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2	G-001	LOCATION PLAN, DRAWING INDEX, LEGEND
3	C-101	SECTION 1 & SECTION 2 PLAN
4	C-102	SECTION 1 & SECTION 2 DETAILS
5	C-103	SECTION 3 PLAN
6	C-104	SECTION 4 PLAN

Appendices:

- A. Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure, May 2015
- B. Pratiques exemplaires nationales de gestion de Parcs Canada - Routes, autoroutes, promenades et infrastructure connexe – Mai 2015
- C. Standard CMS Translations Rev 2 - July 2018
- D. Construction Signage Translation Rev 5 – November 2019
- E. Decontamination Protocol for Parks Canada Fisheries and Aquatic Technicians – May 2017

01 11 00 SUMMARY OF WORK**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 DEFINITIONS

- .1 Alberta Transportation is referred to as “AT”.
 - .1 The latest version of the AT Standard Specifications for Highway Construction is to be used.
- .2 Changes in Definition, - The following changes in definitions have been made to the “AT Specifications”:
 - .1 Consultant – The word “Consultant” shall mean Departmental Representative or their duly appointed representative.
 - .2 Department – The word “Department” shall mean Parks Canada Agency.
- .3 Banff National Park of Canada is referred to as “BNP”.
- .4 Trans-Canada Highway is referred to as “TCH”
- .5 Parks Canada Agency is referred to as “PCA”.
- .6 Canadian Pacific Railway is referred to as “CP Rail”
- .7 Environmental Surveillance Officer is referred to as “ESO”.
- .8 Watercourse is as defined in the National Parks Act.
- .9 Site means the areas
 - .1 On or within the limits of Construction as referenced on the Drawings or described in the Contract.
 - .2 Outside the limits of Construction, all roads, highways, pits, or quarries, used to complete the Work.
- .10 Work means the provision of all labour, services, material, and equipment as necessary, for the Contractor to complete and perform its obligations in accordance with the Contract.

1.3 PROJECT LOCATION

- .1 The project is in Banff National Park, Alberta. Construction work is located on Mount Norquay Road (Norquay Road). The following are key locations relative to the project:
 - .1 TCH km 0 – BNP East Gate
 - .2 TCH km 13.0 - Minnewanka / Banff Ave. Interchange
 - .3 TCH km 17.2 – Mount Norquay Road Interchange
 - .4 TCH km 22.7 - Bow Valley Parkway Interchange

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- .1 All requirements noted within the Contract Documents shall be completed by the Contractor unless specifically stated otherwise.

- .2 Without limiting the scope of work, the work of this Contract generally comprises the following, as directed by the Departmental Representative:
 - .1 Ditch and channel cleanout and drainage excavation of areas designated in the Contract documents and in accordance with Section 31 24 13 – Roadway and Drainage Excavation including hauling and disposal outside of the Parks.
 - .2 Side slope embankment shaping in areas designated in the Contract documents and in accordance with Section 31 24 13 – Roadway and Drainage Excavation including hauling and disposal outside of the Parks.
 - .3 Excavating all types of material from the right-of-way cuts, hauling and placing this material in embankments or in stockpiles designated in the Contract documents and in accordance with Section 31 24 13 – Roadway and Drainage Excavation including hauling and disposal outside of the Parks.
 - .4 Installation and maintenance of temporary barriers and supply and installation of temporary traffic control and other temporary construction facilities required for completion of the Work of the Project.
 - .5 Removal of existing asphalt by saw-cutting, full depth excavation and partial depth milling, including disposal of material in accordance with Section 02 41 13 – Asphalt Pavement Removal.
 - .6 Supply and Build a Gabion Retaining Wall in accordance with Section 31 36 00 – Gabion basket Retaining Wall and AT - Standard Specifications for Highway Construction (latest edition) – Section 6.10, Gabions and Gabion Mattresses.
 - .7 Recompact existing suitable subgrade material in accordance with Section 32 11 20 – Gravel Fill.
 - .8 Supply, load, haul and place AT Designation 6 Class 80 sub-base course materials in accordance with Section 32 11 20 – Gravel Fill.
 - .9 Supply, load, haul and place AT Designation 2 Class 20 base course materials in accordance with Section 32 11 24 – Granular Base Course.
 - .10 Perform mix design for and supply and install AT Mix Type M1 (12.5mm) Asphalt Concrete Pavement using PG 52-34 Asphalt Binder in accordance with Section 32 12 16 – Asphalt Concrete Pavement (EPS).
 - .1 AT Designation 1 Class 12.5 Asphalt Aggregate and asphalt binder PG 52-34 are to be supplied by the Contractor from outside of the Park.
 - .2 Use of processed Reclaimed Asphalt Pavement (RAP) material in hot mix asphalt construction is not permitted.
 - .11 Install integral asphalt curb in areas designated in the Contract documents and in accordance with Section 32 12 16 – Asphalt Concrete Pavement (EPS).
 - .12 Supply and installation of non-woven geotextiles in accordance with Section 31 32 19 – Geotextile and Section 31 36 00 – Gabion Basket Retaining Wall.
 - .13 Supply and installation of AT Class 1M, Class 1 and Class 2 Riprap in accordance with Section 31 37 00 – Riprap.
 - .14 Supply and installation of erosion control blankets and fibre rolls in areas designated in the Contract documents and in accordance with Section 31 32 19 – Geotextile

- .15 Supply and installation of PVC and HDPE drain pipes in accordance with Section 31 36 00 – Gabion Basket Retaining Wall and Section 33 46 19 – Drain Pipe.
- .16 Removal and disposal outside the Parks of existing wood post w-beam guardrail in accordance with Section 34 71 14 – W-Beam Guardrail.
- .17 Supply and installation of steel strong post w-beam guardrail in accordance with Section 34 71 14 – W-Beam Guardrail including FLEAT 350 impact absorbing end treatments.
- .18 Traffic signage, control and other traffic accommodations in accordance with Section 01 35 31 – Special Procedures for Traffic Control.
- .19 Miscellaneous Additional Work as directed by the Departmental Representative.
- .3 The Contractor will not be permitted to set up a crushing plant in the Park.
- .4 The Contractor will not be permitted to set up a Mobile Asphalt Plant or use a Stationary Asphalt Plant for this Project in the Park.
- .1 The asphalt plant to be used on this project, regardless of location, shall be a minimum of 200 tonnes per hour production, equipped with a dry bag system for pollution control, in addition to, or in replacement of standard cyclone dust collectors, to effectively eliminate emissions of dust and smoke pollutants into the atmosphere.
- .5 The Contractor is responsible for sourcing water required for the Works that may require them to obtain it from outside of the National Parks. Accessing local water sources in nearby pits or from other Parks facilities may be coordinated through and at the discretion of the Departmental Representative and the ESO but will require the Contractor to obtain a Restricted Access Permit and to adhere to all conditions contained therein.
- .6 In preparation for and during construction of this project, an “Environmental Protection Plan” (EPP) is to be prepared by the Contractor to meet the requirements of Section 01 35 43 – Environmental Procedures to ensure the desired minimal adverse effects are achieved. The Contractor’s EPP must be approved by Parks Canada Agency prior to the commencement of construction. The Departmental Representative and Parks Canada’s environmental surveillance officer (ESO) will refer to the approved EPP in determining compliance with the plan and Contract specifications. The EPP will form part of the Contract.
- .7 Where material and construction specifications for work covered under the Contract, including any Change Orders are not available, **AT - Standard Specifications for Highway Construction (latest edition)** shall apply unless directed otherwise by the Departmental Representative.

1.5 CONTRACT METHOD

- .1 Construct Work under combined price Contract.

1.6 WORK BY OTHERS

- .1 The Contractor is advised that the following Work and anticipated completion in the vicinity has been or may be contracted by Parks Canada:
 - .2 Pavement Resurfacing: Mount Norquay Road south of TCH and north of CP Rail crossing – Fall 2021.

- .3 Other projects and maintenance work may occur near the Contract Work in 2021.
- .2 Where it is necessary that work is to proceed in areas of this project common to both the Contractor and forces of others, the Contractor shall cooperate with the other Contractors and the PCA Departmental Representative in reviewing their construction schedules and sharing their work space, and shall coordinate their operations with the other Contractors, including traffic management and construction staging.
- .3 The Contractors shall coordinate all work on this project with other Contractors including Site Safety and Traffic Control.
- .4 The pits mentioned in the Contract Documents are operational pits and are used by many contractors and Parks Canada. The Contractor shall cooperate with the other users of the pits.

1.7 WORK SEQUENCE

- .1 Schedule work progress to allow Owner / Departmental Representative unrestricted access to inspect all phases of the Work.
- .2 Maintain fire and emergency access on the roadways at all times.
- .3 Co-ordinate Work with other Contractors / Departmental Representatives doing maintenance, survey / testing work.
- .4 The Contractor shall prepare a meaningful bar chart or network diagram showing the proposed schedules of major work, which shall be submitted to the Departmental Representative in accordance with 01 32 16 Construction Progress Schedules.
- .5 The Contractor shall not commence Works in a Work area until approved to do so by the Departmental Representative. The Departmental Representative is not obliged to allow Works to commence if there is a reasonable risk that the Contractor will not be able to complete the Work area in the required timelines.
- .6 The Contractor shall:
 - .1 Obtain the Interim Certificate (Substantial Performance) by **November 6, 2021**.
 - .2 Complete all the Work by **November 13, 2021** (Contract Completion Date).

1.8 CONTRACTOR USE OF PREMISES

- .1 Contractor has unrestricted use of site subject to Section 01 14 00 –Work Restrictions and Section 01 29 01 – Site Occupancy, until Contract Completion date. The Contractor’s use of the site is not exclusive of other contractors or work zones within the limits of this Contract.
- .2 Contractor shall limit use of premises for Work, for storage, and for access, to allow:
 - .1 Owner occupancy.
 - .2 Public, delivery and emergency travel through site.
- .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 and vehicle work passes in accordance with Section 01 35 43 - Environmental Procedures.

1.9 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.
- .3 Contractor must allow access to the Work Site for other Contractors and PCA. It is up to the Contractor to plan their work accordingly.

1.10 OWNER FURNISHED ITEMS

- .1 None.

1.11 CONSTRUCTION SIGNAGE

- .1 To be in accordance with Section 01 35 31 - Special Procedures for Traffic Control.
- .2 Signage shall be coordinated with other Contractors.
- .3 No signs or advertisements, other than warning signs, are permitted on site.

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 Provide a list of control monuments including coordinates and elevations on request.
- .2 Contractor shall:
 - .4 Not permanently mark any infrastructure or feature during their setting out of the work. They shall fully remove any set out marks, markers, or other identifiers that they installed, prior to demobilizing from the Work Sites.
 - .5 Set additional control points as necessary.
 - .6 Set all work stakes necessary to complete work.
 - .7 Not damage geodetic benchmarks or control monuments unless authorized by Departmental Representative.
 - .8 Provide measurements for Payment (Quantity Surveys), volumes by the surface to surface prismatic method for roadway and drainage excavation and neat line for all surfaces above the excavated surface at a maximum of 10m intervals. and provide all data to the Departmental Representative in DWG format. Coordinates unless otherwise stated shall be UTM Grid and no adjustments will be made to scale the coordinates to ground when calculated volumes by cross-section or setting out of work.
 - .9 Allow the Departmental Representative access to the Works to undertake Quality Assurance of Quantity Surveys.
 - .10 Refrain from covering up Works that have been identified by the Departmental Representative as requiring a Quantity Survey Quality Assurance review and allow reasonable time for the completion of said review.
- .3 No separate payment for setting out work, unless changes are made and approved by the Departmental Representative and additional survey costs are incurred. Payment for

additional survey required due to changes by Departmental Representative to be paid for as per Section 01 21 00 – Allowances.

Part 2 **Products**

2.1 **GENERAL**

- .1 To be in accordance with AT - Standard Specifications for Highway Construction (latest edition).
- .2 Wherever American Society for Testing and Materials (ASTM), Canadian Standards Association (CSA/CAN), Canadian General Standards Board (CGSB) or American Association of State Highway and Transportation Officials (AASHTO) standards are referenced the latest versions of those standards shall apply.

Part 3 **Execution**

3.1 **GENERAL**

- .1 To be in accordance with AT - Standard Specifications for Highway Construction (latest edition).
- .2 Wherever American Society for Testing and Materials (ASTM), Canadian Standards Association (CSA/CAN), Canadian General Standards Board (CGSB) or American Association of State Highway and Transportation Officials (AASHTO) standards are referenced the latest versions of those standards shall apply.

END OF SECTION

01 14 00 WORK RESTRICTIONS**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 ACCESS AND EGRESS

- .1 All existing overhead utility accesses are to be maintained at all times as required.
- .2 Provide for pedestrian, cyclist, and vehicular traffic for the duration of the construction.
- .3 Construction operations shall be conducted to cause minimal inconvenience to the public and to owners of adjoining property. Existing access to property shall be maintained where possible and if new access must be provided, every effort shall be taken to provide the new access before the existing access is removed. Contractor will be responsible for repairing any damage incurred, at the Contractor's cost.
- .4 The Contractor is responsible for the development and supply of construction access to the Work as approved by the Departmental Representative.

1.3 USE OF THE SITE AND FACILITIES

- .1 The Work Sites specified in the Contract shall only be used for the purposes of the Work.
- .2 The Work Site (limits shown on the Drawings) will be specified by Parks Canada and shall only be used for the purposes of the Work. The Work Site will be made available by Parks Canada to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.
- .3 The Contractor will not be permitted to set up a camp in the National Parks. PCA regulations prohibit anyone working within the Park from using public campground facilities.
- .4 Office-tool trailer may also be set up in Cascade Pit. See Section 01 35 43 – Environmental Procedures and Section .01 14 00 - Work Restrictions.
- .5 The Contractor shall not store material or park equipment along the Right of Way within the clear zone.
- .6 Contractor shall maintain adequate drainage at the Work Site.
- .7 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 their cost for the performance and inspection of the Work.
- .8 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and 01 35 43 Environmental Procedures. The Contractor shall post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.
- .9 Any damage to the Work Site caused by the Contractor shall be repaired by the Contractor at their expense.
- .10 Pets shall not be brought to or maintained at the construction site.
- .11 The Contractor shall obtain a Street and Public Place Permit from the Town of Banff and any other applicable Town of Banff permits required to complete the Contract

Works. Any costs associated with obtaining the permits will be considered incidental to the contract and no additional payment will be made. Any claims for delays due to obtaining these permits will not be entertained.

1.4 WORKING TIMES

- .1 Work in BNP is permitted during daylight hours as provided in the table below based on the Month in which the work is occurring unless otherwise approved by the Departmental Representative.

Month	Work Start	Work Finish
January	9:00 am	4:30 pm
February	8:30 am	5:00 pm
March	8:30 am	6:00 pm
April	7:30 am	8:00 pm
May	7:30 am	8:30 pm
June	7:30 am	9:00 pm
July	7:30 am	9:00 pm
August	7:30 am	8:00 pm
September	8:00 am	7:00 pm
October	9:00 am	5:30 pm
November	9:00 am	4:00 pm
December	9:00 am	4:00 pm

- .2 Work will be permitted Monday through Saturday, unless stipulated otherwise in the Contract documents.
- .3 If requested by the Contractor, work may be permitted on Sundays subject to the review and approval of the Departmental Representative.
- .4 The Contractor will not be permitted to work during the period of any Alberta statutory holiday long weekend, including one day prior to and one day following. The Contractor will not be permitted to work during the following Holidays or long weekends unless prior written approval is granted by the Departmental Representative:
- .1 Statutory and Civic Holidays (2021)
- .1 Thanksgiving Day weekend: From 17:30 Thursday, October 7, 2021 to 09:00 Tuesday, October 12, 2021.
- .2 Remembrance Day: Thursday, November 11, 2021.
- .5 If the Work is expected to impact special events within the project limits, the Contractor will not be permitted to work unless prior written approval is granted by the Departmental Representative:
- .1 The Contractor will be notified of details of the special events during the Pre-construction Meeting.

- .6 Variance of the Working Times and any others are provided on the strict condition of satisfactory performance in all requirements as determined at the Departmental Representative's discretion and may be revoked at any time for any reason. It is provided on the presumption that no additional costs or any delay will be attributed to Parks Canada in relation to conducting Works in accordance with the Variance and if that is not the case, the Contractor shall not commence work under the Variance. No claims for additional costs, delays, schedule impacts, loss of productivity or other extra Works resulting from a Variance will be entertained.

1.5 WORK CONDUCTED OVER OR ADJACENT TO WATERWAYS

- .1 All components of the Work shall be conducted in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.
- .2 All components of the Work shall be conducted without equipment entering wetlands, water bodies, or streams.
- .3 All waste materials from the Work shall be contained and collected in a manner to prevent any contact with the water bodies and wetlands. All collected waste materials shall be disposed of in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.

1.6 UTILITIES

- .1 The Contractor shall become familiar with all utilities and services adjacent to the Work and shall be responsible for cost of repair of any damage resulting from their operations.
- .2 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.
- .3 Contractor remains fully responsible for determining the full and accurate extent of utilities within the area of their Works.
- .4 The Contractor shall notify the Departmental Representative and the Utility companies at least seven (7) days in advance of any activities which may interfere with the operation of such Utilities.
- .5 Whenever working near 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 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 and available, 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 ARCHAEOLOGICAL RESOURCES

- .1 The Contractor shall undertake the Works in accordance with the Best Management Practices as described in Section 01 35 43 Environmental Procedures.
- .2 If cultural and/or archaeological resources are encountered, the Contractor shall cease Work in the immediate area and notify the Departmental Representative and ESO without delay.

1.9 PROTECTION OF PERSONS AND PROPERTY

- .1 The Contractor shall comply with all applicable safety regulations of the Workers Compensation Act of Alberta and the Canadian Labour Code Part 2 (CLC) including, but not limited to, Occupational Health and Safety Regulations and General Safety Regulations. Within the Site, the Contractor has all the responsibilities of an "employer" under the *Workers Compensation Act* and the *Occupational Health and Safety Regulation* and is designated as the "Prime Contractor".
- .2 Prime Contractor must comply with Workers Compensation Act and Occupational Health and Safety Regulation Section 20.3 Coordination of multiple employer workplaces.
- .3 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, when working in that province.
- .4 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .5 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site.

- .6 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.

1.10 USE OF PUBLIC AREAS

- .1 Any access or use of the area west of Mt Norquay Road and north of Juniper Way will not be permitted.
- .2 Public areas and pullouts along Mt Norquay Road may be requested for use by the Contractor as laydown areas subject to the review, approval and conditions provided by the Departmental Representative and in accordance with Section 01 35 43 – Environmental Procedures.
- .3 Off-road construction equipment will not be allowed on the existing highway except at designated areas where the existing highway is scheduled for re-construction in this Contract, material loading areas, or alternate sites as designated and approved by the Departmental Representative.
- .4 Steel tracked equipment with cleats will not be allowed on pavement designated for future use. If or when crossing asphalt designated for future use, rubber mats must be used under the tracks to protect the asphalt. 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 unless accepted in writing by the Departmental Representative.
- .5 Flag persons shall be provided when vehicles are entering or exiting Work Site access points and when vehicles are entering or exiting gravel pits in the park. Pit access gates must remain closed at all times or have a gate person monitoring the opening for wildlife.
- .6 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas. All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle. All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner that will prevent dropping of materials or debris on the roadways and, where contents may otherwise be blown off during transit, such loads shall be covered by tarpaulins or other suitable covers. Spills of materials in public areas shall be removed or cleaned immediately by the Contractor at no cost to the Owner. All activities shall be in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.
- .7 Construction areas and construction crossings shall be flood-lit for night operations.

1.11 USE OF PITS AND QUARRIES

- .1 The Contractor will be allowed an area of 20m by 40m within Cascade Pit as determined by the Departmental Representative for the purposes of staging, vehicle and equipment parking, office trailers and meetings, but shall not be allowed to stockpile construction or waste materials of any kind unless otherwise specified in the Contract Documents or approved by the Departmental Representative.
- .2 When the Contractor is operating in a PCA pit or quarry, the Contractor shall utilize the pit or quarry in accordance with the Departmental Representative's authorization.

- .3 Expansion of working pits is not authorized. The Contractor shall confine all work in the pit within the limits of the existing cleared area.
- .4 The Contractor shall be responsible for managing their working space within Cascade Pit and coordination with Parks Canada contractors, personnel or others, to maintain access.
- .5 No dumping of debris or petroleum products is permitted. The pit must be left in a clean and safe condition.
- .6 If a Pit Plan is provided, the Contractor is advised that the conditions depicted on the Pit Plan are very likely to have changed since the time of the survey and that they are wholly responsible for familiarizing themselves with the Pit.
- .7 The Contractor is deemed to be fully knowledgeable with the conditions of Cascade Pit at the time of Tender closing and to have made full allowance for these conditions in their price regardless of whether a Pit Plan is provided or not.
- .8 Pit work must be carried out in accordance with the local provincial government Health, Safety and Reclamation requirements, the current Standard Specifications for Highway Construction and Best Management Practices for the area the Work is occurring in.

1.12 USE OF PITS, QUARRIES, AND DISPOSAL SITES, OUTSIDE OF THE NATIONAL PARKS

- .1 When the Contractor is supplying material from a pit or quarry outside of the National Parks the Contractor is responsible for all permits and approvals. Pit or quarry development and reclamation must be in accordance with local and Provincial regulatory agency requirements.
- .2 When the Contractor is disposing of; stripping, unsuitable, waste, or surplus material in a pit or other disposal sites outside of the National Parks the Contractor is responsible for all permits and approvals including any testing requirements of the facility. Disposal site must be in accordance with local and Provincial regulatory agency requirements.
- .3 The Contractor shall bear and pay all costs, fees, and royalties for pits, quarries, or disposal sites, outside of the National Parks.
- .4 Material supplied from pits and quarries outside of the National Parks must be clean of all, seeds, organics, top soil, or contaminants. No additional payment will be made for cleaning or washing material supplied from pits and quarries outside of the National Parks.
- .5 Material supplied from pits and quarries outside of the National Parks must meet the Contract Specifications.

1.13 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00.

1.14 SUPERVISORY PERSONNEL

- .1 When requesting a Preconstruction Meeting, in accordance with Section 01 31 00 Project Management and Coordination, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.
- .2 At a minimum, the following personnel shall be included in the list:

- .1 Contractor Manager
- .2 Project Superintendent;
- .3 Safety Representative;
- .4 Quality Control Manager;
- .5 Environmental Representative;
- .6 Traffic Control Representative;
- .3 The above personnel shall perform the following duties:
 - .1 Contractor Manager with full authority, as agent of the Contractor, to act on behalf of and legally bind the Contractor in connection with the Work and the Contract. The Contractor may, at its discretion, appoint one person as both Contractor Manager and Project Superintendent.
 - .2 The Project Superintendent shall be employed full time with full authority to supervise the Work, who shall be directly available to the Department Representative during all active periods of Work. Either they or their designated deputy shall be present on the Work Site each and every workday that Work is being performed, from the commencement of Work to Total Performance of the Work. Project Superintendent and their designated Deputy are responsible for supervising all their subcontractors and ensuring each subcontractor has their own foreman onsite during all works.
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 have construction safety supervisory experience. Their duties shall encompass all matters of safety activities from commencement of Work until the Total Performance of the Work.
 - .4 The Quality Control Representative shall be responsible for the development, implementation and execution of the Quality Management Plan and shall be the single point of contact for all quality related queries. This role may be fulfilled another Contractor Representative.
 - .5 The Traffic Control Representative shall be responsible for the development, implementation and execution of the Traffic Management Plan and shall be the single point of contact for all traffic control related queries.
 - .6 The Environmental Representative shall be responsible for the development, implementation and execution of the Environmental Protection Plan and shall be the single point of contact for all environmental related queries.

.7

WASTE MANAGEMENT AND DISPOSAL**1.15**

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

1.16 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.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 21 00 ALLOWANCES**Part 1 General****1.1 REFERENCES**

- .1 General Conditions.

1.2 ADDITIONAL WORK

- .1 Additional work is not planned for this Contract but may arise as requested, directed and approved by the Departmental Representative.
 - .1 Additional work is to be managed in accordance with the Contract General Conditions
 - .2 Any and all additional work must be approved in writing by the Departmental Representative prior to commencement.
 - .3 All expenditures must be substantiated with verified invoices and/or accepted daily extra work reports as noted in Measurement and Payment Procedures below.
- .2 Such work may include, is not be limited to:
 - .1 Additional excavation and disposal of waste materials as directed by the Departmental Representative;
 - .2 Additional relocation or removal and disposal of existing signs, guardrail, guide posts and other miscellaneous items;
 - .3 Additional survey resulting from changes made by the Departmental Representative;
 - .4 Remediation or removal and replacement of unsuitable or contaminated soils not described in the Contract documents;
 - .5 Additional supply and delivery of bituminous materials including asphalt prime, anti-stripping agents, and warm mix A/C admixtures;
 - .6 Additional supply and installation of asphalt concrete pavement;
 - .7 Additional supply and installation of granular sub-base and base course materials;
 - .8 Installation of integral asphalt curb;
 - .9 Additional pavement removal;
 - .10 Crack filling, pot hole patching and other related minor asphalt repairs;
 - .11 Additional supply and installation of geotextiles.
 - .12 Additional supply and installation of Riprap;
 - .13 Additional road structure repairs;
 - .14 Additional removal and disposal and/or supply and installation of guardrail.
 - .15 Supply and installation of seeding;
 - .16 Supply and installation of additional landscaping and/or erosion control products;
 - .17 Additional drainage improvements; ditching; culvert repairs; and cleaning;
 - .18 Sub-drainage not specified in the tender documents;

- .19 Relocation of existing structures;
- .20 Miscellaneous work as directed by the Departmental Representative.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Payment for any potential Work not included in the unit price table but requested and approved by the Departmental Representative is to be made in accordance with the General Conditions of the Contract 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 & Heavy Construction Association's rate schedule and will be all inclusive and fully operated.
 - .2 Vehicles (i.e.. Pickup trucks) will be paid either at daily rates as per the Alberta Roadbuilders & Heavy Construction Association's (most recent) or by mileage using National Joint Council (NJC) rates, whichever is lower. The Contractor will not be permitted to claim both daily rental and mileage rates.
 - .3 Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits. Transportation time to and from site to be reimbursed only if equipment is used exclusively for additional work.
 - .4 Equipment paid on standby will be paid on 50% of the relevant Less Operator rates to a maximum of 10 hours per day.
 - .5 When based upon actual costs for additional works under Prime Cost Sum, payment will be based upon supplied invoices and other work records.
 - .6 The Prime Contractor may apply a 10% mark-up to subcontractor or supplier invoices only, as accepted by the Departmental Representative. No mark-up will be allowed on relevant equipment and labour rates.
 - .7 A claim for additional payment will be considered submitted when all required documentation has been received by the Departmental Representative.
 - .8 The Departmental Representative's, or their delegate's, signature on extra work reports is only a record of the equipment, materials and labour hours utilized on the task, not an agreement to entitlement or quantification of that Work. Review and acceptance may be based on Contractor submitted finalized extra work reports, which are to include appropriate rates, quantities and applicable invoices. Labour and equipment rates are to be reviewed by the Departmental Representative against the appropriate accepted rates when submitted for payment.
 - .9 The Contractor shall submit extra work reports to the Departmental Representative within 24 hours of the day of extra work.
 - .1 Extra work reports not submitted within the specified timelines may be denied payment at the Departmental Representative's sole discretion.
 - .10 The Departmental Representative's, or their delegate's, signature on any of the Contractor's Daily Extra Work Reports shall not be an agreement to waiver any portion of the Contract regardless of any wording to the contrary.
 - .11 Unless otherwise provided for in the Contract, payment on a time and materials or lump sum basis represents complete payment (exclusive of GST) and reimbursement for all impacts, related costs and expenses, including, without

limitation: time; labour; materials; equipment; mobilization; subcontracting; overhead; profit; general supervision; occupational tax and any other Federal or Provincial revenue legislation exclusive of GST; premiums for public liability and property damage insurance policies; bonding; for the use of all tools and equipment for which no specific rental payment provision exists; and for all costs incurred by the Contractor in supplying materials.

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

Part 2 Products

- .1 Products shall be in accordance with AT - Standard Specifications for Highway Construction (latest edition) or as directed by the Departmental Representative.

Part 3 Execution

- .1 Work shall be in accordance with AT - Standard Specifications for Highway Construction (latest edition) or as directed by the Departmental Representative.

END OF SECTION

01 25 20 MOBILIZATION AND DEMOBILIZATIONS

Part 1 General

1.1 DESCRIPTION

- .1 Mobilization and Demobilization consists of preparatory work and operations including but not limited to, those necessary for the movement of personnel, equipment, buildings, shops, offices, supplies and incidentals to and from the project sites.
- .2 Any protective measures or movement of Contractor trailers necessitated by animal interactions and required by Parks Canada will be paid by the Departmental Representative, and are not to be anticipated in the Lump Sum Contract Price for Mobilization and Demobilization.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Mobilization and Demobilization:
 - .1 Payment will be made under “**Lump Sum Price Item 1 – Mobilization / Demobilization**”.
 - .2 50% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.
 - .3 The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.
 - .4

Products

2.1 NOT USED.

Part 2

Execution

3.1 NOT USED.

Part 3

END OF SECTION

01 29 01 SITE OCCUPANCY

Part 1 General

1.1 DEFINITION OF OCCUPANCY

- .2 The Contractor shall be permitted to occupy sites where they will be working in the National Parks, free of charge from the date of award of the Contract up to and including the specified completion date. The sites to be occupied by the Contractor include all the roads and areas specified in the Contract documents and as directed by the Departmental Representative.
- .3 The Contractor's occupancy of the sites identified in Contract will be deemed to have ended, when the following conditions are met to the satisfaction of Parks Canada:
 - .1 All the work identified under this Contract, has been completed.
 - .2 Any outstanding deficiencies for the work identified under this Contract have been addressed to the satisfaction of the Departmental Representative.
 - .3 Contractor has removed from the park all trailers and equipment and sites have been cleaned-up to the satisfaction of the Departmental Representative.

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 31 00 PROJECT MANAGEMENT AND COORDINATION**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .4 This Work shall be incidental to the Contract and will not be measured for payment.

1.2 CHANGES TO DESIGN

- .1 If a change from the IFC design is accepted in writing by the Departmental Representative and agreed on by the Contractor, a design variance letter will be issued by the Departmental Representative. The design variance letter must state what changes are being made from the IFC design and what the method of measurement for payment will be, if varying from the Contract Documents.
- .2 The design variance letter must be signed by both the Contractor's Representative and the Departmental Representative prior to performing the Work.
- .3 The Departmental Representative reserves the right to use as-built survey or neat line measurements for payment if for any reason tolerances are not in accordance with the IFC design.

1.3 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.

1.4 PROJECT MEETINGS

- .1 During the Work, the Contractor shall attend weekly construction meetings as scheduled, chaired, and documented by the Departmental Representative.
- .2 The agenda will include among other things, general construction, payment, scheduling, risk, quality, environmental, and safety management items as well as any other reasonably requested by the parties.
- .3 The Contractor shall provide physical space and arrange for meetings at or near the Work Sites for all meetings that take place in relation to the Contract from their mobilization until their demobilization.
- .4 Meetings held outside of the time noted above (before mobilization or after demobilization) will either be held in the local PCA Field Unit offices or as notified by the Departmental Representative.
- .5 The Contractor will attend or otherwise ensure the attendance of their staff, subcontractors, consultants, suppliers, or other key parties all other meetings identified in the Contract or reasonably requested by the Departmental Representative in an effort to resolve specific issues as they may arise.
- .6 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.

- .7 As described in Section 01 35 43 – Environmental Procedures, an environmental briefing for all staff will take place before beginning work at the site.

1.5 CONSTRUCTION ORGANIZATION AND START-UP

- .1 Within seven (7) days after award of Contract, request a Preconstruction meeting of Contract Representatives to discuss and resolve administrative procedures and responsibilities. Meeting shall be chaired by the Departmental representative who will prepare the minutes of the meeting.
- .2 Senior representatives of the Owner, Departmental Representative, Contractor, major subcontractors, field inspectors and supervisors are to be in attendance.
- .3 Agenda to include following:
 - .1 Appointment of official representative of participants in Work.
 - .2 Schedule of Work, progress scheduling in accordance with Section 01 32 16.
 - .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 35 29, 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 Environmental requirements and expectations
 - .9 Owner-furnished materials, if applicable.
 - .10 Monthly progress claims, administrative procedures, photographs, and holdbacks.
 - .11 Closeout procedures and submittals in accordance with Sections 01 77 00 and 01 78 00.
 - .12 Insurances and transcript of policies.
 - .13 Other business.
- .4 Comply with Departmental Representative's allocation of mobilization areas of site, for field offices and sheds, and for access, traffic, and parking facilities.
- .5 During construction, 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.

1.6 ON-SITE DOCUMENTS

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings if part of tender
 - .2 Specifications

- .3 Addenda
- .4 Reviewed Shop Drawings and mix designs
- .5 Change Orders
- .6 Other modifications to Contract
- .7 Traffic Management Plan
- .8 Safety Plan
- .9 WHMIS
- .10 Environmental Protection Plan
- .11 Quality Control Plan and field test reports
- .12 Copy of accepted Work schedule and most recent updated schedule
- .13 Labour conditions and wage schedules
- .14 Equipment rate schedule and applicable versions of the relevant rate guides
- .15 Applicable current editions of municipal regulations and by-laws

1.7 PROJECT SCHEDULES

- .1 In accordance with Section 01 32 16 - Construction Progress Schedules.

1.8 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .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 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. Provide this schedule to the Departmental Representative in Excel format.
 - .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 CLOSEOUT PROCEDURES

- .1 In accordance with 01 77 00 - Closeout Procedures.

Part 2 **Products**

2.1 **NOT USED.**

Part 3 **Execution**

3.1 **NOT USED.**

END OF SECTION

01 32 16 CONSTRUCTION PROGRESS SCHEDULES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .2 This Work shall be incidental to Contract and will not be measured for payment.

1.2 DEFINITIONS

- .1 Activity: An element of Work performed during course of Project. An activity normally has an expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (Gantt Chart): A graphic display of schedule-related information. In a typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally, Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: Original accepted plan for Project, plus or minus accepted scope changes.
- .4 Construction Work Week: Will provide a work week as indicated in these Contract documents and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: Number of work periods (not including holidays or other nonworking periods required to complete an activity or other Project element. Usually expressed as workdays or work weeks.
- .6 Master Plan: A summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: A significant event in Project, usually completion of a major deliverable.
- .8 Project Schedule: The planned dates for performing activities and the planned dates for meeting milestones. A dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: Overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

- .1 Ensure the Project Schedule is practical and remains within specified Contract duration.
- .2 Ensure all the Work required for the Contract is identified in the Project Schedule. Refer to Section 01 11 00 – Summary of Work for a potential list of activities.
- .3 Include an allowance in the schedule for additional Work performed at the request of the Departmental Representative. Refer to Section 01 21 00 – Allowances for a list of activities.
- .4 Plan to complete Work in accordance with prescribed Project Schedule.

- .5 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this Contract.
- .6 After review, revise and resubmit schedule to comply with the Departmental Representative revised project schedule.
- .7 During progress of Work revise and resubmit as directed by the Departmental Representative.
- .8 The Departmental Representative may hold back progress payment until schedule is provided in acceptable format.
- .9 Include the requirements of Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit to Departmental Representative within 10 working days of Award of Contract a Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

1.5 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
- .2 Include in Project Schedule the Contractual dates under Section 01 11 00 Summary of Work – Work Sequence.

1.6 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Revise impractical schedule and resubmit within 5 working days.
- .3 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.7 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule separately identifies the Work by area and station.
- .3 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Contract Award
 - .2 Obtaining Permits
 - .3 Pre-mobilization Submittals
 - .4 Mobilization and Traffic Control Set-up
 - .5 Guardrail removal
 - .6 Pavement removal
 - .7 Excavation and Disposal
 - .8 Ditch works
 - .9 Embankment construction

- .10 Gabion Basket Retaining Wall Construction
- .11 Road construction
- .12 Asphalt paving
- .13 Drain pipe installation
- .14 Riprap installation
- .15 Erosion Control Product Installation
- .16 Guardrail installation
- .17 Interim Inspection
- .18 Remediation of any noted deficiencies
- .19 Site Clean-up / Demobilization
- .20 Final Completion

1.8 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on monthly basis or as and when requested by the Departmental Representative, reflecting activity changes and completions, as well as activities in progress.
- .2 Provide Weekly Progress Reports that identify completed work and Work planned for the following week in accordance with 01 33 00 Submittal Procedures.
- .3 Include as part of Project Schedule Update, a narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.9 PROJECT MEETINGS

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

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 33 00 SUBMITTAL PROCEDURES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 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, and written acceptance of the submittal has been issued by the Departmental Representative.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Submittals must be accompanied by a completed Quality Control Checksheet in accordance with Section 01 45 00 – Quality Control prior to submission to Departmental Representative. This completed Quality Control Checksheet represents that all the necessary requirements have been met and that the 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.
- .6 Notify Departmental Representative in writing at time of submission, identifying any deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work is consistent.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one accepted copy of each submission on site.

1.3 "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 the Contract Documents. "Build" refers to construction of Contractor's detailed design after design has been reviewed by the Departmental Representative. Contractor's responsibility for error and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .2 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data that are to be provided by the Contractor to illustrate details of a portion of Work.
- .3 The term "Mix Design" means an engineered design for proportioning materials in concrete or asphalt concrete pavement including all supporting test results, materials

properties, that is acceptable to the Departmental Representative. **Asphalt mix design to be performed by a qualified member of the Association of Professional Engineers and Geoscientist who is licenced to practice in Alberta, or by a qualified technician registered in Alberta who has CCIL Asphalt Certification.**

- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of section under which adjacent items will be supplied and installed. Indicate cross-references to Contract Documents.
- .5 Allow five (5) 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 of the shop drawings or mix design for each requirement requested in the Contract Documents and as requested by the Departmental Representative.

- .13 Submit one (1) electronic copy of the product data sheets or brochures for requirements requested in the Contract Documents and as requested by the Departmental Representative where shop drawings will not be prepared due to standardized manufacture of the product.
- .1 Gabion Baskets
- .1 Shall be reviewed and approved by the Departmental Representative prior to ordering.
- .2 Shall be approved for use in the current Approved Products List as published by AT under the section for Erosion Control Systems – Gabions and mats.
- .1 Shall be PVC coated mesh.
- .2 Type 1 Non-Woven Geotextile
- .1 Shall meet or exceed the specifications of Nilex 4510, 4512 and/or 4516 Non-Woven Geotextile. If the Contractor wishes to propose an alternate non-woven geotextile, the approval is subject to the discretion of the Department Representative.
- .3 Type 2 Non-Woven Geotextile
- .1 Shall meet or exceed the specifications of Nilex 4551 Non-Woven Geotextile. If the Contractor wishes to propose an alternate non-woven geotextile, the approval is subject to the discretion of the Department Representative.
- .4 Temporary Rolled Erosion Control Product – AT Erosion Control Blanket – Type C
- .1 Shall be fully biodegradable and selected to mitigate wildlife impacts including entrapment or tripping hazards from mesh facing/backing.
- .2 Shall be reviewed and approved by the ESO and Departmental Representative prior to ordering.
- .3 Shall be approved for use in the current Approved Products List as published by AT under the section for Temporary Rolled Erosion Control Product – AT Erosion Control Blanket – Type C.
- .5 AT Fibre Roll
- .1 Shall be fully biodegradable and/or photo-degradable and selected to mitigate wildlife impacts including entrapment or tripping hazards from mesh facing/backing.
- .2 Shall be reviewed and approved by the ESO and Departmental Representative prior to ordering.
- .3 Shall be approved for use in the current Approved Products List as published by AT under the section for Straw Roll / Fibre Roll.
- .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 the Contract requirements. This review shall not mean that Departmental Representative approves details of the design inherent in shop drawings, responsibility for that shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting the generality of the foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 SAMPLES

- .1 Not used.

1.5 MOCK-UPS

- .1 Not used.

1.6 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
.2 Submit transcription of insurance immediately after award of Contract.

1.7 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 five (5) business days prior to mobilization to the project site:

- .2 Project schedule, detailing the schedule of the workdays required from Contractor, subcontractors, suppliers and consultants to complete each activity of the project by location in order to meet stages specified in Section 01 32 16 – Construction Progress Schedules. 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.
- .3 Environmental Protection Plan (EPP) that meets the requirements of Section 01 35 43 – Environmental Procedures. Submission of EPP must allow 2 weeks for review by the Parks ESO, in accordance with Section 01 35 43 – Environmental Procedures.
- .4 Plan describing methods the Contractor will have to meet their responsibilities as the Prime Contractor for Safety and Traffic Control within the Work limits and to

co-ordinate Work, traffic control, site access, safety, with other Contractors working in or adjacent to the Contract Work zone.

- .5 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. 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. Health and Safety Plan must include in accordance with Section 01 35 29 – Health and Safety Requirements.
 - .4 Contractor shall develop an “Emergency Procedures Protocol” in consultation with Parks Canada. On site Contingency and Emergency Response Plan to address standard operating procedures to be implemented during emergency situations. Emergency Response Plan can be incorporated into the Health and Safety Plan.
- .6 Traffic Management Plan, in accordance with the requirements of Section 01 35 31 – Special Procedures for Traffic Control.
- .7 Quality Control Plan in accordance with Section 01 45 00 – Quality Control, including Quality Control checklist examples for each item of Work.
- .8 Alberta One Call and Utilities Coordination Plan, including notifications to Utility Owners.
- .9 Contractor and any subcontractors to submit a copy of their valid Parks Canada Business License.
- .10 Contractor and Subcontractor Chain of Command, listing key Contractor personnel, including for each name, position, qualification, experience, telephone and cellular telephone. The list shall include the names and telephone/cellular telephone for contact persons who are available on a 24-hour basis in the event of emergencies.
- .11 List of subcontractors, suppliers and consultants, their role and their key personnel, including Forman, experience of key personnel, including names and positions, addresses, telephone and cellular telephone.
- .12 Work Plan, describing in detail for each activity by road segment and location, the Contractor’s intended methods of construction, and materials, equipment and manpower that will be used to meet stages specified in Section 01 32 16 – Construction Progress Schedules. The Work Plan must be linked to the Project Schedule.
- .13 Schedule of Force Account rates, in accordance with Section 01 21 00 – Allowances.
- .14 Survey Plan describing the Contractor’s intended methods of surveying during this project and applicable resumes in accordance with Section 01 71 00 – Examination and Preparation.
- .15 Asphalt Plant provincial registration and records showing compliance with provincial and federal regulations for emission testing and monitoring.
- .16 Pit sourcing information and testing results (i.e. Micro-Deval Test).

- .17 Cold Weather Work Plan, as required, in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .18 The Contractor shall not begin any Work on the Site until the Departmental Representative has provided a Notice to Proceed.

.3 Construction Phase Submittals

- .1 Monthly Progress Reports in accordance with Section 01 32 16.
- .2 Weekly Progress Reports that outline the detailed Work (Contractor, subcontractors, suppliers, consultants) completed to date as well as the anticipated Work to be performed for the following week on a day-by-day basis. Work to be linked to activities by location identified in project schedule and to provide information on materials, equipment and manpower. Also, alternate Work to be identified if Work or a portion of, proposed cannot be done due to weather, equipment breakdown, delays in delivery, etc. Weekly Progress Reports shall be submitted at the end of each week.
- .3 Quality Control Inspection Reports - The Contractor shall maintain a daily inspection report that itemizes the results of all Quality Control inspections conducted by the Contractor. The reports shall be submitted to the Departmental Representative with the Weekly Progress Report. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each Weekly Progress Report.
- .4 Shop Drawings, Mix Designs and Manufacturer's Requirements / Recommendations – The Contractor shall submit all design drawings, shop drawings, mix designs and appropriate manufacturer's literature required to fabricate and / or conduct the work a minimum five (5) calendar days prior to fabrication / production or ordering.
- .5 The Contractor shall provide Manufacturer's product information as required by the Departmental Representative to approve Contractor proposed materials as per Section 31 36 00 – Gabion Basket Retaining Wall and Section 32 32 16 – Geotextiles.
 - .1 Gabion Baskets
 - .1 Shall be reviewed and approved by the Departmental Representative prior to ordering.
 - .2 Shall be approved for use in the current Approved Products List as published by AT under the section for Erosion Control Systems – Gabions and mats.
 - .3 Shall be PVC coated mesh.
 - .2 Type 1 Non-Woven Geotextile
 - .1 Shall meet or exceed the specifications of Nilex 4510, 4512 and/or 4516 Non-Woven Geotextile. If the Contractor wishes to propose an alternate non-woven geotextile, the approval is subject to the discretion of the Department Representative.
 - .3 Type 2 Non-Woven Geotextile
 - .1 Shall meet or exceed the specifications of Nilex 4551 Non-Woven Geotextile. If the Contractor wishes to propose an alternate non-woven geotextile, the approval is subject to the discretion of the Department Representative.

- .4 Temporary Rolled Erosion Control Product – AT Erosion Control Blanket – Type C
 - .1 Shall be fully biodegradable and selected to mitigate wildlife impacts including entrapment or tripping hazards from mesh facing/backing.
 - .2 Shall be reviewed and approved by the ESO and Departmental Representative prior to ordering.
 - .3 Shall be approved for use in the current Approved Products List as published by AT under the section for Temporary Rolled Erosion Control Product – AT Erosion Control Blanket – Type C.
- .5 AT Fibre Roll
 - .1 Shall be fully biodegradable and/or photo-degradable and selected to mitigate wildlife impacts including entrapment or tripping hazards from mesh facing/backing.
 - .2 Shall be reviewed and approved by the ESO and Departmental Representative prior to ordering.
 - .3 Shall be approved for use in the current Approved Products List as published by AT under the section for Straw Roll / Fibre Roll.
- .6 Progress Photographs Format:
 - .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.
 - .4 Viewpoints: viewpoints determined by Construction Manager or Departmental Representative.
 - .5 Submission Frequency: prior to commencement of Work and weekly thereafter with progress statement, or as directed by Construction Manager or Departmental Representative.
 - .6 Submit 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, weekly.
- .8 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors immediately.
- .9 Submit copies of incident and accident reports immediately.
- .10 Submit daily extra work reports in accordance with Section 01 21 00 – Allowances.
- .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 .pdf electronic file containing an itemized set of project quality control documentation.
- .3 All other documents noted with the Specifications, and under Section 01 78 00.
- .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 and this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.
- .6 The Departmental Representative may, at their sole discretion, withhold payment from the Contractor for Work completed until acceptable submittal documents have been provided by the Contractor to the Departmental Representative.

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 35 29 HEALTH AND SAFETY REQUIREMENTS**Part 1 General****1.1 REFERENCES**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System
.1 (WHMIS) Safety Data Sheets (SDS).
- .3 Province of Alberta - Occupational Health and Safety Act.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

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

1.3 SUBMITTALS

- .1 In accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan in accordance with this section and 01 33 00 – Submittal Procedures.

1.4 SAFETY ASSESSMENT

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

1.5 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work. This meeting may be combined with the Organization and Start-Up meeting identified elsewhere.
 - .1 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
 - .2 A copy of the “Attestation and Proof of Compliance with Occupational Health and Safety (OHS)” form is part of the Invitation to Tender package.
- .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.

1.6 REGULATORY REQUIREMENTS

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

1.7 PROJECT / SITE CONDITIONS

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

1.8 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.

1.9 RESPONSIBILITY

- .1 The Contractor shall act as the Prime Contractor in all matters relating to Occupational Health and Safety. They shall conduct their work and make all such arrangements necessary to allow them to be accepted as such by the relevant Provincial Authorities.
- .2 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.
- .3 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.

1.10 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.

1.11 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.

1.12 HEALTH AND SAFETY REPRESENTATIVE

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Co-ordinator must:
 - .1 Have minimum 2 years' site-related working experience specific to activities associated with roadway construction.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.13 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.

1.14 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.

1.15 BLASTING

- .1 Blasting or other use of explosives is not permitted without prior receipt of written approval by the Departmental Representative.

1.16 POWDER ACTUATED DEVICES

- .1 Use of powder actuated devices is not permitted without prior receipt of written approval by the Departmental Representative.

1.17 WORK STOPPAGE

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

Part 2 Products**2.1 NOT USED.****Part 3 Execution****3.1 NOT USED.**

END OF SECTION

01 35 31 SPECIAL PROCEDURES FOR TRAFFIC CONTROL**Part 1 General****1.1 DESCRIPTION**

- .2 Supply, installation, maintenance and removal of Traffic Accommodation for the duration of the Contract or as described in this Section.

1.2 REFERENCES

- .1 AT – Traffic Accommodation in Work Zones (latest edition)
- .2 AT – Traffic Control Standards (latest edition)
- .3 Manual of Uniform Traffic Control Devices for Canada, (MUTCD) distributed by Transportation Association of Canada. (latest edition)

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Payment for Traffic Control as described in this Section, shall be made under “Lump Sum Price Item 2 – Traffic Accommodation” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .2 Payment for Traffic Accommodation will be on a monthly basis based on the percent of Contract Works completed, not to exceed the total lump sum bid price for Traffic Accommodation. Extra works are not to be included in determining the percent complete of the Contract.
- .3 Payment for Traffic Accommodation will commence once the Contractor has implemented their accepted Traffic Management Plan and setup is accepted by the Departmental Representative.
- .4 Items considered incidental to the Work include, but are not limited to:
 - .1 Installation and removal of temporary pavement markings as described in the Contract Documents.
 - .2 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
 - .3 Keeping the existing roadway within the Work limits, clean, free of pot holes while Contractor is on site.
 - .4 Cost of snow removal required by the Contractor to complete the work identified in the Contract.
- .5 The Contractor shall not be responsible for the snow removal required for general highway road maintenance operations within the limit of construction so long as the roadway has been left in a condition deemed suitable, by Departmental Representative, for maintenance crews to safely complete the work.

1.4 GENERAL

- .6 Regardless of type of traffic control being used, **maximum period of delay to public traffic shall be 10 minutes.**
- .7 The Contractor shall develop and implement a Traffic Management Plan in accordance with AT – Traffic Accommodation in Work Zones (latest edition), except where

- specified otherwise in these specifications. The Traffic Management Plan will include plans specific to each roadway for this project.
- .8 The Traffic Management Plan must duly consider the traffic volumes associated with the direction volume increases typically experienced on the lead up to weekends and/or special events. Adjustments to the TMP may be required at the request of the Departmental Representative to mitigate delays in excess of the stipulated maximum 10 minutes.
 - .9 The Contractor shall develop and have in place a completed Traffic Management Plan taking into account all hazards associated with construction operations on a busy, steep and winding access road noting required deliveries and movement of tourists to and from the Mt. Norquay Ski Resort and minimize risks to motorists prior to beginning Work. This plan shall be updated regularly in response to any incidents or changes in conditions, be they weather, work, traffic, or otherwise
 - .10 Contractor shall have appropriate traffic control measures in place so that at least one (1) lane of traffic is maintained through the work zone at all times throughout the construction.
 - .11 A traffic signal system is not necessary or expected but may be considered for use. The Contractor's proposal shall be included in the TMP and is subject to the review and approval of the Departmental Representative. The system proposal shall include at a minimum, all locations, schedules, signal timing and power considerations in all on and off work periods during the project.
 - .12 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.
 - .13 At the request of the Departmental Representative the Contractor shall supply, install and maintain a Flashing Arrow Board (FAB), as required for the Works, in accordance with the accepted TMP. All FAB shall be as per MUTCD (latest edition). Exact installation locations of FABs to be agreed on site with the Departmental Representative. All cost associated with the supply, installation, maintenance and removal of FABs will be incidental to "**Lump Sum Price Item 2 – Traffic Accommodation**". Removal will only be permitted upon completion of the Works.
 - .14 At the request of the Departmental Representative the Contractor shall supply, install and maintain a Portable Changeable Message Sign (CMS) to inform the traffic of construction delays. All CMS shall be as per MUTCD (latest edition) and shall be in both English and French with equal space allotted to each. Exact installation locations of the CMS to be agreed on site with the Departmental Representative. All cost associated with the supply, installation, maintenance and removal of the CMS will be incidental to "**Lump Sum Price Item 2 – Traffic Accommodation**". Removal of the CMS will only be permitted upon completion of the Works.
 - .15 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial type. All signs are to be selected from the Construction Signage Translation Database provided in the Reference Documents.
 - .16 All Changeable Message Sign (CMS) messages are to be selected from the preapproved database provided and are to be bilingual as shown.
 - .1 Any signage requiring translation that is not shown in the standard translation reference documents must be approved by Parks Canada prior to fabrication.

- .17 The Contractor shall coordinate traffic management procedures with other Contractors working in the immediate vicinity as well as collaborate with the Departmental Representative in respect to Traffic Management restrictions on the Highway Network. In consideration of the number of grading, paving and bridge construction projects in the corridor the Contractor must make a concerted effort to coordinate their traffic management strategies with other stakeholders. The Contractor must also be prepared to attend traffic management and construction staging coordination meetings as requested by the Departmental Representative.
- .18 The Contractor is responsible for keeping the roadway, within the Construction Limits, clean at all times. Sweeping, grading, snow removal and/or dust control to the acceptance of the Departmental Representative is considered incidental to the Contract and no additional payment will be made.

1.5 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 Carry out traffic regulation in accordance with AT – Traffic Accommodation in Work Zones (latest edition), except where specified otherwise.
- .3 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.
- .4 The Contractor shall develop and have in place a completed Traffic Management Plan taking into account all hazards associated with construction operations on a busy, steep and winding access road noting required deliveries and movement of tourists to and from the Mt. Norquay Ski Resort and minimize risks to motorists prior to beginning Work. This plan shall be updated regularly in response to any incidents or changes in conditions, be they weather, work, traffic, or otherwise.
- .5 The Contractor shall submit a Traffic Management Plan prior to commencement of work. Short closures may be allowed by the Departmental Representative for some activities such as asphalt removal as long as the delay to motorists does not exceed the stipulated maximum.
- .6 Traffic shall not be stopped in either direction for more than **10 minutes** without the prior written approval of the Departmental Representative.
- .7 Traffic shall not be stopped in both directions at the same time without prior written approval from the Departmental Representative.
- .8 The delay due to single lane alternating traffic shall not exceed **10 minutes**.
- .9 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 AT – Traffic Accommodation in Work Zones (latest edition), except where specified otherwise.

- .10 Contractor to provide a minimum of 4.0m wide available paved surface for traffic, with at least one (1) lane in each direction, unless otherwise authorized by the Departmental Representative.
- .11 Emergency vehicles (i.e., ambulance, RCMP, Park Warden) must be granted immediate passage at all times. The Departmental Representative reserves the right to reduce delay time for public traffic at times when specified delay results in excessive backup of public traffic.
- .12 The Contractor shall provide competent supervision and/or contact personnel as required during non-working hours to ensure that safety flares, flashing beacons, signs, lights, etc., are in proper working order.
- .13 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.
- .14 The Contractor shall maintain a dust free construction zone by means of cleaning and watering when required.

1.6 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 that 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 one day shall be mounted on wood or steel posts installed in the shoulder areas at locations accepted by the Departmental Representative.**
- .3 At the request of the Departmental Representative, the Contractor shall supply, install and maintain one (1) portable Changeable Message Signs (CMS) at the bottom of Norquay Road near Juniper Way to inform the public traffic of construction delays. All CMS shall be in both English and French with equal space allotted to each. Exact installation locations of the CMS to be agreed on site with the Departmental Representative. All cost associated with the supply, installation, maintenance and removal of the CMS will be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”**. Removal of the CMS boards will only be permitted upon completion of the Works or as directed by the Departmental Representative.
- .4 Place signs and other devices to standards and in locations recommended in AT – Traffic Accommodation in Work Zones (latest edition). Provide intermittent signage if work zones exceed 2.0 km in length.
- .5 All construction signs shall be installed to prevent incidental blow down or displacement and must remain in service throughout the construction period. Construction signage heights to be minimum 1.5m from ground to the bottom of the sign, or as per AT – Traffic Accommodation in Work Zones (latest edition), whichever is higher.
- .6 As situation on site changes, Contractor to update their Traffic Management Plan outlining signs and other devices required for the project and submit for the acceptance of the Departmental Representative.
- .7 Continually inspect and maintain traffic control devices in use by:
 - .1 Checking signs daily for legibility, damage, suitability, location and height.

- .2 Cleaning, repairing or replacing signs as required ensuring clarity and reflectance.
- .3 Removing or covering signs that do not apply to conditions existing from day to day or time to time.

1.7 CONTROL OF PUBLIC TRAFFIC

- .19 The Contractor shall develop and have in place a completed Traffic Management Plan taking into account all hazards associated with construction operations on a busy, steep and winding access road noting required deliveries and movement of tourists to and from the Mt. Norquay Ski Resort and minimize risks to motorists prior to beginning Work. This plan shall be updated regularly in response to any incidents or changes in conditions, be they weather, work, traffic, or otherwise
- .20 A traffic signal system is not necessary or expected but may be considered for use. The Contractor's proposal shall be included in the TMP and is subject to the review and approval of the Departmental Representative. The system proposal shall include at a minimum, all locations, schedules, signal timing and power considerations in all on and off work periods during the project.
- .21 Contractor shall provide competent flag persons, trained in accordance with, and properly dressed and equipped as specified AT – Traffic Accommodation in Work Zones (latest edition).
 - .1 When public traffic is required to pass working vehicles or equipment, that block all or part of travelled roadway.
 - .2 When vehicles are entering or exiting Work Site access points.
 - .3 When vehicles are entering or exiting gravel pits in the park.
 - .4 When it is necessary to institute one-way traffic system through construction area or other blockage. In particular, where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .5 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .6 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .7 For emergency protection when other traffic control devices are not readily available.
 - .8 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
 - .9 At each end of restricted sections where pilot cars are required.
- .22 During hours of darkness, Contractor shall determine requirements but as a minimum, flag persons shall be additionally equipped with a red signal hand-light of sufficient brightness to be clearly visible to approaching traffic and flagging stations shall be illuminated by overhead lighting. Signs indicating hazardous conditions and signs requiring increased attention shall be marked with flashers.
- .23 No stoppage of traffic will be allowed for the periods specified in Section 01 14 00, Work Restrictions, pertaining to Statutory Holiday or long weekend unless otherwise approved by the Departmental Representative.

- .24 If night shift operations are implemented on 2-lane undivided sections, the public traffic must be escorted through the work zone by pilot cars in both directions.

1.8 OPERATIONAL REQUIREMENTS

- .1 Maintain existing conditions for traffic throughout period of Contract except that, when required for construction under Contract and when measures have been taken as specified herein and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted as follows:
- .1 Speed limit reduced to 30 km/h or to the posted speed limit if the posted speed limit is less than 30 km/h in work zones in non-work periods.
 - .2 Speed limit reduced to 30 km/h in work zones in work periods.
 - .3 Traffic shall not be stopped in either direction for more than **10 minutes** without the prior written approval of the Departmental Representative.
 - .4 Traffic shall not be stopped in both directions at the same time without prior written approval from the Departmental Representative.
 - .5 The delay due to single lane alternating traffic shall not exceed **10 minutes**.
 - .6 A schedule for all full work zone closures required longer than 10 minutes must be provided to the Departmental Representative at least one (1) week in advance of the planned closure.
 - .7 Traffic control left in place overnight must be monitored by the Contractor to ensure all traffic control equipment remains in place in accordance with the approved Traffic Management Plan.
 - .8 There may be restrictions to accommodate special events within the National Parks.
 - .9 The Departmental Representative reserves the right to stop work in the case of excessive traffic delays.
 - .10 Maintain existing conditions for traffic crossing right-of-way.
 - .11 Provide the Departmental Representative with construction advisories for posting to the Official Alberta Traffic Advisor website (<http://511.alberta.ca/>) and update advisories regularly to reflect the current and planned construction activities and highway closures. A minimum of 4 days notice is required for changes to the accepted TMP.
 - .12 Emergency vehicles are to be directed through the Work Site immediately once conditions are safe.
- .2 Maintain existing conditions for traffic crossing right-of-way.

1.9 VEHICLE DETECTION LOOPS

- .1 Damage to vehicle detection loops shall be repaired by the Contractor at their cost.
- .2 Notify the Departmental Representative immediately of any damage.

1.10 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control.

1.11 SUBMITTALS

- .1 In accordance with Section 01 33 00 Submittal Procedures.

Part 2 **Products**

2.1 NOT USED.

Part 3 **Execution**

3.1 NOT USED.

END OF SECTION

01 35 43 ENVIRONMENTAL PROCEDURES**Part 1 General****1.1 REFERENCES**

- .1 Parks Canada National Best Management Practices Roadway, Highway, Parkway and Related Infrastructure, 2015
- .2 Direction for Permitted Users conducting water-related activities in BNP, 2017
- .3 BFU/ LLYK Reclamation Guidelines, 2021

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 This Work shall be incidental to the Contract and will not be measured for payment.
- .2 Preparation and implementation of an Environmental Protection Plan (EPP) in accordance with this Section 01 35 43 – Environmental Procedures, including certification by a registered Qualified Environmental Professional (QEP), will not be measured separately for payment and will be considered incidental to the Work.

1.3 SUBMITTALS

- .1 The Contractor is required to prepare and submit an Environmental Protection Plan (EPP) in accordance with this Section 01 35 43 – Environmental Procedures and 01 33 00 – Submittal Procedures. The EPP document will be reviewed and accepted for use on the project by the Departmental Representative in collaboration with the Parks Canada designated Environmental Surveillance Officer (ESO).

1.4 NATIONAL PARK REGULATIONS

- .1 The Contractor shall ensure that all work is performed in accordance with the ordinances, laws, rules and regulations set out in the Canada National Parks Act and Regulations.
- .2 The Contractor and any sub-contractors shall obtain a business license from a Parks Canada Administration Office, prior to commencement of the Contract. The business license must be valid for the Park in which the Work is occurring.
- .3 All Contractor's vehicles are required to display a vehicle work pass from PCA. These permits may be obtained free of charge from the PCA Administration Office once a business permit has been obtained.

1.5 IMPACT ASSESSMENT ACT (IAA)

- .1 Execution of the work is subject to the provisions within the *Impact Assessment Act* and subsequent amendments.
- .2 The Contractor is required to implement all recommendations and mitigations and follow all procedures and processes whether supply, construction, administration or otherwise as described in particular in this Section 01 35 42 – Environmental Procedures, BMPs, and all Contract Documents.
- .3 The Contractor shall prepare their Environmental Protection Plan (EPP) to implement the mitigations identified in this Section 01 35 42 – Environmental Procedures, BMPs,

and all Contract Documents as a minimum but shall ensure that all environmental requirements under the Contract and associated with the Works are appropriately managed through their EPP processes.

- .4 Where there is a discrepancy or inconsistency between this Section 01 35 43 – Environmental Procedures and other documents, this Section takes precedence over other documents.
- .5 Failure to comply with or observe environmental protection measures as identified in the Contract Documents may result in the work being suspended pending rectification of the problems. The Contractor shall do as requested at their cost and no claim for time or additional costs will be accepted.

1.6 ENVIRONMENTAL BRIEFING AND ESO

- .1 **All staff employed at the construction site will be required to attend an approximate one (1) hour environmental briefing presented by PCA prior to their commencement of work on site.** It is recognized that new employees may join the Contractors' work force after the initial round of "environmental briefing". In that case and as required, subsequent "environmental briefings" can be presented as numbers warrant, by arrangement with the ESO through the Departmental Representative. Also, some sub-trades may be present at the site for a short time, to perform once-only duties. In these cases, the "environmental briefing" will be replaced by the Contractor explaining the environmental sensitivity of the work location to the sub-trade worker(s), and reviewing highlights of personal conduct expected, with reference to a one-page briefing summary to be provided to the Contractor by the ESO. A copy of this summary will be provided to each sub-trade worker joining the work force at the site.
- .2 Parks Canada will have an ESO attending the site to inspect 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 inspect 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.
- .3 The ESO is not to act as daily environmental monitor, but shall check activities with the approved EPP to ensure compliance, at their discretion. The Contractor shall be responsible for ensuring all activities are conducted in accordance with the approved environmental documents.
- .4 The Contractor shall be responsible for ensuring all activities are conducted in accordance with the Contract Documents.

1.7 ENVIRONMENTAL PROTECTION PLAN

- .1 The EPP is to be prepared and certified by a Qualified Environmental Professional. Certification by a QEP is considered incidental to the Works and no additional payment will be made.
- .2 Changes and/or revisions to the EPP may be required by the ESO as the Work progresses and more information becomes available. No additional payment will be made for changes and/or revisions to the EPP.

- .3 The Contractor's EPP will detail 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.
- .4 The EPP will include how the Contractor will manage all environmental risks and specify site-specific details for implementing mitigation or achieving mitigation outcomes identified in particular in this Section 01 35 42 – Environmental Procedures, BMPs, and all Contract Documents.
- .5 Spill Response and Erosion and Sedimentation Management Plans are to be included in the EPP, in accordance with this Section.
- .6 QEP resumes are to be included in the EPP for Departmental Representative and ESO review.
- .7 The Contractor shall submit the EPP in accordance with Section 01 33 00 – Submittal Procedures yet **allow no less than 1 week for the review of their EPP** and shall address and respond to all comments raised during the review within a maximum of 1 week.

1.8 RESTRICTED ACTIVITY PERMITS

- .1 Prior to commencing any activity, the Contractor will be required to first obtain a Restricted Activity Permit (RAP) in consultation with PCA and Departmental Representative.
- .2 Prior to mobilization, Contractor is to request the list of activities from the Works that require a RAP for the duration of the project from the ESO. The Contractor shall sign and submit the RAP applications for the specified activities by the ESO, allowing no less than two (2) weeks for review and acceptance by the ESO.
- .3 Contractor shall list the RAPs required by the ESO in the EPP.
- .4 The Contractor is required to submit an application form to the Departmental Representative for each required RAP.
- .5 RAP application details include, but are not limited to: Name of activity, start and end date of activity, location of Work, Contractor company name and address, Contractor contact name, phone number and email address and vehicle information.
- .6 Following the application submission, the Contractor may be required to provide further details regarding the Work to PCA via e-mail to the Departmental Representative and ESO.
- .7 Submission of a RAP application to the Departmental Representative does not permit the Contractor to commence the restricted activity.

1.9 CONSTRUCTION SITE ACCESS AND PARKING

- .1 Points of access from the existing roadway to the various construction sites will be required. The Contractor shall review both short and long term construction access requirements with the Departmental Representative, both at start-up and on an ongoing basis. In consultation with the Departmental Representative, the Contractor shall formulate an agreement for worker transportation to and from the work sites and where workers shall park their private vehicles.
- .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.

1.10 ACCIDENTAL FINDS

- .1 It is possible that a scattering of undocumented historic objects will be found within the Project limits. If significant features are encountered, stop Work in the immediate area, notify the Departmental Representative, take photographs of the findings and a GIS location reading.
- .2 Significant features include items such as:
 - .1 Structural remains, high artifact concentrations, tent platforms, cornerstones, commemorative plaques, inscribed tablets, log cribbing retaining features, human remains, marked trees and other various items.
 - .2 If unsure, contact the Departmental Representative immediately.
- .3 The Departmental Representative will notify the Contractor when Works can resume in the area.
- .4 Should any process or requirements regarding archeological matters listed in this Section contradict the BMPs and other Contract Documents, this Section shall take precedence.
- .5 All historical or archaeological objects found in the National Parks are protected under the National Parks Act and Regulations and are the property of Parks Canada. The Contractor and workers shall protect any articles found and request direction from the ESO or the Departmental Representative.

1.11 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

- .6 A RAP application will be required for any off-highway operation of a motor vehicle.
- .7 A Contractor’s office and work headquarters material laydown, equipment parking and storage area will be permitted in accordance with this Section and Section 01 14 00 - Work Restrictions.
- .8 Removal and storage of snow shall be in accordance with 01 35 31 Special Procedures for Traffic Control. If coordination is required, the Contractor shall coordinate through the Departmental Representative.
- .9 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 generated during the grade construction and or utilization of any temporary access roads must be kept at a reasonable level so as not to impart any hazard to the public traffic. Control measures must be initiated as and when required and may require increased vigilance at the discretion of the Departmental Representative.

1.12 SPECIFIC CONCERNS RELATIVE TO EROSION CONTROL AND SEDIMENTATION

- .1 The Contractor shall prepare an Erosion and Sedimentation Management Plan (ESMP) for the components of the Contract that are undertaken in proximity to watercourses, wetlands or riparian environments. The plan shall be included in the EPP and prepared to the satisfaction of the Departmental Representative and ESO.

- .2 The ESMP shall be prepared so as to ensure that there is no release into watercourses of sediments in levels that are deleterious to fish or that would harmfully alter, disrupt, or destroy fish habitat. Similarly, there is to be no sediment release into areas of vegetation growth or sensitive areas of sediments in levels that would adversely alter growing or hydraulic conditions. The target is 0 mg/L of TSS over background levels. The threshold is a maximum instantaneous increase of 25 mg/L over background levels when background levels are <250 mg/L, or a maximum instantaneous increase of 10% over background levels when background levels are >250 mg/L. This threshold shall not be exceeded.
- .3 If necessary, as determined by the ESO, on-site sediment control measures shall be constructed and functional prior to initiating construction activities.
- .4 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.
- .5 The site will be secured against erosion during any periods of construction inactivity or shutdown.

1.13 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 by the Contractor 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 PCA and in accordance with all applicable federal and provincial legislation. The EPP shall include a list of products and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement and sand blasting agents.
- .3 The containment, storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation. Hazardous products shall be stored no closer than 100 metres from watercourses.
- .4 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berms shall be capable of holding 110% of tank storage volumes and shall be to the satisfaction of the Departmental Representative and the ESO before start-up. Measures such as collection / drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double-lined fuel tanks can prevent spills into the environment.
- .5 The Contractor shall prevent blowing dust and debris by covering and/or providing dust control for temporary roads and on-site work by methods that are approved by the Departmental Representative or ESO.

- .6 The Contractor shall provide spill kits at re-fuelling, lubrication, and repair locations that will be capable of dealing with 110% of the largest potential spill and shall be maintained in good working order on the construction site. The ESO and Departmental Representative prior to project start-up must approve these spill kits. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.
- .7 Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. Parks Canada Dispatch shall be notified immediately of any spill and can be contacted at a phone number provided in the Preconstruction Meeting. Following notification of Parks Canada Dispatch, the Departmental Representative and the ESO shall be notified. 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.

1.14 EQUIPMENT MAINTENANCE, FUELLING AND OPERATION

- .1 The Contractor shall ensure that all soil, seeds and any debris attached to construction equipment be removed (e.g. power washing) before moving between locations within in the Project limits.
- .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 the National Parks.

- .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 the National Parks. Alternatively, the Contractor may hire a security person employed to prevent vandalism in accordance with 01 52 00 Construction Facilities.

1.15 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.

1.16 FIRE PREVENTION AND CONTROL

- .1 A fire extinguisher shall be carried and available for use on each machine and at locations within the plant in the event of fire. Basic firefighting equipment recommended (e.g. a water truck; minimum 500 Imperial gallons with 500 feet of fire hose and a pump capable of producing 45 psi water pressure at the nozzle, three shovels, two pulaskis, and two five gallon backpack pumps) shall be maintained at the construction site at a location known and easily accessible to all the Contractors' staff.
- .2 A water truck may be necessary and will depend on the timing of the Contract (e.g. not required during winter or snow covered conditions).
- .3 Construction equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.
- .4 Care shall be taken while smoking on the construction site to ensure that the accidental ignition of any flammable material is prevented.
- .5 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. Parks Canada Dispatch shall be notified immediately of

any fire immediately and can be contacted at a phone number provided in the Preconstruction Meeting. Following notification of Parks Canada Dispatch, the Departmental Representative and the ESO shall be notified.

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

1.17 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 Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from the immediate location if bears, cougars, wolves, elk or moose display aggressive behaviour or persistent intrusion. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) must be exercised at all times.
- .3 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 is not available, Parks Canada Dispatch will be contacted at a phone number provided in the Preconstruction Meeting.

1.18 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 the National Parks. 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 the National Parks. 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 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 Parks Canada Dispatch at the phone number provided in the Preconstruction Meeting 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.

Part 2 **Products**

2.1 **NOT USED.**

Part 3 **Execution**

3.1 **INSTREAM WORK**

- .1 Not allowed and not anticipated as part of the Contract work.

3.2 **WATER EXTRACTION AND DISTRIBUTORS**

- .2 All water related activities are to be conducted in accordance with applicable Whirling Disease Protocols. See for reference, *Direction for Permitted Users conducting water-related activities in BNP*.
- .3 Backflow prevention is required on all water trucks.
- .4 All water trucks and water extraction equipment must be thoroughly cleaned prior to entering any Park. Proof of cleaning must be provided to the Departmental Representative and ESO for verification.
- .5 Extraction of water within any National Park requires a RAP.
- .6 Care must be taken by the Contractor to ensure extracted water does not enter another water body, other than the initial source of extraction.
- .7 ESO may require water trucks to be cleaned prior to moving between sites within the Parks to mitigate the risk of cross- contamination of water bodies.

3.3 **CLEARING, GRUBBING, AND/OR BRUSHING**

- .1 Clearing, grubbing and/or tree removal is only permitted during the migratory bird least risk window, which is August 31 – April 15 in Banff National Park. A RAP must be obtained prior to any vegetation removal. Clearing, grubbing and/or tree removal will only be permitted outside of the migratory bird least risk window upon written approval by the Departmental Representative.

3.4 **SPECIFIC CONCERNS RELATIVE TO SENSITIVE SITES AND ACTIVITIES**

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

END OF SECTION

01 45 00 QUALITY CONTROL**Part 1 General****1.1 DESCRIPTION**

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

1.2 REFERENCES

- .1 AT - Standard Specifications for Highway Construction (latest edition)

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 All Quality Control is to be done by the Contractor.
- .2 This work shall be incidental to Contract and will not be measured for payment.

1.4 QUALITY CONTROL PLAN

- .1 Contractor's quality control plan shall be in accordance with AT - Standard Specifications for Highway Construction (latest edition).
- .2 Submittals in accordance with 01 33 00 – Submittals Procedures.

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:
 - .1 Testing all structural concrete, grout, reinforcing steel, asphalt concrete pavement, structural backfill, corrugated steel culverts, miscellaneous metals, concrete barriers, and all source acceptance testing; and
 - .2 All testing specified in the Contract Documents; and
 - .3 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 latest edition of the AT Standard Specifications for Highway Construction in collaboration with current ASTM and CSA Standards or as stated below.
- .3 All Quality Control technicians are to be certified by Canadian Council of Independent Laboratories (CCIL) for testing asphalt, aggregates and concrete, as applicable to the testing requirements for that item of Work.
- .4 The Contractor shall be fully responsible and bear all costs for all quality control testing and shall conduct such testing in the following manner:
 - .1 Provide testing facilities and personnel for the tests and inform the Departmental Representative in advance to enable the Departmental Representative to witness the tests if it so desired;
 - .2 Notify the Departmental Representative when sampling will be conducted;

- .3 Within one Day after completion of testing, submit test results to the Departmental Representative; and
- .4 Identify test reports with the name and address of the organization performing all tests, and the date of the tests.
- .5 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.
- .6 Testing agencies, their inspectors, and their representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the Contract Documents, nor to approve or accept any part of the Work
- .7 The minimum frequency for Quality Control testing during embankment construction will be as follows:

CONSTRUCTION TYPE	TEST TYPE	MINIMUM FREQUENCY OF TESTS
Embankment construction with fine grained or granular soil	Standard Proctor by: ASTM D698	1 per change in material or 1 per week, whichever is more frequent
	Field density by: ASTM D1556 / D1556M – Sand Cone ASTM D2167 – Balloon ASTM D6938 – Nuclear	3 tests per 50 m2 per lift; spaced randomly across full width of embankment or as directed by the Departmental Representative.
	Proof Roll and or Rutting Test	As required by the Departmental Representative
Road structure construction with granular materials	Standard Proctor by: ASTM D698	1 for each material type and 1 for each accepted change in material gradation.
	Field density by: ASTM D1556 / D1556M – Sand Cone ASTM D2167 – Balloon ASTM D6938 – Nuclear	3 tests per 50 m2 per lift; spaced randomly across full width of embankment or as directed by the Departmental Representative.
	Proof Roll and or Rutting Test	As required by the Departmental Representative
Tests Prior to Concrete Discharge	C 143 / C143M-08 Slump of Hydraulic-Cement Concrete CSA A23.2-7C Air Content of Plastic Concrete by the Volumetric Method	One per truck load.
Tests During Concrete Pour	C 39 / C 39M-05e2 Compressive Strength of Cylindrical Concrete Specimens	Minimum of one cylinder for each pour and at least for every 30 cubic metres of concrete being poured.

	ASTM Test	*Minimum Frequency
Tests During Aggregate Production	ASTM C136 / C136M – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates	-Split Stockpiles: 1 for each stockpile for every 2 hours of production. - One main stockpile: for every 300 tonnes.
	Or	- Blend Sand: 1 for every 100 tonnes during stockpiling.

Tests During Aggregate Production (cont.)	C 117 – Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing	- Natural filler: 1 for every 50 tonnes during stockpiling.
	ASTM D5821 – Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate	Every second coarse aggregate sieve test
	C 117 – Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the crusher
Asphalt Products Tests	Tack and Prime	Mill certifications.
Tests during Asphalt Plant Mixing	C 136 / C 136M – Dry Sieve Analysis of Aggregate	1 of combined aggregate (off the belt) every 300 tonnes.
	D 2216 – Moisture Content	Aggregate: 2 tests/Lot Asphalt mix: 1 on first Sub-Lot and every second day.
	C 117 – Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the plant cold feed.
	D 5581– Resistance to Plastic Flow Using Marshall Apparatus	One set of three briquettes for 1,200 tonnes or Lot, whichever is less.
	D 6307 – Asphalt Extraction, Ignition Method	One/Sub-Lot.
	D 5 / D 5M – 13 Penetration of Bituminous Materials	One per Manufacturer’s Batch. Samples should be taken for every 3000 tonnes of mix production.
	D 2171 / D 2171M –Viscosity	Contractor’s Option
	D 2041 / D 2041M – Maximum Theoretical Density	One per sub-lot
Test During Asphalt Paving for Density Testing	AASHTO T 245- Resistance to Plastic Flow Using Marshall Apparatus	One 15 kg sample for every Sub-Lot or minimum 1/day for field testing.
	Core Samples	At start, two cores for each Sub-Lot. After rolling pattern established, only one core for each Sub-Lot. All Marshall mix cores to be a minimum of 100 mm diameter, Superpave mixes shall require minimum 150 mm diameter cores.

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

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

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 The Quality Control Program shall be described in a Quality Control Plan. The Contractor shall submit the Manual to the Departmental Representative for review in accordance with Section 01 33 00 - Submittal Procedures. The Manual shall develop a logical system for tracking and documenting the Quality Control of the Work. A systematic format and a set of procedures patterned on a recognized Quality Control Standard will be acceptable, subject to review by the Departmental Representative.
- .3 The Quality Control Plan shall include the following information:
 - .1 Distribution list, providing a list of names to whom the Manual shall be distributed;
 - .2 Title page, identifying the Contract, Contractor and copy number;
 - .3 Revision page, identifying the revision number and date of the Manual;
 - .4 Table of contents;
 - .5 Revision control, tabulating the revision number, date of revision, description of revisions and authorized signature;
 - .6 Details of measuring and testing equipment including methods and frequency of calibration;
 - .7 Purchasing details of all materials and equipment including procurement documents and vendor's Quality Control Program standards;
 - .8 Procedures for inspection of incoming items, in-process inspection and final inspection and tagging of all supply items;
 - .9 Details of special processes as identified by the Departmental Representative, including qualifications of personnel and certification;
 - .10 Procedures for shipping, packaging and storage of materials;
 - .11 Procedures for maintaining quality records and Statements of Compliance, including filing and storage of documents for a period of one year after Completion of the Works;
 - .12 Details of any non-conformance, including identification and recording of deficiencies, tagging procedures for "HOLD" or "REJECT" items, and final disposition of non-conformance forms by the Quality Control Manager;
 - .13 Inspection and test checklists, including tabulated checklists describing all manufacturing and delivery activities such as Inspection or Test, frequency of tests, description of tests, acceptance criteria of tests, such as verification, witnessing or holding tests and sign-off by the Quality Control Manager and the Departmental Representative, if the Departmental Representative witnesses the tests; and

- .14 Forms used to ensure the application of the inspection and test checklist requirements. These forms shall be identified in the checklists and describe all testing requirements for Specification compliance.
- .4 The Contractor shall appoint a qualified and experienced Quality Control Manager, who will report regularly to the Contractor's management at a level that shall ensure that Quality Control requirements are not subordinated to manufacturing, construction or delivery. The Quality Control Manager shall be empowered by the Contractor to resolve quality matter and shall be onsite for the duration of the Contract.
- .5 The Quality Control Plan shall include samples of all forms to be filled in by the Quality Control Inspectors. All forms shall be signed by the Quality Control Manager and submitted promptly to the Departmental Representative who will add its review signature.
- .6 An independent check of all Work shall be performed by the Contractor. The Contractor shall appoint Quality Control Inspectors to ensure compliance of workmanship with Contract requirements. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.
- .7 At completion of the Work a bound and itemized copy of all Quality Control documents and reports shall be prepared by the Contractor's Quality Manager and submitted to the Departmental Representative.

1.7 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.
- .5 The Departmental Representative will provide the Contractor with an Approval to Proceed document, after performing an audit and confirming all requirements are met, as stated in 01 71 00 Examination and Preparation. The Approval to Proceed must be signed by the Departmental Representative and the Contractor's representative before proceeding to the next layer.
 - .1 The Contractor shall provide a minimum of 48 hours notice to the Departmental Representative to arrange for an audit and Approval to Proceed.

1.8 INDEPENDENT INSPECTION AGENCIES

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

- .2 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .3 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Departmental Representative at no cost to the Departmental Representative.

1.9 ACCESS TO WORK

- .1 Allow inspection / testing agencies access to Work, including but not limited to: off site manufacturing and fabrication plants, QC testing facilities and asphalt 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 NON-CONFORMANCES

- .1 A Non-Conformance can relate to any item within the Contract including but not limited to: materials testing, lines and levels, products, design-build items, traffic accommodation, quality control, environmental, health and safety, and other general procedural matters including communication protocols.
- .2 Contractor's Internal Non-Conformance Report (NCR):
 - .1 Should the Contractor's QC reporting indicate that the Work is not in conformance, the Contractor's QC Manager shall issue an internal Non-Conformance Report (NCR) to the Contractor, with a copy to the Departmental Representative, including a response time.
 - .2 The Contractor shall then respond to the QC Manager, with a copy to the Departmental Representative, with respect to the NCR, within the specified time, with proposed resolutions and corrective actions. The Contractor and/or the QC Manager shall consult with the Departmental Representative on the resolutions.
 - .3 The Departmental Representative will accept or reject the proposed resolution and corrective action proposal.
 - .4 Payment for the Work itself may be withheld until the NCR issue is resolved.
- .3 Owner Issued NCR:
 - .1 Should the Quality Assurance reporting indicate that the Work is not in conformance, the Departmental Representative will issue to the Contractor a NCR, including a response time.
 - .2 The Contractor shall then respond to that NCR, within the specified time, with proposed resolutions and corrective actions.
 - .3 The Departmental Representative will accept or reject the proposed resolution and corrective action proposal.
 - .4 Assurance testing and inspection will be performed to determine if the corrective action has provided an acceptable product. Acceptance and rejection will

continue until the Departmental Representative determines that a quality product has been achieved.

- .5 Payment for the Work itself may be withheld until the NCR issue is resolved.
- .4 The Completion Certificate will not be issued if there are any unresolved Non-Conformance Reports.
- .5 Appealing an NCR:
 - .1 If the Contractor disputes the validity of a finding in an NCR, the Contractor may file an appeal with the Departmental Representative. The Departmental Representative and the Contractor Representative will use all reasonable efforts to refine the area of dispute and to resolve the determination of conformance with the Contract.
 - .2 If the Departmental Representative and the Contractor Representative cannot come to a mutually agreeable resolution, the Work that is the subject of the Non-Conformance Report shall be re-evaluated by an independent third-party, selected by the Departmental Representative in consultation with the Contractor, at a test frequency equivalent to twice that specified in the Contract or to such other frequency as may be mutually agreed between the Departmental Representative and the Contractor.
 - .3 If the appeal testing confirms the non-conformance determination, all appeal testing costs will be borne by the Contractor. If the appeal testing shows that the Work did in fact meet the requirements of the Contract, all appeal testing costs will be borne by the Owner.

1.12 OPPORTUNITIES FOR IMPROVEMENT

- .1 Should the QA review indicate that the Work is not in conformance, but the variance is deemed minor by the Departmental Representative, the Departmental Representative may issue an Opportunity for Improvement (OFI) report.
- .2 The Contractor is encouraged to review the findings and undertake such modifications to the QC Plan and the work procedures as necessary to address the issue.

1.13 REJECTED WORK

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

1.14 REPORTS

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

1.15 TESTS AND MIX DESIGNS

- .1 Furnish test results and designs as may be requested and in accordance with the Contract Documents.
- .3 At a minimum, submit one (1) electronic copy of all inspection and test reports to Departmental Representative in accordance with Section 01 33 00 Submittals Procedures.

1.16 MILL TESTS

- .1 Submit mill test certificates as required in the Contract Documents.

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 52 00 CONSTRUCTION FACILITIES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 INSTALLATION AND REMOVAL

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

1.3 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.

1.4 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.

1.5 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. Cost of security personnel is incidental to the Work and no additional payment will be made.
- .2 It is strongly advised that the Contractor consider the provision of security personnel.

1.6 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.

1.7 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.

1.8 CONSTRUCTION SIGNAGE

- .1 To be in accordance with Section 01 35 31 - Special Procedures for Traffic Control.

Part 2 **Products**

2.1 NOT USED.

Part 3 **Execution**

3.1 NOT USED.

END OF SECTION

01 56 00 TEMPORARY BARRIERS AND ENCLOSURES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 INSTALLATION AND REMOVAL

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

1.3 HOARDING

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

1.4 COLD WEATHER WORK

- .1 Prepare a Cold Weather Quality Control plan and submit to the Departmental Representative (7) days prior to commencing works. The Contractor shall seek advice of their Geotechnical Engineer when planning for cold weather backfilling of structures, culverts, or grade construction.
 - .1 Monitor for and identify heaving and loosening of the backfill due to frost penetration
 - .2 Monitor compaction, soil temperature and moisture content of each lift. Check for frozen material after compaction and prior to construction of the next lift.
 - .3 If performing structure backfill, monitor for deflection or deformation of the structure.
- .2 Aggregates must conform to Contract requirements plus accommodate cold weather construction
 - .1 Calcium chloride should not be used as an additive for buried structure installation. Non-corrosive additives shall not be used without completion of laboratory investigations that evaluate the impact on the compaction.
- .3 Stockpiles
 - .1 Stockpiles should be inspected to confirm the material is consistent gradation resembling the accepted test results
 - .2 Stockpiles should be placed on a smooth hard surface that is sloped to promote snow melt run off
 - .3 Heating and hoarding of the stockpile may be required
 - .4 Take only unfrozen material from the stockpile for incorporating into the Works
- .4 Prior to placement
 - .1 Heat and hoard the structure foundation / subgrade areas directly beneath backfill zone to prevent freezing.

- .1 For structures, erect vertical hoarding on the structure ends and insert heaters. Monitoring of the air quality should be done in compliance with local work safety regulations.
 - .2 Provide an air gap between the structure / formwork and hoarding tarps to allow for adequate air circulation.
- .5 Backfill / Aggregate installation and monitoring
- .1 Continuously monitor weather conditions and forecast.
 - .2 Ensure the material is not frozen when placed.
 - .3 The backfill / placement zone should be protected as described above.
 - .4 Areas that have material to be placed should be kept to a small footprint to minimize exposure. Minimize delays and interruptions to the placement/compaction process.
 - .5 The temperature of the material is to be checked at the time of placement to confirm that it is not frozen.
 - .6 Graders or dozers should be used to scrape off any frozen uncompacted fill before adding additional material. High ruts should be knocked off before they freeze.
 - .7 Thicker lifts may provide more time before freezing, provided the additional lift thickness is accepted by the Departmental Representative.
 - .8 Compact the backfill immediately after placement.
 - .9 Snow and ice should be continuously removed from the placement area, no snow or ice should be allowed to accumulate on the surface. Snow piles should be situated down-grade to prevent saturation of the material.
 - .10 Frozen material is to be remove and replaced with unfrozen material that is properly compacted.
- .6 Concrete shall not be placed and/or cured against frozen materials. Concrete placed during cold weather should be enclosed and properly cured at appropriate temperature through the use of heaters and blankets.

1.5 GUARDRAILS AND BARRICADES

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

1.6 WEATHER ENCLOSURES

- .1 Not used.

1.7 DUST TIGHT SCREENS

- .1 Not used.

1.8 ACCESS TO SITE

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

1.9 PUBLIC TRAFFIC FLOW

- .1 In accordance with Section 01 35 31 - Special Procedures for Traffic Control.

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

1.10 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 In accordance with 01 14 00 Work Restrictions.

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

01 61 00 COMMON PRODUCT REQUIREMENTS**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 REFERENCE STANDARDS

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 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 in accordance with Section 01 45 00 – Quality Control.
- .4 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

1.3 QUALITY

- .1 In accordance with Section 01 45 00 - Quality Control.
- .2 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.
- .3 Defective products or work, whenever identified, will be rejected regardless of previous inspections. Inspection does not relieve responsibility but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 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.
- .7 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .8 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative whose decision is final.

1.4 AVAILABILITY

- .1 Immediately after signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work
- .2 In the event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, alteration, 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 miscellaneous metals on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.6 TRANSPORTATION

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

1.7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.8 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.

1.9 CONCEALMENT

- .1 The Contractor shall record site conditions and changes to the work concurrently with construction progress. Do not conceal Work until required information is recorded on set of black line opaque Drawings and in copy of the Project Manual.
- .2 The Departmental Representative will inspect all subgrade and granular base preparation work prior to the commencement of retaining wall construction. The Contractor shall notify the Departmental Representative 24 hours before any granular base installation and gabion basket installation for inspection.

1.10 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.

1.11 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 that cause spalling or cracking of material to which anchorage is made are not acceptable.

1.12 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 Materials shall be in accordance with AT - Standard Specifications for Highway Construction (latest edition), or as directed by the Departmental Representative.

Part 3 Execution

- .1 Work shall be completed in accordance with AT - Standard Specifications for Highway Construction (latest edition), or as directed by the Departmental Representative.

END OF SECTION

01 71 00 EXAMINATION AND PREPARATION**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 REFERENCES

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

1.3 QUALIFICATIONS OF SURVEYOR

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

1.4 SURVEY REQUIREMENTS

- .1 The Departmental Representative shall identify the location of all work sites.
- .2 The Contractor shall be responsible for all other survey and layout work identified in the Contract documents and as required to complete the works including but not limited to:
 - .1 Establishing lines and levels, locate and layout, by instrumentation.
 - .2 Staking for grading, cut and fill.
 - .3 Staking for slopes and top of embankment, subgrade, gravel fill course, granular base course and centreline for paving.
 - .4 Establishing gabion wall, drainage piping, and invert elevations and locations.
 - .5 Incidental field adjustments, such as staking of embankments and culverts to match post-stripping ground lines and actual field drainage patterns.
 - .6 Re-establishing Reference Survey Control Points that are in danger of being damaged or destroyed.
 - .7 Ensuring survey instruments are properly calibrated prior to commencing Works.
- .3 Survey Accuracy:
 - .1 All survey work shall be tied into the existing Control Monument Network with grid coordinates in UTM Zone 11 NAD 83. Departmental Representative will provide information on Control Points.
 - .2 All traverses will be closed and balanced. All level loops and traverses will be tied into the Control Monument Network.
 - .3 Secondary Control Points will be tied into and relative to Control Monument Network. Accuracy for Control Point surveys shall be to second order:
 - .4 Horizontal shall be less than $r = 5(d+0.2)$ where "r" is in cm and "d" is in km
 - .5 Vertical shall be less than $0.008 \times \sqrt{k}$ where k is distance in kilometers.
- .4 Staking accuracy shall be:
 - .1 In bush areas, all elevations shall be within 100 mm of correct elevation. In open ground, all elevations shall be within 50 mm of correct elevation.

- .2 In bush areas, all horizontal locations shall be within 100 mm of Design. In open ground, all horizontal locations shall be within 50 mm of Design.
- .3 On highway surface, all elevations shall be within 10 mm of correct elevation.
- .4 All structures shall be within 20 mm of Design elevation and horizontal
- .5 The Departmental Representative may complete quality assurance construction survey measurements if deemed necessary to verify grades and alignment, interim survey re-measurements for excavation limits and final neat line measurements to verify payment quantities for completed works.
- .6 Contractor to provide cut sheet reports for all layers of road template to demonstrate that the defined construction tolerances have been achieved before advancing to the next stage. Departmental Representative to verify that they are correct by performing an audit.
 - .1 Shots are to be taken at 10m intervals along centreline, mid-points and shoulders.
 - .2 The Departmental Representative will provide the Contractor with an Approval to Proceed document upon request in accordance with Section 01 45 00 - Quality Control.

1.5 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.

1.6 SUBMITTALS

- .1 In accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit name and address of Surveyor to Departmental Representative.
- .3 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
- .4 On request of Departmental Representative, submit survey data.
- .5 Submit certificate signed by surveyor certifying those elevations and locations of completed Work that conform to the Contract Documents.

Part 2 Products

- .1 Not Used.

Part 3 Execution

3.1 CROSS SECTIONS

- .1 Cross sections will be taken at a maximum of 20 metre intervals. Additional cross sections will be taken where variations occur, including but not limited to: drainage channels and/or pipes, structures and/or other obstructions.
 - .1 Cross section intervals will be established on OG and are to be used for the duration of the project.

3.2 LAYOUT REQUIREMENTS

Survey Layout	Maximum Interval	Product	Tolerances
Right-of-way	At each point of deflection and at sufficient points between as to be continuously visible.	Stake showing station and offset, or flagging.	Sufficient accuracy to prohibit encroachment into adjoining properties.
Ditch cleanout	At each extent of the work and every 20m	Stake showing station and offset, or flagging	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical accuracy 0.010m
Grading – Slope Stakes	10 m in rock cuts; 20 m in all other cases.	One slope stake each side, at top of cut or bottom of fill, showing station, offset, vertical dimension to subgrade, and slope, plus cut/fill transition stake. Non-standard ditches will be staked separately. An additional slope stake, where applicable, at the top of a rock cut after the removal of overburden.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical accuracy 25mm
Grading – Subgrade	20 m.	One stake at each side of the subgrade, showing station, offset and grade at the stake location, one at each break point, and one at centreline.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical accuracy per Specifications
Top of Sub-base	20 m.	One stake at each side of the sub-base course, showing station, offset and grade at the stake location, one at each break point, and one at centreline.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical accuracy per Specifications
Each Base Course	20 m.	One stake at each side of the base course, showing station, offset and grade at the stake location, one at each break point, and one at centreline.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical accuracy per Specifications
Storm Drainage, Subdrain,		Stakes showing locations of drain pipes and other structures, and invert locations of pipe inlets and outlets, as well as stations.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical tolerance 0.020m
Sawcutting and asphalt pavement milling	5 m	Paint	Offset from CL accuracy required +/- 0.030m
Retaining Walls	Not more than 5 m, and at alignment changes.	One stake showing control line location and either the elevation at the top of the wall or the elevation	+/- 0.30m – up or down chainage

		at the bottom of footing excavation, as well as station.	Offset from CL accuracy required +/- 0.030m Vertical tolerance 0.010m
Paving	20 m	Stake showing station and offset, reference points (ex. centerline offset, guardrail, etc.)	N/A
Profile Milling	5 m grid pattern	5m grid on pavement break points with cuts / fills.	N/A
Superelevation change	At percentage change points	Stakes showing station and superelevation percentage.	N/A
Signs, light poles and other structures		Stake at each sign location with stationing and sign designation.	+/- 0.025m – up or down chainage and vertical tolerance Offset from CL accuracy required +/- 0.025m
Curb and Gutter	10 m and at alignment changes. Curb returns: 5 m or at quarter points, whichever is less.	Offset hub and nail with cut/fill to gutter grade, show stationing.	+/- 0.30m – up or down chainage Offset from CL accuracy required +/- 0.030m Vertical tolerance +/- 0.010m

3.3 MACHINE-CONTROLLED GRADING

.1 Machine controlled grading may be used as a substitute for conventional grade staking under the following conditions:

- .2 The equipment utilized shall be capable of meeting the Design vertical and horizontal tolerances and the use of machine-controlled equipment will in now way relieve the Contractor of the requirement to meet the specified tolerances.
- .3 The Departmental Representative may require the Contractor to revert to conventional staking methods at any point during construction if the machine-controlled grading is producing unacceptable Work and the cost of doing so will be borne by the Contractor.
- .4 The Departmental Representative may provide the Contractor the available electronic files of Design information without warrant with respect to the suitability for the purposes intended by the Contractor and the cost of making them suitable shall be borne by the Contractor. The Contractor remains responsible for completing the works as described in the Contract Documents, even in the event that the electronic Design information provided is not consistent with the Contract Documents.

END OF SECTION

01 74 11 CLEANING**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 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 in accordance with Section 01 35 31 – Special Procedures for Traffic Control
- .4 Keep roadway clean in accordance with Section 01 35 31 – Special Procedures for Traffic Control
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 All containers used for collection of waste materials and debris are to be bear proof.
- .7 Remove waste material and debris from site at end of each working day.
- .8 Dispose of waste materials and debris off site.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances.
- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .12 The Departmental Representative and Environmental Surveillance Officer may, at their total discretion, require the Contractor to suspend work activities until such a time as the Work Site is cleaned and debris, waste, and animal attractants are satisfactorily managed. The Contractor shall do as requested at their cost and no claim for time or additional costs will be accepted.
- .13 Maintain excavation and trenches free of debris and waste.

1.3 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 Remove all construction debris and accumulated dirt from completed drainage systems; manholes; catch basins; and all piping.
- .10 Clean and regrade occupied space and/or reshape disturbed material stockpiles within pits as directed by and to the satisfaction of the Departmental Representative.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

01 77 00 CLOSEOUT PROCEDURES**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Once the Contractor believes they have substantially completed the Contract Works the 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: Once the Contractor has completed their initial inspection the Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: submit written 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

01 78 00 CLOSEOUT SUBMITTALS**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 CLOSEOUT SUBMITTALS

- .1 The Contractor shall provide the following documents and information to the Departmental Representative prior to them being eligible for Final Completion as detailed in Section 01 77 00.

1.3 AS-BUILTS AND SAMPLES

- .1 In addition to requirements in General Conditions, maintain at the site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to the Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 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.

1.4 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque Drawings and in copy of the Project Manual.
- .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.

1.5 FINAL SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.6 WARRANTIES AND BONDS

- .1 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

02 41 13 ASPHALT PAVEMENT REMOVAL**Part 1 General****1.1 DESCRIPTION**

- .1 Removal of existing asphalt pavement to depths and extents shown in the Contract Documents and as accepted by the Departmental Representative.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measure for payment for Sawcutting will be the linear meters of asphalt cut to full depth in accordance with the Contract Documents or as directed by the Departmental Representative.
 - .1 Payment for sawcutting shall be made under “**Unit Price Item 1a - Asphalt Pavement Removal – Sawcutting**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
 - .2 Payment per metre of sawcutting will remain the same, regardless of the number of passes required to complete the Work, to the depth and extents specified, as per the Contract Documents.
- .2 Measure for payment for Milling will be the square metres of asphalt pavement of existing roadway actually removed and disposed in accordance with the Contract Document or as directed by the Departmental Representative.
 - .1 Payment for milling shall be made under “**Unit Price Item 1b - Asphalt Pavement Removal – Partial Depth Milling**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
 - .2 Any milling of areas scheduled for full depth removal shall not be measured separately for payment and will be considered incidental to “**Unit Price Item 1c - Asphalt Pavement Removal – Full Depth Removal**”.
- .3 Measure for payment for Full depth asphalt removal will be based on the square meters of asphalt removed and disposed of in accordance with the Contract Documents or as directed by the Departmental Representative.
 - .1 Payment for full depth asphalt removal shall be made under “**Unit Price Item 1c - Asphalt Pavement Removal – Full Depth Removal**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
 - .4 Payment per square metre of asphalt removal, whether partial or full depth, will remain the same, regardless of the number of passes required to complete the Work, to the depth and extents specified, as per the Contract Documents.
 - .5 Items considered incidental to the Work include, but are not limited to:
 - .1 All operations involved in sawcutting, milling, excavation, removal and disposal including but not limited to;

- .1 Survey, equipment, labour, cold milling or excavating, sweeping, loading, hauling, stockpiling and/or disposal and cleaning of remaining pavement surface.
- .2 Removal and disposal of waste asphalt outside of the Park.
- .3 Replacement of damaged asphalt from sawcutting or milling.
- .4 Sawcut rework to provide a clean joint in cases where the original sawcut interface has been damaged during construction.
- .5 All handling and disposal to the satisfaction of the Departmental Representative including any permitted temporary stockpiling.
- .6 Any milling of areas scheduled for full depth removal shall not be measured separately for payment and will be considered incidental to **“Unit Price Item 1c - Asphalt Pavement Removal – Full Depth Removal”**.
- .7 Overhaul.
- .8 Asphalt Concrete Pavement placing and subsequent removal at milled tie-in locations if requested by the Departmental Representative to mitigate impacts to the travelling public and protect the milled or sawcut edge.
- .9 Cleaning of existing pavement shoulder, whether via sweeping or other methods.
- .10 Maintaining milled areas, including drainage, until completion of asphalt paving.
- .11 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
- .6 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 - Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .7 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”** and no additional payment will be made for remobilization of equipment if all milling work cannot be completed at once.

1.3 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control.

1.4 SUBMITTALS

- .1 In accordance with Section 01 33 00 Submittal Procedures.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

1.6 DEFINITIONS

- .1 Profile Milling: Removal of asphalt concrete pavement to an accurate depth of cut, profile and cross slope and shall include loading the milled material directly into trucks.
- .2 Partial Depth Milling: Removal of asphalt concrete pavement, other than Profile Milling.

Part 2 Products**2.1 MATERIALS**

- .1 The Contractor is to ensure that the maximum particle size of milled materials is less than 50 mm and shall sieve or otherwise separate/remove larger particles at their cost.

Part 3 Execution**3.1 PREPARATION**

- .1 Prior to beginning removal operation, the Contractor shall inspect and verify with the Departmental Representative, all areas, depths and lines of asphalt pavement to be removed.
- .2 Placement of gravels to level the running surface for the milling machine, if required, will be considered incidental to the Work and no additional payment will be made.
- .3 Have appropriate Traffic Control measures in accordance with Section 01 35 31 - Special Procedures for Traffic Control.

3.2 PROTECTION

- .1 Protect existing pavement not designated for removal, concrete deck, concrete curb and barriers, light units and structures from damage. In event of damage, the Contractor shall immediately replace or make repairs to the satisfaction of the Departmental Representative at no additional cost.

3.3 REMOVAL

- .1 Use cold milling, planning or grinding self-powered equipment with automatic grade controls capable of operating from string line, and capable of removing part of pavement surface to depths or grades indicated.
- .2 For Sawcutting and Full Depth Asphalt Removal, it is anticipated that the depth of the existing pavement is 75mm to 150mm deep. Existing asphalt pavement thickness is not uniform and will vary from one location to the next.
- .3 Full depth asphalt pavement removal shall be done to the lines shown on the IFC Drawings or as approved by the Departmental Representative.
- .4 Partial Depth Asphalt Pavement Removal by milling to lines and grades shown on the IFC Drawings or as approved by Departmental Representative in field:
 - .1 Use self-powered equipment and methods of removal and hauling which do not damage or disturb underlying roadway structure.
- .5 Slot milling to be performed by a milling machine capable of the following milling widths:
 - .1 Minimum 300mm width, maximum 600mm width or as approved by the Departmental Representative.
 - .2 Milling machine is to have a conveyor for loading the millings directly into trucks.
- .6 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

- .1 Provide for suppression of dust generated by removal process to ensure a dust free Work Site.
- .7 To tie in from existing pavement to new overlay, remove existing asphalt pavement by milling to lines and grades established by Departmental Representative in field or as per the Contract Documents.
- .8 If applicable, at mill and fill locations, remove existing asphalt to the depths, lengths and width specified in the Contract Documents and as established by Departmental Representative in field.
- .9 If the base course is disturbed by milling operations the Contractor will be required to rectify the base course, to the acceptance of the Departmental Representative, at the Contractor's cost.
- .10 In low areas where water may pond, the Contractor shall cut drainage channels through the shoulders to prevent water from collecting in the milled areas, prior to opening the lane(s) to traffic, as directed by the Departmental Representative.
- .11 The maximum delay between the area cold milled and the completion of asphalt paving of the same area will be seven (7) days. The Contractor shall be responsible for maintaining the milled surface for the travelling public as directed by the Departmental Representative.

3.4 STOCKPILING OF MATERIAL

- .1 The Contractor shall remove and dispose material at a suitable facility outside the Parks.
- .2 Removed asphalt material shall remain the property of the Contractor.
- .3 Temporary stockpiling may be requested but it not guaranteed and shall be applicable to all requirements as specified by the Departmental Representative and ESO.
- .4 If approved, at a minimum the material shall be stockpiled by a loader and in such a manner as to prevent consolidation which means exercising caution and minimizing running equipment on the stockpiles. Trucks and trailers shall not drive on the pile.
- .5 If approved, at a minimum the height of the pile shall not exceed the height of the loader bucket.
- .6 If approved, at a minimum the Contractor shall be responsible to remove any contamination of the stockpile millings.

3.5 FINISH TOLERANCES

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

3.6 SWEEPING

- .1 Sweeping shall be done using the same lane closures as the milling operation and all loose material must be removed prior to opening the lane(s) to traffic.
- .2 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand work and brooming as required. No extra payment will be made for sweeping or associated hand work.

END OF SECTION

02 81 01 HAZARDOUS MATERIAL**Part 1 General****1.1 MEASUREMENT AND PAYMENT PROCEDURES**

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

1.2 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).

1.3 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, Safety Data Sheets (SDS), and worker education programs. WHMIS is put into effect by a combination of federal and provincial laws.

1.4 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Retain current Safety Data Sheet (SDS) for each hazardous material required on site. Submit SDS to Departmental Representative upon request.

1.5 STORAGE AND HANDLING

- .1 Coordinate 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 current 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 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used, or handled.
- .6 Abide by the following 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 which are in good condition.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are not mixed.
 - .6 Store hazardous materials and wastes in a secure storage area with controlled access.
 - .7 Maintain a clear egress from storage area.
 - .8 Store hazardous materials and wastes in a manner and location which will prevent them from spilling into the environment.
 - .9 Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.
 - .10 Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .7 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .8 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

1.6 TRANSPORTATION

- .1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.
- .3 If hazardous waste is generated on site:
 - .1 Coordinate transportation and disposal with Departmental Representative.
 - .2 Ensure compliance with applicable provincial laws and regulations for generators of hazardous waste.
 - .3 Use only a licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Prior to shipping material, obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept the material.
 - .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.

- .6 Ensure that only trained personnel handle, offer for transport, or transport dangerous goods.
- .7 Provide a photocopy of all shipping documents and waste manifests to Departmental Representative.
- .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Departmental Representative.
- .9 Report any discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

Part 2 **Products**

2.1 **MATERIALS**

- .1 Only bring on site the quantity of hazardous materials required to perform Work.
- .2 Maintain SDSs 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.

END OF SECTION

31 05 10 CORRECTED DRY DENSITY FOR FILL

Part 1 General

1.1 DESCRIPTION

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

1.2 REFERENCES

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

1.3 DEFINITIONS

- .1 Corrected maximum dry density is defined as:
 - .10 $D = (D1 \times D2) / ((F1 \times D2) + (F2 \times D1))$.
 - .11 $D = (F1 \times D1) + (0.9 \times D2 \times F2)$.
 - .12 Where: D = corrected maximum dry density kg/m³.
 - .13 F1 = fraction (decimal) of total field sample passing 19mm sieve.
 - .14 F2 = fraction (decimal) of total field sample retained on 19mm sieve (equal to 1.00 - F1).
 - .15 D1 = maximum dry density, kg/m³ of material passing 19mm sieve determined in accordance with Method A of ASTM D1557.
 - .16 D2 = bulk density, kg/m³, of material retained on 19mm sieve, equal to 1000G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127.
- .2 For free draining aggregates, determine D1 (maximum dry density) to ASTM D4253 wet method when directed by Departmental Representative.

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

31 24 13 ROADWAY AND DRAINAGE EXCAVATION

Part 1 General

1.1 DESCRIPTION

- .1 This item consists of the excavation and disposal outside the National Parks 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, washout channel and ditch cleanout excavation.
 - .2 Construction of roadway ditches, embankments and other earthworks necessary for the construction of the road.
 - .3 Removal and disposal of waste/unsuitable/surplus materials from ditch, excavation and embankment areas.
 - .4 Side slope embankment shaping to regrade washout rills and match surrounding existing slopes including all required preparation for the installation of erosion control products as specified in the Contract Documents and directed by the Departmental Representative.
 - .5 Loading, transportation, temporary stockpiling (if permitted) and disposal outside the National Parks of excavated materials.
 - .6 Finishing of top surfaces and slopes.
 - .7 Maintenance of the work set forth under this section in a finished condition until any portion thereof has been accepted as completed by the Departmental Representative.

1.2 REFERENCES

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

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 **Roadway and Drainage Excavation:**
 - .1 Measure for payment for **Waste Excavation** and disposal outside the Parks of material deemed by the Departmental Representative as unsuitable and/or waste/surplus will be the volume in cubic metres measured in its original position from cross sections taken and provided by the Contractor and accepted by the Departmental Representative in areas of road excavation. Work is to be done in accordance with the Contract Documents and accepted by the Departmental Representative. If mutually agreeable the method of measurement may be revised as approved by the Departmental Representative and Contractor Representative.
 - .1 Payment will be made under “**Unit Price Item 2a – Roadway and Drainage Excavation – Waste Excavation and Disposal**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals

necessary to complete the work as specified in the Contract Documents.

- .2 Written Approval to Proceed must be completed by the Departmental Representative prior to sub-excavation for the removal of unsuitable material(s) below design grades. Sub-excavation for the removal of unsuitable material(s) to be paid under **“Unit Price Item 2a – Roadway and Drainage Excavation – Waste Excavation and Disposal”**.
- .3 Waste excavation and disposal of materials beyond the edge of pavement to allow for the supply and installation of the retaining wall shall be considered incidental to **“Lump Sum Price Item 3 – Supply and Install Gabion Basket Retaining Wall”**.

.2 Measure for payment for side slope **Embankment Shaping** will be the area in square metres measured and agreed to on site in areas as noted in the Contract Documents and approved by the Departmental Representative. Work is to be done in accordance with the Contract Documents and accepted by the Departmental Representative.

- .1 Payment will be made under **“Unit Price Item 2b - Roadway and Drainage Excavation – Embankment Shaping”** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .2 Side slope installations of erosion control blankets and fibre rolls shall be scheduled and planned to proceed as soon as practicable following side slope embankment shaping to prevent any erosion or rilling during rain events and avoid rework. The Contractor shall protect the prepared side slope from surface erosion and shall complete any rework at their cost.

.2 **Ditch Cleanout:**

.1 Measure for payment for ditch excavation and disposal will be the linear metres measured along the roadway alignment in areas of excavation completed in accordance with the Contract Documents and accepted by the Departmental Representative.

- .1 Payment will be made under **“Unit Price Item 2c – Ditch Cleanout and Disposal”** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.2 Average depth of ditch excavation is estimated at 250mm, but not uniform and no additional payment will be made where a deeper excavation depth is required.

.3 The Contractor shall ensure the final grade of the ditch is sloped to provide positive drainage such that ponding does not occur along the alignment.

.4 Limits of ditch excavation to be as directed by the Departmental Representative and to be reviewed by ESO prior to commencement of this work.

.3 Items considered incidental to the Work include, but are not limited to:

- .1 General:

- .1 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
 - .2 Survey and layout.
 - .3 Excavating, loading, hauling, placing and compacting material within the limits of the Works.
 - .4 Separating of organic material from non-organic material and disposing, as directed by the Departmental Representative.
 - .5 Scarifying or benching existing slopes or existing road surfaces.
 - .6 Overhaul.
 - .7 Embankment construction.
 - .8 Watering, drying or compacting soils to achieve specified densities inclusive of all compaction efforts.
 - .9 Proof rolling or other testing as per the Contract Documents and required by the Departmental Representative.
 - .10 Compaction of material (150 mm) below subgrade horizon in areas of cut will be paid under **“Unit Price item 3a – Recompact Existing Subgrade (98% SPD)”**
 - .11 If permitted at the discretion of the Departmental Representative, placing material in temporary stockpiles, grading, or maintaining the stockpile site.
 - .12 Finishing.
 - .13 Waste excavation and disposal of materials beyond the edge of pavement to allow for the supply and installation of the retaining wall shall be considered incidental to **“Lump Sum Price Item 3 – Supply and Install Gabion Basket Retaining Wall”**.
- .2 Ditch Cleanout:
- .1 Excavating, loading, hauling and temporary stockpiling of material.
 - .2 Disposing of material outside of the Parks.
 - .3 Delivering and placing suitable material in areas of fill.
 - .4 Obtaining, maintaining, reclamation of a disposal site outside of the Parks.
 - .5 Removal of existing stumps from ditches.
 - .6 Excavation and removal of rippable rock embankment material from the ditch.
 - .7 Cleaning of culverts ends in the vicinity of the Work.
- .3 Waste Excavation:
- .1 Excavation, loading, hauling, and disposal of material outside of the Parks at a location determined by the Contractor.
 - .2 Obtaining, maintaining and reclamation of a disposal site outside of the Parks and all incidentals associated with the removal and disposal of waste.

- .3 Waste excavation and disposal of materials beyond the edge of pavement to allow for the supply and installation of the retaining wall shall be considered incidental to **“Lump Sum Price Item 3 – Supply and Install Gabion Basket Retaining Wall”**.
- .4 Side slope Embankment Shaping:
 - .1 Regrading of washout rills and match surrounding existing slopes as approved by the Departmental Representative.
 - .2 All required preparation for the installation of erosion control products as specified in the Contract Documents and directed and approved by the Departmental Representative.
 - .3 Side slope installations of erosion control blankets and fibre rolls shall be scheduled and planned to proceed as soon as practicable following side slope embankment shaping to prevent any erosion or rilling during rain events and avoid rework. The Contractor shall protect the prepared side slope from surface erosion and shall complete any rework at their cost.
- .4 In addition to incidental items, no measure for payment will be made for:
 - .1 Excavating and/or construction of embankments unnecessarily beyond design lines established by Departmental Representative, with exception of unavoidable slide material. Do not measure slide material, when such slides are attributable to negligence.
 - .2 Ditch or backslope overcut below the design grade line and/or filling back to design grade.
 - .3 If overcut, no payment will be made for filling an area back to grade.
 - .4 Removing unsuitable material from embankment attributable to negligence.
- .5 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .6 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor

1.4 DEFINITIONS

- .1 Rock Excavation: excavation of:
 - .1 Material from solid masses of igneous, sedimentary or metamorphic rock that, 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 2.0 cubic metres or more in volume.
- .2 Common Excavation: excavation of materials that are not Rock Excavation or Stripping.
- .3 Drainage Excavation: Drainage excavation that is not considered ditch cleaning.

- .4 Stripping: excavation of organic material covering original ground.
- .5 Embankment: material derived from usable excavation and placed above original ground or stripped surface.
- .6 Waste Material: material unsuitable for embankment, embankment foundation, and material surplus to requirements.
- .7 Topsoil: capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

1.5 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 Regulatory Requirements:
 - .1 Adhere to Provincial and National Environmental requirements when potentially toxic materials are involved.
- .3 All Quality Control testing by the Contractor in accordance with 01 45 00 – Quality Control.

1.6 SUBMITTALS

- .1 In accordance with Section 01 33 00 - Submittal Procedures.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.
- .2 Waste shall be disposed of at a suitable disposal facility outside of the National Parks at the Contractor's expense including all loading, hauling, required testing and associated fees.

Part 2 Products

2.1 MATERIALS

- .1 Embankment materials require acceptance by Departmental Representative.
- .2 Cold weather work in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

Part 3 Execution

3.1 UTILITY COORDINATION

- .1 In accordance with 01 14 00 - Work Restrictions.
- .2 Coordinate relocations or protection of utilities (manholes, ducts, conduits or other associated infrastructure) with utility service providers and perform works required to complete relocation or protection. Work to be in accordance with utility service provider instruction or as directed by the Departmental Representative.
- .3 Where the utilities may be damaged by the Work, the Contractor shall use low impact excavation such as a hydrovac or a similar method which will not damage buried utilities.

- .4 Payment for locating utilities to be incidental to the Works and no additional payment will be made.
- .5 Payment for utility relocations or protection to include all coordination efforts, labour, equipment and materials to be made in accordance with section 01 21 00 - Allowances and 01 14 00 - Work Restrictions.

3.2 COMPACTION EQUIPMENT

- .1 Compaction equipment must be capable of obtaining required densities in materials on project. Equipment that does not achieve specified densities must be replaced or supplemented.
- .2 Cold weather work in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

3.3 WATER DISTRIBUTORS

- .1 Apply water with equipment capable of uniform distribution and in accordance with 01 35 43 – Environmental Procedures.

3.4 EXCAVATING

- .1 General:
 - .1 Stockpiling along the ROW outside of the cut/fill slope will not be permitted unless approval has been given by the Departmental Representative.
 - .2 Notify the Departmental Representative when waste materials are encountered at the design subgrade depth and remove to depth and extent as approved by the Departmental Representative. This material shall be removed and disposed outside the Parks.
 - .3 Subcut below subgrade elevation in cut sections only as approved by the Departmental Representative and replace with acceptable embankment material and compact.
 - .4 Compact top 150 mm below final subgrade elevation to minimum 98% Standard Proctor density, ASTM D698 (AASHTO T99). No subcut in ditches or backslope unless Departmental Representative approved.
 - .5 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points in accordance with the Contract Documents.
 - .6 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 Ditch Excavation:
 - .1 All excavated material shall be removed and disposed outside the Parks.

- .2 Average depth of ditch excavation is estimated at 250mm, but not uniform and no additional payment will be made where a deeper excavation depth is required.
- .3 Limits of ditch excavation to be as shown on the IFC drawings or as directed by the Departmental Representative.

3.5 EMBANKMENTS

- .1 Side slope Embankment Shaping:
 - .1 In locations noted in the Contract Documents and as confirmed on site by the Departmental Representative, regrade washout rills along the road side slope embankment to match surrounding existing slopes as approved by the Departmental Representative.
 - .2 Preparation for the installation of erosion control products as specified in the Contract Documents and directed and approved by the Departmental Representative.
 - .3 Do not place material that is frozen nor place material on frozen surfaces except in areas authorized.

3.6 SUBGRADE COMPACTION

- .1 This item consists of the compaction of the subgrade in cuts to the lines, grades, cross-sections and dimensions as per the Contract Documents including any required sub-excavation removal, replacement and compaction.
- .2 Compact top 150 mm below final subgrade elevation to minimum 98% Standard Proctor density, ASTM D698 (AASHTO T99). No subcut in ditches or backslope unless Departmental Representative approved.
- .3 Notify the Departmental Representative when waste materials are encountered at the design subgrade depth and remove to depth and extent as approved by the Departmental Representative. This material shall be removed and disposed outside the Parks.
- .4 Subcut below subgrade elevation in cut sections only as approved by the Departmental Representative and replace with acceptable embankment material and compact.
- .5 Do not place material that is frozen nor place material on frozen surfaces except in areas authorized.
- .6 Maintain sloped surface during construction to ensure ready run-off of surface water.
- .7 Drain low areas before placing materials.
- .8 Place geotextiles along all road excavation cuts and over approved subgrade as per the Contract Documents and as directed by the Departmental Representative.
- .9 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

3.7 PROOF ROLLING

- .1 Finished subgrade must not rut or deflect when proof rolled with a truck having a 9 tonne single axle dual tire or 17 tonne tandem axle group with dual tires with a tire pressure of 600 kPa. The prepared subgrade shall receive one complete coverage by the tires of a truck as specified.

- .2 Proof roll subgrade. If use of non-standard proof rolling equipment is approved, Departmental Representative to accept level of proof rolling.
- .3 Where proof rolling reveals areas of defective subgrade:
 - .1 Remove subgrade material to depth and extent as directed by Departmental Representative.
 - .2 Backfill excavated subgrade with suitable Common material and compact in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
 - .3 Replace subgrade material and compact in accordance with the Contract Documents.
- .4 All associated Works, including replacing defective material with new materials in accordance with the appropriate Sections is to be done at the Contractor's cost.
- .5 If it is determined that proof rolling cannot be adequately conducted due to site constraints the Departmental Representative may approve the subgrade surface and/or gravel fill surface based on nuclear densometer test results. In such case, the Contractor shall provide testing as required to meet the satisfaction of the Departmental Representative.

3.8 FINISHING

- .1 Shape entire roadbed to within ± 15 mm of design elevations but not to be uniformly high or low.
- .2 Remove rocks over 150 mm in dimension from slopes and ditch bottoms.

3.9 PROTECTION

- .1 Maintain finished surfaces in condition conforming to this section until acceptance by the Departmental Representative.

END OF SECTION

31 32 19 GEOTEXTILES**Part 1 General****1.1 DESCRIPTION**

- .1 Supply and installation of Geotextiles including but not limited to Type 1 non-woven geotextile, Type 2 non-woven geotextile, AT Erosion Control Blanket – Type C, AT Fibre Rolls and silt fences as required to complete the Work as specified in the Contract Documents and as directed by the Departmental Representative.
- .1 Properties of Type 1 and Type 2 non-woven geotextiles shall be as described in the Contract Documents including this Section under 2.1 Materials.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - .2 ASTM D4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 - .3 ASTM D4716, Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
 - .4 ASTM D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 - .5 ASTM A123 / A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2-M89(R2013), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
 - .3 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.
 - .4 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
 - .5 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
 - .6 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
 - .7 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .4 AT - Standard Specifications for Highway Construction (latest edition)
- .5 AT - Standard Specifications for Bridge Construction (latest edition)
- .6 AT – Erosion and Sediment Control Manual (latest edition)

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 The supply and installation of **Type 1 non-woven geotextile** will be incidental to the applicable item of “**Unit Price Item 6 – Geotextile and Riprap**” and will include supply, installation, anchoring and/or pinning and any other activities required to complete the Works.
- .2 The supply and installation of **Type 2 non-woven geotextile** will be incidental to “**Lump Sum Price Item 3 – Gabion Basket Retaining Wall**” and will include supply, installation, anchoring and/or pinning and any other activities required to complete the Works.
- .3 Measure for payment of supplied and installed **AT Erosion Control Blanket – Type C** shall be the area in square metres of embankment covered in accordance with the Contract Documents and accepted by the Departmental Representative.
 - .1 Payment for the supply and placement **AT Erosion Control Blanket – Type C** will be made under “**Unit Price Item 5a – Geotextile-Erosion Control product-AT Erosion Control Blanket – Type C**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents, including all supply, installation, anchoring and/or pinning and any other activities required to complete the Works .
- .4 Measure for payment of supplied and installed **AT Fibre Roll** shall be the area in square metres of embankment covered in accordance with the Contract Documents and accepted by the Departmental Representative.
 - .1 Payment for the supply and placement **AT Fibre Roll** will be made under “**Unit Price Item 5b – Geotextile-Erosion Control product-AT Fibre Roll**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents, including all supply, installation, anchoring and/or pinning and any other activities required to complete the Works .
- .5 Items considered incidental to the Work include, but are not limited to:
 - .1 Supply and installation of any required silt fences in accordance with Section 01 35 43 – Environmental Procedures.
 - .2 All labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents, including all supply, installation, anchoring and/or pinning and any other activities required to complete the Works.
 - .3 Excavation, shaping and preparation of side slope embankment for erosion control blanket and fibre roll shall be measured and paid under “**Unit Price Item 2b – Embankment Shaping**” in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
 - .4 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

1.4 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control.

1.5 SUBMITTALS

- .1 Submit samples in accordance with 01 33 00 – Submittal Procedures for each type of geotextile used.
- .2 Submit copies of mill test data and certificates in accordance with Section 01 33 00 – Submittal Procedures.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.
- .2 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements and with manufacturer's written instructions.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.
- .2 Unused geotextiles to be removed from the Parks at the Contractor's expense.

Part 2 Products**2.1 MATERIAL**

- .1 Type 1 Non-Woven Geotextile
 - .1 Shall meet or exceed the specifications of Nilex 4510, 4512 and/or 4516 Non-Woven Geotextile. If the Contractor wishes to propose an alternate non-woven geotextile, the approval is subject to the discretion of the Department Representative.
- .2 Type 2 Non-Woven Geotextile
 - .1 Shall meet or exceed the specifications of Nilex 4551 Non-Woven Geotextile. If the Contractor wishes to propose an alternate non-woven geotextile, the approval is subject to the discretion of the Department Representative.
- .3 Temporary Rolled Erosion Control Product – AT Erosion Control Blanket – Type C
 - .1 Shall be fully biodegradable and selected to mitigate wildlife impacts including entrapment or tripping hazards from mesh facing/backing.
 - .2 Shall be reviewed and approved by the ESO and Departmental Representative prior to ordering.
 - .3 Shall be approved for use in the current Approved Products List as published by AT under the section for Temporary Rolled Erosion Control Product – AT Erosion Control Blanket – Type C.
- .4 AT Fibre Roll
 - .1 Shall be fully biodegradable and/or photo-degradable and selected to mitigate wildlife impacts including entrapment or tripping hazards from mesh facing/backing.
 - .2 Shall be reviewed and approved by the ESO and Departmental Representative prior to ordering.

- .3 Shall be approved for use in the current Approved Products List as published by AT under the section for Straw Roll / Fibre Roll.

Part 3 Execution

3.1 INSTALLATION

- .1 Type 1 non-woven geotextile for Riprap area requirements and road excavation granular material separation requirements:
 - .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with Pins.
 - .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
 - .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile as indicated in the Contract Documents and directed by the Departmental Representative.
 - .4 Overlap each successive strip of geotextile 600 mm over previously laid strip.
 - .5 Pin successive strips of geotextile with securing pins at 3m intervals minimum.
 - .6 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
 - .7 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
 - .8 Place and compact Riprap in accordance with Section 31 37 00 - Riprap.
 - .9 Install as per manufacturers specifications and recommendations.
 - .10 It is noted that geotextile is required along all road excavation cut faces and between the gabion retaining wall and the granular base course pad.
- .2 Type 2 non-woven geotextile for Gabion Basket Retaining Wall requirements, including lining basket faces in contact with granular materials and enveloping the drain rock layer:
 - .1 Prior to backfill, the Contractor shall install geotextile along all gabion basket interfaces with drain rock or granular material to ensure complete separation of materials.
 - .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
 - .3 The Contractor shall ensure that the drain rock layer associated with the gabion retaining wall is fully enveloped/wrapped with geotextile.
 - .4 Overlap each successive strip of geotextile 600 mm over previously laid strip.
 - .5 Pin successive strips of geotextile with securing pins at 3m intervals minimum.
 - .6 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
 - .7 Replace damaged or deteriorated geotextile to approval of Departmental Representative.

- .8 Place and compact backfill in accordance with Section 32 11 20 – Gravel Fill, Section 32 11 24 – Granular Base Course and Section 31 36 00 – gabion basket Retaining Wall.
- .9 Install as per manufacturers specifications and recommendations.
- .3 Temporary Rolled Erosion Control Product – AT Erosion Control Blanket – Type C
 - .1 The Contractor shall supply and install at all Treatment B and C locations as specified in the Contract Documents and as directed by the Departmental Representative.
 - .2 Actual extents to be reviewed and confirmed on site following Contractor layout.
 - .3 Before placing geotextile, during side slope embankment shaping the Contractor shall review and confirm locations of fibre rolls with the Departmental Representative and shall trench the embankment 75mm to 125mm deep on contours to facilitate fibre roll placement in accordance with the Contract Documents and manufacturer's recommendations.
 - .4 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with Pins.
 - .5 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
 - .6 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile as indicated in the Contract Documents and directed by the Departmental Representative.
 - .7 Press and pin geotextile into trenches to facilitate fibre roll installation in accordance with the Contract Documents and manufacturer's recommendations.
 - .8 Overlap each successive strip of geotextile 600 mm over previously laid strip.
 - .9 Pin successive strips of geotextile with securing pins at 3m intervals minimum.
 - .10 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
 - .11 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
 - .12 Install as per manufacturers specifications and recommendations.
- .4 AT Fibre Roll
 - .1 The Contractor shall supply and install at all Treatment B and C locations as specified in the Contract Documents and as directed by the Departmental Representative.
 - .2 Actual extents to be reviewed and confirmed on site following Contractor layout.
 - .3 Before placing the erosion control blankets, during side slope embankment shaping, the Contractor shall review and confirm locations of fibre rolls with the Departmental Representative.
 - .4 It is anticipated that 3 rows of fibre rolls will be required at each specified location though the spacing and extents shall be reviewed and confirmed on site.
 - .5 The Contractor shall trench the embankment 75mm to 125mm deep on contours to facilitate fibre roll placement in accordance with the Contract Documents and manufacturer's recommendations.
 - .6 The top row of fibre rolls shall be as close to the edge of pavement as practicable.

- .7 Place fibre roll material by unrolling into trench depressions in the erosion control blanket surface in orientation, manner and locations indicated and retain in position with stakes.
- .8 Place and stake fibre roll material along sloping surfaces in one continuous length where possible or overlap each successive roll as recommended by the manufacturer to ensure a continuous barrier. Recommend min staked overlap of 300mm min. Rolls may tightly abut if confirmed by manufacturer's recommendations and approved by the Departmental Representative.
- .9 Stake fibre rolls at regular intervals to ensure they are secure as recommended by the manufacturer. Recommend at 1m intervals minimum or as approved by the Departmental Representative.
- .10 Protect installed fibre rolls material from displacement, damage or deterioration before, during and after placement of material layers.
- .11 Replace damaged or deteriorated fibre rolls to approval of Departmental Representative.
- .12 Install as per manufacturers specifications and recommendations.

3.2 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.
- .2 Side slope installations of erosion control blankets and fibre rolls shall be scheduled and planned to proceed as soon as practicable following side slope embankment shaping to prevent any erosion or rilling during rain events and avoid rework. The Contractor shall protect the prepared side slope from surface erosion and shall complete any rework at their cost.

END OF SECTION

31 36 00 GABION BASKET RETAINING WALL**Part 1 General****1.1 DESCRIPTION**

- .1 The preparation of the subgrade and granular base course surface to receive gabions, the placement of geotextile and the construction of the gabion structures in place, complete with rock filling and drain rock layer in accordance with these specifications at locations shown on the Drawings or as adjusted by the Departmental Representative.
- .2 Supply and construction of a Gabion Basket Retaining Wall as described in the Contract Documents. Work includes all labour, equipment, incidentals and materials required for the design, storage and construction of a retaining wall.

1.2 REFERENCES

- .1 AT - Standard Specifications for Highway Construction (latest edition)
 - .1 Section 6.10, Gabions and Gabion Mattresses
- .2 AT – Erosion and Sediment Control Manual (latest edition)
 - .1 Best Management Practices #2
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
 - .2 ASTM A313/A313M-98, Standard Specification for Stainless Steel Spring Wire.
 - .3 ASTM A764-95(2001), Standard Specification for Metallic Coated Carbon Steel Wire, Coated at Size and Drawn to Size For Mechanical Springs.
 - .4 ASTM A975, Hexagonal double twisted wire mesh
 - .5 ASTM A641, Tensile Strength
 - .6 ASTM A370, Elongation
 - .7 ASTM A641 Zinc coating
 - .8 ASTM D1248, Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
 - .9 ASTM D1785, Specification for Polyvinyl Chloride (PVC) Plastic Pipe.
 - .10 ASTM D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - .11 ASTM D4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 - .12 ASTM D4716, Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
 - .13 ASTM D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 - .14 ASTM A123 / A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- .4 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-4.2 No. 11.2-M89(R2013), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
- .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
- .3 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.
- .4 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
- .5 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
- .6 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
- .7 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Supply and installation of the Gabion Basket Retaining Wall will be measured as a lump sum item for payment of stone filled baskets incorporated into the Work as per the Contract Documents and directed by the Departmental Representative inclusive of any wall excavation and preparation of subgrade, supply and installation of granular base, supply and installation of graded stone fill, supply and installation of geotextiles required, supply and installation of drain pipes and appurtenances, supply and installation of drain rock and supply and installation of gabion appurtenances and installation of backfill around the baskets.
 - .1 Payment will be under **“Lump Sum Price Item 3 – Gabion Basket Retaining Wall”** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .2 Items considered incidental to the Work include, but are not limited to:
 - .1 Removal, salvage and stockpiling of existing concrete lock blocks as directed by the Departmental Representative.
 - .2 Where the excavation for gabion overlaps excavation for other work (road reconstruction), only the excavation for other work (road reconstruction) will be measured and paid, as if no separate excavation for gabions took place. Road Excavation will be paid under **“Unit Price Item 2a – Waste Excavation and Disposal”**. Gabion wall excavation will be considered incidental to **“Lump Sum Price Item 3 – Gabion Basket Retaining Wall”**.
 - .3 The removal and disposal of debris, stumps, roots, etc. will be considered incidental to the Work and no separate or additional payment will be made.
 - .4 Preparation and compaction of subgrade as approved by the Consultant geotechnical engineer.
 - .5 Supply and installation of the granular base course pad
 - .6 Supply, placement and compaction of imported Drain Rock Material.
 - .7 Supply and installation of Type 2 non-woven geotextile as per Section 31 32 19 – Geotextiles.
 - .8 The supply, installation and use of shoring systems to complete the excavation and protect the site from slide/collapse during construction.

- .9 Supply and installation of 300mm PVC SDR-35 drain pipe in accordance with the Contract Documents and as directed by the Departmental Representative.
- .10 Supply and installation of grated inlet cover as reviewed and approved by the Departmental Representative.
- .11 Payment will be under “**Unit Price Item X – Reinforced Soil Retaining Wall – Design and Supply**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .12 Any required temporary stockpiling, storing, hauling, loading, delivery to site and installation of materials
- .13 Supply and installation of sub-surface drainage systems including perforated pipe drains, discharge pipes, and cleanouts.
- .14 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
- .3 Traffic Control required for this Work shall be incidental to “**Lump Sum Item 2 – Traffic Accommodation**” and no separate payment will be made to the Contractor.
- .4 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item 1 Mobilization/ Demobilization**” and no additional payment will be made.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 In accordance with Section 01 61 00 - Common Product Requirements.
- .2 The Contractor shall follow storage and handling instructions of the manufacturers and suppliers.
- .3 The Contractor shall prevent damage to all materials noted in this section.
- .4 The Contractor shall prevent damage to galvanized and PVC coatings. Repair or replace as directed by Departmental Representative.
- .5 The Contractor shall prevent staining or other defacement of front surfaces of facing panels during storage and handling. Repair or replace as directed by Departmental Representative.
- .6 The Contractor shall store geotextiles as recommended by the manufacturer and supplier.

1.5 SUBMITTALS

- .1 In accordance with Section 01 33 00 - Submittal Procedures.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 – Environmental Procedures.
- .2 Any unused materials shall be either disposed of outside of the Park or retained by PCA at the discretion of the Departmental Representative.

1.7 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control. And as otherwise provided in this section

- .2 In accordance with AT Standard Specifications for Highway Construction (latest edition)

Part 2 Products

2.1 GABION BASKETS FOR RETAINING WALLS

- .1 All materials shall be in accordance with AT - Standard Specifications for Highway Construction (latest edition) - Section 6.10, Gabions and Gabion Mattresses.
- .2 Shall be approved for use in the current Approved Products List as published by AT under the section for Erosion Control Systems – Gabions and mats.
 - .1 Shall be PVC coated mesh.

2.2 MATERIALS

- .1 All materials associated with the Gabion basket retaining wall, drain rock layer and granular base pad shall be approved by the Departmental Representative and supplied by the Contractor.
- .2 All materials shall be in accordance with AT - Standard Specifications for Highway Construction (latest edition) - Section 6.10, Gabions and Gabion Mattresses.
- .3 Granular base pad:
 - .1 AT Designation 2 Class 20 Granular Base Course compacted to 100% SPD.
- .4 Geotextiles:
 - .1 In accordance with Section 31 32 19 – Geotextiles.
- .5 Drain Rock:
 - .1 20mm to 80mm clean, sound durable stone that are resistant to weathering and water action.
 - .2 AT Designation 8 Class 25 material is acceptable. Other materials may be reviewed and approved by the Departmental Representative.
- .6 Gabion Rock:
 - .1 Rock used for gabion structures shall consist of clean, sound durable stones that are resistant to weathering and water action. Shale or other soft rock may not be used.
 - .2 The stones shall be angular in shape with a height and width dimension of at least one third the length. The gradation of the mixture shall be such that at least 80 percent (by weight) of the stones, have a minimum dimension of at least 100 mm. The maximum dimension of a stone shall be the lesser of 300 mm or the gabion structure thickness.
 - .3 AT Class 1M Riprap meeting the requirements above is considered suitable for use.
- .7 Gabion Baskets:
 - .1 Gabion baskets are made of hexagonal double twisted wire mesh, filled with stone. They are divided into cells with diaphragms to reinforce the structures. The mesh (except for the diaphragms) is reinforced on all edges with wires of a larger diameter to strengthen the gabions and mats and facilitate the assembly

and installation. Gabion baskets shall be manufactured with wire mesh coated with a continuous PVC (polyvinyl chloride) sleeve.

- .2 Shall be approved for use in the current Approved Products List as published by AT under the section for Erosion Control Systems – Gabions and mats.
- .3 Alberta native products meeting the properties listed below will be accepted pending review and acceptance by the Departmental Representative.
- .4 Gabion units shall be manufactured from wire in accordance with Federal Specification QQ-W-461G, "Wire Steel, Carbon (Round, Bare and Coated)" and shall be soft tempered. Additional requirements of the wire for gabion units are given in **Table 1 – See Galvanized and PVC Coated Basket**

**TABLE 1
WIRE REQUIREMENTS FOR GABION UNITS**

Property ⁽¹⁾	Type		
	Galvanized Basket	Galvanized and PVC Coated Basket	Galvanized and PVC Coated Mattress
Netting Wire dia. (mm)	2.90	2.65	2.20
Self-edge Wire dia. (mm)	3.85	3.40	2.65
Binding Wire dia. (mm) ⁽²⁾	2.20	2.20	2.20
Zinc coating (gm/m ²)	245	245	245
PVC coating (mm)	--	0.42	0.42

Notes (1): The allowable tolerance on all properties is ± 3%
 (2): Galvanized clips with a wire diameter of 2.90 mm may be used with galvanized baskets.

- .5 Baskets shall be cubical in shape and shall be assembled from independent rectangular faces laced or clipped together. Each face shall be a non-raveling wire mesh woven with a double twist into regular hexagonal openings measuring approximately 75 mm X 100 mm. The edges of each face shall be self-edged by weaving the mesh around a reinforcing wire in a manner designed to prevent slippage. The self-edging shall be secure at all points so that joints formed by tying adjacent faces along the self-edges shall be at least as strong as the internal mesh.
- .6 Gabion baskets shall be supplied, complete with diaphragms and dividers as listed in **Table 2 - See Size No. 3 and Size No.6 baskets** as shown in the Contract Documents.

**TABLE 2
GABION BASKET SIZES AND DIMENSIONS**

Dimensions and Volumes					
Size No.	Number of Diaphragms	Length (m)	Width (m)	Depth (m)	Capacity (m ³)
1	1	2	1	0.3	0.6
2	1	2	1	0.5	1
3	1	2	1	1	2
4	2	3	1	0.3	0.9
5	2	3	1	0.5	1.5
6	2	3	1	1	3
7	3	4	1	0.3	1.2
8	3	4	1	0.5	2
9	3	4	1	1	4

Part 3 Execution**3.1 EXCAVATION AND SUBGRADE PREPARATION**

- .1 The Contractor shall excavate and prepare subgrade foundation for the retaining wall system in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
- .2 Subgrade shall be compacted to a minimum 98% SPD and shall be reviewed and approved by the Consultant geotechnical engineer prior to construction of the granular base pad.

3.2 GRANULAR BASE PAD

- .1 The Contractor shall supply and install granular base course pad as per the Contract Documents.
- .2 Work shall be in accordance with Section 32 11 24 – Granular Base Course

3.3 GEOTEXTILES

- .1 In accordance with Section 31 32 19 – Geotextiles.
- .2 Ensure laps as specified or as per manufacturer recommendations, whichever is greater.
- .3 Ensure material is affixed to the gabion baskets or otherwise staked and pinned as needed
- .4 Ensure the material is laid free from wrinkles
- .5 The edges of the geotextile shall be neatly trimmed or buried in the ground.

3.4 DRAIN PIPE

- .1 In accordance with Section 33 46 19 – Drain Pipe.
- .2 Install 300mm PVC SDR-35 drain pipe as specified in the Contract Documents and as directed by the Departmental Representative including all fittings, bends and grated inlet cover.
- .3 Trim as required.
- .4 Construct pipe, gravels and asphalt to ensure positive drainage at inlet with no ponding of water.
- .5 Ensure 2% slope min between bend and outlet.
- .6 Cleanout drain pipe prior to Contract completion.

3.5 GABION BASKET RETAINING WALL

- .1 All construction shall be in accordance with AT - Standard Specifications for Highway Construction (latest edition) - Section 6.10, Gabions and Gabion Mattresses
- .2 Individual gabion units shall form the component parts of a gabion structure.
- .3 Gabion baskets shall be assembled by tying the appropriate faces together along the selfedges with binding wire. The binding wire shall be tightly looped around every other mesh opening to form a spiral with single and double loops alternating.
- .4 Diaphragms and dividers shall be affixed in position by similarly binding them to the mesh of the assembled cage. Free ends of binding wire shall not be made to project from exposed faces of gabion structures.

- .5 When assembled, gabion baskets shall be divided by the diaphragms into compartments having a plan dimension of one metre square.
- .6 Gabion units, grouped together to form a gabion structure, shall be securely bound to each other along all contacting selfedges in the same manner as the faces are bound in the assembly of the cages.
- .7 Irregular shapes in any structure shall be achieved by overlapping and bending the rectangular components. Cutting of the mesh shall be minimized to avoid damage to the galvanized wire.
- .8 Rocks shall be infilled in the assembled cage units either by machine or by hand. When machine is used, minor rock repositioning shall be done by hand to fill the voids between larger rocks and thereby achieve a dense structure. Rocks along visible faces shall be selected and placed by hand from among the larger sizes with a flat face toward the exterior to produce a semblance of a masonry structure and a neat and workmanlike appearance.
- .9 Undue distortion in gabion units shall be avoided. Rock filing shall be carried out in stages with the difference in rock level between any two adjacent compartments limited to 250 mm. Further, distortion of gabion baskets shall also be prevented by tying with binding wire, the opposite faces of a compartment at the surface level of the rocks when the depth of fill has reached designated levels. These levels shall be 300 mm and 600 mm for 1.0 m deep baskets.
- .10 The exposed faces of a gabion structure shall be maintained true to vertical and horizontal alignment by stretching taut with a standard fence stretcher, or other approved method, before placing rocks within the baskets.
- .11 Following the filling of each gabion unit, the lid shall be affixed in position so that the selfedges coincide with the perimeter of the filled gabion unit. The selfedges shall then be laced together in the same manner as described above.

3.6 DRAIN ROCK

- .1 The Contractor shall backfill behind the gabion baskets with drain rock fully wrapped and properly lapped in Type 2 non-woven geotextile.
- .2 Ensure adequate compaction under consultant supervision as the material is built up in conjunction with the surrounding work.
- .3 Construct Drain Rock layer as shown in the Drawings unless otherwise approved by the Departmental Representative.

3.7 BACKFILL FOR ROAD CONSTRUCTION

- .1 The Contractor shall backfill behind the drain rock layer for road construction as noted in the Contractor Documents as per Section 31 11 20 – Gravel Fill and Section 31 11 24 – Granular Base Course.
- .2 Place backfill by closely following installation of each lift of baskets, alternating work while increasing height.
- .3 Place and compact backfill without causing displacement or rotation of baskets beyond supplier tolerances. Use only hand-held or hand-guided compacting equipment within 1 m of baskets.
- .4 Compact backfill at moisture content not exceeding optimum value.

- .5 Backfill excavation in front of wall as soon as required alignment of modular blocks is assured and when approved by Departmental Representative.

END OF SECTION

31 37 00 RIPRAP**Part 1 General****1.1 DESCRIPTION**

- .1 Supply and installation of Riprap as required to complete the Work as specified in the Contract Documents and as directed by the Departmental Representative.

1.2 REFERENCES

- .1 AT - Standard Specifications for Highway Construction (latest edition).

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measure for payment of supplied and installed Riprap shall be the number of tonnes for each classification of Riprap as totalled on scale tickets in accordance with the Contract Documents and accepted by the Departmental Representative.
 - .1 Scale tickets to be provided to the Departmental Representative within 24 hours of the Riprap being delivered to site.
 - .2 Required supply and installation of underlying approved Type 1 non-woven geotextile shall be considered incidental to the work.
- .2 Payment for the supply and placement of AT Class 1M Riprap will be made under **“Unit Price Item 6a – Riprap – AT Class 1M”** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .3 Payment for the supply and placement of AT Class 1 Riprap will be made under **“Unit Price Item 6b – Riprap – AT Class 1”** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .4 Payment for the supply and placement of AT Class 2 Riprap will be made under **“Unit Price Item 6c – Riprap – AT Class 2”** and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .5 Items considered incidental to the Work include, but are not limited to:
 - .1 Overhaul.
 - .2 Sourcing, processing and sorting blast rock to produce suitable Riprap.
 - .3 Loading, hauling and placing Riprap including any temporary stockpiling.
 - .4 Supply and installation of geotextiles underlying Riprap in all locations in accordance with the Contract Documents and manufacturer’s recommendations
 - .5 Excavation, shaping and preparation of Riprap base geotextiles, and any other related materials.
 - .6 Earthworks associated with the construction of Ditch Dams.
 - .7 Testing of Riprap.
 - .8 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.

- .6 A conversion rate of 2.5 tonnes / cubic metre will be used for converting Riprap quantities, if required.
- .7 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item 1 – Mobilization / Demobilization**”, and no additional payment will be made.
- .8 Traffic Control required for this Work shall be incidental to “**Lump Sum Price Item 2 – Traffic Accommodation**” and no separate payment will be made to the Contractor.

1.4 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control.

1.5 SUBMITTALS

- .1 In accordance with Section 01 33 00 - Submittal Procedures.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.
- .2 Remove materials defined as hazardous or toxic and dispose of outside of the Parks.

Part 2 Products

2.1 STONE

- .1 Hard, dense, angular, stone with specific gravity not less than 2.50, free from seams, cracks or other structural defects, to meet following Class for use intended:
 - .1 Only non-acid generating and non-metal leaching rock is suitable.
 - .2 Suitable Riprap material to be sourced from outside of the Parks and delivered to the sites where Riprap material is required.
 - .3 Riprap for Corrugated HDPE Drain Pipe outlet treatment and Rock Check Dam/Ditch block:
 - .1 AT Class 1M Riprap
 - .4 Riprap for washout channel armouring and spillways:
 - .1 AT Class 1 Riprap, where specified for Treatment A and at Channels 1 and 2.
 - .2 AT Class 2 Riprap, where specified for Channels 1 and 2
 - .3 Supply rock spalls or cobbles to fill open joints.

Part 3 Execution

3.1 INSTALLATION OF RIPRAP

- .1 Contractor shall do the layout for placement of Riprap.
- .2 Where Riprap is to be placed on slopes, excavate trench/bench at toe of slope to dimensions as indicated to provide a stable bearing surface for the initial placement of stones.

- .3 Fine grade area where Riprap is to be placed, to a uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .4 For all Riprap placement locations, install Type 1 non-woven geotextile, as per the Contract Documents and in accordance with Section 31 32 19 - Geotextiles.
- .5 Place Riprap to thickness and details as indicated or as agreed to by the Departmental Representative.
 - .1 Place Riprap by machine or by hand, protecting the geotextile from puncture or other damage. Dumping of the Riprap material shall not be permitted as a placement methodology.
- .6 Place stones in manner accepted by Departmental Representative to secure surface and create a stable mass or to match existing slope. On slopes, place larger stones at bottom of slopes.
- .7 Machine or Hand placing Riprap:
 - .1 Key in benches as required and as shown in the Contract Documents to provide a stable bearing surface for the initial placement of stones
 - .2 Use larger stones for lower courses and as headers for subsequent courses.
 - .3 Place from the downstream end and progress upstream.
 - .4 Stagger vertical joints and fill voids with rock spalls or cobbles.
 - .5 Finish surface evenly, free of large openings and neat in appearance.
 - .6 All Riprap shall be hand or machine placed. No dumping of rip rap into place will be permitted.

END OF SECTION

32 11 20 GRAVEL FILL**Part 1 General****1.1 DESCRIPTION**

- .1 Compaction of existing subgrade materials as shown in the Contract Documents and as directed by the Departmental Representative.
- .2 Supply and installation of AT Designation 6 Class 80 Pit-Run Gravel Fill for use in roadway construction as shown in the Contract Documents and as directed by the Departmental Representative.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D422-63(2007)e2, Standard Test Method for Particle-Size Analysis of Soils.
 - .5 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .6 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .7 ASTM D1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .8 ASTM D4318, 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.
- .3 AT - Standard Specifications for Highway Construction (latest edition)

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measure for payment of compaction of existing subgrade will be in neat line square meter areas calculated from the Design for work completed in accordance with the Contract Documents or by field measurement areas as accepted by the Departmental Representative.
 - .1 Payment shall be made under “**Unit Price Item 3a – Recompact Existing Subgrade**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

- .2 Measure for payment of supply and installation of AT Designation 6 Class 80 Pit-Run Gravel Fill will be in neat line cubic meter volumes calculated from the Design for work completed in accordance with the Contract Documents and accepted by the Departmental Representative.
 - .1 Payment shall be made under “**Unit Price Item 3b – AT Designation 6 Class 80mm**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
 - .3 Items considered incidental to the Work include, but are not limited to:
 - .1 Supply, loading, hauling, placing, compacting, water for compaction, drying of material and finishing.
 - .2 Overhaul.
 - .3 Any temporary stockpiling of aggregates onsite.
 - .4 Any sub-excavation, removal disposal of unsuitable subgrade material.
 - .5 Any replacement of unsuitable subgrade material with Common material.
 - .6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
 - .4 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item 1 – Mobilization / Demobilization**”, and no additional payment will be made.
 - .5 Traffic Control required for this Work shall be incidental to “**Lump Sum Price Item 2 – Traffic Accommodation**” and no separate payment will be made to the Contractor.

1.4 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 Contractor to provide material samples to the Departmental Representative prior to works commencing for Quality Assurance purposes.

1.5 SUBMITTALS

- .1 In accordance with Section 01 33 00 - Submittal Procedures.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.
- .2 Divert unused Gravel Fill outside of the National Parks, as accepted by the Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 AT Standard Specifications for Highway Construction (latest edition), Section 3.8
- .2 AT Designation 6 Class 80 Pit-Run Gravel Fill is to be supplied by the Contractor from outside the Park.

- .3 Cold weather work in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

Part 3 Execution

3.1 SUBGRADE COMPACTION

- .1 Excavate, remove and dispose of waste materials as per Section 31 24 13 Roadway and Drainage Excavation to subgrade.
- .2 Compaction equipment to be capable of obtaining required material densities.
- .3 Compact existing subgrade to density of not less than 98% Standard Proctor density in accordance with ASTM D698.
- .4 Shape and roll alternately to obtain smooth, even and uniformly compacted subgrade.
- .5 Apply water as necessary during compaction to obtain specified density.
- .6 Dry as necessary to obtain specified density.
- .7 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers.
- .8 Where existing subgrade is determined by the Departmental Representative to be unsuitable:
 - .1 Remove subgrade material to depth and extent as directed by Departmental Representative.
 - .2 Backfill excavated subgrade with suitable Common material and compact in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
- .9 If it is determined that proof rolling cannot be adequately conducted due to site constraints the Departmental Representative may approve the subgrade surface and/or gravel fill surface based on nuclear densometer test results. In such case, the Contractor shall provide testing as required to meet the satisfaction of the Departmental Representative.

3.2 PLACING

- .1 Gravel Fill
 - .1 Load, haul and place Gravel Fill after subgrade has achieved the requirements of the Contract Documents.
 - .2 Construct Gravel Fill to depth and grade in areas indicated in the Contract Documents.
 - .3 Ensure no frozen material is placed.
 - .4 Place material only on clean unfrozen surface, free from snow or ice.
 - .5 Begin spreading Gravel Fill material on crown line or high side of one-way slope.
 - .6 Place granular Gravel Fill materials using methods that do not lead to segregation or degradation.
 - .7 For spreading and shaping material, use spreader boxes having adjustable templates or screeds that will place material in uniform layers of required thickness.

- .8 Place material to full width in uniform layers not exceeding 200 mm loose thickness / 150mm compacted thickness.
- .9 Shape each layer to smooth contour and compact to the specified density before succeeding layer is placed.
- .10 Remove and replace portion of layer in which material has become segregated during spreading.

3.3 COMPACTION

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact existing subgrade to density of not less than 98% Standard Proctor density in accordance with ASTM D698.
- .3 Compact gravel fill to density of not less than 98% Standard Proctor density in accordance with ASTM D698.
- .4 Shape and roll alternately to obtain smooth, even and uniformly compacted gravel fill.
- .5 Apply water as necessary during compaction to obtain specified density.
- .6 Dry as necessary to obtain specified density.
- .7 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers.
- .8 Heavy earth compacting equipment or other heavy construction equipment shall not be used within 1.0m of the retaining wall.
- .9 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .10 Cold weather work in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

3.4 PROOF ROLLING

- .1 Gravel fill must not rut or deflect when proof rolled with a truck having a 9 tonne single axle dual tire or 17 tonne tandem axle group with dual tires with a tire pressure of 600 kPa. Each compacted course of base course aggregate shall receive one complete coverage by the tires of a truck as specified.
- .2 Proof roll granular Gravel fill. If use of non-standard proof rolling equipment is approved, Departmental Representative to accept level of proof rolling.
- .3 Where proof rolling reveals areas of defective Gravel fill:
 - .1 Remove Gravel fill material to depth and extent as directed by Departmental Representative.
 - .2 Backfill excavated subgrade with suitable Common material and compact in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
 - .3 Replace Gravel fill material and compact in accordance with the Contract Documents.
- .4 All associated Works, including replacing defective material with new materials in accordance with the appropriate Sections is to be done at the Contractor's cost.
- .5 If it is determined that proof rolling cannot be adequately conducted due to site constraints the Departmental Representative may approve the subgrade surface and/or gravel fill surface based on nuclear densometer test results. In such case, the Contractor

shall provide testing as required to meet the satisfaction of the Departmental Representative.

3.5 SITE TOLERANCES

- .1 Finished Gravel fill surface to be within ± 15 mm of elevation as indicated but not uniformly high or low.

3.6 PROTECTION

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

END OF SECTION

32 11 24 GRANULAR BASE COURSE**Part 1 General****1.1 DESCRIPTION**

- .1 Supply and installation of AT Granular Base Course for use in roadway construction as shown in the Contract Documents and as directed by the Departmental Representative.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .5 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .6 ASTM D1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .7 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .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.
- .3 AT - Standard Specifications for Highway Construction (latest edition)

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measure for payment of AT Granular Base Course shall be in neat line cubic meter volumes calculated from the Design for work completed in accordance with the Contract Documents and accepted by the Departmental Representative.
 - .1 Payment shall be made under the applicable item of “**Unit Price Item 4 – Granular Base Course**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .2 Items considered incidental to the Work include, but are not limited to:
 - .1 Supply, loading, hauling, placing, compacting, water for compaction, drying of material and finishing.
 - .2 The 300mm thick granular base course pad installed under the Gabion Basket Retaining Wall as per the Contract Documents and in accordance with **Section 31 36 00 – Gabion Basket Retaining Wall** shall be considered incidental to

“Lump Sum Price Item 3 – Supply and Install Gabion Basket Retaining Wall.”

- .3 Overhaul.
- .4 Any temporary stockpiling of aggregates onsite.
- .5 Any required grading or shaping to ensure positive drainage of the final grade surface.
- .6 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
- .3 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 1 – Mobilization / Demobilization”**, and no additional payment will be made.
- .4 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 2 – Traffic Accommodation”** and no separate payment will be made to the Contractor.

1.4 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 Contractor to provide material samples to the Departmental Representative prior to works commencing for Quality Assurance purposes.

1.5 SUBMITTALS

- .1 In accordance with Section 01 33 00 Submittal Procedures.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.
- .2 Divert unused granular material outside of the National Parks as accepted by Departmental Representative.

Part 2 Products**2.1 MATERIALS**

- .1 Materials as per AT - Standard Specifications for Highway Construction (latest edition).
- .2 AT Designation 2 Class 20 Base Course Aggregate to be supplied by the Contractor from outside the Park.
- .3 Cold weather work in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

Part 3 Execution**3.1 PLACING**

- .1 Load, haul and place granular base course after the gravel fill surface or subgrade surface (as applicable per the Contract Documents) is inspected and accepted by Departmental Representative.
- .2 Placing

- .1 Construct granular base course 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.
- .4 Begin spreading base aggregate on crown line or on high side of one-way slope.
- .5 Place material using methods that do not lead to segregation or degradation of aggregate.
- .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds that will place material in uniform layers of required thickness.
- .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved.
- .8 Shape each layer to smooth contour and compact to the specified density before succeeding layer is placed.
- .9 Remove and replace that portion of layer in which material becomes segregated during spreading.

3.2 COMPACTION

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density not less than 100% Standard Proctor density in accordance with ASTM D698.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .4 Apply water as necessary during compacting to obtain specified density.
- .5 Dry as necessary to obtain specified compaction.
- .6 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
- .7 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .8 Cold weather work in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

3.3 PROOF ROLLING

- .1 Granular Base Course must not rut or deflect when proof rolled with a truck having a 9 tonne single axle dual tire or 17 tonne tandem axle group with dual tires with a tire pressure of 600 kPa. Each compacted course of base course aggregate shall receive one complete coverage by the tires of a truck as specified.
- .2 Proof roll Granular Base Course. If use of non-standard proof rolling equipment is approved, Departmental Representative to accept level of proof rolling.
- .3 Where proof rolling reveals areas of defective Granular Base Course, Gravel fill or subgrade:
 - .1 Remove Gravel fill and subgrade material to depth and extent as directed by Departmental Representative.

- .2 Backfill excavated subgrade with suitable Common material and compact in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
- .3 Replace Gravel fill and/or Granular Base Course material and compact in accordance with the Contract Documents.
- .4 All associated Works, including replacing defective material with new materials in accordance with the appropriate Sections is to be done at the Contractor's cost.
- .5 If it is determined that proof rolling cannot be adequately conducted due to site constraints the Departmental Representative may approve the granular base course surface based on nuclear densometer test results. In such case, the Contractor shall provide testing as required to meet the satisfaction of the Departmental Representative.

3.4 SITE TOLERANCES

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

3.5 PROTECTION

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied.

END OF SECTION

32 12 14 ASPHALT TACK COAT**Part 1 General****1.1 DESCRIPTION**

- .1 Supply and application of a liquid asphalt to ensure a bond between the surface being paved and the Asphalt Concrete Pavement lift, in accordance with the Contract Document and as directed by the Departmental Representative.

1.2 REFERENCES

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

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Supply, delivery and application of tack coat will not be measured separately and will be incidental to “**Unit Price Item 7 – Asphalt Concrete Pavement - EPS**” and shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

1.4 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two 1 L samples of asphalt tack coat material proposed for use in new, clean, airtight, sealed, wide mouth bottles made with plastic to Departmental Representative, at least 2 weeks prior to beginning Work.
- .3 Sample asphalt tack coat material to: ASTM D140.
- .4 Provide access on tank truck for Departmental Representative to sample asphalt material to be incorporated into Work, in accordance with ASTM D140.

1.5 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 Upon request by Departmental Representative, submit manufacturer's test data and certification that asphalt tack coat material meets requirements of this Section.

1.6 DELIVERY, STORAGE AND HANDLING

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

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

- .2 Divert unused asphalt materials to facility capable of recycling materials outside of the National Parks.

Part 2 Products

2.1 MATERIALS

- .1 Anionic emulsified asphalt: to CAN/CGSB-16.2, grade: SS-1.
- .2 Water: clean, potable, free from foreign matter.

2.2 EQUIPMENT

- .1 Pressure distributor to be designed, equipped, maintained and operated so that asphalt material can be:
 - .1 Maintained at even temperature.
 - .2 Applied uniformly on variable widths of surface up to 5 m.
 - .3 Applied at readily determined and controlled rates from 0.2 to 5.4 L/m² with uniform pressure, and with an allowable variation from any specified rate not exceeding 0.1 L/m².
 - .4 Distributed in uniform spray without atomization at temperature required.
 - .5 Equipped with meter, registering metres of travel per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
 - .6 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
 - .7 Equipped with an easily read, accurate and sensitive device that registers temperature of liquid in reservoir.
 - .8 Equipped with accurate volume measuring device or calibrated tank.
 - .9 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
 - .10 Equipped with nozzle spray bar, with operational height adjustment.
 - .11 Cleaned if previously used with incompatible asphalt material.

Part 3 Execution

3.1 APPLICATION

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

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

END OF SECTION

32 12 16 ASPHALT CONCRETE PAVEMENT (EPS)**Part 1 General****1.1 DESCRIPTION**

- .1 Work shall consist of supplying, loading, hauling and placing AT Mix Type M1 Asphalt Concrete Pavement (EPS) as per the Contract Documents, or as directed by the Departmental Representative
- .2 Production of AT Designation 1 Class 12.5 (12.5mm) asphalt aggregate.
- .3 Recycled Asphalt Pavement (RAP) will not be permitted in the asphalt pavement mix design unless otherwise reviewed and approved by the Departmental Representative.
- .4 Perform and submit mix designs for AT Mix Type M1 Asphalt Concrete Pavement using Asphalt Cement PG 52-34 and 12.5mm Asphalt Aggregate. Mix design is subject to acceptance by the Departmental Representative.
- .5 Supply and place integral asphalt curb as per the Contract Documents and as directed by the Departmental Representative.
- .6 Acceptance and/or rejection of all placed Asphalt Concrete Pavement shall be determined in accordance with the End Product Specifications.

1.2 REFERENCES

- .1 AT - Standard Specifications for Highway Construction (latest edition)
 - .1 Design Bulletin #13 – Revisions to Pavement Design Manual for Selection of ACP Mix Types and Asphalt Binder Grades (March 2017)

1.3 MEASUREMENT AND PAYMENT PROCEDURES**.1 Asphalt Concrete Pavement**

- .1 Measure for payment of Asphalt Concrete Pavement will be in tonnes by scale tickets submitted to and accepted by the Departmental Representative in accordance with the Contract Documents.
- .2 Payment for accepted Asphalt Concrete Pavement will be made under “**Unit Price Item 7a - Asphalt Concrete Pavement (EPS) – AT Mix Type M1 – 12.5mm, PG 52-34**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .3 Placement for pipe drain inlets as directed by the Departmental Representative shall be considered incidental to the work.

.2 Unit Price Adjustments

- .1 EPS Unit price adjustments will not apply.

.3 Reclaimed Asphalt Pavement

- .1 Recycled Asphalt Pavement (RAP) will be not be permitted in the asphalt pavement mix design unless otherwise reviewed and approved by the Departmental Representative. If approved, production and usage of Reclaimed Asphalt Pavement (RAP) shall be considered incidental to the Work and the price(s) bid shall be full compensation for the cost of furnishing all labour,

materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.4 Integral Asphalt Curb

.1 Measure for payment for the installation of Integral Asphalt Curb shall be per linear meter installed along the centreline of the curb as per the Contract Documents as accepted by the Departmental Representative.

.2 Payment shall be made under “**Unit Price Item 7b – Asphalt Concrete Pavement (EPS) – Integral Asphalt Curb**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

.3 Placement for pipe drain inlet swales and as directed by the Departmental Representative shall be considered incidental to the work.

.5 Items considered incidental to the Work include, but are not limited to:

.1 Production and supply from outside the Parks of asphalt aggregate.

.2 The movement of equipment and crew.

.1 A move is defined as the Contractor moving equipment and crew to the next section to pave after having completed, in its totality, the previous section.

.3 Cleaning of existing pavement prior to paving, whether via sweeping or other methods.

.4 Survey and layout for asphalt concrete paving and asphalt curb.

.5 Sawcut rework to provide a clean joint in cases where the original sawcut interface has been damaged during construction.

.6 Preparing asphalt mix designs (including anti-stripping test), in accordance with Section 01 45 00 Quality Control and Section 01 33 00 Submittal Procedures.

.7 Supply, delivery and incorporation of asphalt cement.

.8 Anti-stripping agent(s) and other additives, if required and accepted by the Departmental Representative.

.9 All work associated with the forming and compaction of the asphalt curb and drainage inlets as directed by the Departmental Representative.

.10 All work associated with the placement and compaction around existing guardrail posts.

.11 All restoration work to areas damaged by old guardrail removal.

.12 All restoration work to areas damaged by new guardrail installation.

.13 Supply, installation, maintenance, calibration of weight scales and a scale house, or alternately electronic calibrated silo scales, at the plant by the Contractor.

.1 Contractor shall provide a scale person, as required, at their cost.

.14 Cleaning of existing pavement shoulder, whether via sweeping or other methods

.15 Sloped (4:1) paved shoulders as described in this Section.

.16 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures

.17 Overhaul.

- .6 Traffic Control required for this Work shall be incidental to “**Lump Sum Price Item 2 - Traffic Accommodation**” and no separate payment will be made to the Contractor.
- .7 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item 1 – Mobilization / Demobilization**” and no additional payment will be made.

1.4 SUBMITTALS

- .1 In accordance with Section 01 33 00 Submittal Procedures.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

Part 2 Products

2.1 MATERIALS

- .1 PG 52-34 Asphalt Cement shall be used.
- .2 Asphalt Aggregate:
 - .1 Materials used shall be in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition).
 - .2 AT Designation 1 Class 12.5 Asphalt Aggregate is to be supplied from outside the Park or produced, in whole or in part, from suitable material excavated from within the roadway cuts and structure excavations.
- .3 Reclaimed Asphalt Pavement (RAP) material is not approved for use in this Contract.
- .4 All additives (including anti-stripping agents) to be in accordance with the Approved Products List as published by AT.

Part 3 Execution

3.1 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control.
- .2 Contractor is responsible for all Quality Control required in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition) and Section 01 45 00 – Quality Control.
- .3 Unit Price Adjustments will not apply though the Contractor remains responsible for meeting all acceptance criteria in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition).
- .4 Contractor is to provide a full time Road Checker during all times of asphalt placement that shall be responsible for providing a daily Road Checker’s Summary in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition).
- .5 The Road Checker’s Summary shall be provided to the Departmental Representative no less than 24 hrs after the relevant shift end.
- .6 To assist in the Road Checker’s role, the Contractor shall layout and stake stations at the appropriate intervals to achieve the desired accuracy throughout the Work Site. All survey and marking stakes shall be removed prior to completion of the Works.

- .7 The method of tests for asphalt appeal samples shall be the same method of tests conducted as during Quality Control testing.

3.2 METHODOLOGY

.1 ACP placement:

- .1 Asphalt concrete mix shall not be placed when the air temperature is below 4°C, or when rain is forecasted.
- .2 Asphalt concrete mix shall be placed only on clean, dry, and unfrozen surfaces.
- .3 Unless otherwise shown on the plans, the asphalt concrete mix shall be placed in the following lift thicknesses:
 - .1 in a single lift when the design compacted total thickness is 75 mm or less.
 - .2 in two or more lifts when the design compacted total thickness is greater than 75 mm. The lift thickness selection shall be determined by the Contractor except that:
 - .1 the maximum thickness of any lift shall be 75 mm.
 - .2 the minimum thickness of a final lift shall be 50 mm.
 - .3 On widenings, the thickness of asphalt concrete mix up to 75 mm may be placed in one lift. Over 75 mm thickness, the asphalt concrete shall be placed in two or more lifts.
- .4 Finished asphalt surface not to have irregularities exceeding 5mm when checked with 4.5m straight edge placed in any direction.
- .5 The edge of pavement shall have sloped paved shoulders following the existing side slope for the length of the paving limits, except where there is guardrail or curb and shall be constructed in conjunction with all lifts of ACP or as directed by the Departmental Representative.

.2 Integral Asphalt Curb:

- .1 The traffic facing side of the curb must not protrude into the travelled lanes further than the face of the guardrail above in consideration of snow plow conflicts.
- .2 Mixing and placing of asphalt curb material shall be in accordance with AT - Standard Specifications for Highway Construction (latest edition) – Section 4.1, Asphalt Curb, Medians, Traffic Islands and Flumes.
- .3 The bituminous mixture shall be produced, transported, and placed in accordance with the requirements of Specification 3.50, Asphalt Concrete Pavement (EPS).
- .4 Mix temperatures shall be sufficiently high to enable adequate mixing and compaction, but shall not be so high as to cause asphalt damage or curb instability.
- .5 The placing, compacting and finishing of asphalt curbs shall be accomplished by use of a mechanical curb machine of a type approved by the Departmental Representative OR hand-formed and compacted if reviewed and approved by the Departmental Representative prior to the works occurring.
 - .1 If hand-forming and compacting is discussed and approved, an alternative cross section may be discussed with the Departmental

Representative for approval in consideration of end product quality and functionality.

- .6 The bituminous mixture shall be laid only upon a dry, clean surface, and shall be integrated into the top lift of asphalt.
- .7 Asphalt concrete mix shall not be placed when the air temperature is below 4°C, or when rain is forecasted.
- .8 Asphalt concrete curb mix shall be placed only on clean, dry, unfrozen surfaces and be integrated into the top lift of asphalt.
- .9 Curb shall be placed in a continuous, one step operation, in one direction, with a minimum number of joints. Where joints are absolutely necessary, they shall be constructed so that they are virtually indistinguishable from the adjacent curb. Cold joints shall be tacked before new material is placed against them.
- .10 The finished asphalt curb shall be true to alignment and cross-section, thoroughly compacted, and shall have a smooth, tight, uniform surface texture which is free from segregation, defects, blemishes or other irregularities.

3.3 EQUIPMENT, PLANT AND MIXING REQUIREMENTS

- .1 Execution of the Work shall be in accordance with AT - Standard Specifications for Highway Construction (latest edition).
- .2 The Contractor will not be permitted to setup a Mobile Asphalt Plant for this Project.
- .3 Asphalt plant to be used on this project, regardless of location, shall be a minimum of 200 tonne per hour production plant, equipped with a dry bag system for pollution control, in addition to, or in replacement of standard cyclone dust collectors, to effectively eliminate emissions of dust and smoke pollutants into the atmosphere. Use of secondary dust collection systems, requiring discharge of dust polluted water into settling ponds or drainage system will not be permitted. In addition, Asphalt plant must comply with all environmental pollution control regulations applicable in the asphalt plant area. The plant operator must make daily inspections of the emission control components, to ensure proper working order and provide the most recent stack monitoring results for viewing by the Departmental Representative or their designate.

END OF SECTION

33 46 19 DRAIN PIPES**Part 1 General****1.1 DESCRIPTION**

- .1 Supply and installation of 300mm diameter PVC SDR-35 Drain Pipe for retaining wall construction including all fittings, bends and an approved grated inlet cover in accordance with the Contract Documents and as directed by the Departmental Representative.
 - .1 See also, Section 31 36 00 – Gabion Basket Retaining Wall
- .2 Supply and installation of 150mm diameter Corrugated HDPE (non-perforated) Drain Pipe for roadway surface drainage in accordance with the Contract Documents and as directed by the Departmental Representative.

1.2 REFERENCES

- .1 AT - Standard Specifications for Highway Construction (latest edition)
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .2 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³(600 kN-m/m³)).
 - .3 ASTM D1785, Specification for Polyvinyl Chloride (PVC) Plastic Pipe.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-[M88], Sieves, Testing, Woven Wire, Metric.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA B1800-11, Thermoplastic NonPressure Piping Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
 - .2 CAN/CSA-B182.11 Standard Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings
- .5 American Association of State Highway Officials, (AASHTO)
 - .1 AASHTO M294, Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Supply and installation of 300mm nominal diameter PVC-SDR-35 pipe drain shall be considered incidental to “**Lump Sum Price Item 3a – Supply and Install Gabion Basket Retaining Wall**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .2 Supply and installation of 150mm nominal diameter corrugated HDPE (non-perforated) pipe drain shall be measured in linear metres of approved drain pipe supplied and

installed in accordance with the Contract Documents and as directed by the Departmental Representative.

- .1 Payment shall be made under “**Unit Price Item 8a – Supply and Install Corrugated HDPE Drain Pipe**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .3 Items considered incidental to the Work include, but are not limited to:
 - .1 Supply, placement and compaction of imported drain rock for Gabion Wall construction and pipe bedding will be considered incidental to “**Lump Sum Price item 3a – Supply and Install Gabion Basket Retaining Wall**”
 - .2 Survey, layout and field adjustments as directed by the Departmental Representative.
 - .3 Supply and installation of inlet covers as proposed by the Contractor and reviewed and approved by the Departmental Representative, including provision of material specification/shop drawings for review.
 - .4 Supply and installation of all materials including anchors and fittings to complete the work as per the Contract Documents and manufacturer’s recommendations.
 - .5 All granular and asphalt material shaping to ensure positive drainage of the roadway surface through the drain pipes shall be considered incidental to “**Unit Price Item 4 – Granular Base Course and/or Unit Price Item 7 – Asphalt Concrete Pavement (EPS)**” as applicable.
 - .6 Supply and installation of riprap end treatments as specified in the Contract Documents and/or directed by the Departmental Representative shall be incidental to “**Unit Price Item 6 – Geotextile and Riprap**”.
 - .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
- .4 Traffic Control required for the work shall be incidental to “**Lump Sum Price Item 2 – Traffic Accommodation**” and no additional payment will be made.
- .5 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item 1 Mobilization/ Demobilization**” and no additional payment will be made.

1.4 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 - Quality Control.

1.5 SUBMITTALS

- .1 Submit Shop Drawings and material specifications for proposed drain pipe grated inlet covers to the Departmental Representative for approval prior to ordering.
- .2 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 – Environmental Procedures.

Part 2 Products**2.1 MATERIALS**

- .1 PVC Plastic Drainage Pipe and fittings shall meet SDR-35 and CSA and other industry standard requirements. Nominal pipe sizes 300mm.
- .2 Non perforated, corrugated HDPE Plastic Drainage Pipe and fittings shall meet CSA and other applicable industry standard requirements. Nominal pipe sizes 150mm.
- .3 Certifications to be marked on pipes.
- .4 Geotextile in accordance with Section 31 32 19 – Geotextiles, where applicable.

Part 3 Execution**3.1 BEDDING**

- .1 Retaining Wall Drain Pipe (PVC-SDR-35):
 - .1 Place and compact drain rock under supervision in accordance with the Contract Documents and **Section 31 36 00 – Gabion Basket Retaining Wall**.
 - .2 Roadside Drain Pipe (Corrugated HDPE):
 - .1 Place 150 mm layer of AT Designation 2 Class 20 granular base course to dimensions as specified in the Contract Documents or as directed by the Departmental Representative to facilitate the widening for the roadside drain and compact to minimum 100% of Standard Proctor density to ASTM D698.
 - .2 Embed pipe inlet into top lift of asphalt approximately 30mm to 50mm and tie-in to asphalt curb as directed by the Departmental Representative. Swale granular base and/or asphalt as required to ensure positive drainage.
 - .3 No trenching or bedding will be required along the length of pipe except and ends as specified.

3.2 INSTALLATION OF PIPE DRAINS

- .1 Retaining Wall Drain Pipe (PVC-SDR-35)
 - .1 The Contractor shall layout and construct the drain pipe in stages from the outlet and proceed in upstream direction in conjunction with the retaining wall construction as per the Contract Documents and as Directed by the Departmental Representative.
 - .2 The drain pipe shall be outlet shall be in line with and tied-into the outward face of the Gabion Basket Retaining Wall.
 - .3 The drain pipe shall be sloped at 2% min. to provide positive drainage.
 - .4 The Contractor shall make joints tight in accordance with manufacturer's instructions.
 - .5 Geotextiles shall be cut precisely to allow the drain pipe to pass through while maintaining the required granular material separation.
 - .6 Drain pipe inlet shall be laid out in consideration of the final grade requirements and dimensions of the approved grated inlet cover to ensure positive drainage and allow for any swale grading and placement of the asphalt curb.

- .7 The Contractor shall compact all backfill to the satisfaction of the Departmental Representative.
- .2 Roadside Drain Pipe (Corrugated HDPE):
- .1 The Contractor shall layout pipe drain location for review. Exact location will be confirmed in the field by the Departmental Representative,
- .2 Construct riprap outlet treatment as per the Contract Documents and in accordance with **Section – 31 37 00 – Riprap and Section – 31 32 19 – Geotextiles.**
- .3 The Contractor shall begin laying at outlet and proceed in upstream direction.
- .4 The Contractor shall make joints tight in accordance with manufacturer's instructions.
- .5 The Contractor shall install the drain pipe on existing ground and anchor in accordance with the Contract Documents and as directed by the Departmental Representative.
- .6 The pipe shall slope at a minimum of 2% and be free of sags or high points. Ensure barrel of each pipe is in contact with ground throughout full length.
- .7 Place 150 mm layer of AT Designation 2 Class 20 granular base course to dimensions as specified in the Contract Documents or as directed by the Departmental Representative to facilitate the widening for the roadside drain and compact to minimum 100% of Standard Proctor density to ASTM D698.
- .8 Embed pipe inlet into top lift of asphalt approximately 30mm to 50mm and tie-in to asphalt curb as directed by the Departmental Representative. Swale granular base and/or asphalt as required to ensure positive drainage.

END OF SECTION

33 71 14 W-BEAM GUARDRAIL

Part 1 General

1.1 DESCRIPTION

- .1 Removal and disposal outside the Parks of existing W-Beam Guardrail at locations as shown in the Contract Documents and as directed by the Departmental Representative.
- .2 Supply and installation of Strong Post W-Beam Guardrail with metal posts at locations identified in the Contract Documents and as directed by the Departmental Representative.
- .3 Supply and installation of Impact Absorbing Guardrail End Treatments at locations identified in the Contract Documents and as directed by the Departmental Representative.

1.2 REFERENCES

- .1 AT - Standard Specifications for Highway Construction (latest edition)
- .2 AT – Roadside Design Guide (latest edition)
- .3 CSA G40.20 and G40.21 - Structural Quality Steels
- .4 CSA G164-M - Hot Dip Galvanizing of Irregularly Shaped Articles
- .5 CSA W59-M - Welded Steel Construction (Metal Arc Welding)
- .6 CSA 080-M - Wood Preservation,
- .7 AASHTO Standard Designation M-180-841 "Corrugated Sheet Steel Beams for Highway Guardrail
- .8 ARTBA Technical Bulletin No. 268-B
- .9 NLGA Standard Grading Rules for Canadian Lumber

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 W-Beam Guardrail (rails and posts) removal and disposal, including end terminals, will be measured for payment in linear metres of W-Beam Guardrail removed and disposed of outside of the Parks in accordance with the Contract Documents and as accepted by the Departmental Representative.
 - .1 Payment shall be made under “**Unit Price Item 9a – Remove & Dispose of Existing Guardrail**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
 - .2 Supply and installation of Strong Metal Post W-Beam Guardrail shall be measured for payment in linear metres of complete strong metal post w-beam guardrail supplied, assembled and installed in accordance with the Contract Documents and as accepted by the Departmental Representative.
 - .1 Payment will be made under “**Unit Price Item 9b – Supply & Install Strong Metal Post W-Beam Guardrail**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

- .3 Supply and installation of Impact Absorbing Guardrail End Treatments shall be measured for payment by each end treatment supplied, assembled, installed in accordance with the Contract Documents and accepted by the Departmental Representative.
 - .1 Payment will be made under “**Unit Price Item 9c – Supply & Install Impact Absorbing Guardrail End Treatments**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .4 Items considered incidental to the Work include, but are not limited to:
 - .1 Dismantling the W-Beam rails, remove posts, dispose of the rails, hardware and posts outside the National Parks, backfill post holes, grade the area as necessary and clean up the work sites and/or reinstallation of posts and W-Beam rails.
 - .2 Site layout and modification as directed by the Departmental Representative.
 - .3 Site preparation, including but not limited to shoulder widening, grading and levelling to the standard required by the manufacturer of the Impact Absorbing Guardrail End Treatment.
 - .4 Supply and installation of reflectors.
 - .5 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
 - .6 Replacement of posts or guardrail elements damaged during removal for reinstallation are to be replaced at the Contractor’s expense.
- .5 Traffic Control required during work identified under this Section shall be included under “**Lump Sum Price Item 2 - Traffic Accommodation**” and no separate payment will be made to the Contractor.
- .6 Mobilization and demobilization required for this Work shall be included under “**Lump Sum Price Item 1 - Mobilization / Demobilization**” and no separate payment will be made to the Contractor

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit WHMIS SDS - Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
 - .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties, including mill certifications and galvanizing thickness test results performed by independent laboratory retained by the Contractor.
 - .4 Manufacturer's Instructions: submit manufacturer's storage and installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.5 QUALITY CONTROL

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 Provide certification by Professional Engineer licensed to practice in Alberta, that the Strong Metal Post W-Beam Guardrail system and Impact Absorbing Guardrail End Treatment meets the Contract Documents prior to delivery of materials.
- .3 Contractor to verify all W-Beam quantities in the field prior to ordering new W-Beam or end treatments.
- .4 Prior to installing any guardrail, the Contractor shall provide the Departmental Representative with a copy of the manufacturer's certificate verifying that materials supplied conform to Section 16 of CSA G40.20M, for each of the mechanical and chemical tests.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Store materials in accordance with manufacturer's recommendations
- .3 Replace defective or damaged materials with new.
- .4 Materials shall be inspected by the Contractor during delivery to ensure that they are free of defects.
- .5 Materials are to be stored in a secure location prior to installation as designated by the Departmental Representative.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.
- .2 All existing guardrails, posts and hardware shall become the property of the Contractor who shall dispose of it outside the National Parks in an approved facility.
- .3 Contractor to supply disposal ticket(s) to Departmental Representative for approval of disposal site(s) prior to its disposal.

Part 2 Products**2.1 GENERAL**

- .1 The Contractor shall inform the Departmental Representative and Owner and make clear at the Preconstruction Meeting, the proposed post material or system that they will supply and install. Steel post systems with spacer blocks are a requirement and that the complete system meets or exceeds NCHRP 350 TL-3 crash requirements.

2.2 MATERIAL

- .1 Strong Metal Post W-Beam Guardrail to be in accordance with AT –Standard Specifications for Highway Construction, Section 5.25 – Supply of W-Beam Guardrail and Posts (latest edition), or as contained herein, whichever requirement is more stringent.
- .2 Posts shall be W150 x 14 x 1830mm. Steel for post, spacer and hardware to be in accordance with manufacturer's recommendations, CSA Standard G40.21 Grade 350W

or ASTM Standard A36, and be hot dip galvanized after fabrication as per CSA G164-M or ASTM A123/A123M.

- .3 Impact absorbing guardrail end treatments shall meet or exceed NCHRP 350 TL-3 crash requirements and be approved for use in the current Approved Products List as published by AT.
 - .7 FLEAT-350 Impact absorbing end terminals are approved for use, though other AT approved equivalent products may be proposed by the Contractor and subject to the review and approval by the Departmental Representative.
- .4 Inspection of W-Beam Guardrail Material:
 - .1 Hot dip galvanized coating shall be smooth, free of beading or sharp projections at edges. Coating adherence shall prevent the peeling of any portion of the zinc coating so as to expose the base metal by cutting or prying with a stout knife under considerable pressure (bond check). A magnetic gauge will be used for checking thickness in accordance with ASTM Standard E316.3(c).
 - .2 Warped or otherwise deformed rails and terminal elements will be rejected, as will those with injurious defects or excessive roughness of the zinc coating. When the rail is laid on a flat surface, the warpage shall not be greater than 5 cm.
 - .3 Inspection of Posts and Blocks:
 - .1 The Departmental Representative may verify the penetration and retention of the preservative by the assay method.
 - .4 Posts and blocks shall be subject to inspection by the Departmental Representative when the bundles are opened immediately prior to use.
- .5 Reflectors:
 - .1 Reflectors to be hinged and double sided in accordance with Alberta Transportation TEB 3.01 Strong Post W-Beam Guardrail Hardware Wood Spacer and Block Post.
 - .2 Acceptable products include:
 - .1 Pexco Hinged Guardrail Reflectors.
 - .2 Or equivalent as approved by the Departmental Representative from the Alberta Transportation Recognized Product List (latest edition).
 - .3 Reflectors shall be attached by nailing or stapling to wooden posts or adhesives for metal posts, as accepted by the Departmental Representative.
 - .4 Reflectors to be either fluorescent yellow or white to comply with the nearest pavement lane marking colour.

2.3 RAILS AND TERMINAL ELEMENTS

- .1 W-beam guardrail shall consist of rail sections fabricated to develop a continuous beam strength with the necessary safety end feature components
- .2 All rail sections and other components shall match the design profiles and dimensions of the AASHTO/ARTBA hardware requirements for full interchangeability of similar components regardless of the manufacturer.

- .3 The name or trademark of the manufacturer, the metal thickness and the year of production shall be clearly and permanently stamped on each component clear of the splicing overlap and on the face opposite the traffic side.
- .4 The rails and terminal elements shall be manufactured from open hearth, electric furnace or basic oxygen semi-spring steel sheet and hot dip galvanized after fabrication, all in general accordance with the AASHTO Standard Designation M180-841 and shall conform to the relevant TEB and RDG drawings.
- .5 Rails shall be punched for splice and post bolts in strict conformity with the AASHTO Standard to the designated number and centre-to-centre spacing of posts. No punching, cutting or welding will be permitted on site except for special details in unforeseen and exceptional cases with the prior approval of the Departmental Representative.
- .6 If any guardrail installation requires curved W-beam rails, the Contractor shall form these to fit the radius of the existing highway.
- .7 The rails and terminal elements shall be manufactured according to the following standards:
 - .1 Metal properties of the base metal for the rails shall conform to the following requirements:
 - .1 Minimum Yield Point: 345 MPa
 - .2 Minimum Tensile Strength: 483 MPa
 - .3 Minimum Elongation: 12% in 50 mm length
 - .4 Sheet thickness shall be in accordance with Table 1 (Class A, Type 2) of AASHTO Standard M180-841 with a nominal base metal thickness of 2.8 mm (2.67 mm minimum).
 - .5 Sheet width for the W-beam rail shall be 483 mm, with a permissible tolerance of minus 3.2 mm.
 - .6 Welding for the fabrication of terminal elements shall conform to the requirements of CSA-W59M. Rails and terminal elements shall be hot dip galvanized after fabrication, in accordance with CSA-G164M.
 - .7 Drainage Slots: Cast-in as indicated in the Contract Documents.

2.4 BOLTS, NUTS AND WASHERS

- .1 Bolts, nuts and washers shall conform to ASTM-A307, and shall be hot dip galvanized in accordance with CSA-G164M (Drawing TEB 3.06).

Part 3 Execution

3.1 PREPARATION

- .1 Removal and disposal of existing guardrail sections and posts outside of the Park.
- .2 Backfill holes and perform minor grading as necessary.
- .3 Excavate accumulated granular material, load, haul, and dispose of material at a suitable disposal facility outside of the Park or as directed by Departmental Representative.

3.2 MANUFACTURER'S INSTRUCTIONS

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

3.3 INSTALLATION

- .1 The Contractor shall not install replacement guardrail until approved by the Departmental Representative. Each location will be reviewed and approved by the Departmental Representative.
- .2 Strong Metal Post W-Beam Guardrail and Impact Absorbing Guardrail End Treatments shall be installed permanently along the road embankment in accordance with Alberta Transportation Standard Drawings and the Contract Documents.
- .3 The installed top of rail height shall be in accordance with AT Specifications.
- .4 Contractor shall perform the layout of the Strong Post W-Beam Guardrail and Impact Absorbing Guardrail End Treatments. The layout shall be reviewed and approved by the Departmental Representative prior to the works occurring.
- .5 Site specific adjustments may be approved by the Departmental Representative noting similar recent Strong Post W-Beam Guardrail installations along Norquay Road.
- .6 Reflectors are to be installed as per Alberta Transportation TEB 3.01 Strong Post W-Beam Guardrail Hardware Wood Spacer and Block Post.
- .7 Restore and repair to the satisfaction of the Departmental Representative any damaged asphalt as a result of the removal or installation processes. Where asphalt ties-in to guardrail posts the Contractor shall ensure a compacted and watertight seal.

END OF SECTION