaces smooth, uniform and firm against deep foot printing.

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, except topsoil not required, where directed by Departmental Representative off site.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 00.06 – Special Procedures for Traffic Control.
- .3 Section 01 35 43 - Environmental Procedures.

1.2 DESCRIPTION OF WORK

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

1.3 MEASUREMENT FOR PAYMENT

- .1 Mechanical 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 mechanical 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, and direction of the Departmental Representative. **Payment shall be paid under “Lump Sum Price”**
- .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”**, and no additional payment will be made.
- .5 Traffic Control required for this Work shall be incidental to **“Lump Sum Price”** 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.

1.4 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
 - .3 Submit in writing to Departmental Representative 14 days prior to commencing work:
 - .1 Volume capacity of hydraulic seeder in litres.

- .2 Amount of material to be used per tank based on volume.
- .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

1.5 **QUALITY ASSURANCE**

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

1.6 **MATERIAL DELIVERY, HANDLING AND STORAGE**

- .1 Use all means necessary to protect all materials before, during and after installation. Provide adequate protection to materials which 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.

2.4 SOIL STABILIZER/TACKIFIER

- .1 Soil stabilizer/tackifier shall be a non toxic, 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.

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 hand seed or 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 all disturbed areas created as a result of this work. i

3.2 MECHANICAL SEEDING

- .1 The following application rates are the minimum required for mechanical seeding:
 - .1 Canada Parks Blend Seed: 35 kg/hectare

- | | | |
|----|------------------------|----------------|
| .2 | Fertilizer 1: 45-25-20 | 125 kg/hectare |
|----|------------------------|----------------|
- .2 The Contractor shall apply fertilizer at the time of seeding onto prepared seedbeds ensuring even coverage at specified rates.
 - .3 The Contractor shall mechanically sow seed during calm weather using a drill seeder.
 - .4 The Contractor shall clean all structures, appurtenances and natural features not designated to be seeded, to the satisfaction of the Departmental Representative.
 - .5 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 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
.4	Mulch:	500 kg/hectare
.5	Soil Stabilizer/tackifier: Soil Master WR	1300 L/hectare
.6	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.

3.4 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.

3.5 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.

3.6 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 25mm 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.

3.7**CLEANING**

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

END OF SECTION