

01 11 00	SUMMARY OF WORK	4
01 14 00	WORK RESTRICTIONS	10
01 21 00	ALLOWANCES	18
01 25 20	MOBILIZATION AND DEMOBILIZATIONS	21
01 29 01	SITE OCCUPANCY	22
01 31 00	PROJECT MANAGEMENT AND COORDINATION	23
01 32 16	CONSTRUCTION PROGRESS SCHEDULES	27
01 33 00	SUBMITTAL PROCEDURES	30
01 35 29	HEALTH AND SAFETY REQUIREMENTS	38
01 35 31	SPECIAL PROCEDURES FOR TRAFFIC CONTROL	41
01 35 43	ENVIRONMENTAL PROCEDURES	48
01 45 00	QUALITY CONTROL	58
01 52 00	CONSTRUCTION FACILITIES	66
01 56 00	TEMPORARY BARRIERS AND ENCLOSURES	68
01 61 00	COMMON PRODUCT REQUIREMENTS	70
01 71 00	EXAMINATION AND PREPARATION	73
01 74 11	CLEANING	76
01 77 00	CLOSEOUT PROCEDURES	78
01 78 00	CLOSEOUT SUBMITTALS	79
02 81 01	HAZARDOUS MATERIAL	81
31 05 10	CORRECTED DRY DENSITY FOR FILL	84
31 05 16	AGGREGATE AND RIP RAP PRODUCTION	85
31 22 13	ROUGH GRADING	88
31 23 20	ROCK SCALING	90
31 24 13	ROADWAY AND DRAINAGE EXCAVATION	93
31 72 13	ROCK SUPPORT	103

**Drawings :**

CIVIL DRAWING INDEX		
SHEET NO.	REVISION	SHEET TITLE
0	REV 0	Title Page
1	REV 0	Drawing Index, Legend, Yoho Control Monuments, Project Location and Key Plan
2	REV 0	General Notes and Specifications
3	REV 0	Sherbrooke Rock Slope Typical Section and Rock Support
4	REV 0	Rock Support and Catchment Typical Details
5	REV 0	Rock Slope Finishing Details
6	REV 0	Rock Cut Construction Layout Typical Section Sherbrooke
7	REV 0	Sherbrooke Creek Rock Slope Plan STA 88+580 to 88+820
8	REV 0	Sherbrooke Creek Rock Slope Plan STA 88+820 to 89+060
9	REV 0	Sherbrooke Creek Rock Slope Cross Sections STA 88+500 to STA 88+660
10	REV 0	Sherbrooke Creek Rock Slope Cross Sections STA 88+670 to STA 88+720
11	REV 0	Sherbrooke Creek Rock Slope Cross Sections STA 88+740 to STA 88+840
12	REV 0	Sherbrooke Creek Rock Slope Cross Sections STA 88+860 to STA 88+960
13	REV 0	Sherbrooke Creek Rock Slope Cross Sections STA 88+980 to STA 89+100
C101	REV 0	Mt. Stephen Avalanche Berm Regrading Plan

**Reference Documents:**

1. Basic Impact Analysis Trans-Canada Highway Rock Slope Reprofilng 2015 Works – May 2015
2. Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure - May 2015
3. Project Overview Map – Sherbrooke Slope Reprofilng
4. Otertail Pit Plan – November 2017
5. Km 81 Quarry Pit Plan – October 30 2017
6. Mannix Pit Plan – November 2017
7. Hector Pit Plan – May 13 2017
8. 16 Mile Pit Plan – November 5 2016
9. Standard CMS Translations Rev 1 Nov 2016
10. Construction Signage Translation Rev 1 Nov 2016
11. INTERIM - Contractor WD Decontamination Protocol - LLYK26April2017 - signed.
12. YNP – TCH Slope Reprofilng Data Report – Km 88 to 91 and Km 114 to 128 – Rev03 IFU
13. Project Photos

**Project photos:**

Photos of the past site condition regarding excavation and embankment construction works.

*Photos are provided for reference and to prompt responsible investigations by potential Contractors.*

*They were taken at a specific time and do not represent the current condition for any time other than the specific time that they were taken. Potential Contractors are advised that the conditions depicted in the photos are very likely to have changed since the time of the photos and that they are wholly responsible for familiarizing themselves with the site prior to submitting their respective prices.*

## 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 British Columbia Ministry of Transportation and Infrastructure is referred to as "MoTI".
  - .1 BC MoTI specifications specified for the work can be found at the following website address:  
<http://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/standard-specifications-for-highway-construction>
- .2 Alberta Transportation is referred to as "AT".
  - .1 AT specifications specified for the work can be found at the following AT website address:  
[http://www.transportation.alberta.ca/images/Standard\\_Specifications\\_for\\_Highway\\_Construction\\_2013.pdf](http://www.transportation.alberta.ca/images/Standard_Specifications_for_Highway_Construction_2013.pdf)
- .3 Changes in Definition, - The following changes in definitions have been made to the "BC MoTI Specifications":
  - .1 Ministry Representative – The word "Ministry Representative" shall mean Parks Canada Departmental Representative or their duly appointed representative.
  - .2 Ministry – The word "Ministry" shall mean Parks Canada Agency.
- .4 Changes in Definition, - The following changes in definitions have been made to the "AT Specifications":
  - .1 Consultant – The word "Consultant" shall mean Departmental Representative or their duly appointed representative.
  - .2 Department – The word "Department" shall mean Parks Canada Agency.
- .5 Yoho National Park of Canada is referred to as "YNP".
- .6 Banff National Park of Canada is referred to as "BNP".
- .7 Kootenay National Park of Canada is referred to as "KNP".
- .8 TCH means Trans-Canada Highway
- .9 Parks Canada Agency is referred to as "PCA".
- .10 Canadian Pacific Railway is referred to as "CP Rail".
- .11 Environmental Surveillance Officer is referred to as "ESO".
- .12 Site means the areas on or within the limits of Construction as referenced on the Drawings and/or described in the Contract Documents.
- .13 Work means the provision of all labour, services, material, and equipment as necessary, for the Contractor to complete and perform its obligations in accordance with the Contract.

### 1.3 PROJECT LOCATION

- .1 The project is located in Banff National Park, Alberta / Yoho National Park, British Columbia / Kootenay National Park, British Columbia. Construction work is on the Trans Canada between Km 88.5 and Km 89.2. The following are key locations relative to the project:
  - .1 TCH km 0 – BNP East Gate
  - .2 TCH km 46 – Castle Mountain Interchange (Hwy 93S / TCH Intersection)
  - .3 TCH km 49.9 – Access Road to Mannix Pit
  - .4 TCH km 81 – Bedrock Reserve for Quarry Operations
  - .5 TCH km 82 – Alberta/British Columbia and Banff/Yoho National Park borders
  - .6 TCH km 88.5 – East End of Project
  - .7 TCH km 89.2 – West End of Project
  - .8 TCH km 93.7 – Mt. Stephen Berm
  - .9 TCH km 105.5 – Ottertail Pit
  - .10 Hwy 93S km 0 – Castle Mountain Interchange (Hwy 93S / TCH Intersection)
  - .11 Hwy 93S km 57.2 – Hector Pit Entrance
  - .12 Hwy 93S km 79.1 – Pit 16
  - .13 Hwy 93S km 103.2 – Kootenay South Gate

### 1.4 WORK COVERED BY CONTRACT DOCUMENTS

- .1 The project work consists of production drilling and blasting, excavation, rip-rap production, hauling and storage, aggregate production and traffic management.
- .2 All requirements noted within the Contract Documents shall be completed by the Contractor unless specifically stated otherwise.
- .3 Without limiting the scope of work, the work of this Contract generally comprises the following, as directed by the Departmental Representative:
  - .1 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.
  - .2 Conduct drilling and blasting of solid rock; hauling and stockpiling in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
  - .3 Produce Riprap in accordance with Section 31 05 16 – Aggregate and Rip Rap Production.
  - .4 Produce BC MoTI IGB 75mm Aggregate in accordance with Section 31 05 16 – Aggregate and Rip Rap Production.
  - .5 Grade the catchment area in accordance with 31 22 13 – Rough Grading.
  - .6 Perform safety scaling in accordance with Section 31 23 20 – Rock Scaling.
  - .7 Install rock support systems in accordance with Section 31 72 13 – Rock Support.
  - .8 Excavating Type D material from cut slopes and placing this material in embankments in accordance with Section 31 24 13 – Roadway and Drainage Excavation.

- .9 Supply and install temporary roadway paint markings during construction as required in accordance with Section 01 35 31 – Special Procedures for Traffic Control.
- .10 Traffic signage, control and other traffic accommodations in accordance with Section 01 35 31 – Special Procedures for Traffic Control.
- .11 Miscellaneous Additional Work as directed by the Departmental Representative.
- .4 The Contractor will be permitted to set up a crushing plant within the National Parks at locations as noted in the Contract Documents or as directed by the Departmental Representative.
  - .1 All blasted Type A material which is not required for Rip Rap shall be processed into 75 mm IGB. Oversized Type A pieces shall be mechanically broken down and processed by a primary jaw crusher. The primary jaw crusher shall have a minimum Horse Power of 300 HP. The secondary crushing plant to be used for this project, regardless of location, shall have a minimum combined Horse Power of 200 HP. No portion of the products of crushers or screening plants shall be wasted, but shall be stockpiled or used as directed by the Departmental Representative.
- .5 The Contractor is responsible for sourcing water required for the Works and may be required to obtain it from outside of the National Parks. Accessing local water sources in nearby pits or from other Parks facilities can be coordinated through the Departmental Representative and the ESO but will require the Contractor to obtain a Restricted Access Permit and to adhere to all conditions contained therein.
- .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 Documents. 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, **BC MoTI –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 will be contracted by Parks Canada:
  - .1 TCH Roadway Rehabilitation km 90 to km 127.5. Fall 2018
  - .2 Wildlife Overpass: km 84.5 to km 84.6. Summer 2018
  - .3 TCH Twinning km 82.5 to km 88, Summer 2018
  - .4 Otertail River Bridge Rehabilitation: km 107.2, Fall 2018
  - .5 Line painting at various locations. Spring 2017

- .6 Other projects and maintenance work may occur along the TCH in 2018.
- .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:
  - .1 Complete all blasting and remove all loose blasted Type A material from the blast site by **June 28, 2018**.
  - .2 Demobilize offsite prior to **June 28, 2018**, and undertake no Works and maintain no presence on site between **June 28, 2018** and **September 4, 2018**.
  - .3 Obtain the Interim Certificate (Substantial Performance) by **October 19, 2018**.
  - .4 Complete all of the Work by **October 26, 2018** (Contract Completion Date).
  - .5 Demobilize from site if at any time, the relevant area is declared to be at risk of being impacted by an avalanche.
  - .6 Remobilize to site only when the relevant area is declared to not be at risk of being impacted by an avalanche.

## 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 Work by other Contractors.
- .3 Coordinate use of premises under direction of the Departmental Representative.
- .4 Crushing operations cannot be located within the Highway Right of Way unless approved by the Departmental Representative.

- .5 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .6 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 There are no Owner furnished items readily available for the Contractor.

### **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 Detailed cross-section templates showing design centreline and shoulder grades.
  - .2 Complete set of construction Drawings.
  - .3 Alignment notes showing curve data and control point coordinates.
  - .4 Provide a list of control monuments including coordinates and elevations on request.
  - .5 Measurements for Payment (Quantity Surveys) and volumes by the surface to surface prismatic method for roadway and drainage excavation and neat line for all surfaces above the excavated surface at a maximum of 20m intervals. Coordinates unless otherwise stated are UTM Grid and no adjustments will be made to scale the coordinates to ground when calculated volumes by cross-section or setting out of work.
- .2 Contractor shall:
  - .1 Not permanently mark any infrastructure or feature during their setting out of the work. They shall fully remove any set out marks, markers, or other identifiers that they installed, prior to demobilizing from the Work Sites.
  - .2 Set additional control points as necessary.
  - .3 Set all work stakes necessary to complete work.
  - .4 Allow sufficient time for Departmental Representative to take measurements for payment.
  - .5 Not damage geodetic benchmarks or control monuments unless authorized by Departmental Representative.

- .3 No separate payment for setting out work, unless changes are made and approved by the Departmental Representative and additional survey costs are incurred. Payment for additional survey required due to changes by Departmental Representative to be paid for as part under **“Lump Sum Price Item 1 – Prime Cost Sum”**

**Part 2 Products**

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

**Part 3 Execution**

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

**END OF SECTION**

## **01 14 00 WORK RESTRICTIONS**

### **Part 1 General**

#### **1.1 ACCESS AND EGRESS**

- .1 All existing CP Rail accesses are to be maintained or relocated as required. Location and details of any proposed relocation to be approved by both CP Rail and PCA.
- .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 as far as possible and if new access must be provided, every effort shall be taken to provide the new access before the existing access is removed. 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.

#### **1.2 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 at Ottertail Pit. See Section 01 35 43 – Environmental Procedures.
- .5 The Contractor shall not store material or park equipment along the Highway 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 Section 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.

#### **1.3 WORKING TIMES**

- .1 Work in BNP, YNP, and KNP is permitted during daylight hours from 07:00 to 19:00, Monday to Saturday unless stipulated otherwise in the Contract documents.

- .2 Drilling works will be permitted from 19:00 to 07:00 Monday to Saturday unless stipulated otherwise in the Contract Documents.
- .3 No work will be permitted on Sundays unless prior written approval is granted by the Departmental Representative
- .4 The Contractor will not be permitted to work during the period of any Alberta or British Columbia statutory holiday long weekend, including one day prior to and one day following. The Contractor will not be permitted to work during the following Civic Holidays or long weekends unless prior written approval is granted by the Departmental Representative:
  - .1 Statutory and Civic Holidays (2018)
    - .1 BC Family Day weekend: From 19:00 Thursday February 8, 2018 to 07:00, Tuesday February 13, 2018.
    - .2 AB Family Day weekend: From 19:00 Thursday, February 16, 2018 to 07:00, Tuesday February 24, 2018.
    - .3 Good Friday weekend: From 19:00 Thursday, March 28, 2018 to 07:00 Tuesday, April 3, 2018.
    - .4 Victoria Day Weekend: From 19:00 Thursday May 17, 2018 to 07:00 Tuesday, May 22, 2018.
    - .5 Canada Day weekend: From 19:00 Thursday June 28, 2018 to 07:00 Tuesday, July 3, 2018.
    - .6 Heritage Day weekend: From 19:00 Friday August 2, 2018 to 07:00 Tuesday August 7, 2018.
    - .7 Labour Day long weekend: From 19:00. Thursday, August 30, 2018 to 07:00 Tuesday, September 4, 2018.
    - .8 Thanksgiving Day weekend: From 19:00 Thursday, October 4, 2018 to 07:00 Tuesday, October 10, 2018.
    - .9 Remembrance Day Weekend: From 19:00 Thursday, November 8, 2018 to 07:00 Monday, November 13, 2018.
- .5 The Contractor will not be permitted to work during special events unless written approval is granted by the Departmental Representative. PCA will provide two (2) weeks' notice of any upcoming special events. No claims for additional costs, delays, schedule impacts, loss of productivity or other extra Works resulting from the special event will be entertained.
- .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 this Variance will be entertained.

#### 1.4 WORK CONDUCTED OVER OR ADJACENT TO WATERWAYS

- .1 All components of the Work shall be conducted in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.
- .2 All components of the Work shall be conducted without equipment entering into wetlands, water bodies, or streams.

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

## 1.5 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 cooperate 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 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.
- .4 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the Work, using hand labour as required.
- .5 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.
- .6 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.

## 1.6 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, 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.

### **1.7 ARCHAEOLOGICAL RESOURCES**

- .1 The Archaeological Overview Assessment (AOA), included in the BIA, provides a list of areas of archaeological concern.
- .2 The Contractor shall undertake the Works in accordance with the Archaeological Impact Assessment Letter of Clearance and AOA as described in Section 01 35 43 - Environmental Procedures.

### **1.8 FISH HABITAT ASSESSMENTS**

- .1 Contractor shall adhere to recommendations for measures and standards to mitigate serious harm to fish as identified in the BIA.
- .2 The period of least risk for instream works is as noted in the BIA.

### **1.9 PROTECTION OF PERSONS AND PROPERTY**

- .1 The Contractor shall comply with all applicable safety regulations of WorkSafe BC and the Workers Compensation Act of British Columbia and Alberta 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 British Columbia and 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 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.
- .2 The Contractor is not permitted to use the pullout at km 89.25.
- .3 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, rip rap and

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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.

- .4 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.
- .5 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.
- .6 Construction areas and construction crossings shall be flood-lit for night operations.

#### **1.11 USE OF PITS AND QUARRIES**

- .1 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. Under no circumstances will waste of useable material be permitted, and excavations shall be continued to depths below water level if suitable material is available.
- .2 Expansion of working pits is not authorized unless written approval has been given from the Departmental Representative. The Contractor shall confine all work in the pit within the limits of the existing cleared area.
- .3 The Contractor must determine the quality and quantity of material available and the condition of the PCA pit or quarry made available to the Contractor
- .4 The Contractor is responsible for producing material in accordance with the Contract Documents should the Contractor choose to utilize the available pit(s) or quarry for the Work.
- .5 The Contractor shall be responsible for managing their working space within the pit(s) and quarries and coordination with Parks Canada contractors, personnel or others, to maintain access.
- .6 Any claims by the Contractor or its subcontractors arising from the quality and quantity of material available, condition of, access and working space within the available pits and quarries will not be entertained, even if those claims are associated with the activities of Contractors or works conducted for Parks Canada Agency.
- .7 No separate payment will be made for clearing, grubbing, disposal or relocation of stockpiles, debris or contaminated materials, or for any other costs of site preparation, pit development, or access, or for any delay or other cost arising from, the suitability of the referenced PCA pit, or the use of referenced PCA pits by others, and all costs thereof shall be covered in the prices for the Items under which payment is provided for the applicable materials

**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, or surplus material in a pit or other disposal sites outside of the National Parks the Contractor is responsible for all permits and approvals. Disposal site or pit development and reclamation 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 requirements in the Contract Documents.

**1.13 SUBMITTALS**

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

**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.

- .3 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence.
- .4 The Safety Representative shall possess a minimum of 2 years' construction safety supervisory experience. Their duties shall encompass all matters of safety activities from commencement of Work until the Total Performance of the Work.
- .5 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.
- .6 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.
- .7 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.

### **1.15 WASTE DISPOSAL**

- .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.
- .4 One "Bear Proof" garbage container will be provided by PCA in accordance with Section 01 74 11 - Cleaning.

### **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.

### **1.17 WINTER SHUTDOWN**

- .1 If the Work is scheduled to span over winter months, the Contractor shall prepare the Site for safe, efficient winter operations and the travelling public. Winter shutdown requirements include, but are not limited to, Erosion and Sediment Controls, relocation of barriers, re-instatement of damaged pavement, line painting, traffic signage, and re-instatement of existing highway speed limits for winter shutdown.
- .2 Although no guarantee is provided as to when winter shutdown will be required, in the past it has been mid-October to June 1.
- .3 The Contractor shall arrange a meeting with the Departmental Representative in mid-September, or as weather dictates, to review winter shutdown requirements.
- .4 All winter shutdown requirements shall be made to the satisfaction of the Departmental Representative, and no additional payment will be made.

## **Part 2 Products**

- .1 Not Used.

**Part 3 Execution**

.1 Not Used.

**END OF SECTION**

## 01 21 00 ALLOWANCES

### Part 1 General

#### 1.1 REFERENCES

- .1 General Conditions.

#### 1.2 PRIME COST SUM

- .1 Included in Contract Price a total Prime Cost Sum of **\$640,000.00**
- .1 Do not include in the Contract Price, additional contingency allowances for products, installation, overhead or profit.
- .2 Prime Cost Sum provided for in the Lump Sum Arrangement Table is not a sum due to the Contractor. Rather, payment will be made against it for miscellaneous work not included in the unit price table under the General Conditions of the Contract.
- .3 No interpretation of the items listed under Prime Cost Sum Allowances shall indicate that work will be included under the Prime Cost Sum. Items, tasks, and activities included in the Works elsewhere in the Contract, including Unit Price and Lump Sum Items, shall be paid as indicated in those sections and not under the Prime Cost Sum.
- .4 Any and all additional work must be approved in writing by the Departmental Representative prior to commencement.
- .5 All expenditures must be substantiated with verified invoices and/or accepted daily extra work reports as noted in Measurement and Payment Procedures below.
- .6 Such work may include, but not be limited to:
  - .1 Supply and installation of asphalt concrete pavement;
  - .2 Pavement removal;
  - .3 Crack filling, pot hole patching and other related minor asphalt repairs;
  - .4 Clearing and Grubbing;
  - .5 Stripping as directed by the Departmental Representative;
  - .6 Additional excavation and disposal of waste materials as directed by the Departmental Representative;
  - .7 Danger tree assessment and removal;
  - .8 Relocation or removal and disposal of existing signs, guardrail, guide posts and other miscellaneous items;
  - .9 Supply and installation of permanent signs (not construction signs);
  - .10 Supply and installation of lane markings;
  - .11 Additional survey resulting from changes made by the Departmental Representative;
  - .12 Relocation / protection of existing utilities, including payment of utility service provider costs;
  - .13 Utility Pole Relocation;
  - .14 Remediation or removal and replacement of unsuitable or contaminated soils not described in the Contract documents;
  - .15 Supply and installation of seeding;

- .16 Supply and installation of additional landscaping;
  - .17 Additional supply and installation of Riprap;
  - .18 Road structure repairs;
  - .19 Additional drainage improvements; ditching; culvert repairs; and cleaning;
  - .20 Sub-drainage not specified in the tender documents;
  - .21 Supply and installation of precast concrete barrier;
  - .22 Removal and disposal of existing guardrail or precast concrete barrier;
  - .23 Rehabilitation work in gravel pits;
  - .24 Additional rock scaling as directed by the Departmental Representative;
  - .25 Additional supply and installation of rock bolts;
  - .26 Additional supply and installation of rock slope drains
  - .27 Shoulder graveling;
  - .28 Revegetation of exposed slopes;
  - .29 Culvert installation and/or removal;
  - .30 Traffic control equipment additional to is required by the applicable regulations and standards;
  - .31 Relocation of existing structures;
  - .32 Additional processing of blast rock as requested by the Departmental Representative;
  - .33 Supply and maintenance of Departmental Representative's office trailer; and
  - .34 Miscellaneous work as directed by the Departmental Representative.
- .7 The Contract Price, and not Prime Cost Sum, includes Contractor's overhead and profit in connection with the Work.

### 1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Payment for Work under the **“Lump Sum Price Item 1 – Prime Cost Sum”** made using negotiated rates or by material, labour and equipment rates as per the following:
- .1 Rental rates will be in accordance with current British Columbia Roadbuilders and Heavy Construction Association rate schedule, and will be all inclusive and fully operated.
  - .2 Vehicles (ie. Pickup trucks) will be paid either at daily rates as per the British Columbia Roadbuilders and Heavy Construction Association (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.
- .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.

**Part 2 Products**

- .1 Products shall be in accordance with BC MoTI Standard Specifications for Highway Construction or as directed by the Departmental Representative.

**Part 3 Execution**

- .1 Work shall be in accordance with BC MoTI Standard Specifications for Highway Construction 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, camp, buildings, shops, offices, supplies and incidentals to and from the project sites.
- .2 Any protective measures or movement of Contractor trailers necessitated by animal interactions and required by Parks Canada will be paid by the Departmental Representative, and are not to be anticipated in the Lump Sum Contract Price for Mobilization and Demobilization.

#### **1.2 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Mobilization and Demobilization:
  - .1 Payment will be made under “**Lump Sum Price Item 2 – Mobilization / Demobilization**”.
  - .2 50% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.
  - .3 The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, camp, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.
  - .4 Payment of only **5%** of the total price tendered will be scheduled as outlined above. If the amount bid for mobilization and demobilization is greater than **5%** of the total price tendered, payment of the remainder of the amount will be authorized when the Contract has been completed.

### **Part 2 Products**

- .1 Not Used.

### **Part 3 Execution**

- .1 Not Used.

**END OF SECTION**

## **01 29 01 SITE OCCUPANCY**

### **Part 1 General**

#### **1.1 DEFINITION OF OCCUPANCY**

- .1 The Contractor shall be permitted to lease and 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 leased by the Contractor include all the roads and areas specified in the Contract documents and as directed by the Departmental Representative.
- .2 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 All sites' have been cleaned up and any outstanding deficiencies for the work identified under this Contract have been addressed to the satisfaction of the Departmental Representative.
  - .3 Contractor has removed from the park all trailers and equipment and sites have been cleaned-up to the satisfaction of the Departmental Representative.
- .3 If the Contractor has completed the work identified in the contract prior to June 28, 2018 (Section 01 11 00 – Summary of Work - Work Sequence), to the satisfaction of the Departmental Representative, Parks Canada will pay the Contractor an amount equal to site lease fee of \$50,000.00.

### **Part 2 Products**

- .1 Not Used.

### **Part 3 Execution**

- .1 Not Used.

**END OF SECTION**

## **01 31 00 PROJECT MANAGEMENT AND COORDINATION**

### **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 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 course of 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 make arrangements 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 at the Owner's site office, 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 – Construction Progress Schedules.
  - .3 Schedule of submittals in accordance with Section 01 33 00 – Submittal Procedures.
  - .4 Requirements for temporary facilities, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 – Construction Facilities.
  - .5 Site safety and security in accordance with Sections 01 14 00 – Work Restrictions, 01 35 29 – Health and Safety Requirements, 01 52 00 – Construction Facilities and 01 35 43 – Environmental Procedures.
  - .6 Quality Control in accordance with Section 01 45 00 – Quality Control.
  - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
  - .8 Owner-furnished materials.
  - .9 Monthly progress claims, administrative procedures, photographs, and holdbacks.
  - .10 Closeout procedures and submittals in accordance with Sections 01 77 00 – Closeout Procedures and 01 78 00 – Closeout Submittals.
  - .11 Insurances and transcript of policies.
  - .12 Other business.
- .4 Comply with Departmental Representative’s allocation of mobilization areas of site, for field offices and sheds, 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
- .16 WorkSafe BC Notice of Project

### **1.7 SUBMITTAL SCHEDULE**

- .1 In accordance with Section 01 33 00 – Submittal Procedures.
- .2 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.
- .3 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.

### **1.8 PROJECT SCHEDULES**

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

### **1.9 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.

### **1.10 CLOSEOUT PROCEDURES**

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

## **Part 2 Products**

- .1 Not Used.

**Part 3 Execution**

.1 Not Used.

**END OF SECTION**

## **01 32 16 CONSTRUCTION PROGRESS SCHEDULES**

### **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 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.
- .4 Construction Work Week: Monday to Saturday, inclusive, will provide six-day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: Number of work periods (not including holidays or other nonworking periods required to complete an activity or other Project element. Usually expressed as workdays or work weeks.
- .6 Master Plan: A summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: A significant event in Project, usually completion of a major deliverable.
- .8 Project Schedule: The planned dates for performing activities and the planned dates for meeting milestones. A dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: Overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

#### **1.3 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 Work performed and paid for as Prime Cost Sum. Refer to Section 01 21 00 – Allowances for a list of activities.
- .4 Plan to complete Work in accordance with prescribed Project Schedule.
- .5 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 revised project schedule.
- .7 During progress of Work revise and resubmit as directed by the Departmental Representative.
- .8 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 – Submittals 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.
- .3 Submit Project Schedule to Departmental Representative in accordance with Section 01 33 00 - Submittal Procedures.

#### **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.

#### **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
  - .5 Catchment grading
  - .6 Rock scaling
  - .7 Type A excavation
  - .8 Rip-rap production
  - .9 Aggregate production
  - .10 Rock bolt installation
  - .11 Rock drain installation
  - .12 Traffic signage
  - .13 Interim Inspection

- .14 Remediation of any noted deficiencies
- .15 Site Clean-up / Demobilization
- .16 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 Section 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. Activities considered behind schedule are those with projected start or completion dates later than current accepted dates shown on baseline schedule.
- .2 Meetings in accordance with Section 01 31 00 - Project Management and Coordination.

## **Part 2 Products**

- .1 Not Used.

## **Part 3 Execution**

- .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 Engineers and Geoscientist BC, or by a qualified technician registered in British Columbia 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 fourteen (14) calendar days for Departmental Representative's review of each submission.
- .6 Adjustments made on shop drawings by the Departmental Representative are not intended to change the Contract Price. If adjustments affect the value of Work, state such in writing to the Departmental Representative prior to proceeding with the Work.
- .7 Make changes in shop drawings as the Departmental Representative may require, consistent with the Contract Documents. When resubmitting, notify the Departmental Representative in writing of any revisions other than those requested.
- .8 Submit letter(s) of certification with all mix designs.
- .9 Accompany submissions with a transmittal letter containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, mix design, product and sample.
  - .5 Other pertinent data.
- .10 Submissions shall include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor,
    - .2 Supplier,
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with the Contract Documents.
  - .5 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.
- .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 Material samples to be provided as outlined in the Contract Documents or as requested by the Departmental Representative.

#### **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 twenty (20) days prior to mobilization to the project site:

- .1 Project schedule, detailing the schedule of the workdays required from Contractor, subcontractors, suppliers and consultants to complete each activity of the project by road segment or location in order to meet stages specified in Section 01 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

- .2 List of subcontractors, suppliers and consultants, their role and their key personnel, including names and positions, addresses, telephone and cellular telephone.
- .3 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.
- .4 Contractor 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.
- .5 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.
- .6 Quality Control Plan in accordance with Section 01 45 00 – Quality Control, including Quality Control checklist examples.
- .7 Traffic Management Plan, in accordance with the requirements of Section 01 35 31 – Special Procedures for Traffic Control.
- .8 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.
- .9 Site Access and Detour Plans shall include, but not be limited to, engineered Drawings and procedures for accessing all areas of the Work or for proposed detours.
- .10 Survey Plan describing the Contractor's intended methods of surveying during this project.
- .11 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.
- .12 Contractor and any subcontractors to submit a copy of their valid Parks Canada Business License.
- .13 Health and Safety Plan - The Contractor shall have a Certificate of Recognition (COR) or Registered Safety Plan (RSP) including a site specific Health and Safety Plan acceptable to the Departmental Representative. The Contractor shall implement and maintain the Health and Safety Plan during the Work. Health and Safety Plan must include in accordance with Section 01 35 29 – Health and Safety Requirements.
- .14 BC One Call and Utilities Coordination Plan, including notifications to Utility Owners.

- .15 Blasting Safety Plan, describing special procedures to be followed during rock blasting to ensure protection of the public and workers in accordance with Section 01 35 29 – Health and Safety Requirements.
- .16 Contractor Experience and Qualifications: The Contractor shall provide a statement of the qualifications to the Departmental Representative including:
  - .1 Experience and duties of all personnel assigned to drilling and blasting activities.
  - .2 A summary of previous project experience including the project name, location, volume of rock, year constructed, and the owner/client name and contact information.
  - .3 The company, the driller, and the blaster shall each have a minimum of five (5) years' experience in drilling and controlled blasting. Work experience should include at least three (3) projects involving rock cuts over 8 m height, and at least one (1) of the aforementioned three shall be along transportation corridors.
- .17 Blasting Consultant Experience and Qualifications: The Blasting Consultant shall have a minimum of five (5) consecutive years of demonstrated experience in preparing successful blast designs along transportation corridors for at least three (3) projects and be a registered Professional Engineer in the Province of British Columbia. The Contractor shall provide the following information about the Blasting Consultant to the Departmental Representative:
  - .1 A list of at least three (3) projects (including project name, location, and description) demonstrating experience in preparing successful blast designs.
  - .2 Name and phone number of owner/client contact who can verify the experience of the Blasting Consultant's site representative.
  - .3 Qualifications of the Blasting Consultant's on-site representative who will be providing the Quality Assurance for rock excavation.
- .18 The Contractor shall provide and follow a blast design, approved and signed by the blasting consultant, not less than one week prior to commencing drilling and blasting operations and a minimum of one day before the Contractor proposes to implement any changes to the previously utilized drilling or blasting methods. The design may be prepared by the blaster, but shall be reviewed by the Contractor and forwarded to the blasting consultant for signing. The design shall contain full details of the drilling and blasting patterns and controls that the Contractor proposes to use for controlled blasting. The blast design shall contain the following minimum information:
  - .1 Date the design was prepared and proposed date of blast.
  - .2 Station limits of proposed blast.
  - .3 Plan and section views of proposed drill pattern including free face, burden, blasthole spacing, blasthole diameters, blasthole angles, lift height, hole depth, and subdrill depth.
  - .4 The location of production (including buffer) and backline holes.
  - .5 Loading diagram showing type and amount of explosives, primers, initiators, and location and depth of stemming.
  - .6 Initiation sequence of blastholes including delay times and delay system.

- .7 Manufacturer's data sheets for all explosives, primers, delays, and initiators to be used.
- .8 Blasting consultant's signature, printed name, and company name.
- .9 Blaster's signature, printed name, company name, and blaster's certificate number
- .19 The Contractor shall not begin any Work on the Site until the Departmental Representative has provided a Notice to Proceed.
- .20 Submit a copy of the filed Notice of Project with Provincial authorities.
- .3 Construction Phase Submittals
  - .1 Monthly Progress Reports in accordance with Section 01 32 16 – Construction Progress Schedules.
  - .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 road segment or location identified in project schedule and to provide information on materials, equipment and manpower. Also, alternate Work to be identified if Work or a portion of, proposed cannot be done due to weather, equipment breakdown, delays in delivery, etc. 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 "Design and Build" documents, Shop Drawings and Mix Designs – The Contractor shall submit all design drawings, shop drawings and mix designs required to fabricate and / or conduct the work a minimum fourteen (14) days prior to fabrication / production.
  - .5 The Contractor shall submit manufacturer's data sheets for all explosives, anchorages, concrete guardrails, fencing, and all other products to be incorporated into the Work prior to their use on the Work Site
  - .6 Progress Photographs:
    - .1 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.
  - .11 As-Built Blasting Record: Not more than one (1) working day after completing work at each location, the Contractor shall submit an As-Built Blasting Record to the Departmental Representative. The As-Built Blasting Record shall indicate all deviations from the Proposed Blast Design; state the actual date, time, and duration of blasting; and identify any known or suspected damage, traffic delays, or other problems that may have resulted from blasting. The As-Built Blasting Record will show all actual blast details in a format that permits direct comparison with the proposed blast design. As-Built Blasting Records that are inadequate will be returned to the Contractor for revision and re-submittal prior to acceptance. Re-submittal shall be no longer than two (2) working days of the return to the Contractor. If appropriate, the Proposed Blast Design may be used as the As-Built Record as long as it is signed as such.
  - .12 Blasting Consultant Field Report: Within three (3) days following each site visit, the Contractor shall submit a Field Report prepared by the Blasting Consultant. The Field Report shall document observations and recommendations made by the Blasting Consultant and consist of two (2) to four (4) typed pages plus relevant photographs and drawings.
  - .13 Vibration and Peak Overpressure Records: The Contractor shall provide vibration and peak overpressure records including monitoring results and interpretation following each blast, where a prescribed limit has been placed on blast vibrations and/or overpressures. These should be submitted as an appendix to the As-Built Blasting Record report.
- .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 within the Contract Documents, and under Section 01 78 00 – Closeout Submittals.
- .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**

- .1 Not Used.

**Part 3 Execution**

- .1 Not Used.

**END OF SECTION**

## **01 35 29 HEALTH AND SAFETY 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 REFERENCES**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System  
.1 (WHMIS) Material Safety Data Sheets (MSDS).
- .3 Province of British Columbia / Alberta - Occupational Health and Safety Act, depending on the province where the Work is occurring.

#### **1.3 SUBMITTALS**

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

#### **1.4 FILING OF NOTICE**

- .1 File Notice of Project with Provincial authorities prior to beginning of Work and provide a copy to the Departmental Representative. Notice of Project to be posted onsite upon mobilization and remain posted until project completion.

#### **1.5 SAFETY ASSESSMENT**

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

#### **1.6 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.
- .3 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.

## **1.7 REGULATORY REQUIREMENTS**

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

## **1.8 PROJECT / SITE CONDITIONS**

- .1 Work at site will involve contact with British Columbia / Alberta Occupational Health and Safety, depending on which province the Work is occurring in.

## **1.9 GENERAL REQUIREMENTS**

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

## **1.10 RESPONSIBILITY**

- .1 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.

## **1.11 COMPLIANCE REQUIREMENTS**

- .1 Comply with Occupational Health and Safety Act, General Safety Regulation, British Columbia / Alberta, depending on which province the Work is occurring in.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

## **1.12 UNFORESEEN HAZARDS**

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

## **1.13 HEALTH AND SAFETY 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.

#### **1.14 POSTING OF DOCUMENTS**

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

#### **1.15 CORRECTION OF NON-COMPLIANCE**

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

#### **1.16 BLASTING**

- .1 Production of blasting powder must be done in accordance with Section 01 35 43 – Environmental Procedures
- .2 Do blasting operations in accordance with Section 31 24 13 – Roadway and Drainage Excavation.

#### **1.17 POWDER ACTUATED DEVICES**

- .1 Use powder actuated devices only after receipt of written permission from the Departmental Representative.

#### **1.18 WORK STOPPAGE**

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

#### **Part 2 Products**

- .1 Not used.

#### **Part 3 Execution**

- .1 Not used.

**END OF SECTION**

## 01 35 31 SPECIAL PROCEDURES FOR TRAFFIC CONTROL

### Part 1 General

#### 1.1 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Cost of Traffic Control, including temporary pavement marking, described in this Section, shall be considered incidental to **“Lump Sum Price Item 3 – Traffic Accommodation”**, and no additional payment will be made for the duration of the Contract.
- .2 The Contractor shall receive payment for traffic management on a monthly basis prorated by the number of months working on site divided by the number of months on site identified on Contractor schedule, not to exceed the total lump sum bid price for Traffic Management.
- .3 Payment for traffic control will commence once the Contractor has implemented their accepted Traffic Management Plan and setup is accepted by the Departmental Representative.
- .4 Cost of keeping the existing roadway within the Work limits, clean, free of pot holes while Contractor is on site shall be considered incidental to **“Lump Sum Price Item 3 – Traffic Accommodation”**, and no additional payment will be made for the duration of the Contract.
- .5 The cost of snow removal required by the Contractor to complete the work identified in the Contract shall be considered incidental to **“Lump Sum Price Item 3 – Traffic Accommodation”**, and no additional payment will be made for the duration of the Contract.
- .6 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.
- .7 Payment for the removal and disposal of the traffic barriers onsite will be considered incidental to **“Lump Sum Price Item 3 – Traffic Accommodation”** and shall include all costs associated with labour, materials, and equipment required to complete the Work.

#### 1.2 REFERENCES

- .1 The Contractor shall provide traffic control in accordance with:
  - .1 British Columbia - Traffic Control Manual for Work on Roadways (1999)
  - .2 BC MoTI – Standard Specifications for Highway Construction – Traffic Management for Work Zones (latest edition)
  - .3 Manual of Uniform Traffic Control Devices for Canada, (MUTCD) distributed by Transportation Association of Canada. (latest edition)

#### 1.3 QUALITY CONTROL

- .1 All Quality Control by the Contractor.

#### 1.4 GENERAL

- .1 The Contractor will not be permitted to remove the temporary pavement marking until the final pavement markings have been installed to the satisfaction of the Contract and Departmental Representative.
- .2 At all work sites, the Contractor shall mark **accurately**, at regular intervals, the location and type of existing painted lines prior to their removal or covering, including start and ends of passing lanes and intersections, with a stake at the side of the roadway and make a written record of markings in a book, in order that painted lines can be accurately re-established after work is completed. If no lines are present the Contractor shall mark **accurately (+ or – 20 mm)** and at regular intervals in accordance with the Section 2.2.1 of the **“BC MoTI - Traffic Control Manual for Work on Roadways, 1999”**.
- .3 The Contractor shall develop and implement a Traffic Management Plan in accordance with BC MoTI - Traffic Control Manual for Work on Roadways (1999), except where specified otherwise in the Contract Documents. The Traffic Management Plan will include plans specific to each roadway for this project.
- .4 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 20 minutes.
- .5 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.
- .6 The Contractor shall supply, install and maintain two (2) Flashing Arrow Boards (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 3 – Traffic Accommodation”**. Removal will only be permitted upon completion of the Works.
- .7 The Contractor shall supply, install and maintain two (2) Portable Changeable Message Signs (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 3 – Traffic Accommodation”**. Removal of the CMS will only be permitted upon completion of the Works.
- .8 The Contractor shall supply, install and maintain two (2) speed reader boards (SRB), as required for the Works. Exact installation locations of SRBs to be agreed on site with the Departmental Representative. All cost associated with the supply, installation, maintenance and removal of SRBs will be incidental to **“Lump Sum Price Item 3 – Traffic Accommodation”**. Removal will only be permitted upon completion of the Works.
- .9 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.

- .10 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.
- .11 All speed limits, traffic control and warning signs shall have an “NPC” adhesive sticker added to bottom right-hand corner. These stickers will be supplied by Parks Canada following the acceptance by the Departmental Representative of the Contractor’s traffic management plan.
- .12 Temporary pavement marking used shall be acceptable to the Departmental Representative and in accordance with Section 2.2.1 of the BC MoTI Traffic Control Manual for Work on Roadways, 1999. Spacing between temporary line markings to not exceed 10m.
- .13 All temporary pavement markings will be removed at the Contractor’s expense prior to the completion of the Contract.
- .14 Temporary lane markings that are not consistent with the final geometric design layout shall be removed using eradication or water blasting to the satisfaction of the Departmental Representative. Blackout painting of existing lines will not be permitted. No additional payment will be made for removal of existing paint lines.
- .15 Contractor shall have appropriate traffic control measures in place so that one lane of highway traffic is maintained in each direction through the work zone at all times throughout the construction.
- .16 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.
- .17 The Contractor is responsible for keeping the roadway, within the Construction Limits, clean at all times. Sweeping, grading 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 BC MoTI – Standard Specifications for Highway Construction – Traffic Management for 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 highway and minimize risks to motorists prior to beginning Work. This plan shall be updated regularly in response to any incidents or changes in conditions, be they weather, work, traffic, or otherwise.
- .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 **20 minutes**.
- .6 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 BC MoTI - Traffic Control Manual for Work on Roadways (1999), except where specified otherwise.
- .7 Contractor to provide a minimum of 10.0m wide available paved surface for traffic, with at least one lane in each direction, unless otherwise authorized by the Departmental Representative.
- .8 Regardless of type of traffic control being used, maximum period of delay to public traffic shall be 20 minutes. Emergency vehicles (i.e., ambulance, RCMP, Park Warden) must be granted immediate passage at all times. The Departmental Representative reserves the right to reduce delay time for public traffic at times when specified delay results in excessive backup of public traffic.
- .9 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.
- .10 Traffic control measures will be monitored by the Departmental Representative, who may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traveling public and coordination with adjacent contracts.
- .11 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 each end of the Work site, supply, install and maintain CMS's with a minimum of three (3) lines with 8 characters for the duration of the project.
- .4 Place signs and other devices to standards and in locations recommended in BC MoTI - Traffic Control Manual for Work on Roadways (1999). 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 BC MoTI - Traffic Control Manual for Work on Roadways (1999), 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

- .1 Contractor shall provide competent flag persons, trained in accordance with, and properly dressed and equipped as specified in BC MoTI - Traffic Control Manual for Work on Roadways (1999).
  - .1 When public traffic is required to pass working vehicles or equipment, that block all or part of travelled roadway.
  - .2 When vehicles are entering or exiting Work Site access points.
  - .3 When vehicles are entering or exiting gravel pits in the park.
  - .4 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
  - .5 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
  - .6 Where temporary protection is required while other traffic control devices are being erected or taken down.
  - .7 For emergency protection when other traffic control devices are not readily available.
  - .8 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
  - .9 At each end of restricted sections where pilot cars are required.
- .2 Delays to public traffic due to Contractor's operations: **maximum 20 minutes**. In consideration of the anticipated cumulative effect of the multiple construction sites in the corridor traffic total travel time delay through the construction zones must not exceed 90 minutes, as a result of all construction activities in YNP. To maintain that objective a concerted effort must be made between all of the active contractors to coordinate construction sequencing.
- .3 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.
- .4 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.

- .5 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 70 km/h in work zones in non-work periods.
  - .2 Speed limit reduced to 50 km/h in work zones in work periods.
  - .3 Speed limit reduced to 50 km/h in all detours.
  - .4 Contractor to provide a minimum of 10.0m wide available paved surface for traffic, with at least one lane in each direction, unless otherwise authorized by the Departmental Representative.
  - .5 The delay due to single lane alternating traffic shall not exceed 20 minutes.
  - .6 Full traffic closures for the purposes of blasting will be permitted under the following conditions:
    - .1 Short full closures for a maximum of 30 minutes will be permitted by the Departmental Representative, provided the delay to motorists does not exceed 45 minutes.
    - .2 Two 60 minute site wide closures per day between 09:00 hrs and 13:00 hrs.
    - .3 One 60 minute site wide closure per day between 19:00 hrs and 07:00 hrs. Blasting must be completed during daylight hours.
    - .4 30 minutes elapse time between full closures.
    - .5 Full closures are only permitted on Monday, Tuesday, Wednesday, Thursdays, Fridays, and Saturday and as otherwise limited under Section 01 14 00 Work Restrictions.
    - .6 Traffic shall not be stopped for construction work on Sundays.
    - .7 From June 15 to October 2 the Contractor shall not blast during the following times to accommodate the Bus Schedule at O'Hara Lake;
      - .1 From 07:30 to 08:30
      - .2 From 09:30 to 10:30
      - .3 From 14:30 to 15:30
      - .4 From 16:30 to 17:30
  - .7 A schedule for all full work zone closures required longer than 45 minutes must be provided to the Departmental Representative at least one (1) week in advance of the planned closure.
  - .8 There may be restrictions to accommodate special events within the National Parks. PCA will provide two (2) weeks' notice of any upcoming restrictions.
  - .9 The Departmental Representative reserves the right to stop work in the case of excessive traffic delays. The Contractor shall do as requested at their cost and no claim for time or additional costs will be accepted.
  - .10 Maintain existing conditions for traffic crossing right-of-way.

- .11 Provide the Departmental Representative with construction advisories for posting to the DriveBC website (<http://www.drivebc.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.
- .13 No stoppage of traffic shall be allowed during inclement weather conditions.
- .2 Maintain existing conditions for traffic crossing right-of-way.
- .3 No stoppage of traffic shall be allowed during inclement weather conditions.

**Part 2 Products**

- .1 Not used.

**Part 3 Execution**

- .1 Not used.

**END OF SECTION**

## **01 35 43 ENVIRONMENTAL PROCEDURES**

### **Part 1 General**

#### **1.1 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 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.
- .2 The cost of environmental and aesthetic protection in accordance with this Section 01 35 43 – Environmental Procedures will not be measured separately for payment and will be considered incidental to the Work.

#### **1.2 REFERENCES**

- .1 Basic Impact Analysis – Trans-Canada Highway Rock Slope Reprofilng 2015 Works – May 2015
- .2 Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure - May 2015.
- .3 INTERIM - Contractor WD Decontamination Protocol - LLYK26April2017 - signed.

#### **1.3 SUBMITTALS**

- .1 The Contractor is required to prepare an Environmental Protection Plan in accordance with this Section 01 35 43 – Environmental Procedures and Section 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 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 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)**

- .1 Execution of the work is subject to the provisions within the *Canadian Environmental Assessment Act* (CEAA) Guidelines Order of 2003 and subsequent amendments.
- .2 Refer to the PCA Basic Impact Analysis (BIA) and Best Management Practices (BMPs) for the Work included with this tender. 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 the BIA.

- .3 The Contractor shall prepare their Environmental Protection Plan (EPP) to implement the mitigations identified in the BIA 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 the BIA and other documents, the BIA 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.

## **1.6 START-UP AND ENVIRONMENTAL BRIEFING**

- .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's QEP shall be responsible for ensuring all activities are conducted in accordance with the approved environmental 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 the BMPs and BIA.
- .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 2 weeks for the review of their EPP** and shall address and respond to all comments raised during the review within a maximum of 2 weeks.

## **1.8 RESTRICTED ACTIVITY PERMITS**

- .1 Prior to commencing any activity, the Contractor may be required to first obtain a Restricted Activity Permit (RAP) in consultation with PCA and Departmental Representative.
- .2 Prior to mobilization, Contractor is to establish what RAPs are required for the Works, for the duration of the project. Include, in the project schedule, the acquisition of the application for RAPs, allowing no less than 2 weeks for review and acceptance by the ESO.
- .3 Contractor shall list RAPs they require 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 / equipment information.
- .6 Following the application submission, the Contractor may be required to provide further details regarding the Work to PCA.
- .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 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, 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 BIA, the BIA shall take precedence.

#### **1.11 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES**

- .1 A RAP application will be required for any permitted Work camps or off-highway operation of a motor vehicle.
- .2 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.
- .3 Removal and storage of snow shall be in accordance with Section 01 35 31 - Special Procedures for Traffic Control. If coordination is required, the Contractor shall coordinate through the Departmental Representative.
- .4 The Contractor shall control blowing dust and debris generated from the construction site by means such as covering or wetting down dry materials and rubbish. Dust 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's QEP 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, 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 SPECIFIC CONCERNS RELATIVE WATER DIVERSIONS**

- .1 The Contractor's EPP shall describe the proposed locations and types of temporary stream or channel diversions, complete with construction procedures and timing of construction. Temporary stream or channel diversions shall be subject to the same environmental constraints as permanent watercourses and shall be built to pass, at least, the 10 year return period flood for the time of year during which the temporary diversion will be in place. Temporary stream or channel diversions that have been constructed during periods of low precipitation (i.e. fall and spring freshet), unless otherwise approved by the Departmental Representative.

### **1.14 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's QEP 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 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. 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.

#### **1.15 EQUIPMENT MAINTENANCE, FUELLING AND OPERATION**

- .1 The Contractor shall ensure that all soil, seeds and any debris attached to construction equipment to be used on the project site shall be removed (e.g. power washing) outside the National Parks before delivery to the work site.
- .2 Equipment fuelling sites will be identified by the Contractor and approved by the Departmental Representative and the ESO. Except for chain saws, any fuelling closer than 100 metres any streams, wetlands, water bodies or waterways shall require the authorization and oversight of the Departmental Representative.
- .3 Diesel and gasoline delivery vehicles, including bulk tankers shall be parked more than 100 metres from any streams, wetlands, water bodies or watercourses. Gravity fed fuel systems are not allowed. Manual or electric pump delivery systems shall be used. Fuelling personnel shall maintain presence at and immediate attention to the fuelling operation.
- .4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage sites is addressed 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 Section 01 52 00 - Construction Facilities.

### **1.16 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.

### **1.17 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. Fires or burning of waste materials is not permitted.
- .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.

### **1.18 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.

### **1.19 RELICS AND ANTIQUITIES**

- .1 Artifacts, relics, antiquities and items of historical interest such as cornerstones, commemorative plaques, inscribed tablets and similar objects found on the work site shall be reported to the ESO or the Departmental Representative immediately. The Contractor and workers shall wait for instructions before proceeding with their work.
- .2 All historical or archaeological objects found in 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.

### **1.20 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**

- .1 Not Used.

## **Part 3 Execution**

### **3.1 WATER EXTRACTION AND DISTRIBUTORS**

- .1 All water related activities are to be conducted in accordance with Direction for Permitted Users conducting water-related activities in Alberta.
- .2 Backflow prevention is required on all water trucks.
- .3 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.
- .4 Extraction of water within any National Park requires a RAP.
- .5 Care must be taken by the Contractor to ensure extracted water does not enter another water body, other than the initial source of extraction.
- .6 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.

### **3.2 CLEARING AND GRUBBING**

- .1 Clearing, grubbing and/or tree removal is only permitted during the migratory bird least risk window, which is September 5 – April 15 in Yoho 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.

### **3.3 SPECIFIC CONCERNS RELATIVE TO SENSITIVE SITES AND ACTIVITIES**

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

### **3.4 SPECIFIC CONCERNS RELATIVE TO BLASTING AND SCALING**

- .1 Blasting and Scaling will be done in accordance with Section 31 23 20 – Rock Scaling and Section 31 23 21 – Rock Blasting.

- .2 Prior to blasting and during scaling, the Contractor shall sweep the work area and maintain a continuous watch for wildlife that may be present. If wildlife are present, work shall be halted until the wildlife have passed through the area or have been hazed out of the area by the ESO or a Park Warden. No claim for time or additional costs will be accepted.
- .3 Steps shall be taken to minimize fly rock and dust. Vegetation outside the designated area shall not be damaged or destroyed.
- .4 Ditches shall be formed and cleaned upon completion of the Work and the natural drainage shall be restored as specified or as directed by the Departmental Representative.
- .5 The Contractor shall describe the proposed type and quantities of explosives to be used to the satisfaction of the Departmental Representative and ESO. Blasting products that may produce high residual nitrogen concentrations (such as ANFO) will not be permitted.

**END OF SECTION**

## **01 45 00      QUALITY CONTROL**

### **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      Canadian Standards Association (CSA)
  - .1      CAN/CSA-A23.2-04, Methods of Test and Standard Practices for Concrete
- .2      BC MoTI – Standard Specifications for Highway Construction Manual (latest edition)

#### **1.3      QUALITY CONTROL PLAN**

- .1      Contractor's quality control plan shall be in accordance with Section 101 of the BC MoTI – Standard Specifications for Highway Construction (latest edition).
- .2      Submittals in accordance with Section 01 33 00 – Submittals Procedures.

#### **1.4      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 BC MoTI 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	1 per 1000 m <sup>2</sup> per lift, spaced randomly across full width of embankment
	Proof Roll and or Rutting Test	As required by the Departmental Representative
Embankment construction with blasted rock or oversize granular	Field observation with daily field report; and a summary report signed and stamped by the Contractor's Engineer.	Full time during blasted rock placement
Road structure construction with granular materials	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 m per lift; on centreline and on lt and rt fog lines
	Proof Roll and or Rutting Test	As required by the Departmental Representative
Culvert Installation	Field Density	Minimum three per 300 mm lift per culvert, spaced through the length and depth of the culvert backfill

	ASTM Test	*Minimum Frequency
Tests During Aggregate Production	ASTM C136 / C136M – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates  Or  C 117 – Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing	- Split Stockpiles: 1 for each stockpile for every 2 hours of production.  - One main stockpile: for every 300 tonnes.  - Blend Sand: 1 for every 100 tonnes during stockpiling.  - Natural filler: 1 for every 50 tonnes during stockpiling.

Tests During Aggregate Production (cont.)	ASTM D5821 – Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate	Every second coarse aggregate sieve test
	C 117 – Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the crusher
Asphalt Products Tests	Tack and Prime	Mill certifications.
Tests during Asphalt Plant Mixing	C 136 / C 136M – Dry Sieve Analysis of Aggregate	1 of combined aggregate (off the belt) every 300 tonnes.
	D 2216 – Moisture Content	Aggregate: 2 tests/Lot  Asphalt mix: 1 on first Sub-Lot and every second day.
	C 117 – Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the plant cold feed.
	D 5581 – Resistance to Plastic Flow Using Marshall Apparatus	One set of three briquettes for 1,200 tonnes or Lot, whichever is less.
	D 6307 – Asphalt Extraction, Ignition Method	One/Sub-Lot.
	D 5 / D 5M – 13 Penetration of Bituminous Materials	One per Manufacturer's Batch. Samples should be taken for every 3000 tonnes of mix production.
	D 2171 / D 2171M – Viscosity	Contractor's Option
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.*

## 1.5 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 Contract Document compliance.
- .4 The Contractor shall appoint a full time qualified and experienced Quality Control Manager, 100% of their time dedicated to quality matters and who will report regularly to the Contractor's management at a level that shall ensure that Quality Control requirements are not subordinated to manufacturing, construction or delivery. The Quality Control Manager shall be empowered by the Contractor to resolve quality 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 products and workmanship with Contract requirements. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.
- .7 At completion of the Work a bound and itemized copy of all Quality Control documents and reports shall be prepared by the Contractor's Quality Manager and submitted to the Departmental Representative.

## 1.6 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, 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 Section 01 71 00 - Examination and Preparation. The Approval to Proceed must be signed by the Departmental Representative and the Contractor's representative before proceeding to the next layer.
  - .1 The Contractor shall provide a minimum of 48 hours notice to the Departmental Representative to arrange for an audit and Approval to Proceed.

## 1.7 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies 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.

## **1.8 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.

## **1.9 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.

## **1.10 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.

#### **1.11 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.

#### **1.12 REJECTED WORK**

- .1 Remove defective Work, whether as a result of poor workmanship, use of defective products or damage and whether incorporated in Work or not. Replace or re-execute defective Work in accordance with Contract Documents, through the NCR process.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 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.

#### **1.13 REPORTS**

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

#### **1.14 TESTS AND MIX DESIGNS**

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

#### **1.15 MILL TESTS**

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

**Part 2 Products**

.1 Not Used.

**Part 3 Execution**

.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**

- .1 Not Used.

### **Part 3 Execution**

- .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 the Contract and will not be measured for payment.

#### **1.2      INSTALLATION AND REMOVAL**

- .1      Provide temporary controls in order to execute Work expeditiously.
- .2      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      GUARDRAILS AND BARRICADES**

- .1      Provide secure, rigid guard rails and barricades around deep excavations.
- .2      Place Concrete Roadside Barriers parallel to the traffic lanes to separate the work zone and the traveling public.
  - .1      Barriers are available onsite for Contractor use. All costs associated with moving the barriers will be incidental to the Contract. Any additional barriers required to meet the Contract Specifications shall be supplied and installed at the Contractors cost.

#### **1.5      WEATHER ENCLOSURES**

- .1      Not used.

#### **1.6      DUST TIGHT SCREENS**

- .1      Not used.

#### **1.7      ACCESS TO SITE**

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

#### **1.8      PUBLIC TRAFFIC FLOW**

- .1      Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public in accordance with Section 01 35 31 - Special Procedures for Traffic Control.

#### **1.9      PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

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

#### **1.10     PRODUCTS**

- .1      Not Used.

**Part 2 Execution**

.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 the Contract Documents.
- .3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

#### **1.3 QUALITY**

- .1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in Contract Documents, maintain uniformity of manufacture for any particular or like item throughout building.

#### **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, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber and 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 the Contract Documents, 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 Contract Documents and manufacturer's instructions, so that Departmental Representative may establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

## **1.8 QUALITY OF WORK**

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 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.
- .3 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .4 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative whose decision is final.

### **1.9 CO-ORDINATION**

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

### **1.10 CONCEALMENT**

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

### **1.11 REMEDIAL WORK**

- .1 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.

### **1.12 FASTENINGS**

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

### **1.13 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 BC MoTI – 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 BC MoTI – 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 practice in Place of Work, acceptable to Departmental Representative.

#### **1.4 SURVEY REQUIREMENTS**

- .1 The Departmental Representative shall identify the location of all work sites.
- .2 The Contractor shall be responsible for all other survey and layout work identified in the Contract documents and as required to complete the works including but not limited to:
  - .1 Establishing lines and levels, locate and layout, by instrumentation.
  - .2 Staking for grading, cut and fill.
  - .3 Staking for slopes and top of embankment, sub-base course, base course and centreline for paving.
  - .4 Establishing culverts, catch basin structures, invert elevations and locations.
  - .5 Layout for interim and final lane markings, including those for intersection treatments
  - .6 Re-establishing the start and finish of “No Passing Zones”, Passing Lanes or at new limits as directed by the Departmental Representative
  - .7 Re-establishing Reference Survey Control Points that are in danger of being damaged or destroyed.
- .3 Survey Accuracy:
  - .1 All survey work shall be tied into the existing Control Monument Network with grid coordinates in UTM Zone 11 NAD 83. Departmental Representative will provide information on Control Points.
  - .2 All traverses will be closed and balanced. All level loops and traverses will be tied into the Control Monument Network.
  - .3 Secondary Control Points will be tied into and relative to Control Monument Network. Accuracy for Control Point surveys shall be to second order:
  - .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 0.1m of correct elevation.
  - .2 In open ground, all elevations shall be within 0.05 m of correct elevation.

- .3 On highway surface, all elevations shall be within 0.01 m of correct elevation.
- .5 The Contractor shall provide cut sheet reports to the Departmental Representative for all stages of road construction to demonstrate that the defined construction tolerances have been achieved before advancing to the next stage.
- .6 The Departmental Representative will complete quality assurance construction survey measurements to verify grades and alignment, interim survey re-measurements for excavation limits and final neat line measurements to verify payment quantities for completed works.
- .7 Contractor to provide cut sheet reports for all layers of road template to prove they meet the Contract tolerances. Departmental Representative to verify that they are correct by performing an audit.
- .1 Shots are to be taken at 10m intervals along centreline, mid-points and shoulders.
- .2 The Departmental Representative will provide the Contractor with an Approval to Proceed document in accordance with Section 01 45 00 - Quality Control.
- .8 Contractor to provide a stake out report as requested by the Departmental Representative.

## **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 Submit name and address of Surveyor to Departmental Representative.
- .2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
- .3 On request of Departmental Representative, submit survey data.
- .4 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, 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**

<b>Survey Layout</b>	<b>Maximum Interval</b>	<b>Product</b>
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.
Clearing and Grubbing	Same as Right-of-way.	Same as Right-of-way.
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.
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.
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.
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.
Final Base Course only	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.
Culverts	Inlet and outlet.	One stake at each end of the culvert, plus an offset line, showing invert elevation and station.
Storm Drainage, Subdrain, Watermain or Sanitary Sewer		Stakes showing locations of manholes, catch basins and other structures, and invert locations of pipe inlets and outlets, as well as stations.
Retaining Walls	Not more than 10 m, and at alignment changes.	One stake showing control line location and either the elevation at the top of the wall or the elevation at the bottom of footing excavation, as well as station.
Paving	20 m	Stake showing station and offset, reference points (eg. centerline offset, barrier, changes in paint lines etc.)
Superelevation change	At percentage change points	Stakes showing station and superelevation percentage.
Concrete Barriers	Same as paving.	Same as paving.
Signs		Stake at each sign location with stationing and sign designation.
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.
Median/Island Curb	Continuous.	Paint line at face/edge of curb
Pavement Marking	10 m, changes in line type, symbols	Paint dots and lines

**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      One bear proof container will be provided by Parks Canada. Contractor to provide any additional on-site bear proof containers they require for collection of waste materials and debris.
- .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.

#### **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.

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

### **Part 2 Products**

- .1 Not Used.

### **Part 3 Execution**

- .1 Not Used.

**END OF SECTION**

## **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 – Closeout Procedures.

#### **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 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, material safety data sheets (MSDS), 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 Material Safety Data Sheet (MSDS) for each hazardous material required on site. Submit MSDS 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 MSDSs in proximity to where the materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

## **Part 3 Execution**

### **3.1 DISPOSAL**

- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes for which there is an approved, cost effective recycling process available.
- .3 Send hazardous wastes only to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

**END OF SECTION**

## **31 05 10 CORRECTED DRY DENSITY FOR FILL**

### **Part 1 General**

#### **1.1 SUMMARY**

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

#### **1.2 REFERENCES**

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

#### **1.3 DEFINITIONS**

- .1 Corrected maximum dry density is defined as:
  - .1  $D = (D1 \times D2) / ((F1 \times D2) + (F2 \times D1))$ .
  - .2  $D = (F1 \times D1) + (0.9 \times D2 \times F2)$ .
  - .3 Where: D = corrected maximum dry density kg/m<sup>3</sup>.
  - .4 F1 = fraction (decimal) of total field sample passing 19mm sieve.
  - .5 F2 = fraction (decimal) of total field sample retained on 19mm sieve (equal to 1.00 - F1).
  - .6 D1 = maximum dry density, kg/m<sup>3</sup> of material passing 19mm sieve determined in accordance with Method A of ASTM D1557.
  - .7 D2 = bulk density, kg/m<sup>3</sup>, of material retained on 19mm sieve, equal to 1000G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127.
- .1 For free draining aggregates, determine D1 (maximum dry density) to ASTM D4253 wet method when directed by Departmental Representative.

### **Part 2 Products**

- .1 Not Used.

### **Part 3 Execution**

- .1 Not Used.

**END OF SECTION**

## 31 05 16 AGGREGATE AND RIP RAP PRODUCTION

### Part 1 General

#### 1.1 REFERENCES

- .1 BC MoTI Intermediate Graded Base (IGB) 75mm aggregate shall be produced in accordance with **BC MoTI - Standard Specifications for Highway Construction (latest edition)**.
- .2 BC MoTI Class 500 Rip Rap shall be produced in accordance with **BC MoTI - Standard Specifications for Highway Construction (latest edition)**.

#### 1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 The payment for the production of 75mm IGB shall be under "**Unit Price Item 4e) – Stockpile and Produce 75mm IGB in Ottertail Pit**". Payment will be made based on the number of cubic meters of IGB 75mm aggregate produced and accepted by the Departmental Representative at Ottertail Pit.
- .2 The payment for the production of Class 500 Rip Rap shall be under "**Unit Price Item 4a – Stockpile and Produce Class 500 Rip Rap in Ottertail Pit**". Payment will be made based on the number of cubic meters of Class 500 Rip Rap produced and accepted by the Departmental Representative at Ottertail Pit.
- .3 The payment for the production of Class 500 Rip Rap shall be under "**Unit Price Item 4b) – Stockpile and Produce Class 500 Rip Rap in Mannix Pit**". Payment will be made based on the number of cubic meters of Class 500 Rip Rap produced and accepted by the Departmental Representative at Mannix Pit.
- .4 The payment for the production of Class 500 Rip Rap shall be under "**Unit Price Item 4c) – Stockpile and Produce Class 500 Rip Rap in Hector Pit**". Payment will be made based on the number of cubic meters of Class 500 Rip Rap produced and accepted by the Departmental Representative at Hector Pit.
- .5 The payment for the production of Class 500 Rip Rap shall be under "**Unit Price Item 4d) – Stockpile and Produce Class 500 Rip Rap in 16 Mile Pit**". Payment will be made based on the number of cubic meters of Class 500 Rip Rap produced and accepted by the Departmental Representative at 16 Mile Pit.
- .6 Accepted processed materials shall be stockpiled at locations as per the Contract Documents or as directed by the Departmental Representative.
- .7 Payment will be full compensation for loading and hauling blast rock from the blast site, temporary stockpiling, crushing, stockpiling of processed material; testing, maintaining and plowing access roads and areas in the Work areas; clean-up of work area and pit; and all labour, equipment, tools and incidentals necessary to complete the Work.
- .8 Crushing, hauling and stockpiling of processed materials will be measured as the volume of the stockpiles, as determined by the Departmental Representative, taking survey measurements before and after stockpiling. The surface to surface prismatic method will be used in calculating surveyed stockpiled quantities.
- .9 Contractor is advised that it is their responsibility to allow for compaction shrinkage, of crushed materials, when placed in stockpiles and no allowance by Departmental Representative is calculated in survey quantity stockpile calculations for this shrinkage.

- .10 The Contractor shall be responsible for managing their working space within the pit(s) and coordination with Parks Canada contractors, personnel or others, to maintain access in accordance with Section 01 14 00 - Work Restrictions.
- .11 Traffic Control when required for this Work shall be incidental to “**Lump Sum Item 3 - Traffic Accommodation**” and no separate payment will be made to the Contractor.
- .12 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item 2 Mobilization / Demobilization**” and no additional payment will be made.
- .13 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment shall be made to the Contractor.

### 1.3 QUALITY CONTROL

- .1 All Quality Control testing by the Contractor.

### 1.4 WASTE MANAGEMENT AND DISPOSAL

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

## Part 2 Products

- .1 Not used.

## Part 3 Execution

### 3.1 CRUSHING PLANT

- .1 All blasted Type A material which is not required for Rip Rap shall be processed into 75mm IGB. Oversized Type A pieces shall be mechanically broken down and processed by a primary jaw crusher. The primary jaw crusher shall have a minimum Horse Power of 300 HP. The secondary crushing plant to be used for this project, regardless of location, shall have a minimum combined Horse Power of 200 HP. No portion of the products of crushers or screening plants shall be wasted, but shall be stockpiled or used as directed by the Departmental Representative.

### 3.2 PRODUCTION

- .1 All aggregate materials to be produced in accordance with BC MoTI - Standard Specifications for Highway Construction (latest edition).

### 3.3 STOCKPILING

- .1 All aggregate materials to be stockpiled in accordance with BC MoTI - Standard Specifications for Highway Construction Section 202 Granular Surfacing, Base and Sub-bases (latest edition).
- .2 No stockpiling by conveyor shall be permitted.
- .3 Stockpile sites shall be prepared by clearing of all vegetation, trees, brush, rocks or other debris and constructing a uniform gravel surface prepared before the stockpile material is deposited on the stockpile site.

- .4 Stockpiles shall be constructed on the designated site and when completed shall be neat and regular in shape, occupying as small an area as is practicable. Spilling of material over the edges of the piles will not be permitted.
- .5 The Contractor shall ensure that stockpiles shall be built up in layers not to exceed 1m in thickness.
- .6 No stockpile shall have side slopes steeper than 1.5H:1V. Side slopes and Pit faces shall meet WCB requirements for the province in which the stockpiles are located.
- .7 The Contractor shall only use an excavator to stockpile Rip Rap in the Pits identified in the Contract Documents.

**END OF SECTION**

## **31 22 13 ROUGH GRADING**

### **Part 1 General**

#### **1.1 SCOPE AND INTENT**

- .1 This section contains the requirements for placement, excavation and grading of material as shown on the contract drawings

#### **1.2 MEASUREMENT AND PAYMENT**

- .1 Quantities for payment for Rough Grading will be paid under “**Unit Price Item 1) – Catchment Grading**” and will be measured based on the area in horizontal (2D) square meters of catchment grading that has been acceptably completed in accordance with the Contract Documents and will, unless otherwise specified, be measured from the edge of the existing pavement to the toe of the rock cut slope (WP 2) as shown approximately on the IFC Drawings or as directed by the Departmental Representative. Payment under this item shall include all labour, equipment and material to satisfactorily complete the work.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Fill material: Either Type D or Type A Fill in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
- .2 Excavated or graded material existing on site suitable to use as fill for grading work as defined in the Drawings and Specifications and approved by Departmental Representative.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other sections or contracts are acceptable for rough grading installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

#### **3.2 GRADING**

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Grade ditches above excavated rock to the design surface as indicated on Contract Drawings using Rock Fill or blast rock as approved by the Departmental Representative. The area to be graded includes the area between the existing edge of pavement and the bottom of the rock slope and includes also any work necessary to tie the new ditches to the existing ones at the start and end of the work areas.
- .3 Field Fitting by direction of the Departmental Representative may take precedence over the Contract Drawings.
- .4 Positive drainage must be maintained at all times.

**3.3 TOLERANCES**

- .1 Top surface of rough grading shall be plus or minus 50 mm from the design surface.

**3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**END OF SECTION**

## **31 23 20      ROCK SCALING**

### **Part 1          General**

#### **1.1              SCOPE AND INTENT**

- .1 This section provides requirements for scaling of rock faces where requested by the Departmental Representative or where necessary for Safety to carry out the Work, including submittals and execution.

#### **1.2              DEFINITIONS**

- .1 Safety Scaling: The removal of all loose material from the excavation face using scaling bars, portable hydraulic jacks, air bags, other hand tools, wire rope cables, compressed air / water blow pipes, blasting without the need for drilled holes and other methods authorized by the Departmental Representative; and the removal of loose soil, rock, and overburden from up to 5 m behind the crest of the slope, the slope face, and benches on the slope.
- .2 Hand Scaling: Scaling done by hand working from a fall restraint, work positioning system or long-reach man-lift and using suitable hand tools and powered equipment.
- .3 Mechanical Scaling: Removing loose soil, rock, trees and bushes, on, above, or below the slope using mechanical means, typically an excavator with toothed bucket, ripping tooth, or hydraulic breaker.
- .4 Cleaning: Removal of loose rock and debris on the excavated slopes following blasting and mucking out by handheld tools, or with handheld compressed air/water blow pipes or with machine held chains, rubber tires or brush attachments.

#### **1.3              MEASUREMENT PROCEDURES**

- .1 All cleaning of loose debris on slopes following blasting and mucking out shall be incidental to Rock Blasting and will not be measured for payment.
- .2 Safety scaling will be measured as the hours spent by a crew of 3 people actively working on the slope, beginning at the top of rope descent to the scaling area, and ending at the time the scaler reaches the bottom of that particular rope descent, including standby for passing traffic. Time spent accessing scaling areas, maintaining equipment, or carrying out work using tools or methods that are not best suited to a particular situation will not be measured for payment.
- .3 Safety Scaling at the beginning of the project will be measured in crew hours under **“Unit Price Item 2) – Safety Scaling”**, and shall be full compensation for supplying all material, labour, and equipment to execute the Work as specified, including any timber and brush disposal, and other overhead costs.
- .4 Cleanup, disposal and / or storage of materials from rock scaling, and excavation of existing fallen materials in ditches in the Work areas will be considered incidental to **“Unit Price Item 4) – Aggregate and Rip Rap Production”**.
- .5 Protection of infrastructure shall be considered incidental to the Work and all other unit price Work Items. Cleanup and removal of scaled material from the roadway and adjacent areas is incidental to the Work.
- .6 Repair or replacement of all infrastructure damaged by scaling operations, to the satisfaction of the Departmental Representative, shall be at the Contractor’s expense.

**Part 2 Products**

- .1 Not Used

**Part 3 Execution****3.1 SUBMITTALS**

- .1 Contractor Experience and Qualifications: The scaling crew shall consist of a supervising scaling foreman with at least eight (8) years' experience with an average (mean) of at least four (4) years' experience in each scaling and working from ropes at heights. The scaling crew shall not have more than one (1) scaler with less than one (1) years' experience at any time. A minimum of twenty (20) days prior to mobilizing to site, the Contractor shall provide a Statement of Qualifications to the Departmental Representative including:
  - .1 Experience and duties of all personnel assigned to Scaling activities.
  - .2 A summary of previous project experience including the project name, location, duration, and the owner/client name and contact information.
  - .3 Rock scaling procedure and methodology including proposed equipment.

**3.2 REQUIREMENTS**

- .1 Where Scaling activities may affect existing infrastructure, the Contractor shall provide protective measures as detailed in the Contractor's Work Plan/Procedure, prior to commencing Scaling. Protective measures shall include, but not be limited to, padding material placed on the roadway, blasting mats, temporary rock berms or barriers, and temporary removal of signs, guardrails, and similar infrastructure. The Contractor shall be fully and completely responsible for all damage resulting from its Scaling or other operations.
- .2 The Contractor is required to have available on site at the start of the Work the following equipment: ropes and fall restraint equipment, scaling bars, mattocks/pulaskis, shovels, hydraulic jacks or wedge jacks, compressed air and water "blow pipes", air bags, and wire ropes.
- .3 The Scaling foreman and at least one other scaler on the slope shall have a two-way radio for communication with supervisory/traffic control personnel at the highway grade.

**3.3 GENERAL EXECUTION**

- .1 For each slope section or undesirable feature, scale areas shown in Field Memoranda containing photographs or as directed by the Departmental Representative.
- .2 Trees and brush shall only be removed as directed and approved by the Departmental Representative or Environmental Surveillance Officer.
- .3 Scaling shall be carried out using the most appropriate and effective tools and methods for any given situation as approved by the Departmental Representative.
- .4 Any construction access on the slope including but not limited to trail building, installing access ropes and ladders, and tree and brush removal to facilitate access to the designated scaling areas shall be considered incidental to the Work. Any temporary construction access shall be removed upon completion of the Work.
- .5 All scaling carried out with rope access shall comply with best practices detailed in applicable WorkSafe BC Regulation.

Project No. 569-01

Parks Canada Agency

Trans Canada Highway

Slope Re-Profiling

Km 88.5 – 89.2

Yoho National Park

Page 92

**END OF SECTION**

Section 31 23 20  
ROCK SCALING

## 31 24 13 ROADWAY AND DRAINAGE EXCAVATION

### Part 1 General

#### 1.1 REFERENCES

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

#### 1.2 DESCRIPTION

- .1 This item consists of the excavation and disposal of all materials in conformity with the lines, grades and dimension indicated in the Contract Documents and as directed by the Departmental Representative and includes:
  - .1 Construction of roadway ditches, embankments, entrances, berms, approved haul roads and other earthworks necessary for construction.
  - .2 Removal and disposal of unsuitable / surplus materials from excavation, embankment and borrow areas.
  - .3 Transportation of excavated materials.
  - .4 Finishing of top surfaces and slopes.
  - .5 Maintenance of the work set forth under this section in a finished condition until any portion thereof has been accepted as completed by the Departmental Representative.

#### 1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Roadway and Drainage Excavation:
  - .1 The quantity of Type D for which payment will be made shall be the volume in cubic meters measured in its original position from cross sections taken by Departmental Representative in areas of excavation. Payment will be made under **“Unit Price Item 3b - Roadway and Drainage Excavation – Type D Excavation”** and shall include cost of excavating, loading, hauling, placing and compacting material within the limits of the Works.
  - .2 Separating of organic material from non-organic material and stockpiling, as directed by the Departmental Representative, is considered incidental to the Work and no additional payment will be made.
  - .3 The Contractor shall take care not to contaminate suitable surplus materials with Unsuitable materials. Unsuitable materials shall be stockpiled separately by type at locations identified in the Pit Plans.
  - .4 Written Approval to Proceed must be completed by the Departmental Representative prior to sub-excavation for the removal of unsuitable material(s). Sub-excavation for the removal of unsuitable material(s) to be paid under **“Lump Sum Item 1 – Prime Cost Sum”**.

- .5 Payment for Type A of material deemed by the Departmental Representative as Type A will be made under **“Unit Price Item 3a – Roadway and Drainage Excavation – Type A Excavation”**.
- .6 Type A will be measured as the in situ “bank” volume of rock excavated, based on survey measurements taken by the Contractor and approved by the Departmental Representative. Payment for this item will be made per cubic meter and shall include the cost of drilling, blasting, rock hammering, excavation, labor, materials, vibration monitoring, and all other activities required to complete the work outlined in the Contract Documents.
- .7 The tolerance for the design slope is to be within  $\pm 0.3\text{m}$  of the target Type A excavation design line as shown in the Contract Drawings. No payment will be made for excavation beyond 0.3m of the target design line above the ditch. No payment will be made for Type A excavation beyond the design line between the bottom of ditch and edge of pavement.
- .8 Secondary breaking of oversize material resulting from blasting will not be measured for payment. The tendered unit prices shall be full compensation for supplying all material, labour, and equipment to execute the work as specified.
- .9 The loading, hauling, and stockpiling of blast rock at the locations identified in the Contract Documents shall be paid in accordance with Section 31 05 16 - Aggregate and Rip Rap Production.
- .10 The Contractor shall survey the blast excavation and send their survey and quantity takeoff to the Departmental Representative before any Progress Payments are made for the Type A excavation.
- .11 The Contractor shall submit an existing rock face survey for review prior to proceeding with blasting works, and all costs related are considered incidental to Type A.
- .12 All waste material not meeting the requirements in the Contract Documents shall be loaded, hauled, and stockpiled at Ottertail Pit at a location approved by the Departmental Representative. All the Work associated with the management of the waste material shall be considered incidental to the Contract and no separate payment will be made to the Contractor.
- .13 The drill offset bench removal shall be considered incidental to **Unit Price Item 3a – Roadway and Drainage Excavation – Type A Excavation”**.
- .14 Structural support, remedial work, half barrels, or blast hole traces shall not be visible on the final rock face and shall be considered incidental to **“Unit Price Item 3a – Roadway and Drainage Excavation – Type A Excavation”**.
- .15 Payment will not be made until all related submittals have been received and approved by the Departmental Representative
- .16 Departmental Representative will take initial cross sections immediately prior to excavation of material to be incorporated into work.
- .17 No overhaul will be paid.
- .18 Embankment construction will not be measured for payment directly, rather it shall be considered incidental to **“Unit Price Item 3 – Roadway and Drainage Excavation”**.
- .2 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item 2 – Mobilization / Demobilization”**, and no additional payment will be made.

- .3 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item 3 – Traffic Accommodation”** and no separate payment will be made to the Contractor.
- .4 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor
- .5 No measurement payment will be made for:
  - .1 Excavating 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 If overcut, no payment will be made for filling an area back to grade.
  - .3 Loading hauling, placing and compaction of boulders less than 2.0 cubic metres into large embankments.
  - .4 Scarifying or benching existing slopes or existing road surfaces.
  - .5 Removing unsuitable material from embankment attributable to negligence.
  - .6 Overhaul.
  - .7 Watering, drying or compacting soils to achieve specified densities inclusive of all compaction efforts.
  - .8 Proof rolling.
  - .9 Compaction of material (150 mm) below subgrade horizon in areas of cut.
  - .10 Placing material in stockpiles, grading, or maintaining the stockpile site.
  - .11 Finishing.

#### 1.4 DEFINITIONS

- .1 Type A Excavation: excavation of:
  - .1 All forms of “solid rock in place” occurring in masses, ledges, seams or layers of sufficient hardness to require breaking by continuous drilling and blasting before excavation and removal.
  - .2 Detached masses of rock or boulders individually containing a volume of 2.0 cubic metres or more.
- .2 Type D: Materials that are not Type A Excavation or Stripping.
- .3 Borrow:
  - .1 Suitable material obtained from locations outside the limits of the roadway cut and placed as embankment material.
  - .2 Suitable material obtained from culvert foundation excavations used for the onsite production of granular material.
- .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 Unsuitable Material: material unsuitable for embankment, embankment foundation, and material surplus to requirements.
- .7 Topsoil: material passing a 100 mm sieve and capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

## **1.5 QUALITY CONTROL**

- .1 Regulatory Requirements:
  - .1 Adhere to regulations of authority having jurisdiction when blasting is required.
  - .2 Adhere to Provincial and National Environmental requirements when potentially toxic materials are involved.
- .2 All Quality Control testing by the Contractor in accordance with Section 01 45 00 – Quality Control.

## **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials 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.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Embankment materials require acceptance by Departmental Representative.
  - .1 The Contractor shall provide material test certificates to the Departmental Representative for consideration.
- .2 Material used for embankment not to contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps or other unsuitable material.
- .3 Borrow material:
  - .1 Obtained from sources as indicated or as designated by Departmental Representative.
  - .2 Obtained from borrow pit approved by Departmental Representative.
  - .3 BC MoTI Standard Specification for Highway Construction Section 201 (latest edition)
  - .4 Imported from Contractor determined site outside of the Parks. Supply, loading, hauling, temporary stockpiling, placing, compacting and finishing considered incidental to the unit price.

### **2.2 EXPLOSIVES AND ACCESSORIES**

- .1 All explosives and associated material used for blasting operations will be supplied by a recognized manufacturer.
- .2 Explosives products with a lot expiry date that has passed shall not be used.
- .3 Bulk ammonium nitrate and fuel oil (ANFO) type blasting agents shall not be used.
- .4 Where there is a danger of initiation system cut-offs, detonators and delay elements must be of a type that includes down-hole delays (e.g., Handidet) to prevent cut-offs.
- .5 Detonation cord over 20 Grain shall not be used on the surface without prior written consent from the Departmental Representative. 400 Grain Detonation Cord may be used in pre-shear holes.

### **Part 3 Execution**

#### **3.1 UTILITY COORDINATION**

- .1 In accordance with Section 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 Existing buried utilities are to be located at all new culvert locations and every 100 m along segments of the Work where the utilities may be damaged by the Work, by using low impact excavation such as hydrovac or similar methods which will not damage buried utilities.
- .4 Payment for locating utilities to be incidental to the Works and no additional payment will be made.
- .5 Payment for utility relocations to include all coordination efforts, labour, equipment and materials to be made under **“Lump Sum Item 1 – Prime Cost Sum”** in accordance with Section 01 21 00 - Allowances and Section 01 14 00 - Work Restrictions.

#### **3.2 COMPACTION EQUIPMENT**

- .1 Compaction equipment must equivalent of one 12 tonne vibratory packer capable of obtaining required densities in materials on project. Equipment that does not achieve specified densities must be replaced or supplemented.

#### **3.3 WATER DISTRIBUTORS**

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

#### **3.4 STRIPPING OF TOPSOIL**

- .1 Commence topsoil stripping of areas on acceptance by the Departmental Representative after clearing and grubbing debris have been removed from these areas.
- .2 Strip topsoil to depths as verified by the Departmental Representative. Do not mix topsoil with subsoil. Stripping depth will vary.
- .3 Stockpile stripped materials at Ottertail Pit at locations directed by the Departmental Representative. The Contractor is advised that there is limited storage area for this material.
- .4 Stripped soil (including fine forest litter) materials shall be placed and stored at locations and in amounts and form as instructed by the Departmental Representative, for later reclamation use on graded slopes. Stripping piles may require erosion control, sedimentation protection or stabilization, depending on the location and anticipated duration of storage. At the Departmental Representatives direction, the Contractor shall prepare a plan for management of each stripping pile.

#### **3.5 EXCAVATING**

- .1 General:

- .1 Notify the Departmental Representative when waste materials are encountered and remove to depth and extent as approved by the Departmental Representative. This material shall be hauled to and stockpile at the designated pit locations.
  - .2 Subcut below subgrade elevation in cut sections only as approved by the Departmental Representative and replace with acceptable embankment material and compact. Compact top 300 mm below final subgrade elevation to minimum 100% Standard Proctor density, ASTM D698 (AASHTO T99). No subcut in ditches or backslope unless Departmental Representative approved.
  - .3 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points in accordance with the Contract Documents.
  - .4 The dimensions of the excavations and embankments shall be, in accordance with the typical sections accompanying these specifications, but the dimensions of any or all excavations and embankments may be increased or decreased at any time by the Departmental Representative as conditions and circumstances may determine.
- .2 Drainage:
- .1 Maintain profiles, crowns and cross slopes to provide positive surface drainage at all times.
  - .2 Provide ditches as work progresses for positive drainage.
- .3 Type A excavation:
- .1 Submittals to be in accordance with Section 01 33 00 – Submittal Procedures and Section 204.04.07 of the BC MoTI Standard Specification for Highway Construction (latest edition).
  - .2 Blasting to be in accordance with Section 204 of the BC MoTI Standard Specification for Highway Construction (latest edition) unless otherwise stated in the Contract Documents.
  - .3 The Blasting Consultant shall make an initial Site Visit prior to any blasting to inspect the blasting areas and advise on blasting methods and measures necessary to protect infrastructure and the environment and to prevent rock damage or overbreak beyond the Limits of Excavation.
  - .4 The Blasting Consultant shall be present at each blast unless their absence has been approved by the Departmental Representative.
  - .5 Shatter rock to 300 mm below subgrade elevation.
  - .6 Contractor shall be responsible for safety of all blasting. Particular attention should be paid to control of rock falls from excavation slopes so there is no hazard to Park users and wildlife during construction. Contractor shall advise Departmental Representative 24 hours prior to blasting operations. Contractor shall control blasting so there is no flyrock damaging existing trees and vegetation.
  - .7 All rock on cut face that is loose, hanging or that creates a potentially dangerous situation shall be removed or stabilized during or upon completion of excavation of each lift and will be considered incidental to the Contract. Drilling of next lift will not be allowed until this work has been completed. Other methods such as machine scaling, hydraulic splitters or light blasting may be used in lieu of, or to supplement hand scaling.

- .8 The Contractor should expect and be prepared for wet hole conditions and have the appropriate explosives or procedures available at no additional cost to the Owner.
- .9 As required, ditches shall be formed and cleaned upon the completion of the Work and the drainage shall be restored/alterd as specified or as directed by the Departmental Representative. Unless otherwise specified, areas where rock was excavated should be free draining. If craters are formed during blasting, the Contractor shall provide drainage by trenching to a suitable outlet.
- .10 Blast induced vibrations shall not exceed 50 mm/s when measured at any CP Rail Track, including historic infrastructure.
- .11 At locations identified on the Construction Drawings (or near CP Rail infrastructure), the Contractor shall develop a site specific Scaled Distance plot to improve confidence in PPV prediction, and this shall be refined after each monitored blast. Initial blasts shall utilize  $1140(SD)^{-1.6}$  for the initial blasting.
- .12 Explosives shall be stored outside Yoho National Park. Magazine set up and storage shall comply with all NR-Can regulations. The cost of setting up and maintenance of the magazine shall be incidental to the project.
- .13 Safety fuse shall not be used as a blast initiation mechanism.
- .14 Audible blast warning devices, capable of alerting workers and the public up to a radius of 1,000 m, shall be used before and after blasting.
- .15 Blasting shall be performed prior to other specified work, such as scaling or anchoring, where this work may be adversely affected by blasting.
- .16 For development of a pioneer access bench across the crest of the cut, the holes may be drilled sub-horizontally; advance rounds should be limited to not more than 5 m.
- .17 Drilling 0.5 m below the ditch bottom is permitted to facilitate removal of the toe berm.
- .18 Supply, place, and remove protective measures for roadways and all other infrastructure that might be damaged by blasting. Protective measures shall include, but not be limited to, granular padding material to protect roadways, timbers or blasting mats to prevent fly rock or protect structures, and temporary removal of infrastructure at risk. The Contractor shall repair or replace any and all damage caused by blasting at its own cost.
- .19 Blasting shall be scheduled and coordinated with all stakeholders including, but not limited to, Parks Canada Agency (PCA), the Departmental Representative, utilities, paving contractors, CP Rail, and local businesses in compliance with traffic control and blasting related provisions of the specifications. No additional payment will be made for coordinating with stakeholders.
- .20 Blasting shall use explosives unless otherwise approved by the Departmental Representative.
- .21 Benching:
  - .1 The Contractor shall complete each bench in its entirety before proceeding with the subsequent lower bench.
  - .2 The Contractor shall complete all rock scaling and rock support before proceeding with the subsequent lower bench.

- .3 The Contractor must receive a signed Approval to Proceed from the Departmental Representative before proceeding to the subsequent lower bench.
- .22 Controlled Blasting:
  - .1 The purpose of controlled blasting is to minimize damage to rock back slope and to help ensure long-term stability.
  - .2 Controlled blasting will involve controlled use of explosives and blasting accessories in carefully spaced and aligned drill holes to produce a free surface or shear plane in rock along specific excavation backs slope. Controlled blasting techniques will be used for this project.
  - .3 Blast design for controlled blasting will sequence the blasts to limit the amount of rock which falls to the road surface during blasting.
  - .4 The Contractor shall limit the size of each blast to a maximum 2,000m<sup>3</sup>.
  - .5 The slopes of the cut shall be scaled of all loose material and ditches shall be formed and cleaned.
  - .6 Subgrade shall be constructed to a true and uniform surface as to line and grade preparatory to application of sub-base material.
- .4 Borrow Excavation:
  - .1 Completely use in embankments, suitable materials removed from right-of-way excavations before taking material from borrow areas.
  - .2 Obtain embankment materials, in excess of what is available from cut areas, from designated borrow areas.
  - .3 Departmental Representative to designate extent of borrow areas and allowable depth of excavation.
  - .4 Remove waste and stripping material from borrow pits to designated locations.
  - .5 Slope edges of borrow areas to minimum 3:1 and provide drainage as directed.
  - .6 Trim and leave borrow pits in condition to permit accurate measurement of material removed.

### 3.6 EMBANKMENTS

- .1 This item consists of the construction of the subgrade in embankments and cuts to the lines, grades, cross-sections and dimensions as per the Contract Documents.
- .2 Scarify or bench existing slopes in side hill or sloping sections to ensure proper bond between new materials and existing surfaces. Method used to be subject to prior approval of the Departmental Representative.
- .3 Do not place material that is frozen nor place material on frozen surfaces except in areas authorized.
- .4 Maintain crowned surface during construction to ensure ready run-off of surface water.
- .5 Drain low areas before placing materials.
  - .1 Place and compact to full width in layers not exceeding 200 mm loose thickness. The Departmental Representative may authorize thicker lifts if specified

compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.

- .6 Rock Embankments:
  - .1 Place to full width in layers of sufficient depth to contain maximum sized rocks, but in no case is layer thickness to exceed 0.7 m.
  - .2 Distribute rock material to fill voids with smaller fragments to form compact mass.
  - .3 Fill surface voids at design elevation with rock spalls or selected material to form earth-tight surface.
  - .4 The Contractor may place rock embankments during freezing conditions provided compaction equipment of sufficient size to break large rock particles is used and all snow and ice is removed from fill surface.
- .7 Deductions from excavation will be made for overbuild of embankments.
- .8 Excess Excavation placed in stockpile in the designated pits:
  - .1 Material in the quantities specified shall be placed in the designated pits or as otherwise directed by the Departmental Representative.
  - .2 The Contractor shall place, grade and track pack the material in stockpile as necessary to allow for construction access and the movement of equipment.
  - .3 The Contractor shall maintain access to the stockpile area and allow for access to the stockpiled material by other.
  - .4 Materials placed in the designated pits, once accepted by the Departmental Representative, are the property of PCA.

### 3.7 SUBGRADE COMPACTION

- .1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.
- .2 Embankment material shall be placed in successive uniform layers over the entire area as follows:
  - .1 Material containing less than 25 percent by volume of stones larger than 100 mm shall be constructed in successive horizontal layers not exceeding 200 mm in loose thickness except that the top 500 mm shall be constructed in layers not exceeding 100 mm in loose thickness
  - .2 Material containing 25 percent or more by volume of stones larger than 100 mm shall be placed in layers not exceeding the maximum size of the stones. Stones larger than 100 mm shall not be placed within 150 mm of the subgrade elevation.
  - .3 In embankments composed principally of material obtained from rock cuts, the larger stones shall be carefully distributed and the interstices filled with smaller stones and other material to form a compact mass. Such embankments shall be constructed in layers not exceeding 1 metre. The placing of individual rocks and boulders exceeding 1.0 metres in least dimension will be permitted provided they are carefully distributed and the interstices filled with finer material to form a dense and compact mass. Each layer, before starting the next, shall be levelled and smoothed with suitable equipment. Hauling and spreading equipment shall be operated over the full width of each layer.

- .9 Each layer shall be brought to its required degree of compaction throughout its entire width before successive layers are placed.
- .10 Compact each layer to minimum 95% Standard Proctor density, ASTM D698 (AASHTO T99). Top 300 mm of subgrade to be compacted to 100% Standard Proctor density, ASTM D698 (AASHTO T99).
- .11 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.
- .12 For rock placed as fill, compact with large steel wheeled or tracked equipment of sufficient size to break larger particles. Compact until rock fill is stable under compaction equipment and all voids are filled.

### **3.8 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 Type D material and compact in accordance with Section 31 24 13 – Roadway and Drainage Excavation.
  - .3 Replace subgrade material and compact in accordance with the Contract Documents.
- .4 All associated Works, including replacing defective material with new materials in accordance with the appropriate Sections is to be done at the Contractor's cost.

### **3.9 FINISHING**

- .1 Shape entire subgrade to within  $\pm 15$  mm of design elevations but not to be uniformly high or low.
- .2 Round top of back slope as shown on the Drawings.
- .3 Remove rocks over 150 mm in dimension from slopes and ditch bottoms.
- .4 Trim between constructed slopes and edge of clearing to provide drainage.

### **3.10 PROTECTION**

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

**END OF SECTION**

## **31 72 13      ROCK SUPPORT**

### **Part 1          General**

#### **1.1              SCOPE AND INTENT**

- .1 This section includes material and installation requirements for rock anchors and rock drains to improve slope stability following blasting and excavation.
- .2 Anchors and anchor hardware shall not be exposed on the final rock face.

#### **1.2              GENERAL**

- .1 Rock anchors consist of the installation of deformed steel bars (tendons) in holes drilled into rock. Anchors shall be either tensioned or untensioned (dowels) as directed by the Departmental Representative. Anchorages for tensioned anchors shall be mechanical anchors or resin grout as described below.
- .2 The Contractor shall have all materials and equipment available on site to install the rock anchors including the appropriate drills and drill bits to install both mechanical and resin anchors as recommended by the manufacturer.
- .3 Existing anchors may have been installed within the Work sites. These anchors are camouflaged and not visible without close on-slope inspection.
- .4 The required type, number, length, location, and orientation of anchors will be determined on site by the Departmental Representative. The Contractor shall be prepared to install any combination of anchors ranging up to 9 m in length at any or all of the Work sites.
- .5 Rock drains shall be lined drains as specified in BC MoTI Specification Section 208 “Lined Drains” in designated areas as specified by the Departmental Representative.
- .6 The Contractor shall maintain a Reserve Supply of anchor accessories, grout, and rock drain materials on site such that there are no delays for procurement of materials.
- .7 The Contractor shall complete all rock support before proceeding with the subsequent lower bench.

#### **1.3              MEASUREMENT PROCEDURES**

- .1 Installation of anchors shall include the supply of tendons, mechanical anchor heads, flat bearing plates, nuts, hardened flat washers, beveled washers, centralizers, couplers, resin grout, and cement grout, as well as the drilling, installation, and testing of the anchors. The quantity of anchorages delivered to site shall not exceed the tender amount. If required, additional anchor procurement will be authorized by the Departmental Representative.
- .2 Payment for anchorages will be under “**Unit Price Item 5 – Rock Bolts**”. Installation of anchors will be measured as the length in meters of anchors successfully installed and embedded into the ground. Where mechanical anchors are installed the length of the mechanical shell assembly shall be included in the length of anchor. Excessive bar protruding from the rock face shall not be measured and must be cut flush with the rock face. Payment will not be authorized until all related submittals have been received and approved by the Departmental Representative.
  - .1 Payment for tensioned rock bolts will be under “**Unit Price Item 5a – Tensioned Rock Bolts, 5m**” and shall include all labour, materials, and equipment required to complete the Work.

- .2 Payment for untensioned dowels will be under “**Unit Price Item 5b – Untensioned Dowels, 3m**” and shall include all labour, materials, and equipment required to complete the Work.
- .3 The Contract Unit Price for anchors shall be considered full compensation for all anchor requirements in this Specification. Scaling to facilitate access to the designated anchoring areas, and anchorage testing are considered incidental to the Work and shall not be measured for payment.
- .4 Payment for rock drains will be under “**Unit Price Item 6 – Rock Slope Drains**” and will be measured as linear meters of drain hole drilled. Payment for rock drains will be authorized after installation in accordance with the contract specifications. The Unit Price will be considered full compensation for all work and materials necessary to complete the installation.
  - .1 Payment for sub-horizontal toe drains will be under “**Unit Price Item 6a – Sub-Horizontal Toe Drains**” and shall include all labour, materials, and equipment required to complete the Work.
  - .2 Payment for rock drains will be under “**Unit Price Item 6b – Sub-Vertical Bench Drains at 88+660 to 88+710**” and shall include all labour, materials, and equipment required to complete the Work.

## Part 2 PRODUCTS

### 2.1 MATERIALS – ROCK ANCHORS

- .1 Rock anchor equipment shall be supplied in order to install tensioned anchors up to 9 m in length.
- .2 The tendons shall be 25 mm diameter, Grade 517/690 MPa deformed steel bars conforming to CAN/CSA G30.18, such as “Dywidag Threadbar” manufactured by Dywidag Canada Limited, #8 bar supplied by “Williams Form Engineering All-Thread Rebar” or approved equivalent.
- .3 Mechanical anchorage assemblies shall be shell and cone type assembly’s compatible with the steel tendons capable of maintaining loads up to 150 kN. Alternatively, mechanical anchors can be pre-assembled mechanical anchors such as “Williams Form Engineering RIJ Solid Rebar Spin-Lock Rock Anchors” or approved equivalent.
- .4 Resin Grout shall be the product of an established manufacturer who has been producing these products for at least five (5) years. Resin shall be supplied in cartridge form and have a shelf life of not less than six (6) months, as dated on the container, and be used within the first three (3) months of the shelf life. Cartridges shall be stored in accordance with the manufacturer’s recommendations. Resin used for the anchorage length of the bolt shall have a gel set time of one (1) to three (3) minutes.
- .5 Steel bearing plates shall be flat keyhole type bearing plates conforming to CAN/CSA-G40.21, Grade 300 W and have minimum dimensions of 10 mm by 150 mm by 150 mm.
- .6 Non-perpendicular anchor installations shall be accommodated by using a minimum of two (2) bevelled washers. Bevelled washers shall be compatible with the anchor tendon and comply with either ASTM A47 or A536.
- .7 Nuts shall be hexagonal head, heavy duty type and shall conform to ASTM F436. Threads and nuts shall be capable of developing the full strength of the anchor.

- .8 Anchors and all associated hardware shall be hot-dip galvanized to CSA G164 & CSA G30.18M. Field cut anchor bar shall be touched up with “Galvanox” zinc-rich paint or approved alternate by the Departmental Representative.
- .9 Fast set resin grout may be used at the distal portion of the anchor in lieu of mechanical shell cones. Resin grout shall not be used where the rock is excessively fractured or wet, as determined by the Departmental Representative.
- .10 Untensioned dowels and mechanical anchors after tensioning shall be fully grouted using an approved cement grout. Cement grout shall be a pre-bagged, non-shrink cementitious product such as “Microsil® Anchor Grout” produced by Basalite Concrete Products, or approved equivalent. Cement grout shall have a minimum three (3) day and twenty-eight (28) day compressive strengths of 30 MPa and 50 MPa, respectively, when tested in accordance with CAN/CSA A23.2-1B.
- .11 Equipment for mixing and pumping grout shall be capable of satisfactorily mixing and agitating the grout, and pumping it into the holes at the water/cement ratio recommended by the grout manufacturer. For holes oriented below horizontal grouting shall be tremmied from the base of the hole to rock face. In the unlikely case of holes oriented above horizontal grouting shall be pumped from the collar until grout return is observed in a full length de-air tube located at the distal end of the hole. Cementitious grouts and mortar shall not be warmer than 30°C or colder than 5°C during mixing or pumping.
- .12 Cement mortar levelling pads, where necessary to create a level bearing surface, shall be Nanocrete R4 concrete repair mortar, or approved equivalent, and shall be mixed, placed, and cured in accordance with the manufacturer’s recommendations.

## **2.2 MATERIALS – ROCK DRAINS**

- .1 Rock drain lining shall consist of Schedule 40 slotted PVC pipe. The outside diameter of the pipe shall not be less than 67% of the borehole diameter, and the internal diameter of the pipe shall be a minimum of 19 mm. The slots shall be along the entire length of the pipe in one row. Unless otherwise specified, the slots shall be 0.5 mm wide, spaced 6 mm apart and have a minimum length of 30% of the outside circumference of the pipe.

## **Part 3 EXECUTION**

### **3.1 SUBMITTALS**

- .1 Anchor Installation Procedure: Prior to ordering anchor materials, the Contractor shall submit an Anchor Installation Procedure for review by the Departmental Representative. The Installation Procedure shall include product information from the anchor hardware and grout manufacturers including their recommended installation procedures, drilling equipment and hole diameter, grouting and tensioning procedures, calibration certificate(s) for anchor testing equipment, and similar information.
- .2 Anchor Installation Records: The Contractor shall submit anchor installation records to the Departmental Representative daily in a format approved by the Departmental Representative. The records shall include, but shall not be limited to, individual anchor reference number, anchor type, bar length, bar grade/diameter, depth of anchor distal end, proximal extension from face, proximal bar extension behind nut, over-drill depth, grout type, grout temperature, grout volume used, number of spacers used, grout samples taken, lock off load/tension, date/time tested, as-constructed anchor azimuth, and date/time completed.

- .3 Driller's Logs: The Contractor shall submit the Driller's Logs to the Departmental Representative within one (1) day after drilling or upon request. The records shall include, but shall not be limited to, details of flush losses/reductions, inferred faults, voids, depth of overburden, hole diameter, rig type, type of flush, water ingress, jamming during drilling, changes in rock type, and other relevant information that may affect the quality of the anchor installation.
- .4 Grout Testing Results: The Contractor shall submit to the Departmental Representative grout testing results, including but not limited to, Compressive Strength Testing within three (3) days following completion of testing.
- .5 Mill and Galvanizing Certificates: The Contractor shall submit to the Departmental Representative mill and galvanizing certificates for the anchor bar a minimum of one (1) day prior to installation.
- .6 Calibration Certificates: The Contractor shall submit calibration certificates for testing and tensioning equipment within one (1) day of commencing work on site, including but not limited to, hydraulic jacks, gauges, and torque wrenches.
- .7 Anchor Testing Results: The Contractor shall submit all anchor testing reports in a format approved by the Departmental Representative.

### 3.2 QUALITY CONTROL

- .1 Drill and install anchors under the direct supervision of an individual having at least four (4) years' experience in the installation of mechanical and cement grouted anchors.
- .2 Prior to drilling and installing any production anchors, the Contractor shall drill and install three (3) mechanical test anchors as directed by the Departmental Representative. These anchors shall be Proof Tested as described below. Following the successful completion of the Proof Tests, each anchor shall be pulled to failure in order to measure the anchor maximum capacity.
- .3 The first ten (10) anchors shall be installed and tested in the presence of the Departmental Representative. Thereafter, a minimum of 20% of the anchors shall be tested in the presence of the Departmental Representative.
- .4 Hydraulic jacks, gauges, and torque wrenches used for testing and tensioning of anchors shall be calibrated by an independent, certified testing laboratory within one (1) month of use. It is recommended that a backup jack and gauge be available on the Work site.
- .5 Provide the Departmental Representative with any samples of grouting materials that may be requested for quality assurance testing.
- .6 Grout quality control measures undertaken by the Contractor shall follow the recommendations of the grout manufacturer. Grout testing, at a minimum, shall comprise compression cube testing in accordance with the procedures outlined in CSA A23. Initially, a minimum of six (6) grout cubes shall be taken per batch, or once per day where multiple batches are mixed. Three (3) cubes shall be tested at three (3), seven (7) and twenty eight (28) days. Following continued satisfactory results from grout cube testing this requirement can be relaxed to three (3) grout cubes per batch or per day, and possible review of the testing frequency requirements.

### 3.3 PROCEDURES – ROCK ANCHORS

- .1 Drill holes for mechanical anchors shall have a diameter recommended by the manufacturer. For fully grouted dowels, drill holes shall have a minimum diameter of 2

- times the bar diameter. Completely clean holes of all drill cuttings, sludge, debris, and water using clean water and/or air.
- .2 Drill holes for resin grouted tensioned anchors shall have a diameter recommended by the grout manufacturer and be based on the diameter of the cartridges used. The number of cartridges inserted per hole in the anchor/bond zone shall be determined by the Departmental Representative based on the recommended tension applied to the anchor and rock conditions. Anchor tendons shall be beveled at the distal end at a 45 degree angle to facilitate puncturing and mixing of the cartridges. Mix the resin by inserting the bolt in the hole and rotating it at a uniform penetration rate, rotation rate and duration as recommended by the resin manufacturer. After allowing the fast setting cartridges to set, perform testing and tensioning, and attach the bearing plate and nut.
  - .3 All anchors shall be installed using at least three commercially manufactured centralizers at intervals not greater than 2 m to keep the bar centered in the hole.
  - .4 Anchors shall be installed with sufficient thread exposed outside of the rock to accept a plate and nut and to facilitate tensioning and testing. Following tensioning and grouting, the nut and face plate shall be removed and the anchor tendon cut flush to the rock surface and covered with mortar coated with drill cuttings. Alternatively, the anchor plate and nut can be counter sunk into the rock surface and covered with mortar coated with drill cuttings.
  - .5 Untensioned dowels can be installed flush to or cut flush to the rock surface, and shall be covered with mortar coated with drill cuttings following installation.
  - .6 All untensioned dowels and tensioned anchors above the anchorage/bond zone shall be cement grouted. For holes oriented below horizontal, fill the holes with grout by pumping the grout through a grout tube that extends to the lowest/distal end of the hole, while providing a means of venting at the highest/proximal end of the hole. In the unlikely case of holes oriented above horizontal, grouting shall be pumped from the collar until return is observed from a long length de-air tube extending to the distal end of the hole.
  - .7 Tensioned mechanical or resin grouted anchors shall be cement grouted within 48 hours of tensioning.
  - .8 Wash all excess, or spilled cement grout from rock surfaces.
  - .9 Tensioning: The Departmental Representative will determine the tension load for each anchor. Tensioning equipment shall consist of a hollow core jack. A calibrated impact or torque wrench may be used for light tension loads, subject to approval by the Departmental Representative. Anchors shall be tensioned and locked-off at tensions ranging from 50 kN to 150 kN as directed by the Departmental Representative.
  - .10 Testing: Testing equipment shall consist of a suitably sized hollow core jack, an adjustable bearing truss for aligning the direction of pull with the centreline of the anchor, an extension bar for attaching the jack to the anchor, a hydraulic pump with a gauge, a calibration chart for the ram/gauge combination that provides the applied load directly in kilonewtons, and an independently mounted dial gauge for measuring the strain of the anchor under load. Anchors for testing will be selected at random by the Departmental Representative. All testing will be undertaken by the Contractor as directed by the Departmental Representative. The Contractor shall supply all necessary equipment and be capable of performing the following testing:
    - .1 Proof Tests: Prior to grouting, tensioned anchors shall be proof tested by incrementally loading the anchor in tension according to the load steps listed in the Table below. The maximum Design Load (DL) shall be provided by the Departmental Representative. The 1.2 DL load shall be maintained for ten (10)

minutes while measuring creep at minutes 1, 2, 3, 4, 5, 6, and 10. Anchors will be considered to have failed if the creep is greater than 1 mm between 1 and 10 minutes. If the anchor fails, the test shall be extended to 60 minutes and the total creep movement shall be less than 1 mm measured between 6 minutes and 60 minutes. Failed anchors shall be replaced at the Contractor's expense.

.2 Proof Test Load Steps

- .1 Alignment Load = 0.1 DL
- .2 0.25 DL
- .3 0.5 DL
- .4 0.75 DL
- .5 1.0 DL
- .6 1.2 DL

.3 Pull Tests: After anchorage, the anchor shall be pull tested by loading the anchor in tension to 1.2 DL and maintaining the load for ten (10) minutes. Anchors will be considered to have failed, and shall be replaced at the Contractor's expense, if load at the end of the test falls beneath 1.1 DL or if movement continues to occur at or below the test load.

- .11 The first ten (10) tensioned anchors shall be proof tested; thereafter, a minimum of 20% of the tensioned anchors shall be proof tested as selected by the Departmental Representative.
- .12 A minimum of 20% of the anchors shall be pull tested under the supervision of the Departmental Representative.
- .13 Additional tests shall be performed as directed by the Departmental Representative where different rock types or anchor installation conditions are encountered as construction progresses.
- .14 Up to five (5) additional anchors in the vicinity of a failed anchor shall be tested as required by the Departmental Representative.

### 3.4 PROCEDURES – ROCK DRAINS

- .1 Holes for rock drains shall be drilled in the direction and to the depth specified by the Departmental Representative. The dip angle for drain holes shall be specified by the Departmental Representative. Finished holes shall be flushed with air to remove deleterious materials.
- .2 PVC pipes shall be installed into the finished holes immediately after flushing. Pipes shall be coupled according to the manufacturer's specifications. The pipe shall be installed along the entire length of the holes and shall be finished flush with the rock face or as per the Drawings. The slots shall be on top when the pipe is installed. The pipe shall be secured in the hole, using plastic or wooden wedges driven into the hole collar if necessary, so that the pipe cannot be pulled out by hand.

**END OF SECTION**