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SPECIFICATION

PROJECT NO. 669
PHASE 4 – LITTLE SMOKEY

CAPE BRETON HIGHLANDS NATIONAL PARK, NS

ISSUED FOR TENDER

2017-09-01

Pages

Division 01 - GENERAL REQUIREMENTS

Division 31 - EARTHWORK

APPENDICES

Drawing Number

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Part 1 General

1.1 DESCRIPTION OF WORK

.1 Work on this Contract covers the furnishing of all labour, materials and equipment required to provide construction services for the stabilization of two slopes on Little Smokey, in the Cape Breton Highlands National Park, NS as illustrated on the attached Project Drawings.

.2 The two slopes are identified as RR7448 and RR7542 and are located at approximate Station 74+480 and 75+420, respectively. Station 0+000 is at the Park Boundary at the Cheticamp River Bridge. The provincial section in Pleasant Bay was not included in the stations.

.3 The Project shall include, but is not limited to, the following:

.1 Clearing and grubbing of vegetation along the rock slope face and crest.

.2 Trimming (rock removal) of unstable rockmass that are too large to be removed by manual scaling, as per project drawings.

.3 Scaling operations for removal of loose rock and soil along existing rock slopes.

.4 Disposal of scaled, trimmed, and cleared/grubbed, and existing fallen material, at a disposal site outside the Park boundary.

.5 Layout of proposed rock anchors, as per direction of Department Representative.

.6 Preparation of rock surface to accommodate the anchor plates.

.7 Drilling, installation, and testing of rock anchors.

.8 Supply and operation of traffic control, including temporary traffic lights at the approaches for duration of project and temporary barriers.

.9 Protection of the asphalt surface during construction operations and reinstatement, if required, at Contractor's expense.

.10 All work to be carried out in accordance with applicable federal, provincial regulations for those agencies having jurisdiction for the work. The work is subject to the National Park Act and Regulations, Canadian Environmental Protection Act, and the Code of Practice of the Department of Labour, as it applies to the Temporary Workplace Traffic Control Manual.

.4 Site Description

.1 Rock slopes RR7448 and RR7542 are located adjacent to the Cabot Trail highway along the eastern coast of Cape Breton Highlands National Park. Access to the slope is limited to the highway at the base of the rock cut, with no trails or roads along the crest. At RR7542, an overhead utility line is located in close proximity to the crest of the slope and can be observed in several photographs on the design drawings. The utility pole beyond the crest of RR7448 is set back from the crest, ranging in distance from approximately 20 m to 80 m from the crest.

.5 Geological Conditions

.1 The rock mass at RR7448 and RR7542 consists of granitic to granodioritic gneiss (metamorphic rock).

.1 RR7448: The rock face consists of large, 0.5 to 3.0 m effective diameter, loose blocks that create overhangs at several locations. The blocks are formed by persistent, open, fractures throughout the slope. A major fracture set is dipping unfavourable out of the rock slope, and is cross-cut by several sub-vertical fracture sets.

.2 RR7542: The rock mass varies from fresh to severely weathered gneiss throughout the slope. The rock face is highly fractured, with many intersecting, open, fracture planes throughout. Block sizes range from as low as 0.3 m up to 3.0 m in effective diameter. The rock mass weathering condition at RR7542 ranges from slightly weathered to moderately weathered in areas. Weak rock conditions should be anticipated.

It should be noted that the site evaluation was limited to site walkover visual inspection and 3D photogrammetric analysis. No intrusive geotechnical investigations were completed (geotechnical borehole drilling, strength testing of rock samples, water level readings, water pressure testing of drill holes, etc.)

1.2 CONTRACT METHOD

.1 All items in this contract will be paid for as indicated in Section 01 29 00 – Payment Procedures.

1.3 WORK SEQUENCE

.1 Construct Work in stages to accommodate Owner's continued use of premises during construction.

.2 Complete all work by November 15, 2017.

.3 Provide within five (5) working days after Contract Award, construction schedule showing material delivery dates, key milestones, anticipated progress stages and final completion of work within the time period required by Contract Documents and as specified herein. The schedule should include a detailed construction plan/sequence and include time for ordering, preparation and delivery of all materials.

.4 Prior to the pre-construction meeting, the Contractor shall submit a phased plan to the Department Representative for approval indicating the work area and the schedule for each phase of work.

.5 The Contractor shall submit Rock Bolt Installation Plan and Rock Removal Plan for approval from the Departmental Representative. The Contractor shall supply all Blasting Submittals in accordance with Section 31 23 21, Clause 3.1 if Trimming will be carried out.

.6 Maintain fire and emergency access/control at all times.

.7 The general remedial measure sequence for the rock slopes is as follows:

.1 RR7448: Rock Removal to be completed prior to manual scaling.

.2 RR7542: Manual scaling to be completed prior to installation of rock anchors.

1.4 WORK WITHIN PARK BOUNDARIES

.1 The project is within a national park and it is essential that lands remain as undisturbed as possible. The Contractor will be expected to use standards and methods beyond those for normal construction in order to protect the environment and ensure the aesthetics of the work. Contract limits shall be strictly adhered to and every precaution shall be taken to minimize environmental damage and disruption to vegetation, wildlife habitat, and structures or existing services, on construction and access sites:

.1 If any damage occurs during construction, the Contractor is responsible to bear the expense to immediately restore such damaged areas to the satisfaction of the Departmental Representative.

.2 If Contractor fails to repair damage to the satisfaction of the Departmental Representative, the Departmental Representative may complete repairs at the Contractor's expense.

.3 The Contractor shall ensure that contracted work meets the standards outlined in the contract specification and drawings.

.4 The Contractor is responsible to follow the Provincial requirements regarding the following:

.1 Pit and Quarry Guidelines.

.2 Environmental Construction Practice specifications.

.5 The Contractor will make arrangements with authorities or owners of private properties for quarrying and transporting materials and machinery over their properties and be responsible for obtaining and paying of fees.

1.5 CONTRACTOR USE OF SITE

.1 Co-ordinate use of premises under direction of the Departmental Representative.

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

.3 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

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

.5 At completion of Construction, return disturbed areas to equal condition or better condition than existed before Work started.

1.6 PROJECT MEETINGS

.1 The Departmental Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

1.7 SETTING OUT OF WORK

.1 The Contractor is to provide devices needed to lay out and construct work.

.2 The Contractor is to assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

.3 The Contractor shall provide coordinates, elevations and dimensions in the field, as required by the Departmental Representative.

.4 The Contractor is to make the Departmental Representative aware of any discrepancies between the contract drawings and field measurements and inform the Departmental Representative when errors are discovered.

1.8 ALTERATIONS, ADDITIONS, OR REPAIRS TO EXISTING FACILITIES

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

1.9 CONSTRUCTION SAFETY MEASURES

.1 The Contractor must submit a project specific Safety Plan prior to the pre-construction meeting.

1.10 EXISTING SERVICES

.1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission. The Contractor is responsible for locating any buried utilities prior to commencing the Work.

.2 Where Work involves breaking into or connecting to existing services, give the Owner forty-eight (48) hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian, vehicular traffic and tenant operations.

.3 Provide alternative routes for personnel, pedestrian and vehicular traffic as required to complete the Work.

.4 Submit schedule to and obtain approval from Owner for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.5 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.

.6 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.7 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.8 Protect, relocate, or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.9 Record locations of maintained, re-routed and abandoned service lines.

.10 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers.

1.11 DOCUMENTS REQUIRED

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

- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Reviewed Shop Drawings.
- .5 Change Orders.
- .6 Other Modifications to Contract.
- .7 Field Test Reports.
- .8 Copy of Approved Work Schedule.
- .9 Health and Safety Plan and Other Safety Related Documents.
- .10 Other documents as specified.
- .11 Construction Schedule.
- .12 Environmental Control Plan.

1.12 EXECUTION

.1 Disposal of Materials from Rock Slope Stabilization

- .1 All materials from rock scaling,trimming, clearing/grubbing, and excavation of existing fallen material in ditches in work areas shall be hauled to a disposal site outside of Park boundaries, and noted within these specifications (Section 31 23 16 Common Excavation).
- .2 All ditches in work sites where stabilization work is carried out, shall be cleaned and restored to a visually pleasing quality, which includes having side slopes and bottom slopes, as well as preventing the ponding of water, or as directed by Departmental Representative.
- .3 Roadways and sidewalks in work sites shall be cleaned of scaled rock before motorists and pedestrians are permitted to pass through the work site.
- .4 No extra payment will be made for clean-up of roadway and work site following rock scaling and all other project work as it will be considered incidental to project. Ditch clean up and disposal of rock materials are paid under the Common Excavation bid item.

.2 Execution of Work

- .1 The Contractor shall execute work in an efficient, safe and expeditious manner. The Departmental Representative reserves the right to order the removal from the work site any employee of the Contractor who fails to work in an efficient, safe and expeditious manner. This shall be strictly enforced.
- .2 Departmental Representative reserves right to order removal from work site, any piece of equipment that is not in good operating condition and the Contractor shall immediately rectify problem or replace faulty equipment with an equivalent unit within forty-eight (48) hours.

.3 Crew Qualifications

.1 The Contractor must have a crew and supervisors experienced and qualified in rock scaling (Section Scaling 31 23 20), drilling, rock anchor installation, excavation and disposal of excavated material, and all other work identified herein.

.2 The Contractor shall provide an experienced scaling crew that consists of a supervising scaling foreman with at least three (3) years' experience in rock scaling, a minimum of two (2) rock scalers with at least two (2) years' experience each scaling on slopes similar to the project site conditions. The scaling crew size shall be maintained at all times until the completion of all work.

.3 In view of the rock slope heights at the project site, it has been assumed that scaling crews will be working from ropes at heights. Each scaling person working from ropes at heights must have a minimum of Level 1 Industrial Rope Access Trade Association (IRATA) training or approved equivalent. In addition, a Level 3 IRATA or approved equivalent supervisor must be onsite at all times.

.4 The Contractor shall provide qualified traffic control personnel.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 PRECEDENCE

.1 For Federal Government projects, General Conditions take precedence over technical specification.

1.2 RELATED SECTIONS

.1 Section 01 35 30 – Health and Safety Requirements.

.2 Section 01 35 31 - Special Procedures for Traffic Control.

.3 Section 01 35 43 - Environmental Procedures.

1.3 EXISTING SERVICES

.1 It is understood that above ground Bell Aliant communication cables are located on utility poles at the crests of the Little Smokey slopes.

.2 The contractor is responsible for locating the above line and any/all utilities prior to commencing work. All utilities must be protected or temporarily relocated and maintained throughout the life of the project in coordination with the utility company.

.3 The contractor shall be responsible for any damage incurred to utilities in the Work area while occupying the site.

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

.5 Where Work involves breaking into or connecting to existing services, give the Owner forty-eight (48) hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian, vehicular traffic and tenant operations.

.6 Provide for pedestrian, bicycle, vehicular, and wildlife traffic through the work areas for the duration of the construction.

1.4 USE OF SITE AND FACILITIES

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

.2 Provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 The natural environment within the work area is to be preserved, as practical. Excessive cutting of trees or other vegetation at the crest of the slope is not allowed. The Contractor will submit, with the Work Plans/Procedures, any requirement for tree cutting or disturbance of the natural ground surface beyond the crest of the slope or in areas adjacent to the rock cuts.

.5 All components of the Work shall be conducted in accordance with Section 01 35 43 - Environmental Procedures and the Environmental Protection Plan for the project.

1.5 PROTECTION OF PERSONS AND PROPERTY

.1 The Contractor shall comply with all applicable safety regulations including, but not limited to, the Worker's Compensation Act and the Occupational Health and Safety Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.

.2 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site in accordance with Section 01 35 26.06 – Health and Safety Requirements.

.3 The Contractor shall promptly repair, replace or compensate for any loss or damage caused by the Contractor to any property or, if Departmental Representative so directs, shall promptly reimburse the costs resulting from such loss or damage.

1.6 SPECIAL REQUIREMENTS

.1 There are no restrictions on working on nights, weekends, or statutory holidays.

.2 Work may be restricted to accommodate special events within the park. Parks Canada will provide at least two (2) weeks notice of upcoming restrictions. No events are presently known at the time of tender.

.3 Any maintenance performed on equipment must be completed outside park boundaries or at a predetermined location approved by the Departmental Representative.

.4 Traffic interruptions/closures to facilitate the work shall be in accordance with Section 01 35 00 06 – Special Procedures for Traffic Control.

.5 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.

.6 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.7 Keep within limits of work and avenues of ingress and egress.

1.7 BLASTING OPERATIONS

.1 Blasting Permit to be given written approval by Field Unit Staff ahead of any blasting. Notice must be provided to Field Unit Staff five (5) business days prior to blasting to allow for review. All conditions must be met on the Permit.

.2 Blasting is restricted to the hours between 10:00 am and 3:00 pm.

.3 The maximum cumulative traffic delay, as specified in Clause 1.6.4, shall be adhered to.

.4 All work must be carried out in accordance with the specifications of Section 31 23 21.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 General Conditions.

1.2 PRIME COST SUM

.1 Include in Contract Price a total Prime Cost Sum of $ 40,000.

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

.3 Prime Cost Sum provided for in the unit price table is not a sum due the Contractor. Rather, payment will be made against it for miscellaneous work not included in the unit price table ordered under GC 6.1 of the General Conditions.

.4 Such work may include, but not be limited to:

.1 Trimming, rock scaling, common excavation, drilling and installation of rock anchors, within project site.

.5 The Contract Price, and not prime cost sum, includes Contractor's overhead and profit in connection with such prime cost sum.

.6 Once a Prime Cost Sum has been agreed upon with Parks, it shall be included as an item.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Section 01 11 00 – Summary of Work.

1.2 MEASUREMENT PROCEDURES

.1 See Section 01 29 00 – Payment Procedures.

1.3 DESCRIPTION OF WORK

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

.2 For those purposes of mobilization and demobilization, “project site” means the location as per the contract drawings.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS OF THE BID AND ACCEPTANCE FORM

.1 Unit price and Lump Sum price bids are full compensation for the work necessary to complete each item in the Contract and in combination for all work necessary to complete the Work as a whole.

.2 Overhaul will not be paid for on this project.

.3 The quantities listed in the Bid and Acceptance Form are approximate only and are for the purpose of tendering. Payment to the Contractor will be based on actual quantities of work completed in accordance with the drawings and specifications.

.4 The number of the items described below corresponds to the items in the Bid and Acceptance Form.

1.2 MEASUREMENT AND PAYMENT

.1 All items in this contract will be paid for as indicated in the bid items below:

.2 Lump Sum Item 1 – Section 01 21 00 - Allowances

.1 Unit of Measurement: Lump Sum (LS)

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

.1 Rental rates will be in accordance with current Nova Scotia Roadbuilders rate schedule, or for work undertaken in Nova Scotia, and will be all inclusive and fully operated. Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits.

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

.3 Lump Sum Item 2 – Section 01 25 20 – Mobilization / Demobilization

.1 Unit of Measurement: Lump Sum (LS)

.2 This Item includes: For 50% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete. The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment and facilities are removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.

.4 Lump Sum Item 3 – Section 01 35 00.06 - Special Procedures for Traffic Control

.1 Unit of Measurement: Lump Sum (LS)

.2 This Item includes:

.1 Traffic control persons and traffic accommodation person(s).

.2 Provision, installation, and maintenance of temporary traffic control devices, including proper lighting, temporary barriers, construction signage, portable variable message sign and temporary pad sites.

.3 Maintaining one lane of traffic open at all times.

.4 Provide, erect and maintain project identification site signs, Safety and Instruction signs, additional traffic signs (TC-73, TC-73S and RB-55), trail closure signs and notices.

.5 Traffic control devices and measures required to comply with NSTIR, TWTCM including but not limited to all labour, materials and equipment related to traffic control, Accredited Temporary Workplace Signer (TWS), traffic control signage, flashing light units, jersey barriers, traffic barrels, etc.

.5 Lump Sum Item 4 – Section 01 35 43 – Environmental Procedures

.1 Unit of Measurement: Lump Sum (LS)

.2 This item includes:

.1 Periodic and general maintenance of all erosion control measures or as directed by Departmental Representative.

.2 All environmental protection, sedimentation and erosion control measures required to complete the project, such as (but not limited to) diversion ditching, silt fences, temporary ground covers, and rock flow checks in accordance with Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure (May 2015).

.6 Lump Sum Item 5 – Section 01 52 00 – Construction Facilities

.1 Unit of Measurement: Lump Sum (LS)

.2 This item includes:

.1 Provide and maintain adequate access to the project site.

.2 Clean roads and parking areas where used by the Contractor or employees.

.3 Provide, erect and maintain project identification site signs, Safety and Instruction signs, trail closure signs and notices.

.4 Provide sanitary facilities.

.7 Lump Sum Item 6 – Other Items Not included in the Lump Sum Table

.1 Unit of Measurement: Lump Sum (LS)

.2 This item includes: All other work considered incidental to the work and which are not specifically mentioned or accounted for in the Lump Sum Table, but are necessary to complete the work in accordance with the Contract, the Drawings, and Specifications. This item shall include but are not limited to the following; project layout and surveying, construction management, weigh scales, permits, water/snow control, landscaping features and approvals required to complete the Work.

.8 Unit Price Item 1 – Section 31 33 13 – Supply and Install 32 mm Rock Anchors

.1 Unit of Measurement: Each (Ea)

.2 This item includes: Unit price for installation per 32 mm diameter, 9 m long rock anchor and shall include all labour, materials, equipment, and site access necessary to complete the work.

.3 The number of rock anchors specified on the drawings may change after scaling operations.

.4 Rock anchors will be installed at locations designated by the Departmental Representative.

.5 Rock anchors must be locked off at the design loads and proof tested as per PTI guidelines.

.6 Payment for rock anchor installation and proof testing will be made per rock anchor and shall be full compensation for supplying all material, labour, alternate drilling methodology as per Section 31 23 16.26, equipment and incidentals to execute the work as specified.

.9 Unit Price Item 2 – Section 31 33 13 – Supply and Install 26 mm Rock Anchors

.1 Unit of Measurement: Each (Ea)

.2 This item includes: Unit price for installation per 26 mm diameter, 6 m long rock anchor and shall include all labour, materials, equipment, and site access necessary to complete the work.

.3 The number of rock anchors specified on the drawings may change after scaling operations.

.4 Rock anchors will be installed at locations designated by the Departmental Representative.

.5 Rock anchors must be locked off at the design loads and proof tested as per PTI guidelines.

.6 Payment for rock anchor installation and proof testing will be made per rock anchor and shall be full compensation for supplying all material, labour, alternate drilling methodology as per Section 31 23 16.26, equipment and incidentals to execute the work as specified.

.10 Unit Price Item 3 – Section 31 33 13 – Performance Test Rock Anchors

.1 Unit of Measurement: Each (Ea)

.2 This item includes: Unit price for performing performance load tests on new rock anchors.

.3 The number of rock anchors to be performance load tested will be determined by the Departmental Representative.

.4 Payment for rock anchor performance load testing shall be full compensation for supplying all material, labour and equipment to execute the work as specified.

.11 Unit Price Item 4 – Section 31 23 20 – Manual Rock Scaling

.1 Unit of Measurement: Hour (hr)

.2 This item includes: Unit price per hour of entire scaling crew actively manually scaling by repelling on rope.

.3 Manual scaling by repelling on rope will be measured as the hours of time spent by the entire crew actively scaling the slope, beginning at the top of rope decent to the scaling area, and ending at the time the scaler reaches the bottom of that particular rope decent. Time spent accessing scaling areas, maintaining equipment, or carrying out work using tools or methods which are not the most appropriate or best suited to a particular situation will not be measured for payment.

.4 Payment for scaling will be made at the Contract Unit Prices per hour for manual scaling, which shall be full compensation for supplying all material, labour and equipment to execute the work as specified.

.5 Disposal and cleanup of materials from rock scaling and excavation of existing fallen materials in ditches in the work areas will be paid separately under the Common Excavation bid item.

.12 Unit Price Item 5 – Section 31 33 23 – Manlift Rock Scaling

.1 Unit of Measurement: Hour (hr)

.2 This item includes: Unit price per hour for manual scaling by manlift.

.3 Manlift scaling will be measured as the hours of time spent actively scaling the slope in designated areas while one (1) approved scaler is working from a manlift, commencing when the scaler ascends from ground level, and ending at the time the scaler returns to ground level. Time spent, maintaining equipment, or carrying out work using tools or methods which are not the most appropriate or best suited to a particular situation will not be measured for payment.

.4 The manlift must have a minimum working height of 20 metres, minimum horizontal reach of 15 metres, and a lift capacity of 227 kg.

.5 Payment for scaling will be made at the Contract Unit Prices per hour for one (1) approved scaler actively manlift scaling, which shall be full compensation for supplying all material, labour, and equipment to execute the work as specified.

.6 Disposal and cleanup of materials from rock scaling and excavation of existing fallen materials in ditches in the work areas will be paid separately under the Common Excavation bid item.

.13 Unit Price Item 7 – Section 31 23 16 – Common Excavation

.1 Unit of Measurement: Cubic meter (m^3).

.2 This item includes: Common Excavation will be based on the measured volume of common excavation material in the box of haul trucks, multiplied by the number of truck loads.

.3 The Departmental Representative will measure the volume of each different haul truck based on physical dimensions of the truck box measured up to the base of batter boards, or if there are no batter boards, the physical dimensions that would provide a freeboard of at least 300 mm with a level load.

.4 Haul truck Operators shall submit a haul ticket for each load to the Departmental Representative prior to taking each load off site. Failure to do so will result in the load not being measured for payment.

.5 Only full loads of excavated material will be measured for payment. Non full loads must be approved by the Departmental Representative prior taking off site.

.6 Payment for Common Excavation will be made at the Contract Unit Price per cubic meter of the measured truck load. The tendered unit price shall be full compensation for supplying all material, labour, and equipment to execute the work as specified.

.7 Existing catchment ditches shall be surveyed prior to scaling operations and after common excavation procedures are complete. The catchment ditch shall be reinstated to the elevation of the existing ditch and shoulder width, post scaling operations or as directed by the Departmental Representative.

.8 Over excavation beyond the limits shown on the plans or directed by the Departmental Representative will not be measured for payment.

.9 Excavation, removal, stockpiling, clearance of snow or other frozen materials are not considered to be measurable items.

.14 Unit Price Item 7 – Section 31 23 16.26 – Rock Removal

.1 Unit of Measurement: Cubic meter (m^3).

.2 This item includes: Unit price per cubic meter of rock removed from the rock slope.

.3 This item includes price per cubic meter of rock removed whereby Trimming (Section 31 23 21) techniques are used.

.4 Rock Removal will be measured as the in-situ "bank" volume of rock excavated, based on measurements agreed upon by the Departmental Representative and the Contractor before and after each trim. Other excavation and overbreak beyond the Limits of Excavation, and secondary breaking of oversize material resulting from Trimming operations will not be measured for payment.

.5 Payment for Rock Removal will be made at the Contract Unit Price per cubic metre (m^3) of rock removed. The tendered unit price shall be full compensation for supplying all material, labour, and equipment to execute the work as specified.

.6 Payment for Rock Removal will not be made until all related submittals have been received and approved by the Departmental Representative.

.7 For Trimming operations, payment for Blasting Consultant shall be inclusive of the cubic meter priced presented herein.

.8 Disposal and clean up of materials produced by rock scaling and rock removal will be paid separately in accordance with Section 31 23 22 – Common Excavation.

.9 Access to Rock Removal locations and shall be incidental to the Rock Removal unit price.

.10 Preparation of submittals and engaging a Blast Consultant to prepare and/or certify Proposed Blasting Plans is considered incidental to Rock Removal.

.11 Protection of infrastructure and removal of rock material from the roadway and adjacent areas is considered incidental to Rock Removal.

.12 In the case where Trimming is used for Rock Removal, areas damaged by unsuccessful blasting shall be remediated by the Contractor to the satisfaction of the Departmental Representative at the Contractors expense.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 11 00 – Summary of Work.

1.2 ADMINISTRATIVE

.1 The Departmental Representative shall schedule and administer project meetings throughout the progress of the work.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four days in advance of meeting date to the Engineer.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 The Department Representative will record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 The Department Representative will reproduce and distribute copies of minutes within three (3) days after meetings and transmit to meeting participants and affected parties not in attendance.

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

1.3 PRECONSTRUCTION MEETING

.1 Immediately upon issuance of "Issued for Construction" drawings, the Departmental Representative shall arrange a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Representatives of the Owner, Contractor, Subcontractors, field inspectors and supervisors should be in attendance.

.3 Establish time and location of meeting and notify parties concerned a minimum of five (5) days before meeting.

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

.5 Agenda to include:

- .1 Appointment of official representative of participants in the Work.
- .2 Schedule of Work.
- .3 Schedule of submission of shop drawings.
- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences.
- .5 Delivery schedule of specified equipment.
- .6 Site security.

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

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

.9 Appointment of inspection and testing agencies or firms.

.10 Insurances, transcript of policies.

1.4 PROGRESS MEETINGS

.1 During course of Work the Departmental Representative shall schedule bi-weekly progress meetings.

.2 Contractor, Subcontractors, Departmental Representative are to be in attendance.

.3 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for affect on construction schedule and on completion date.

.12 Other business.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

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

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

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

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

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

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

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

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

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

1.2 REQUIREMENTS

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

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

.3 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.

1.3 SUBMITTALS

.1 Submit to Departmental Representative within five (5) working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.2 Submit Project Schedule to Departmental Representative within five (5) working days of receipt of acceptance of Master Plan.

1.4 MASTER PLAN

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

.2 Departmental Representative will review and return revised schedules within five (5) working days.

.3 Revise impractical schedule and resubmit within five (5) working days.

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

1.5 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

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

- .1 Award.
- .2 Shop Drawings, Samples.
- .3 Permits.
- .4 Mobilization.
- .5 Traffic Control.
- .6 Scaling Operations including Common Excavation.
- .7 Install Rock Anchors.
- .8 Cleanup and Demobilization.

1.6 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule every two (2) weeks reflecting activity changes and completions, as well as activities in progress.

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

1.7 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule

are those with projected start or completion dates later than current approved dates shown on baseline schedule.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 11 00 – Summary of Work.

.2 Section 01 32 16.07 – Construction Progress Schedules.

.3 Section 01 35 29 – Health and Safety.

.4 Section 01 45 00 – Quality Control.

.5 Section 01 78 00 – Closeout Submittals.

1.2 ADMINISTRATIVE

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

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

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

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

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

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

.7 Verify field measurements and affected adjacent Work are co-ordinated.

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

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

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

.11 Make any changes in submissions which Departmental Representative may require consistent with Contract Documents and resubmit as directed by Departmental Representative.

.12 Notify Departmental Representative, in writing, when resubmitting of any revisions other than those requested by Departmental Representative.

1.3 SHOP DRAWINGS AND PRODUCT DATA

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

.2 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 co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.3 Allow five (5) working days for the Departmental Representative's review of each submission.

.4 Adjustments made on shop drawings by the Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Departmental Representative prior to proceeding with Work.

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

.6 Accompany submissions with transmittal letter, in duplicate, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.7 Submissions 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 Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions, and clearances.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Relationship to adjacent work.

.8 After the Departmental Representative's review, distribute copies.

.9 Submit six (6) prints of shop drawings for each requirement requested in specification Sections and as the Departmental Representative may reasonably request.

.10 Submit six (6) copies of product data sheets or brochures for requirements requested in specification Sections and as requested by the Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.11 Delete information not applicable to project.

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

.13 If upon review by the 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.

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

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

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

1.4 SAMPLES

.1 Samples: materials, equipment quality, finishes, workmanship.

.2 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.3 Deliver samples prepaid to the Departmental Representative's business address.

.4 Notify the Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.5 Adjustments made on samples by the Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Departmental Representative prior to proceeding with Work.

.6 Make changes in samples which the Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 PROGRESS PHOTOGRAPHS

.1 Submit electronic colour digital photographs in ".jpg" format.

.2 Identification: name and number of project and date of exposure indicated.

.3 Number of viewpoints: location of viewpoints determined by Department Representative.

.4 Frequency: monthly and at completion of project.

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 WORK SCHEDULE

.1 Provide within five (5) working days after contract award, schedule showing anticipated progress stages and final completion of work within time period required by Contract Documents.

.2 Interim reviews of work progress based on work schedule will be conducted as decided by Department Representative and schedule updated by Contractor in conjunction with and to approval of Department Representative.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 Regulate traffic in accordance with the Public Highways Act (Nova Scotia) and stipulated in the Temporary Workplace Traffic Control Manual (NSTWTCM) distributed by the Nova Scotia department of Transportation and Infrastructure Renewal latest edition.

.2 The Department Representative reserves the right to direct the Contractor to reduce either the number or length of traffic control work areas during peak traffic volumes or when cumulative delays exceed the specified maximum.

1.2 REFERENCES

.1 Manual of Uniform Traffic Control Devices for Canada (MUTCD) – Latest Edition.

.2 Nova Scotia Temporary Workplace Traffic Control Manual (NSTWTCM) – Latest Edition.

1.3 TRAFFIC CONTROL PLAN

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

.2 The contractor shall develop and implement a Traffic Control Plan in accordance with the requirements of NSTWTCM. The Traffic Control Plan must be submitted to the Departmental Representative seven (7) days prior to the commencement of any work. The Traffic Control Plan shall include plans specific to each rock slope location and any special requirements for each work task (blasting, scaling, etc.) based on the project specific hazards. The Traffic Control Plan shall include layout drawings indicate the quantity, spacing and detail of signs, and traffic control devices to be used during construction for each work area site (including adjustments for various stages of work).

.3 The Traffic Control Plan may be required to be updated and re-submitted to the Departmental Representative for review and acceptance should traffic, site, or work conditions change.

.4 Do not change traffic control operation without approval of Departmental Representative.

1.4 PROTECTION OF PUBLIC TRAFFIC

.1 TC-132NS flashing light units with lights ahead signs will be required at both approaches, as well as proper work zone signage and spacing.

.2 Provide additional traffic signage including No Stopping (RB-55) and Share The Road signs (TC-73 and TC-73S).

.3 Provide initial timing of traffic lights by a third party consultant for approval by the Departmental Representative prior to mobilizing to site.

.4 Temporary concrete barricades and fencing will be required at the site.

.5 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.

.6 When working on travelled way:

.1 Place equipment in position to present minimum of interference and hazard to travelling public.

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

.3 Do not leave equipment on travelled way overnight.

.7 Do not close any lanes of road without approval of Departmental Representative. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in Part D of MUTCD and NSTWTCM.

.8 Keep travelled way sufficient width for required number of lanes of traffic.

.9 Do not exceed a lane closure length of 400 metres.

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

.11 Accommodate cyclists and provide appropriate signage and space for traveling through project limits.

.12 Minimize delays for school buses.

1.5 INFORMATIONAL AND WARNING DEVICES

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

.2 All traffic signs are to be bilingual or symbolic.

.3 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions Signs and Devices, of MUTCD manual and Nova Scotia Temporary Workplace Traffic Control Manual.

.4 Place signs and other devices in locations recommended by NSTWTCM.

.5 The Contractor shall provide an accredited Temporary Workplace Signer, who has successfully completed an approved Temporary Workplace Signer course, to be on site at all times when active construction is taking place. The Temporary Workplace Signer will be responsible to supervise the placement and dismantling of all temporary conditions signs and devices that indicated to the road user that highway construction activity exists and also to ensure that proper traffic control producers are carried out in accordance with NSTWTCM. The Temporary Workplace Signer is considered part of the Contractor’s supervision and administration staff and compensation from the provision of this individual is considered incidental to the work.

.6 Continually maintain traffic control devices in use by:

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

.2 Removing or covering signs which do not apply to conditions existing from day to day.

1.6 CONTROL OF PUBLIC TRAFFIC

.1 Provide traffic control personnel who have a valid provincial license and are trained in accordance with, and properly equipped as specified in NSTWTCM manuals in following situations:

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

.2 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.

.3 When workmen or equipment are employed at locations where oncoming traffic would not otherwise have adequate warning.

.4 Where temporary protection is required while other traffic control devices are being erected or taken down.

.5 For emergency protection when other traffic control devices are not readily available.

.6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.

.7 At each end of restricted sections where pilot vehicles are required.

.2 All Traffic Control Personnel shall be equipped with portable radios of sufficient range to ensure continuous communication within the traffic control zone.

.3 All construction vehicles shall operate in accordance with and are subject to traffic control restrictions and operations in place on the project.

1.7 TRAFFIC INTERUPTIONS

.1 Any traffic interruptions greater than ten (10) minutes must have prior approval of the Departmental Representative.

.2 All road closures require prior approval of the Departmental Representative.

.3 Requests should be provided to the Departmental Representative at least one (1) week in advance of the planned interruption, providing details on the period, timing and nature. Requests with less than 72 hours notice may be rejected without consideration.

1.8 SIGNS AND BARRICADES

.1 Portable Variable Message Sign and Trailer assembly will be used at each end of the project limits to provide public traffic information regarding the ongoing construction and potential delay. Temporary pad sites shall be constructed for the Portable Variable Message Sign and approved by the Departmental Representative.

.2 Provide, erect and maintain necessary barricades, suitable and sufficient flashing warning lights, danger signals and other signs.

.3 Placement and erection of signs, barricades, delineators and warning lights and other devices to be in strict accordance with the Nova Scotia Department of Transportation and Infrastructure Renewal Temporary Workplace Traffic Control Manual.

.4 Remove or cover signs which do not apply to existing conditions.

.5 Check devices daily for damage, legibility and correct positioning. Repair, replace or reposition as required or as directed by Departmental Representative.

1.9 OPERATIONAL REQUIREMENTS

.1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted as follows:

.1 In accordance with NSTWTCM.

.2 Maintain, at minimum, one-lane two-way traffic, by way of temporary, fully actuated traffic signals.

.3 Maximum cumulative traffic delay of ten (10) minutes.

Part 2 Products

2.1 TRAFFIC CONTROL DEVICES

.1 Barricades, lights, signs, delineators, warning lights, traffic control person's paddles and other devices shall be in strict accordance with NSTWTCM.

.2 In active work areas, temporary concrete barricades shall be PreCast Concrete 570 mm F-shaped Jersey Barriers or equivalent in accordance with NSTWTCM.

.3 In active work areas, temporary concrete barricades shall have top mounted fencing for added security/safety to the construction area.

.1 Fencing shall be installed prior to start of construction.

.2 Fencing shall consist of interlocking modular metal temporary fence panels utilizing structural steel square tubing and interior panels with heavy gauge welded wire mesh (Modu-loc or approved equivalent).

.3 The height of the fence shall be no less than 1800 mm high, as measured from the top of the Jersey barrier.

.4 The Fencing Supplier shall rigidly mount the fencing to the temporary concrete barriers with all necessary hardware/accessories to ensure support and stability during the expected project work conditions in accordance with the Fencing Manufacturer's installation procedures. As a minimum, the fencing system shall include:

.1 Heavy duty concrete saddle mounts or equivalent concrete mounts.

.2 Heavy duty wind braces.

.3 Heavy duty steel fence top interlocking caps.

.5 The temporary fencing system must be provided to the Departmental Representative for approval at least one (1) week prior to work commencing.

.4 Signs, barricades, delineators and traffic control persons' paddles shall be as new and reflectorized to show same shape and colour by night as by day.

.5 Signs to be bilingual and symbolic.

Part 3 Execution

3.1 GENERAL

.1 Contractor shall provide and maintain traffic control services twenty-four (24) hours a day and seven (7) days a week during this project schedule.

.2 Conduct operations as to create a minimum of inconvenience to traffic.

.3 Provide and maintain access to and from properties adjacent to work area.

.4 Provide traffic control through use of either an approved traffic signal system or traffic control persons.

.5 Take into account the effect of steep grades and curved alignment present in the work area when planning and executing traffic control measures.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

1.2 REFERENCES

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

.2 Province of Nova Scotia.

.1 Occupational Health and Safety Act, S.N.S. - Updated 2013.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

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

.1 Results of site specific safety hazard assessment.

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

.3 Submit two (2) copies of Contractor's authorized representatives work site health and safety inspection reports to Departmental Representative weekly.

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

.5 Submit copies of incident and accident reports.

.6 Submit WHMIS MSDS - Material Safety Data Sheets.

.7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within five (5) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments from Departmental Representative.

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

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

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

.11 Submit other data, information and documentation upon request as stipulated elsewhere in this section.

1.4 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project prior to submission of the Site Specific Safety Plan.

1.5 MEETINGS

.1 Schedule and administer Health and Safety meetings as required by the Nova Scotia Occupational Health and Safety Act, and the Regulations made pursuant to the Act.

.2 Record and post minutes of all meetings in plain view on the work site. Make copies available to the Departmental Representative upon request.

1.6 COMPLIANCE REQUIREMENTS

.1 Comply with the latest edition of the Occupational Health and Safety Act, and the Regulations made pursuant to the Act.

.2 Observe and enforce construction safety measures required by:

.1 National Building Code of Canada (latest edition).

.2 Nova Scotia Health and Safety Act.

.3 Provincial Worker's Compensation Board.

.4 Municipal statutes and ordinances.

.5 In event of conflict between any provisions of above authorities the most stringent provision shall apply.

.3 Provide and maintain Worker's Compensation Board coverage for all employees for the duration of the contract. Prior to commencement of the work, at the time of Interim Completion and prior to final payment, provide to the Departmental Representative a letter of Clearance from the Workers' Compensation Board indicating that the Contractor's account is in good standing.

1.7 BIRDS AND WILDLIFE

.1 Any food or waste that could attract birds or wildlife can only be discarded in properly sealed waste containers.

1.8 GENERAL REQUIREMENTS

.1 Contractors are required under Nova Scotia Occupational Health and Safety Act, and the Regulations made pursuant to the Act to have in place a Health and Safety Program. Compliance requirements for the content, detail and implementation of the program resides with the provincial authority. For the purpose of this contract the Health and Safety Program shall include a site-specific Health and Safety Plan (the "Plan") that acknowledges, assesses and addresses hazardous substances and/or hazardous conditions known and identified and on-going hazard assessments performed during the progress of work identifying and documenting new or potential health risks and safety hazards not previously known and identified.

.2 Provide one copy of the Health and Safety Program to the Departmental Representative prior to commencement of work on the work site. The copy provided to the Departmental Representative is for the purpose of review against the contract requirements related to

the known hazardous substances and/or hazardous conditions. The review is not to be construed to imply approval by the Departmental Representative that the program is complete, accurate and legislatively compliant with the Nova Scotia Occupational Health and Safety Act, and the Regulations made pursuant to the Act, and shall not relieve the Contractor of their legal obligations under such legislation.

.3 The Health and Safety Program shall include no texting or cell phone use permitted when driving or operating heavy equipment.

.4 Contractor shall ensure that all site personnel are familiar with the contents of the Plan and maintain records for proof.

.5 Contractor shall employ measures to ensure all personnel entering the site are advised to abide by the Plan.

.6 The Departmental Representative reserves the right to demand the removal of any persons not complying with the Plan. Any persons removed from the site shall not be permitted re-entry unless authorized by Departmental Representative.

1.9 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

.3 Should an unforeseen or peculiar safety related hazard or condition become evident during performance of work, immediately take measures to rectify the situation and prevent damage or harm. Advise the Departmental Representative verbally and in writing of the hazard or condition.

1.10 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.

1.11 ACCIDENT REPORTING

.1 Investigate and report incidents and accidents as required by Nova Scotia Occupational Safety and Health Act, and the Regulations made pursuant to the Act.

.2 For the purpose of this contract immediately investigate and provide a report to the Departmental Representative on incidents and accidents that involve:

.1 A resulting injury that may or may not require medical aid but involves lost time at work by the injured person(s).

.2 Exposure to toxic chemicals or substances.

.3 Property damage.

.4 Interruption to adjacent and/or integral infrastructure operations with potential loss implications.

.3 In the investigation and reporting of incidents and accidents, the Contractor is required to respond in a timely fashion to correct the action that was deemed to have caused the incident and/or accident and advise in writing on the action taken to prevent a re-occurrence of the incident and/or accident.

1.12 SITE CONTROL AND ACCESS

.1 Control all work site access points and work site activities. Delineate and isolate the work site from adjacent and surrounding areas by use of appropriate means of maintain control of all work site access points.

.2 Make provisions for granting permission to access onto work site to all persons who require access. Procedures for granting permission to access are to be in accordance with the Nova Scotia Occupational Health and Safety Act, and the Regulations made pursuant to the Act and the Contractor's Health and Safety Program.

.3 Ensure persons granted access to the work site are in possession of and wear the minimum personal protective equipment (PPE) designated by the Contractor's Health and Safety Program. Ensure persons granted access to the work site are provided with, trained in the use of, and wear, appropriate PPE that are required above and beyond the designated minimums previously noted and as specifically related to the work site activity that they are involved in. Be responsible for the efficacy of the PPE that is provided above and beyond the designated minimums.

.4 Secure the work site at all times to protect against un-authorized access.

1.13 CORRECTION OF NON-COMPLIANCE

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

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

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

1.14 BLASTING

.1 Blasting is only permitted on site in accordance with Section 31 23 21, as directed by the design drawings.

1.15 WORK STOPPAGE

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

1.16 PERMITS

.1 Obtain permits, licenses and compliance certificates, at appropriates times and frequency as stipulated by authorities having jurisdiction.

.2 Where particular permit or compliance certificate cannot be obtained at the required stage of work, notify Departmental Representative in writing and obtain Departmental Representative's approval to proceed prior to carrying out that portion of the work.

1.17 TOOLS AND EQUIPMENT SAFETY

.1 Implement and follow a scheduled tool and equipment inspection/maintenance program at work site. Regularly check tools, equipment and machinery for safe operation and perform maintenance at pre-established time and frequency intervals as recommended by manufacturer. Include subcontractors equipment as part of the inspection process.

.2 Use standardized checklists to ensure established safety checks are stringently followed.

.3 Immediately tag and remove items found faulty or defective off site.

.4 Maintain written documentation on each inspection. Make available to Departmental Representative upon request.

1.18 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information Systems (WHMIS).

.2 Keep MSDS data sheets on site. Provide copies of all data sheets to Departmental Representative upon receipt of materials on site.

.3 Put all MSDS data sheets on site, in a common area, visible to workers.

1.19 PROJECT SITE CONDITIONS

.1 The following are known or potential project related safety hazards at site:

.1 Steep cliffs are present throughout the majority of site and working from heights will be required to complete the scope of the project.

.2 Rock cuts adjacent to the site have been actively releasing quantities of rock ranging from small individual pieces falling into the ditch to larger wedges that have filled the ditch and landed on the road.

.3 The site will be open to one way traffic throughout the entire project which could pose risk to construction staff and equipment.

.4 The site is continually exposed to high winds and planning may be required to ensure safe construction practices under windy conditions.

.5 Snow and ice may be present during construction and could induce slips/trips/falls as well as risk to moving equipment.

.6 The working area of the site is relatively small being limited to one lane and may become congested during construction activities.

.7 The nature of the project will require large equipment which may pose risk to field personnel during mobilization and construction activities.

.8 Drilling equipment may have numerous spinning/moving parts and can pose risk to workers if not properly guarded.

.2 Above lists shall not be construed as being complete and inclusive of all safety and health hazards encountered as a result of Contractor's operations during the course of work. Include above items into the hazard assessment program specified herein.

1.20 ACCIDENT REPORTING

.1 Investigate and report all incidents and accidents as outlined in Provincial Occupational Safety and Health Act and Regulations.

.2 Investigate and immediately report to Departmental Representative incidents and accidents which result, or have the potential of resulting in:

.1 Injuries requiring medical aid.

.2 Property damage in excess of $5,000.00.

.3 Required notification to Workers Compensation Board or other regulatory agencies as stipulated by applicable regulations.

.3 Medical aid in above clause shall have the same meaning as the term "medical aid injury" as defined in the Canadian Dictionary of Safety Terms - 1987 issue, from the Canadian Society of Safety Engineers (C.S.S.E.) as follows:

.1 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Definitions:

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

.3 Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure (May 2015).

.2 Reference Standards:

.1 Canadian Environmental Protection Act.

1.2 SITE SET-UP AND USE

.1 All site activities related to construction AND USE are to be confined within the defined project boundaries.

.2 Work sites will be equipped with appropriate and properly maintained sanitary facilities.

.3 Garbage must be collected and removed daily from the work site. All material must be removed, transported and disposed of in accordance with existing federal, provincial, and municipal solid waste disposal guidelines and/or regulations.

.4 Littering is prohibited.

.5 Temporary storage, parking areas, and turn-a-round facilities for Contractor-related equipment and vehicles will be limited to those areas agreed to and designated by the Departmental Representative.

1.3 FIRES

.1 Fires and burning of rubbish on site not permitted.

1.4 DRAINAGE

.1 Provide Erosion and Sediment Control Plan identifying type and location of erosion and sediment controls provided. Ensure plan includes monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations, EPA 832/R-92-005, Chapter 3 requirements.

.2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.

.3 Provide temporary drainage and pumping required to keep excavations and site free from water.

.4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.5 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties as indicated.

.2 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.3 Minimize stripping of topsoil and vegetation.

.4 Topsoil and vegetation should not be removed to obtain fill for road construction purposes.

.5 Restrict tree removal to areas indicated or designated by the Departmental Representative.

.6 Vegetation should not be cleared unless approved by Departmental Representative.

.7 Bulldozers, graders and other clearing and grubbing equipment should not be operated outside of designated clearing boundaries and should have a restricted turning radius.

.8 Trees and other vegetation outside the limits indicated on the drawing should not be cut or removed; trees or snags posing a danger to operations would be an exception.

.9 Trees and debris should not be permitted to fall outside cleared areas or into water courses.

.10 Whenever possible, organic debris removed during grading operations should be stored for use during site restoration. Such stockpiles should be located well away from any streams or water body and should be covered with coarse material or tarps to minimize wind and water erosion.

.11 For excavation of new work, grubbing operations should only be carried out where required. The vegetative mat should be disturbed in the grubbing operations area only.

1.6 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this Contract.

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

.3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7 DISPOSAL OF WASTE

.1 Do not bury rubbish and waste materials on site. Remove all garbage from site daily.

.2 Do not dispose of waste or volatile materials, such as mineral spirits or oil into water, storm or sanitary sewers.

.3 Dispose of uncontaminated construction/demolition materials which cannot be recycled or reused, at an approved construction and debris disposal site.

1.8 EARTH MOVEMENT

.1 All excavated material must be disposed of at an approved location and in an approved manner.

.2 Any proposed sources of borrow material shall be approved by the Departmental Representative prior to start-up. Fill materials or aggregate used during this Contract shall not contain sulphide-bearing material as defined by the proposed Guidelines for Development on Slates in Nova Scotia (April, 1991).

.3 When vegetation must be removed, then the extent and duration of exposure should be kept to a minimum. Plan the phases of development so that only areas that are actively being developed are exposed.

.4 Dust control measures will be necessary, especially when asphalt is removed. The use of chemical dust control agents must be pre-approved by the Departmental Representative.

.5 Where there is potential for severe erosion and/or downstream "siltation" the Contractor shall cover excavations during major precipitation events as directed by Departmental Representative.

1.9 HAZARDOUS MATERIALS

.1 Dangerous goods, whose release into the environment could cause adverse effect, should be stored and handled in a manner which gives due regard for workers and public safety, and for the protection of the environment.

.2 No material toxic to fish or any aquatic life shall be permitted to enter any stream, river, or lake. This shall include, but not be limited to lubricants, fuels, testing fluids, insecticides, detergents, herbicides, cement, lime or concrete.

.3 The management of fuels, lubricants and chemicals must meet with the requirements of the Nova Scotia Dangerous Goods and Hazardous Wastes Management Criteria and all other appropriate provincial and federal regulations.

.4 Fueling and lubricating of equipment cannot be done closer than 100 m to any watercourse.

.5 All refueling and lubricating operations should employ protection measures such as drip pans, to reduce the potential for escape or petroleum products to the environment.

.6 The Departmental Representative must be immediately contacted after a spill of more than 10 L of fuel or lubricant, and after any amount of other chemical products has escaped.

.7 Storage of hazardous material, including explosives, shall not be permitted, except for quantities which shall normally be expected to be utilized in a day of Work, and which are not permitted to stockpile.

1.10 ENVIRONMENTAL INCIDENT OR EMERGENCY

.1 In the event of an environmental incident or emergency such as:

.1 Chemical spill or petroleum spill,
.2 Poisonous or caustic gas emission,
.3 Biological or chemical explosion,
.4 Hazardous material spill,
.5 Sewage spill,
.6 Contaminated water into waterways,
.7 The Contractor or his employees shall:
.1 Notify the Contractor's job superintendent.
.2 Call the local emergency services and give type of emergency.
.3 Notify the environmental emergency reporting system (1-800-565-1633)
.4 Notify the Departmental Representative.

.2 The Contractor is to submit to Departmental Representative a copy of its Environmental/Spill Response Plan for approval.

1.11 SITE DECOMMISSIONING

.1 Unless prior permission from the Departmental Representative is obtained, all Contractor equipment, facilities and materials must be removed from the site at the finish of each work phase, or if work is suspended due to weather or other circumstances, upon the suspension of work activities.

.2 All work sites must be returned to a neat and tidy condition upon site abandonment.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 INSPECTION

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

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by the 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 The Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.2 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.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

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

.4 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. Pay costs for retesting and re-inspection.

1.3 ACCESS TO WORK

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

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

1.4 PROCEDURES

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

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

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

1.5 REJECTED WORK

.1 Remove defective Work, which has been rejected by the Departmental Representative as failing to conform to Contract Documents, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not. Replace or re-execute in accordance with Contract Documents.

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

1.6 REPORTS

.1 Provide copies to subcontractor of work being inspected or tested.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use or as directed by Departmental Representative.

1.2 DEWATERING

.1 Provide temporary drainage to keep excavations and site free from standing water.

.2 Ensure discharge is not contaminated with sediment, oil, etc.

1.3 TEMPORARY POWER AND LIGHT

.1 Departmental Representative will not provide and pay for temporary power during construction for temporary lighting and operating power tools.

.2 Arrange for connection with approval utility company. Pay all costs for installation, maintenance and removal.

.3 Temporary power for electric cranes and other equipment requiring in excess of above is the responsibility of the Contractor.

.4 Provide and maintain temporary lighting throughout the project.

.5 Coordinate with all Parks Canada Staff.

.6 Install temporary facilities for power to approval of local power supply authorities.

1.4 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

1.5 SANITARY FACILITIES

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

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

.3 All surface modifications are restricted to the identified corridors. Accurate delineation of these corridors by field survey is required prior to commencement of construction.

1.6 STORAGE SHEDS

.1 Provide adequate weather-tight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.

1.7 ACCESS

.1 Provide and maintain adequate access to project site.

.2 Build and maintain temporary roads where indicated 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.

.4 All surface modifications are restricted to the identified construction corridors. Accurate delineation of these corridors by field survey prior to commencement of construction is required.

.5 All vehicle traffic is restricted to existing roadways or as indicated in project plans. A field visit will be scheduled with the Contractor for locational confirmation and all areas of proposed construction will be marked in the field with orange flagging tape prior to commencement of work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ACCESS

.1 Provide and maintain adequate access to project site.

.2 Build and maintain temporary roads where indicated or directed 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.

1.2 SANITARY FACILITIES

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

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

1.3 SITE SIGNS & NOTICES

.1 Safety and Instruction Signs and Notices:

.1 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN3-Z321-77.

.2 Maintenance and Disposal of Site Signs:

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

Part 2 Materials

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 35 31 – Special Procedures for Traffic Control.

1.2 MEASUREMENT PROCEDURES

.1 See Section 01 29 00 – Payment Procedures.

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Supply and install temporary concrete barricades and fencing for traffic control as per NSTWTCM.

.3 Remove from site all such work after use.

1.4 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 Within text of each specifications section, reference may be made to reference standards.

.2 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be borne by Contractor in event of non-conformance.

1.2 QUALITY

.1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout the project.

1.3 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Departmental Representative/Project Managers at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative/Project Managers reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 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 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.5 Touch-up damaged factory finished surfaces to Departmental Representative/Project Managers satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

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

1.6 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.8 CO-ORDINATION

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 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.

1.10 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTION

.1 Section 01 77 00 – Closeout Procedures.

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 as directed by Department Representative. Do not burn waste materials on site.

.3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.4 Provide on-site containers for collection of waste materials and debris.

.5 Provide and use clearly marked separate bins for recycling.

.6 Remove waste material and debris from site and deposit in waste container at end of each working day.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.8 Dispose of waste materials, and debris off site at approved facilities.

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 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review, remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris including that caused by Owner or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Sweep and wash clean paved areas.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 29 01 – Site Occupancy.

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.

.2 Departmental Representative Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.

.3 Each slope will be inspected separately upon completion of all the work specified on the project drawings.

.4 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 Equipment and systems have been tested, adjusted and are fully operational.
- .4 Operations of systems have been demonstrated to Departmental personnel.
- .5 Work is complete and ready for Final Inspection.

.5 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.

.6 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance.

.7 Commencement of Lien and Warranty Periods: date of Departmental acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.8 Final Payment: When Departmental Representative considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. If work is deemed incomplete by Owner and Departmental Representative, complete outstanding items and request re-inspection.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Environmental Protection Act (CEPA).

1.2 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings.

.1 Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab.

.1 Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 scaled CAD files in dwg format on CD.

1.3 AS-BUILT DOCUMENTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for the Departmental Representative one record copy of:

.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Change Orders and other modifications to Contract.
.5 Reviewed shop drawings, product data, and samples.
.6 Field test records.
.7 Inspection certificates.
.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction.

.1 Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.

.1 Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition.

.1 Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by the Departmental Representative.

1.4 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by the Departmental Representative.

.2 Record information concurrently with construction progress.

.1 Do not conceal Work until required information is recorded.

.3 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.2 Field changes of dimension and detail.

.3 Changes made by change orders.

.4 Details not on original Contract Drawings.

.5 References to related shop drawings and modifications.

.4 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.5 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

.6 Provide digital photos, if requested, for site records.

1.5 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 manufacturers, within ten days after completion of the applicable item of work.

.4 Except for items put into use with Departmental 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

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 35 31 – Special Procedures for Traffic Control.

.2 Section 31 23 20 – Scaling.

.3 Section 31 23 16.26 – Rock Removal.

1.2 DEFINITIONS

.1 Common excavation consists of excavation, hauling, and disposal of scaled materials (including vegetation), rock removed from slope trough rock removal and/or trim blasting, and pre-existing loose rock and soil material from the highway ditches or as directed by the Departmental Representative.

1.3 MEASUREMENT PROCEDURES

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 MATERIALS

.1 Not used.

Part 3 Execution

3.1 EXCAVATION

.1 Existing highway ditches shall be surveyed prior to any scaling or rock removal operations, and following common excavation to determine the material quantities.

.2 The highway ditch shall be reinstated to the lines, limits, and grades as directed by the Departmental Representative.

.3 Common excavation shall be carried out daily unless otherwise authorized by the Departmental Representative.

.4 Common excavation areas shall be cleaned and restored to a visually pleasing quality, which includes having final slopes and grades as directed by the Departmental Representative.

.5 Where disturbed, the highway shoulders shall be reinstated to match existing with typically a minimum of 1.0 m in width from the edge of asphalt.

.6 Catch basins and culvert inlets shall be cleaned out and restored to match existing.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 35 43 – Environmental Procedures.

.2 Section 01 35 31 – Special Procedures for Traffic Control.

.3 Section 31 33 23 – Scaling.

.4 Section 31 23 21 – Controlled Blasting.

1.2 DESCRIPTION

.1 This section outlines the requirements for rock removal along the crest of rock slope RR7448, as presented on the Project Drawings.

1.3 DEFINITIONS

.1 Rock Removal: The excavation and removal of rock masses, which are too large to be removed by manual scaling utilizing appropriate techniques.

.2 Trimming: Utilization of Controlled Blasting techniques to reshape, trim, or sculpt the slope to the lines, limits, and grades as specified. Trimming can be defined as a technique utilized for rock removal.

.3 Non-explosive Excavation: Rock Removal with means alternative to blasting such as hydraulic splitter or excavator mounted hydraulic breaker.

1.4 MEASUREMENT PROCEDURES

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

.1 Not Used

Part 3 Execution

3.1 SUBMITTALS

.1 General Work Plan: Within seven (7) days of Contract award, the Contractor shall provide a General Work Plan for the Rock Removal operations which outlines the proposed method (controlled blasting or non-explosive excavation or other), with controls to limit overbreak, or underbreak of the final rock cut, prevent damage to the final rock cut, as well as measures to ensure the safety of the work site, public, and nearby infrastructure.

3.2 QUALITY CONTROL

.1 If loose blocks are on the backslope after Rock Removal, the Departmental Representative may instruct that these blocks be removed. This does not in any way relive the Contractor's responsibility for Health and Safety of personnel or members of the public while on site.

3.3 GENERAL REQUIREMENTS

.1 Rock Removal shall be performed prior to other specified work such as scaling or rock bolting where this work may be adversely impacted by Rock Removal.

.2 All Rock Removal operations shall be carried out in accordance with the requirements provided in Section 01 57 19 – Environmental Procedures.

.3 All Rock Removal methods, including Trimming or Non-Explosive Excavation, must be carried out in such a way as to prevent fly rock or debris from reaching the road surface within the active lane of traffic.

.4 The Contractor shall supply, place, and remove protective measures for roadways and all other infrastructure that might be damaged by Rock Removal. The Contractor shall repair or replace any and all damage caused by Rock Removal at their own cost.

.5 Rock Removal shall be scheduled and coordinated with all stakeholders including but not limited to PCA, the Departmental Representative, utilities, and local businesses in compliance with traffic control and related provisions of the specifications.

.6 Following Rock Removal, the slope shall be scaled to provide a sound rock surface in the trim area and to remove all loose rock and debris caused by Rock Removal.

.7 The Contractor is responsible for reviewing the anticipated rock mass conditions in the areas to have Rock Removed. Where Trimming (controlled blasting) is utilized, the contractor is responsible for ensuring the blast design or excavation method is appropriate for the conditions. If conditions are encountered that are potentially detrimental to the proposed Work Plan, written notice shall be provided to the Departmental Representative for review and an alternate technique developed by the Contractor for approval by PCA.

.8 The Contractor shall use appropriate methods and take all necessary precautions to minimize breaking, loosening, or damaging rock outside the Limits of Excavation.

.9 Where Trimming is utilized, any blasting shall be carried out using Controlled Blasting techniques, as per Section 31 23 21, including Smooth Wall Blasting methods such as Pre-Shear Blasting or Cushion Blasting to control overbreak and underbreak, and ensure a clean face on the excavated rock cut.

.10 As required, ditches shall be formed and cleaned upon the completion of the Work and the drainage shall be restored/altered as specified or as directed by the Departmental Representative.

3.4 ENVIRONMENTAL REQUIREMENTS

.1 The natural environment within the work area is to be preserved, as practical. Excessive cutting of trees or other vegetation at the crest of the slope is not allowed. The Contractor will submit, with the Work Plan, any requirement for tree cutting or disturbance of the

natural ground surface beyond the crest of the slope or in areas adjacent to the rock cuts for approval by PCA.

.2 Dispose of waste materials as specified in Section 01 35 43 – Environmental Procedures.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 35 31 – Special Procedures for Traffic Control.

.2 Section 31 33 13 – Rock Anchors.

.3 Section 31 23 22 – Common Excavation.

1.2 DEFINITIONS

.1 Scaling Crew: Experienced scaling crew consists of a supervising scaling foreman and a minimum of two (2) rock scalers.

.2 Scaling: Scaling consists of 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. Scaling shall be done by hand working from a fall restraint or work positioning system and using suitable hand tools and powered equipment. Scaling also includes felling and removal of trees and brush, and pulling down larger rocks with wire rope attached to equipment on the highway.

.3 Manlift Scaling: Manlift Scaling consists of the removal of loose soil, rock, and overburden from the slope face beneath overhanging areas that are not easily accessible using rope access techniques. Manlift Scaling shall be done by a single scaler working from a mobile powered manlift or telescopic crane with man-basket using suitable hand tools and powered equipment.

1.3 MEASUREMENT PROCEDURES

.1 See Section 01 29 00 – Payment Procedures.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

1.5 REQUIREMENTS

.1 The Contractor shall provide an experienced scaling crew that consists of a supervising scaling foreman with at least three (3) years' experience, a minimum of two (2) rock scalers with at least two (2) years' experience each scaling on slopes similar to the project site conditions, within the last five (5) years. The scaling crew size shall be maintained at all times until the completion of all work.

.2 In view of the rock slope heights at the project site, it has been assumed that scaling crews will be working from ropes at heights. Each scaling person working from ropes at heights must have a minimum of Level 1 Industrial Rope Access Trade Association (IRATA) training or approved equivalent. In addition, a Level 3 IRATA or approved equivalent supervisor must be onsite at all times.

.3 Where scaling activities may impact upon any 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, guardrail and similar infrastructure. The Contractor shall be completely responsible for all damage that is a result of its scaling or other operations.

.4 The Contractor shall have hand tools and equipment available on site such that scaling can be carried out using the most appropriate and effective tools and methods for any given situation.

.5 The scaling foreman and at least one other scaler on the slope shall have a 2-way radio for communication with supervisory/traffic control personnel at the highway grade.

Part 2 Products

2.1 MATERIALS

.1 Not used.

Part 3 Execution

3.1 SCALING

.1 Rock slope scaling and removal shall include the areas of the site identified on the project drawings or on site by the Departmental Representative.

.2 Thoroughly scale the rock slope to remove all loose soil, rock, and overburden from the slope face and up to 5 m behind the crest of the slope, where conditions require scaling.

.3 All scaling operations must be completed from the top and proceeding downwards.

.4 The Contractor is to assess the appropriateness of the methods in order to safely and effectively carry out the scaling and removal operations. Prior to initiation of the work, the Contractor must advise the Departmental Representative in writing, or otherwise agreed, of how the Contractor intends to complete operations, including alternate methods of scaling then those described in the project specifications, and must obtain Departmental Representative approval.

.5 On slopes that require both scaling and rock removal, complete the rock removal operation in a particular area prior to scaling unless otherwise directed by the Departmental Representative.

.6 On slopes that require both scaling and anchoring, complete the scaling operation in particular area prior to rock anchoring in that same area unless otherwise directed by the Departmental Representative. The Departmental Representative may request access by manlift to assess the slope prior to anchoring.

.7 All scaling and removal operations are to be conducted under full time inspection of Departmental Representative and completed to the satisfaction of the Departmental Representative. The extent of scaling and removal in all areas and suitability of equipment being used will require the approval of Departmental Representative.

.8 The Contractor shall be responsible for protecting the roadway from damage resulting from Contractor activities. The Contractor shall be responsible for public safety during scaling operations. One lane of traffic must remain open all times.

.9 Scaled material is considered waste material and must be disposed of outside the park boundaries in accordance with applicable regulations as directed by the Departmental Representative.

.10 Comply with all safety requirements during the scaling operation.

.11 Notify Departmental Representative forty-eight (48) hours prior to scaling operations for inspection of scaled work surface. Departmental Representative may request the Contractor to do further work which the Departmental Representative deems necessary.

3.2 PROTECTION

.1 Prevent damage to surroundings and injury to persons in accordance with Section 01 56 00 - Temporary Barriers and Section 01 35 00.06 – Special Procedures for Traffic Control.

.2 Protection of infrastructure shall be considered incidental to scaling and all other unit price work items. Clean up and removal of scaled material from the roadway and adjacent areas is incidental to Common Excavation bid item.

.3 Repair or replacement of all infrastructure damaged by scaling operations, to the satisfaction of the Departmental Representative, shall be at the Contractors cost.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 35 43 – Environmental Procedures.

.2 Section 01 35 31 – Special Procedures for Traffic Control.

.3 Section 31 23 20 – Scaling.

.4 Section 31 23 16.26 – Rock Removal

1.2 DESCRIPTION

.1 This section outlines the requirements for Trimming (rock removal) along the crest of rock slope RR7448 should the Contractor choose to employ Controlled Blasting Techniques as noted in Section 31 23 16.26 Rock Removal.

1.3 DEFINITIONS

.1 Trimming: Utilization of Controlled Blasting techniques to reshape, trim, or sculpture the slope to the lines, limits, and grades as specified. Trimming can be defined as a technique utilized for rock removal.

.2 Rock Removal: The excavation and removal of rock masses, which are too large to be removed by manual scaling utilizing appropriate techniques.

.3 Non-explosive Excavation: Rock removal with means alternative to blasting such as hydraulic splitter or excavator mounted hydraulic breaker.

.4 Blasting Consultant: A consultant with expertise in blasting and non-explosive rock excavation, independent of the Contractor, and retained by the Contractor to provide blasting design and quality control functions as specified herein.

.5 Blaster: A qualified blaster, with the Nova Scotia Construction Association who holds a certificate of qualification in the trade.

.6 Limits of Excavation: Surfaces forming the required extent of trimming as shown on the design drawings, or as directed by the Departmental Representative.

.7 Controlled Blasting: The use of blasting methods designed to prevent rock damage or overbreak beyond the Limits of Excavation, provide adequate fragmentation, and prevent damage to infrastructure from vibrations, fly rock, or falling rock. Unless otherwise authorized by the Department Representative, Controlled Blasting requires that:

.8 Smooth Wall Blasting Techniques: Methods of achieving rock walls that are more intact and smooth compared to those produced by production blasting. These techniques may include Cushion, Buffer, and Pre-Shear blasting.

.9 Cushion Blasting: A blasting method where holes drilled along the final excavation backslope (i.e., backline holes) are detonated after production holes have been detonated.

.10 Pre-Shear Blasting: Also known as pre-splitting, a method in which holes drilled along the final excavation backslope are detonated in advance of the production holes to create a fracture line along the Limits of Excavation.

.11 Fly Rock: Fragmented rock, thrown during blast detonation.

.12 Vibration Monitoring: The use of a seismograph to record blast induced ground movements.

.13 Underbreak: Material remaining on the final face that should have been excavated by the blast, where the Limit of Excavation is not achieved.

.14 Overbreak: Rock mass removed, displaced, or destabilized beyond the Limits of Excavation as a result of blasting or drilling operations.

.15 Half-Barrels: Remnants of a borehole left on the final rock face of the Limits of Excavation.

1.4 MEASUREMENT PROCEDURES

.1 See Section 01 29 00 – Payment Procedures.

Part 2 Products

2.1 MATERIALS

.1 All explosives and associated material used for blasting operations will be supplied by a recognized manufacturer.

.2 Bulk ammonium nitrate and fuel oil (ANFO) type blasting agents shall not be used.

.3 Explosive products with a lot expiry date that has passed shall not be used.

Part 3 Execution

3.1 SUBMITTALS

.1 General Work Plan: Within seven (7) days of Contract award, the Contractor shall provide a General Work Plan for the blasting operations which outlines the proposed types of explosives, delays and detonators, drilling methods, practices for executing blasting, final wall control, and practices for handling and storing explosives.

.2 Blasting submittals are for safety, quality assurance and record keeping purposes. No blasting work may begin until the Departmental Representative has confirmed that all pre-mobilization submittals have been reviewed and accepted, and that all blasting-related submittals have been reviewed and accepted. The Department Representative's review of the Contractor's blasting plan should not be construed as approval and does not reduce the Contractor's responsibility for means, methods and results of the Contractor's drilling and blasting work. Review of blast designs or other submittals shall not relieve the Contractor's responsibility for the accuracy and adequacy of the implemented designs. Submittals that are inadequate will be returned to the Contractor for revision and re-submittal prior to acceptance.

.3 Contractor Experience and Qualifications: Within seven (7) days of Contract award, 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 three (3) years' experience in drilling and controlled blasting. Work experience should include at least three (3) projects involving rock cuts over 10 m height, and at least one (1) of the aforementioned three shall be along transportation corridors.

.4 Blasting Consultant Experience and Qualifications: Within seven (7) days following Contract award, 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.

.4 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 Nova Scotia.

.5 Proposed Blast Design: Not less than five (5) days prior to commencing work for each trim location, the Contractor shall submit to the Departmental Representative, a Proposed Blast Design for that trim. The Proposed Blast Design shall be in a format acceptable to the Departmental Representative and include as a minimum the following information:

.1 Site location and Limits of Excavation.

.2 Proposed time and date for the blast.

.3 Methodology for Trimming.

.4 Plan and cross-section sketch drawings of proposed trim showing the free face, drill pattern (burden and spacing), dimensions, and estimated volume.

.5 Diameter, inclination, orientation, depth, and number and type of drilled holes.

.6 Loading diagram showing type and amount of high explosive or non-explosive products, powder factor, initiators, and depth of stemming for each type of blast hole.

.7 Initiation sequence for blast holes including delay pattern and delay times.

.8 Manufacturer's data sheets for all explosive and non-explosive products, delays and initiation systems to be used.

.9 Make and model of non-explosive rock excavation equipment (e.g., hydraulic splitters, excavator mounted Hydraulic Breaker).

.10 Methods of protecting existing infrastructure and public safety that shall be employed.

.6 Pre-Construction Condition Survey: The Contractor shall submit to the Departmental Representative, not less than five (5) days before Trimming, a Pre-Construction

Condition Survey of all infrastructure in the area that might be subject to damage. The format of the survey shall be acceptable to the Departmental Representative.

.7 As-Built Blasting Record: Not more than one (1) working day after completing the work at each trim 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, the actual date, time, and duration of Trimming, and identify any known or suspected damage, traffic delays, or other problems which may have resulted from Trimming.

.8 Blasting Consultant Field Report: Within three (3) days following each Site Visit, the Contractor shall submit a Field Report prepared by the Blasting Consultant.

3.2 QUALITY CONTROL

.1 Proposed Blast Designs for Trimming shall be prepared by the licensed Blaster who will directly oversee the Trimming, and approved by the Blasting Consultant.

.2 The Blasting Consultant shall make an initial Site Visit prior to any blasting to inspect the blasting areas and advise on methods and measures necessary to protect infrastructure and the environment. The Departmental Representative may require the Blasting Consultant to make subsequent Site Visits during the construction period.

.3 The Blaster shall directly oversee the drilling, loading, and detonation of all blasts.

.4 The Contractor shall not commence drilling or other work on a trim blast until the Blast Design has been submitted to, and reviewed by, the Departmental Representative.

.5 If loose blocks are on the backslope after a blast, the Departmental Representative may instruct that these blocks be removed. This does not in any way relive the Contractor's responsibility for Health and Safety of personnel or members of the public while on site.

3.3 GENERAL REQUIREMENTS

.1 Trimming shall be performed prior to other specified work such as scaling or rock bolting where this work may be adversely impacted by Trimming.

.2 All blasting shall be carried out in accordance with the requirements provided in Section 01 57 19 – Environmental Procedures.

.3 All Trimming methods, including blasting or non-explosive excavation, must be carried out in such a way as to prevent fly rock or debris from reaching the road surface within the active lane of traffic.

.4 The Contractor shall supply, place, and remove protective measures for roadways and all other infrastructure that might be damaged by Trimming. The Contractor shall repair or replace any and all damage caused by Trimming at its own cost.

.5 Trimming shall be scheduled and coordinated with all stakeholders including but not limited to PCA, the Departmental Representative, utilities, and local businesses in compliance with traffic control and blasting related provisions of the specifications.

.6 Following Trimming, the slope shall be scaled to provide a sound rock surface in the trim area and to remove all loose rock and debris caused by Trimming.

.7 All blasting shall be carried out in accordance with the requirements provided in Section 01 14 00 – Work Restrictions. The maximum cumulative traffic delay associated with work carried out under this contract shall not exceed a total of ten (10) minutes per traffic control set up. This limitation must be considered in the blasting design and execution.

.8 Blasting may only be carried out between the hours of 10:00 am and 3:00 pm.

.9 The Contractor is responsible for reviewing the anticipated rock mass conditions in the areas to be trimmed and is responsible for ensuring the blast design or excavation method is appropriate for the conditions. If conditions are encountered that are potentially detrimental to the proposed Work Plan, written notice shall be provided to the Departmental Representative for review and an alternate technique developed by the Contractor for approval by PCA.

.10 The Contractor shall use appropriate methods and take all necessary precautions to minimize breaking, loosening, or damaging rock outside the Limits of Excavation. If the rock mass condition of the final rock cut is made worse due unsuitable blasting methods, the Contractor is responsible for remediating the rock cut at their expense.

.11 Any blasting shall be carried out using Controlled Blasting techniques, including Smooth Wall Blasting methods such as Pre-Shear Blasting or Cushion Blasting to control overbreak and underbreak and ensure a clean face on the excavated rock cut.

.12 The results of the blasting will be reviewed and approved by the Departmental Representative and PCA. Modifications to the blasting technique shall be requested, at the Contractor's expense, if excessive overbreak or underbreak are observed, or the conditions of the final rock cut are considered unacceptable (i.e., excessive damage).

.13 The Contractor shall provide labour, equipment, blasting mats, and all other supplies necessary to control fly rock and protect existing infrastructure during the work.

.14 The Contractor shall obtain all necessary permits from and shall comply fully with the laws, rules, and regulations of Municipal, Provincial, and Federal agencies in connection with the use, transport, storage, and safe handling of all explosives. The Contractor shall be familiar with the Blasting Safety Regulations published under the *Occupational Health and Safety Act* of Nova Scotia.

.15 Explosives and all detonating apparatus shall be stored in a magazine in accordance with the requirements of all Federal or Provincial inspectors having jurisdiction, and the requirements of the Explosives Act (Canada), R.S. 1985, as amended, and any applicable Municipal By-Laws.

.16 Blasting shall only be conducted after the Departmental Representative has received the Certificates of Insurance required by the Contract Documents. The Certificates shall verify that the Blaster's General Liability and Property Damage Coverage contain no specific exclusions for Work related to Blasting.

.17 The Blaster shall bear full responsibility for ensuring that all blasting operations are conducted in a satisfactory manner and in accordance with these specifications. The Departmental Representative's review of the Blasting Plan shall in no way relieve the Blaster from this obligation, nor shall the Departmental Representative or PCA assume any responsibility for the adequacy of the Blasting to achieve adequate breakage or acceptable results.

.18 As required, ditches shall be formed and cleaned upon the completion of the Work and the drainage shall be restored/altered as specified or as directed by the Departmental Representative. Unless otherwise specified, areas where rock was excavated should be free draining.

3.4 ENVIRONMENTAL REQUIREMENTS

.1 The natural environment within the work area is to be preserved, as practical. Excessive cutting of trees or other vegetation at the crest of the slope is not allowed. The Contractor will submit, with the Work Plan, any requirement for tree cutting or disturbance of the natural ground surface beyond the crest of the slope or in areas adjacent to the rock cuts.

.2 The Departmental Representative will undertake blast monitoring, as required, and provide the results to the Contractor after the blast.

.3 Use appropriate excavation equipment to remove all drill hole traces in the final excavation surfaces produced by trimming to the satisfaction of the Departmental Representative and PCA. Removal of drill hole traces shall be incidental to Trimming.

.4 Dispose of waste materials as specified in Section 01 35 43 – Environmental Procedures.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 11 00 – Summary of Work.

.2 Section 01 33 00 – Submittal Procedures.

.3 Section 31 23 20 – Rock Scaling.

1.2 REFERENCES

.1 Prestressed Rock and Soil Anchors by the Post-Tensioning Institute (PTI), 2004.

1.3 MEASUREMENT PROCEDURES

.1 See Section 01 29 00 – Payment Procedures.

1.4 SUBMITTALS

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

.2 Rock Anchor Installation Plan:

.1 Prior to ordering Rock Bolt materials, the Contractor shall submit a Rock Bolt Installation Procedure for review by the Departmental Representative.

.2 The Installation Plan shall include:

.1 Product Data from the bolt hardware, grout and other applicable manufacturers (printed product literature and data sheets including recommended installation procedures, product characteristics, performance criteria, physical size, finish and limitations).

.2 Installation procedures, including drilling equipment and hole diameter, control and monitoring of angle and alignment, grouting, preparation of rock surface to accept the bearing plate, tensioning/testing and supporting calibration certificate(s).

.3 Grout batching QA methodology (including one trial batch) for Departmental Representative approval seven (7) days prior to grouting procedures.

.4 Field Quality Control Submittals:

.1 Maintain field drilling records for each rock anchor, including drill type, date/time, drilled length, inclination, and general drilling conditions such as loss of flush, jamming, inferred weak zones, inferred faults, water ingress, or other relevant information that may affect the quality of the installation.

.2 Maintain grout installation records for each rock anchor, including, date/time, amount of grout used of each grout batch.

.3 Maintain bolt installation records, including bar grade/diameter, bar length, coupling, spacers, depth of insertion, stick-up from the face, over-drill depth, rock face preparation, tendon insertion date/time, grouting (type, dates/times of staged grouting, volumes of grout used), testing/lock-off date/time.

.4 Provide Departmental Representative with a daily copy of field records.

Part 2 Products

2.1 MATERIALS

.1 Anchors shall be a minimum 26 mm or 32 mm diameter, grade 1030 MPa, with all accessories (caps, centralizers, couplers, bearing plates, wedge washers, nuts, etc.) required to complete the work as detailed on the design drawings and to the manufacturer's specifications.

.2 The anchor shall be provided with Class I, encapsulated tendon, double corrosion protection according to the recommendation for Prestressed Rock and Soil Anchors publication.

.3 Anchor lengths shall be 6 m, or 9m, as specified on the attached drawings.

.4 9 m length rock anchors shall have a 250 mm by 250 mm by 38 mm bearing plate, beveled hardened steel washers (minimum two (2) per anchor) and a hexagonal nut.

.5 6 m length rock anchors shall have a 300 mm by 300 mm by 38 mm bearing plate, beveled hardened steel washers (minimum two (2) per anchor) and a hexagonal nut.

.6 Rock anchor installations will utilize grout consisting of non-expansive, non-shrink grout. Grout shall have a minimum compressive strength of 30 MPa at three (3) days and 40 MPa at twenty-eight (28) days.

.7 The rock anchor shall have a two-stage grouted anchor with the free length of the anchor fully grouted after tensioning and lock-off (no bond breaker).

.8 Each item of the rock bolt system shall be Hot-Dip Galvanized conforming to ASTM A123 or ASTM A153 wherever applicable.

Part 3 Execution

3.1 GENERAL

.1 Due to the nature of this project, the Contractor is responsible for site condition assessment regarding ground and rock conditions that are anticipated to be encountered. It is the Contractors responsibility to assess the site with their experience and/or obtain third party professional advice on the geological conditions.

.2 For a general geological description of the site, see Section 01 11 00, Clause 1.1.4. This section does not preclude the responsibility of the Contractor to verify conditions as stated in Clause 3.1.1.

3.2 EXAMINATION

.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 and receipt of written approval to proceed from Departmental Representative.

3.3 INSTALLATION

.1 Anchor hole drilling, anchor installation, grouting, pre-stressing and related activities shall be carried out only under the supervision of experienced geotechnical personnel and after all scaling operations are complete.

.2 Upon completion of the scaling allow forty-eight (48) hours for the Departmental Representative to review the slope condition and finalize anchor locations.

.3 Provide an allowance for the Departmental Representative to assess the slopes by manlift prior to determining anchor locations.

.4 Anchor hole diameters shall be a minimum of 100 mm or to meet the manufacture specifications.

.5 Temporary casing should be provided as required to stabilize drill hole sidewalls. Contractor to assume weak rock conditions containing voids, sand seams and fractured rock and to provide alternate drilling methods to advance drill hole at Contractors expense.

.6 Anchor holes shall be grouted within forty-eight (48) hours of the hole being drilled and locked off to the design load within seven (7) days after grouting.

.7 Anchor hole depth shall be approved by Departmental Representative before anchor installation.

.8 Couplers (if required) shall be installed in a manner which will ensure that they can transfer the required anchor loads.

.9 The rock anchor shall have a Grout shall be tremied into anchor hole with the bond zone grouted without interruption.

.10 Grout sampling and testing will be carried out by a certified testing consultant appointed by PCA.

.11 Prepare the rock surface at each anchor location to accept the bearing plate. Each prepared rock surface to be approved by the Departmental Representative prior to tensioning each anchor.

.12 After grout is cured to at least 30 MPa, anchors shall be tension tested and locked off in accordance with the Post Tensioning Institute (PTI 2014) method for proof testing rock anchors. Performance load tests as per PTI will be performed on select anchors, as per Departmental Representative direction. Design loads and lock off loads are as shown on the drawings.

3.4 DEFECTIVE ROCK ANCHORS

.1 If rock anchors are deemed to be defective by the Departmental Representative then Contractor must remediate and reinstall anchors at own cost with methods approved in writing from Departmental Representative.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

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

END OF SECTION

APPENDIX A

Parks Canada Parcs Canada

Parks Canada National Best Management Practices

Roadway, Highway, Parkway and Related Infrastructure

Canada

May 2015

Parks Canada National Best Management Practices for Roadway, Highway, Parkway and Related Infrastructure

Approved by

Original signed by Mike Wong

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Mike Wong, Executive Director Natural Resource Conservation Branch

Original signed by Kalvin Mercer

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Kalvin Mercer, Associate Vice-President Asset Management and Project Delivery

July 23, 2015

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Date

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Introduction

The Parks Canada National Best Management Practices for Roadway, Highway, Parkway and Related Infrastructure will allow an identified suite of project activities to be undertaken in such a manner that there will not be resulting significant adverse environmental effects.

The Best Management Practice (BMP) pathway is applied when there is a suite of routine, repetitive projects (e.g. paving) or activities (e.g.de-watering), with well understood and predictable effects. This fulfils Park's Canada's obligations under the *Canadian Environmental Assessment Act 2012* as a manager of federal land, see the Guide to the Parks Canada EIA Process. The BMP maximizes efficiency through creation of a pre-approved impact assessment for the defined suite of projects, to which standard mitigation and environmental management measures can be applied.

The impact assessment officer (IAO) will review a proposed project and advise the functional manager of the project if and how this BMP should be applied. The IAO's advice will be based on whether the project falls within the scope of the BMP, and whether application of the mitigation measures in the BMP will adequately address potential adverse effects of the project.

Project Managers are responsible to ensure all mitigation measures applicable to the project are added to the terms and conditions of any permits or contracts issued for the project.

The Impact Assessment Officers must ensure the project, EIA pathway applied and determination are recorded in the Parks Canada National Impact Environmental Assessment Tracking System.

Scope of Application

This BMP outlines the impact assessment of repetitive and routine projects on roadways, highways and parkways. If a project involves some or all of below activities, and the initial assessment of site and project indicate "the project is unlikely to result in significant adverse environmental effects" the BMP can be applied. Projects that this BMP would likely be applied to include:

- The proposed maintenance or repair of an **existing** sidewalk, or parking lot.
- The proposed maintenance or repair of an **existing** road, including pull-off areas, that would be carried out on the existing right of way[1].

Activities included in the scope of this BMP are:

1. Project Design
2. General Activities
    - Worksite Conditions/Staging/Laydown
    - Equipment operations
    - Fuel storage and refueling

[1] Highway Footprint or Right of Way (ROW): The permanent physical intrusion of a highway or freeway, including the road surface, shoulders, side slopes, drainage ditches and/or storm drainage ponds (Transport Canada, 2008).

- Site Clean Up/Waste Disposal

3. Asphalt Production and Handling
    - Asphalt Plant Operation
    - Gravel Crushing and Washing
    - Oiling of Truck Boxes
    - Clean Up and Disposal of Waste Products
4. Concrete Handling
    - Operation, maintenance and inspection of Onsite Temporary Concrete Washout Facility
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5. Paving, Resurfacing and Grading
    - Grading
    - Paving and Resurfacing
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8. Excavation, Soil Stripping and Overburden Removal
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    - Soil Stripping
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    - Excavated Material Storage
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9. Slope Stabilization, Drilling and Blasting
    - Slope stabilization-scaling, hydraulic hammers
    - Drilling and blasting for Slope Stabilization and Geotechnical Investigations
10. Soil and Vegetation Restoration
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    - Soil Amendments
    - Seedbed Preparation
    - Species Selection
    - Seed Lot Selection
    - Seed Mixture Composition
    - Seeding
    - Alternatives to Seeding
    - Reclamation Standards
    - Reclamation Plot Evaluation
    - Time Limits

10. Drainage Structures
    - Drainage structures
    - Culverts
11. Bridge Maintenance
    - Bridge Cleaning
    - Bridge Repairs Using Treated Wood Products
    - Bridge and Structure Painting
12. Water Withdrawal and Dewatering
    - Water Withdrawal
    - Pump Screens
    - Dewatering

Exceptions

This BMP is not suitable for the following project activities as they would require supplemental assessment and/or mitigations:

- Work that may impact aquatic or terrestrial wildlife habitat connectivity, such as fences or culverts;
- Elongation of culverts; realigning water courses; dredging; or work below the high water mark of a fish bearing water body;
- Bridge projects needing work to occur below the High-Water Mark[1], with permanent; alteration to the water course, such as replacement of piers/abutments or permanent installation of structures on the bed of a water body;
- Greater than 10% increase in land use footprint (e.g. gravel pit expansion); and,
- Work which might adversely impact any potential or established Aboriginal and Treaty rights or traditional use[2].

If the project has the potential to have an adverse effect on the critical habitat of a species at risk (with endangered, threatened, or extirpated status) this BMP does NOT apply. The project will require a separate environmental impact analysis.

If the project has the potential for **residual** adverse effects on a listed species at risk (including effects to individuals and residence of the individuals) this BMP does NOT apply, the project will require a separate environmental impact analysis.

Note: If there is any uncertainty regarding potential adverse effects to species at risk, consult a member of the National Office Species Conservation team.

[1] High-water Mark is the usual or average level to which a body of water rises at its highest point and remains for a sufficient time so as to leave a mark on the land. (Fisheries and Oceans, 2015). Upper Controlled Water Elevation (UCWE) is used as definition of High-water Mark in managed waterways.

[2] Parks Canada must engage in additional and separate consultations with Aboriginal groups if there is a possibility of a project adversely affecting established or potential Aboriginal or Treaty rights. This is required to fulfill federal government responsibilities in upholding the honour of the crown. If there is uncertainty regarding the need for Aboriginal consultation with respect to a project, refer the matter to Parks Canada Legal Services for advice. Guidance on consultation may be sought from the Aboriginal Affairs Secretariat and from the guidance document "A Handbook for Parks Canada Employees on Consultation with Aboriginal Peoples".

Approved geographic area of application

This BMP is intended for use in all Parks Canada administered protected heritage places with roadways, highways and parkways.

Components of the environment that may be affected

Potential effects from projects of this type are well understood and predictable. They include:

Water Resources:

- Adverse modifications to surface drainage patterns
- Reduced water quality due to increased erosion, sedimentation, transportation of debris and contamination (i.e. from leaks and accidental spills, etc.)

Soil/Land Resources:

- Change in slopes, landforms, and landscape
- Soil compaction and rutting
- Slope instability, due to increased soil exposure and improper excavation and storage
- Soil contamination

Air quality:

- Decreased ambient air quality (i.e. from dust, equipment emissions, etc.)
- Increased ambient noise levels
- Temporary increased levels of CO2 and other pollutants
- Temporary increased localized temperatures from paving and equipment operation.

Flora and Fauna:

- Damage to and/or removal of vegetation in immediate or adjacent areas
- Introduction of non-native species populations, or expansion of existing populations
- Wildlife sensory disturbance causing displacement/preferred habitat avoidance
- Wildlife habituation/attraction to artificial food sources
- Impeded/altered wildlife movement
- Damage to nests/disruption of nesting animals
- Mortality from project activities

Cultural Resources:

- Adverse effects on the heritage value or character-defining elements of a cultural resource
- Impacts to archaeological resources (known or potential)

Mitigation Measures

To use the document efficiently, keep the activity mitigation lists that apply to the project expanded and collapse the other activities by clicking on the section titles, print this as a pdf or

paper document and include with the EIA determination record. This will reduce the overall size and scope of the mitigations to present to contractors and project managers.

Choose all that apply to project. Each title is hyperlinked to the related section.

Module	
1.	Project Design
2.	General Activities
3.	Asphalt Production and Handling
4.	Concrete Handling
5.	Paving, Resurfacing, Grading
6.	Barriers and Guardrails
7.	Vegetation Removal
8.	Excavations, Soil Stripping and Overburden Removal
9.	Slope Stabilization, Drilling and Blasting
10.	Soil and Vegetation Restoration
11.	Drainage Structures
12.	Bridge Maintenance
13.	Water Withdrawal and Dewatering

1. Project Design

When upgrades to infrastructure are planned opportunities to decrease the environmental impacts of long term operation should be considered in the engineering design. Some examples are: directing runoff into vegetated areas rather than directly into surface waters to decrease pollution in surface waters, increasing the span length of bridges during replacements to allow for terrestrial wildlife passage underneath and converting smaller culverts to larger culverts or clear span bridges to allow for better fish passage and less restricted flows.

2. General Activities Mitigations Module

Construction activities involve the use of laydown/staging areas, equipment operations, storage and handling of hazardous materials. Potential adverse effects include: destruction of vegetation, erosion and sedimentation, constriction for wildlife movements and introduction/spread of non-native vegetation.

Work Site Conditions/Staging/Laydown

2.1. All employees must attend a briefing with an Impact Assessment Officer (IAO) or Surveillance Officer (SO) before beginning work at the site review and explain the mitigations that are conditions of the project approvals.

2.2. Minimize vegetation-clearing activities and ground disturbance by staging on existing hardened areas wherever possible.

2.3. Avoid or terminate activities on site that attract or disturb wildlife. Vacate the area and stay away from the immediate location if wildlife display aggressive behaviour or persistent intrusion.

2.4. Control materials that might attract wildlife (e.g. petroleum products, human food and garbage).

2.5. Notify the SO immediately about dens, litters, nests, carcasses (road kills), wildlife activity or encounters on or around the site or crew accommodation. Other wildlife-related encounters are to be reported to SO within 24 hours.

2.6. Delineate the work zone; clearly mark the limits to active construction and the access and egress locations.

2.7. When work involves the disturbance of soils or the use of erodible materials (e.g. sands, topsoil), prevent the transport of sediment by the installing of appropriate erosion and sediment control.

2.8. An Erosion and Sedimentation Management Plan shall be prepared for the components of the work undertaken in proximity to watercourses, wetlands or riparian environments. If sediment ponds are required, they shall be designed to settle all sediment particles 0.02 mm or larger. The ponds shall also be designed to handle 1:5 year storm events, with overflow spill capacity for 1:10 year storm events and emergency spillway capacity for 1:100 year storm events. All components require regular maintenance to ensure effectiveness.

Equipment Operations

2.9. Equipment movements and workers' private vehicles shall be restricted to the 'footprint' of the construction area.

2.10. Ensure machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species, noxious weeds and soils from off-site.
2.11. Operate machinery on land above the high water mark, on ice, or in another manner that minimizes disturbance to the banks and bed of any water body.
2.12. Limit machinery crossing (fording) a stream or watercourse to a one-time event (i.e., over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure in compliance with the *Fisheries Act*.
2.13. For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.
2.14. Use temporary crossing structures or other practices to cross streams or water bodies with steep and highly erodible (e.g., dominated by organic materials and silts) banks and beds.

Fuel Storage and Refueling/Emergency Plans

2.15. A Spill Response Plan will be prepared and detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products in accordance with all applicable federal and provincial legislation. The Plan 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.
2.16. Spill kits shall be provided at re-fuelling, lubrication, and repair locations that are capable of dealing with 110% of the largest potential spill and shall be maintained in good working order. Site staff shall be informed of the location of the spill response kit(s) and be trained in its use.
2.17. If potentially hazardous materials (e.g. cement-based products, sealants or paints) are used on site ensure raw material, mixed compounds and wash water are not released to any watercourse or soils. 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.
2.18. Hazardous or toxic products shall be stored no closer than 100 metres from streams, wetlands, water bodies or waterways.
2.19. Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. The SO shall be notified immediately of any spill. In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.
2.20. 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 proponent. The site will be inspected to ensure completion to the expected standard and to the satisfaction of Parks Canada.

Site Clean Up/Waste Disposal

2.21. Clean tools and equipment off-site to prevent the release of wash water that may contain deleterious substances.

2.22. Where possible, sweep up loose material or debris. Any material thought to pose a risk of contamination to soils, surface water or groundwater should be disposed of appropriately off-site.
2.23. Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried or discarded at the construction site or elsewhere in Parks Canada protected heritage places. These wastes shall be contained and removed in a timely and approved manner and disposed at an appropriate waste landfill site located outside the Parks Canada protected heritage place. Construction waste storage containers, shall be emptied when 90% full. Waste containers will have lids, be wildlife proof if there attractants and waste loads shall be covered while being transported.
2.24. Sanitary facilities, such as a portable container toilet, shall be provided and maintained in a clean condition.

3. Asphalt Production and Handling Mitigations Module

Asphalt is a common building material for transportation infrastructure. Its production requires the use of gravel, water, and petroleum products, and associated project activities include transportation, storage and handling of these materials. Installation of asphalt plants is common within the larger parks where gravel extraction is undertaken.

Timing of Works

3.1. Asphalt works are preferably undertaken during periods of dry weather as this allows easier control of contaminated runoff and sediment.
3.2. If the work schedule requires working in the rain, the area of work must be isolated and appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters, particularly for surface repair works requiring the application of patching and sealing compounds, tar, asphalt, and chemical surface sealants.

Operation of Asphalt Plants

3.3. Asphalt plant operation must comply with all environmental pollution control regulations, including provincial regulations, and the plant operational plan.
3.4. Spoil piles and stock piles will be at least 30 meters from the edge of any water body.
3.5. There must be enough room between the stockpiles and the asphalt plant for a loader in the event of a spill at the asphalt plant.
3.6. A containment berm with an associated liner made of occlusive material (e.g. plastic of a thickness approved by the SO) and covered with absorbent sand or clay shall be installed under the asphalt storage tank to ensure containment of 110% of the tank's capacity.
3.7. The proponent shall be responsible for the purchase and safe delivery/storage/handling of asphalt cement and emulsions to the asphalt plant site.
3.8. Excess hot mix or reject new asphalt shall be temporarily in stored in the containment area sufficient to prevent runoff of petroleum into soils or surface waters as directed by the SO, and removed from the Parks Canada protected heritage place, prior to project completion.

3.9. Every effort will be made to recycle waste asphalt, either as a base course, or by recycling waste asphalt through the asphalt plant according to engineering specifications.Old cured ground asphalt material shall be removed, recycled, or stored for future recycling at an approved operational gravel pit or asphalt plant site. Stockpiles must be further than 30 metres from any surface waters.
3.10. Remaining stockpiles will be removed or incorporated into reclamation plans for the gravel pits or asphalt plant sites.
3.11. Asphalt to be removed must be sampled and analyzed to determine possible lead contamination. Contaminated asphalt will be transported to an approved waste disposal facility. A receipt of delivery is to be provided to the SO.
3.12. Proponent should protect containment/catchment areas and drip trays at the asphalt plant from rainfall since, if contaminated, all of the collected water will require disposal of at an approved disposal facility at the expense of the Proponent.
3.13. Dyking and ponding will be required to control the rate and quality of runoff from the plant site.
3.14. Ensure that the water in the settling ponds remains clean of petroleum products. Any contaminated water will require disposal at an approved disposal facility at the expense of the Proponent.

Gravel Crushing and Washing

3.15. Where possible within engineering constraints, asphalt materials should be recycled to reduce the need for new gravel.
3.16. Gravel will be obtained from an approved operational borrow pit only. For gravel obtained from a borrow pit within a protected heritage place or borrow pit, gravel extraction within the footprint of the disturbed area of the approved operational borrow pit is permitted.
3.17. Gravel will not be crushed within 30 meters of any water body.
3.18. If water for cleaning is extracted from a watercourse, refer to water withdrawal section of this BMP.
3.19. If gravel requires washing, the water used will not be returned directly to any watercourse.
3.20. Water free from chemical contaminants will be discharged into ground where further erosion and runoff into surface water is prevented. Discharging into well vegetated ground surface, at a rate which prevents erosion can often provide increased absorption and reduction of sediment load.
3.21. Contaminated water must be treated to meet CCME guidelines or transported outside of the Parks Canada protected heritage place for disposal at an approved facility.
3.22. For waste removed from the park a detailed receipt of delivery to an approved facility will be provided to the SO.

Oiling of Truck Boxes

Trucks for hauling asphalt mixture shall have tight, clean, smooth metal beds that have been sprayed with a minimum amount of thin fuel oil to prevent the mixture from adhering and causing waste asphalt.

3.23. Truck boxes may be oiled only when absolutely necessary.

3.24. Oiling will take place in a bermed area, consisting of a plastic underlay with 15 centimetres overlay of clean gravel. Oil contaminated gravel will be hand collected (so as to prevent tearing of the plastic) from the bermed area daily, and put through the asphalt plant.
3.25. Vehicle covers shall be securely fastened.

Air Quality Mitigations

3.26. Asphalt plants should be 500 meters from buildings with human habitation.
3.27. Emissions from the asphalt plant and paving project equipment will comply with End Product Specifications (EPS) emission control standards and other provincial emissions regulations. Stack test results provided to the ESO by the operator or surveillance contractor may be required when the asphalt plant is at full capacity to ensure the plant is operating within the required standards. If the plant is not operating within the appropriate levels, production will cease until the requirements are met.
3.28. Sludge removed from the clarifier that is free of chemical contamination will be contained to prevent fine dust particles from becoming airborne during windy periods.
3.29. Unannounced stack tests will be conducted throughout the project. If the plant does not meet requirements, operation will cease until the requirements can be met.

Disposal and Clean Up of Other Waste Products

3.30. To ensure regular clean-up of waste asphalt and petroleum spills, a defined clean up schedule will be established during the preconstruction meeting.
3.31. Leaks will be collected in drip-trays, the collected material will either be removed from the park, or recycled back through the Asphalt Plant. For any material removed outside the park to an approved facility, a detailed receipt will be provided to the ESO.
3.32. Used oil, filters, grease cartridges, oil cans and other waste products of plant servicing will be collected and disposed of at the nearest industrial waste facility.

4. Concrete Handling Mitigations Module

Concrete is a common construction material used in transportation infrastructure. Its use ensures longevity of the infrastructure and safety for public use. One litre of concrete wash water or leachate in 1000L of water will kill fish. Cement-based products including grouts and concrete are lethal to fish and many other aquatic organisms. Raw product or leachate entering a watercourse will alter water chemistry, making it more basic or alkaline.

Onsite Temporary Concrete Washout Facility

4.1. Temporary concrete washout facilities shall be located a minimum of 30m from storm drain inlets, open drainage facilities, and watercourses.
4.2. Temporary concrete washout facilities shall be temporary pit or bermed areas constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.
4.3. Straw bales, wood stakes, and sandbag materials can be used to construct temporary containment walls or “barriers”.

4.4. Plastic lining material shall be a minimum of 10-mil polyethylene sheeting and shall be free of holes, tears or other defects that compromise the impermeability of the material.
4.5. The soil base shall be prepared free of rocks or other debris that may cause tears or holes in the plastic lining material.
4.6. Perform washout of concrete mixer trucks in designated areas only.
4.7. Wash concrete from mixer truck chutes into approved concrete washout facility or collect in an impermeable bag for disposal.
4.8. Pump excess concrete in concrete pump bin back into concrete mixer truck.
4.9. Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed offsite.
4.10. Once concrete wastes are washed into the designated area and allowed to harden, the concrete shall be broken up, removed, and disposed of per federal and provincial regulations.

Maintenance and Inspection of Temporary Concrete Washout Facilities

4.11. Temporary concrete washout facilities shall be maintained to provide adequate holding capacity with a minimum freeboard of 100 mm (4 inches) for above grade facilities and 300 mm (12 inches) for below grade facilities.
4.12. Maintaining temporary concrete washout facilities shall include removing and disposing of hardened concrete and returning the facilities to a functional condition.
4.13. Existing facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.
4.14. Temporary concrete washout facilities shall be inspected for damage (i.e. tears in PVC liner, missing sand bags, etc.).
4.15. Onsite concrete waste storage and disposal procedures should be monitored at least weekly or as directed by the ESO.

Removal of Temporary Concrete Washout Facilities

4.16. Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities shall be backfilled and restored.

Onsite Concrete Management

4.17. Rolling concrete mixers with surplus concrete in amounts less than one cubic metre of wet concrete may waste this concrete in the grade right-of-way as directed by the Parks Canada Representative in areas that drain well away from watercourses. Surplus amounts in excess of one cubic metre are to be returned to the batching yard.
4.18. Water contaminated in the placing of cement and curing of concrete shall be contained and removed from the site to an approved disposal facility.
4.19. The concrete batching plant must be operated pursuant to applicable dust, air emission, and water quality control regulations.

4.20. Waste, solidified concrete from rolling concrete mixers in amounts less than 1 cubic meter and waste solidified concrete from construction pour shall be buried in the grade within 48 hours of the pour, subject to approval and direction from the Departmental Representative

5. Paving, Resurfacing, Grading Mitigations Module

Highway surface management activities are undertaken to ensure public safety on Parks Canada Agency highways by maintaining clean, level, and unbroken road surface conditions through activities such as pavement cleaning, patching, application of surface treatments, and pavement crack sealing. Grading is used to address drainage issues, vegetation encroachment, potholes and rough surfaces.

Timing of Works

5.1. Works are preferably undertaken during periods of dry weather (e.g., summer) as this allows easier control of contaminated runoff and sediment.

5.2. If the work schedule requires working in the rain, the area of work must be isolated and appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters, particularly for surface repair works requiring the application of patching and sealing compounds, tar, asphalt, and chemical surface sealants.

Grading

5.3. During grade construction conducted close to any watercourse, water body or wetland ensure materials are not pushed, fall or are eroded into the water or wetlands.

5.4. No grade building shall occur outside of the delineated work area or within 1 metre of the drip line of existing forest. Any material inadvertently falling outside the work limits will be removed promptly in a manner that does not damage trees or vegetation.

5.5. Materials shall be placed at storage sites or on the grade without spillage outside the work limits. Any material inadvertently falling outside the work limits will be removed promptly in a manner that does not damage trees or vegetation.

5.6. Retain a 30 metre vegetated buffer around water bodies or install runoff management structures.

5.7. If possible grade roads early in the spring before vegetation develops seed heads or late in season after vegetation has set seed and is dormant to minimize non-native vegetation propagation.

5.8. Ensure gravel or road bed material is free of weeds and comes from an approved operational gravel source free of other contaminates.

Paving and Resurfacing

5.9. Minimize changes to the surface that could affect infiltration and runoff characteristics and maintain effective surface drainage to limit direct runoff into surface waters.

5.10. Minimize application of seal coats in wet conditions. Attempt to apply only to dry surfaces and not prior to (within 24 hrs.) or during rainfall. If unforeseen rain arrives ensure runoff from recently seal coated surfaces are prevented from entering surface waters.

5.11. For asphalt handling and management see the Asphalt Mitigation Module of the BMP.

Pavement Marking and Barrier and Guardrail Reinstatement

5.12. Minimize changes to the surface that could affect infiltration and runoff characteristics and maintain effective surface drainage to limit direct runoff into surface water Pavement marking shall be undertaken pursuant to standard methods applied in National Parks for control of paint products, both in transport and handling. The Contractor shall present a description of methods to be employed for transporting and controlling paint and hazardous products, application of paint, cleaning of equipment, containment and disposal of waste paint and cleaning products, etc. the satisfaction of the Parks Canada Representative.

5.13. Where concrete barriers or guard rails are temporarily removed, for highway improvements, temporary glow posts shall be installed, at 20.0 m intervals on straight sections and at 10.0 m intervals on curves and shall remain in place until permanent barrier system has been installed.

6. Barriers and Guardrails Mitigations Module

Repair, installation and upgrade of barriers and guardrails involves laydown/staging areas, equipment operations, minor excavation (e.g., for barrier post holes) and use of concrete. Potential adverse effects include destruction of vegetation and erosion and sedimentation.

Timing of Works

6.1. Where excavation is required, schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.

6.2. If the work schedule requires working in the rain, appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters.

Repairs, Replacement and Upgrades

6.3. An Erosion and Sedimentation Management Plan shall be prepared for the components of the work undertaken within 100m of watercourses, wetlands or riparian environments. If sediment ponds are required, they shall be designed to settle all sediment particles 0.02 mm or larger.

6.4. Where use of concrete is required for guardrail post holes, Concrete Handling Mitigations apply.

6.5. If vegetation removal is required for barrier or guardrail works, Vegetation Removal Mitigations apply.

6.6. Where concrete barriers or guardrails are temporarily removed, temporary glow posts shall be installed, at 20.0 m intervals on straight sections and at 10.0 m intervals on curves and shall remain in place until permanent barrier system has been installed.

7. Vegetation Removal Mitigations Module

Roadside vegetation management activities include mowing, brushing, and landscape maintenance activities undertaken to maintain clear sight lines for highway users, control noxious weeds, facilitate effective drainage, and reduce possible fire hazards. Mature timber

may need to be removed for improving road alignments, improving sight linesor replacing or repairing associated infrastructure. Grubbing (stump and root removal) may be required to prepare the ground surface for other activities.

Timing Windows

7.1. Vegetation clearing can negatively impact nesting birds and/or bats in spring and summer. Avoid all vegetation removal during this time. If vegetation removal is scheduled to occur within these times a qualified professional biologist/ecologist should further clarify the species presence and timing particular to the work site and any occupied bird nests, eggs, or nests of species protected under the Migratory Bird Convention Act (MBCA). See appendix on regulatory guidance for further detail on the MBCA and SARA.

7.2. If a nest is found during the pre-work surveys, the vegetated area will be left intact with a suitable sized buffer of shrubs/trees around it until the young have fledged and left the nest. Size of buffer species dependent, to be determined in consultation with professional biologist or park ecologist.

7.3. Grass mowing and trimming should not occur during peak spring or fall reptile/amphibian migrations and hatching. Consult a local biologist/ecologist for site and species specific timing windows.

Vegetation Removal Mitigations

7.4. Vegetation removal should be limited to the minimum Clear Zone Distance[1] dependent on type and size of road and maximum height needed to meet the road safety objectives.

7.5. Minimize full removal and retain vegetation when possible to reduce erosion.

7.6. Prior to the commencement of any vegetation removal, the worksite must be surveyed for species at risk. If species at risk are found, work must be stopped until site-specific mitigations to address potential adverse effects are developed.

7.7. Survey vegetation for non-native species, clear vegetation areas with non-native vegetation in spring and early summer to avoid further spread and development of the non-native seed bank.

7.8. Clearing activities shall be avoided during nesting seasons for birds, reptiles and amphibian species in the project area.

7.9. If wildlife is observed during work, if possible, give animals the opportunity to escape the work area to the surrounding forest or elsewhere to seek new shelter.

7.10. Avoid ground vegetation removal during dry, windy periods to prevent erosion of topsoil and reduction of air quality with dirt/dust.

7.11. Retain 30 metre vegetated buffer around water bodies, where disturbance is necessary and unavoidable restoration is required.

7.12. Debris will not be deposited in water bodies.

7.13. Ensure tree limbs/stumps are flush cut as close to the ground or stem as possible.

[1] A clear zone is an unobstructed, traversable roadside area designed to enable a driver to stop safely or regain control of a vehicle that has accidentally left the roadway. The selection and design of appropriate clear zone dimensions is project-specific and should be the responsibility of professionals trained in roadside design.

7.14. Logs and other salvage materials are to be conveyed to and placed at a storage site without spread of debris or damage to other standing trees or landscape resources outside the marked clearing or storage limits. They shall not be skidded through wetlands, waterways or water bodies.
7.15. During the grubbing component, stumps, roots, imbedded logs and other non-soil debris shall be pulled and shaken free of loose soil and rocks before transport to a designated pit.
7.16. Where possible preserve identified wildlife trees by limbing or topping if they are not assessed as hazard trees.

Disposal of Vegetation Debris

7.17. All vegetation debris must be removed as soon as possible from the right-of-way, either by transporting off-site for disposal or piling and burning on-site.
7.18. All vegetation containing non-native species will be piled and burnt or bagged and removed off site to disposal facility.
7.19. Piles will be made where trees are felled, piles will be 1.2-1.8 (4 to 6 feet) in diameter and no more than 1.2 m (4 feet) high (approximately 1 to 3 trees per pile) or as instructed by local fire and vegetation specialists.
7.20. Piles are to be located so that they do not scorch surrounding live trees and measures must be in place to ensure that fires do not spread (i.e., conduct burning on snow or on mineral soil).
7.21. Piles will be left until fall for burning to allow for curing of green fuels.
7.22. Provincial regulations for air quality must be met.
7.23. Where fire fuel loading is not a concern vegetation debris of limited amounts will be dragged in the forest to mimic natural tree fall.
7.24. If removal or burning are not feasible a chipper may be used for less than 50 boles per hectare. Chip depth is to be a maximum of 5 cm (2 inches), spread over area no greater of 5m x 5m per hectare so as to not cover underlying vegetation, prevent new native seedlings from sprouting, and cause soil/seed bank sterilization. Spreading of chips may extend beyond these parameters with permission from Parks Canada.
7.25. To facilitate chipping of woody debris, all trees/shrubs/vines can be left temporarily along the road shoulders and laid facing the same direction.
7.26. In some cases, logs from newly cut trees may be set aside for use elsewhere as directed by local park site managers and the ESO.
7.27. Store removed vegetation on already disturbed areas to minimize disturbance area.
7.28. In appropriate areas re-establish native vegetation where it has been completely removed/damaged.

Integrated Pest Management

7.29. A Field Unit Integrated Pest Management Plan (IPMP) must be completed and approved prior to the use of herbicides to ensure the most effective and least harmful substances are properly used.

8. Excavations, Soil Stripping and Overburden Removal Mitigations Module

Construction projects often involve excavations. To successfully complete reclamation of disturbed areas, and protect areas from erosion proper soil handling and backfilling procedures must be followed. Post excavation and stripping soil and vegetation restoration mitigations should be applied. See section of this BMP for Soil and Vegetation Restoration.

Timing of Works

8.1. Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.

8.2. If the work schedule requires working in the rain, appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters.

Excavation

8.3. Materials shall be placed at storage sites or on the grade without spillage outside the working limits. Any material inadvertently falling outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation.

8.4. All sediment control measures must be in place before starting work in the vicinity of rivers, water bodies, watercourses, and wetlands.

8.5. Special precautions may have to be taken during excavation in the vicinity of intermittent or active drainage channels.

8.6. Excavation plans must be compared to local archaeological resource inventories, if available. If no archaeological information is available for the work area, an Archaeological Overview Assessment (AOA) may be required to determine the archaeological potential of the work area. Based on the results from the AOA, an Archaeological Impact Assessment might be required. It would be time and cost efficient to refer the plan to Parks Canada's Terrestrial Archaeology section before conducting any excavation to determine the appropriate course of action.

8.7. If cultural resources (eg. archaeological resources) are discovered, immediately cease work, and alert SO.

8.8. Minimize changes to the ground surface that affects its infiltration and runoff characteristics and maintain/re-establish effective surface drainage on completion of the project

8.9. Backfill and compact excavations as soon as possible. Optimize degree of compaction to minimize erosion and allow for re-vegetation.

8.10. All trenches or ditches left unattended overnight must be fenced or covered to prevent wildlife entrapment.

Soil Stripping

8.11. Strip topsoil under dry conditions, whenever possible.

8.12. No stripping shall occur outside of the delineated work area or within 1 metre of the drip line of existing forest.

8.13. In the event of a work program shutdown during inclement weather (e.g. winter conditions unfavourable for construction, heavy rain events, construction delays, etc.) erosion control of bared soils or excavated material stockpiles is required.
8.14. Stripping close to any watercourse, water body or wetland shall employ methods to ensure materials are not pushed, do not fall or erode into the water or wetlands.
8.15. Work within a 100 metre buffer from the high water mark of waterways or wetlands will require a site specific sediment and erosion control plan.
8.16. An erosion control plan is also needed to control dust generated from the construction site.

Topsoil Salvage

8.17. Salvage topsoil at all excavation sites for reclamation purposes.
8.18. Usually the upper 15 cm of soil, below the sod layer if present, is considered topsoil, where depths exceed 15cm salvage the entire depth of topsoil.
8.19. Remove stumps and woody debris from topsoil, wherever possible.

Excavated Material Storage

8.20. Allow space for separate storage of topsoil and spoil; where space is available separate stored topsoil from spoil by at least 1 m. Use appropriate material (e.g., geo-textile) to separate soil components where space is limited.
8.21. Topsoil may be stored on hardened surfaces, geo-textile material or directly on undisturbed vegetation. If storage occurs on vegetation, material recovery by hand may be required.
8.22. Cover all stockpiled material with heavy-duty plastic or filter cloth to prevent erosion during precipitation events.
8.23. Topsoil should be stockpiled on the uphill side of the disturbance on sloped terrain.
8.24. Construct barricades to prevent losses on steep terrain (>18°, 3:1) and within 100m of watercourses.

Excess Materials and Waste (Overburden Removal)

8.25. Remove excess excavated material from site where it cannot be used for the final grading of the area. Site specific arrangements must be made for disposal locations and procedures of overburden.
8.26. Surplus excavated material may be used to fill depressions around the project site providing topsoil is stripped before filling, with approval from SO.

9. Slope Stabilization, Drilling and Blasting Mitigations Module

Where standard excavation is not sufficient, scaling, hydraulic hammers, drilling units or trim blasting are used to break up rock or soil for removal. Accumulations of debris in ditches reduce their effectiveness at trapping rock fall and reduce public safety. Ditches will be cleaned using a loader and back hoe. Guardrails and rock fences may be temporarily removed to permit this activity.

Timing of Works

9.1. Time any vegetation removal work should adhere to the Migratory Bird windows for the area.
9.2. Time work to reduce impact to mammals, amphibians and reptiles using rock faces during sensitive life stages such as birthing and rearing of young. This often occurs during the spring. Confirm timing windows with local wildlife ecologists.
9.3. Avoid ditch clearing during wet periods and wait until ditches are dry to reduce impacts to amphibians and reptiles and limit sedimentation.

Slope Stabilization-Scaling, Hydraulic Hammers

The use of hydraulic hammers attached to excavators is considered the ideal solution for rock disintegration. It avoids rock blasting where the parent rock is no longer rippable by the excavator's bucket but still has enough planes of weakness for economical operation and effective use of the hydraulic hammer. Scaling is the manual removal of loose material on rock slopes using pry bars, hydraulic press, brooms, shovels and power equipment operated by personnel using roped access to a rock face.

9.4. For vegetation clearing refer to the vegetation removal mitigation module of this BMP.
9.5. For slope-stabilization in soils, please refer to the Excavation section.
9.6. Survey the work site for cultural resources such as rock art (ex. pictographs, petroglyphs, etc. prior to the work commencing, establish site specific mitigations for their protection.
9.7. Measures shall be taken to control dust as much as possible during the removal and falling of rock materials down slope.
9.8. Placement of rip rap and backfill on shorelines shall be undertaken without contacting the watercourse, wetted margins and must not be below the High Water Mark.
9.9. If replacement rock reinforcement/armouring is required to stabilize eroding or exposed areas, then ensure that appropriately- sized, clean rock is used, and rock is installed at a similar slope to maintain a uniform bank.
9.10. Direct concentrated surface water (runoff) away from cut and fill slopes.
9.11. Immediately stabilize banks disturbed by any activity associated with the project to prevent erosion and/or sedimentation, preferably through vegetation restoration with native species suitable for the site-refer to soil and vegetation restoration section of BMP.

Drilling and Blasting for Slope Stabilization and Geotechnical Investigations

Trim blasting is used for controlled blasts in which explosive charges are placed in predetermined pattern of holes drilled into the rock face and then detonated. Potentially unstable masses of rock can sometimes be stabilized using rock bolts and long steel rods drilled into the rock to bind it together. Drilling is a common method of investigation to obtain geotechnical reports required for engineering design.

Drilling

9.12. Debris from drilling will be contained (screened or settle out) so it will not cover the surrounding area or enter any water course. All debris will be removed, see section on overburden removal for further mitigations.

9.13. The cuttings from all drilling will be contained so they can be removed entirely from the site. If contaminated, the cuttings are to be disposed at an approved waste disposal facility.

9.14. Control of spoil and sediment loaded water is required on the drill site. Dyking will be required to retain the deposit on non-vegetated surfaces. If contaminated, the spoil pile must be disposed at an approved waste disposal facility.

9.15. During aquifer tests, the water must be piped so it does not erode any soil or any part of the ground. If the water from the tests is piped to a creek, stream, or river, the pipe is to be situated so that there is no erosion of the stream bank or bed. If any sand or similar material is discharged during the aquifer test, care must be taken that the sand does not cover any vegetation.

9.16. All test wells will be filled in after the testing is completed. The proponent will be responsible for rectifying any future problems associated with any of the wells or test wells.

Blasting

9.17. The Parks Canada Representative will identify a magazine location for explosives should a factory site or "ready-to-use" explosives storage site be required

9.18. The blasting supervisor will ensure no damage to infrastructure, people, surrounding vegetation or wildlife by mitigating risk of fly rock.

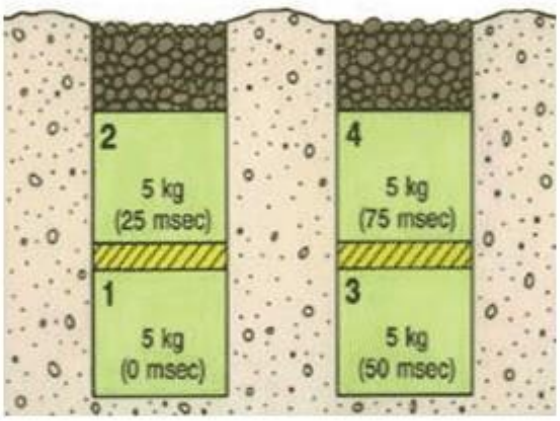
9.19. Avoid using explosives in or near water. Use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs. Blasting vibrations may also kill or damage fish eggs or larvae.

9.20. If explosives are required as part of a project (e.g., removal of structures such as piers, pilings, footings; removal of obstructions such as beaver dams; or preparation of a river or lake bottom for installation of a structure such as a bridge or culvert), the potential for impacts to fish and fish habitat will be minimized by implementing the following measures:

- Time in water work requiring the use of explosives to prevent disruption of vulnerable fish life stages, including eggs and larvae, by adhering to appropriate fisheries **timing windows**.
- Isolate the work site to exclude fish from within the blast area by using bubble/air curtains (i.e., a column of bubbled water extending from the substrate to the water surface as generated by forcing large volumes of air through a perforated pipe/hose), cofferdams or aquadams.
- Remove any fish trapped within the isolated area and release unharmed beyond the blast area prior to initiating blasting.
- Minimize blast charge weights used and subdivide each charge into a series of smaller charges in blast holes (i.e. Decking) with a minimum 25 millisecond (1/1000 seconds) delay between charge detonations (see Figure 1).

- Back-fill blast holes (stemmed) with sand or gravel to grade or to streambed/water interface to confine the blast.
- Place blasting mats over top of holes to minimize scattering of blast debris around the area.
- Do not use ammonium nitrate based explosives in or near water due to the production of toxic by-products. Remove all blasting debris and other associated equipment/products from the blast area.

Figure 1: Sample Blasting Arrangement



Per Fig. 1: 20 kg total weight of charge; 25 msecs delay between charges and blast holes and decking of charges within holes. (Fisheries and Oceans Canada, 2015)

10. Soil and Vegetation Restoration Mitigations Module

Almost all projects activities included in this BMP will require some ecological restoration- *the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed*. The restoration plan can be a simple application of the following mitigations and can be at the site or both at the site and in concert with another site designated to offset the permanent impact of a project. For disturbance areas greater than a hectare a restoration plan is required. The restoration works can be often be considered projects in and of themselves. Soil and vegetation restoration must apply the principles of effective, efficient and engaging solutions.

Timing Windows

10.1. Develop restoration plan as part of the project scoping and specifications prior to project approvals.

10.2. Vegetation restoration is most effective if seeded in the fall, this allows for full scarification of the seed over the winter and adequate moisture available. Spring and early summer will also work, consider using seed that requires shorter scarification times for these applications. Transplants will do best in the spring and summer and will require adequate watering.

Topsoil Replacement

10.3. Implement restoration plan for the disturbed area immediately following completion of construction.
10.4. Replace topsoil to all areas immediately following fine grading.
10.5. Do not compact topsoil.
10.6. Where insufficient topsoil is available imported soil may be used as a last resort. Imported topsoil must be certified completely free of non-native seeds and compost developed from sewage treatment plants. Methods of improving vegetation succession using locally sourced, weed and contaminant free materials are preferred.
10.7. Slopes to be seeded should be no steeper than 2 horizontal to 1 vertical (2:1) and covered with a minimum of 5 cm (2 inch) of topsoil. Finish grading should always follow top soil placement.
10.8. Where remaining soils are unstable due to steepness or soil characteristics, immediate installation of sod or erosion control blanket is required.
10.9. Methods of bioengineering such as terracing, willow staking, live pole drain systems should be assessed as solutions where soils are steeper or remain unstable.

Soil Amendments

Fertilizer Application

10.10. Avoid use of fertilizer to limit non-native vegetation growth and allow for local species to use available nutrients.
10.11. If needed use locally sourced mycorrhizae compost teas to improve vegetative success.

Topsoil substitute

10.12. Apply an organic cellulose only amendment as a soil substitute if reclamation standards are not being met within the defined time frame.
10.13. Determine the type of organic amendment based on the site-specific requirements (e.g., peat moss, compost).

Seedbed Preparation

10.14. The seedbed will be scarified by hand or, with the approval of the SO, by machine on large areas (i.e., roadbeds) where it is accessible and appropriate.
10.15. The seedbed will be scarified if seeding takes place more than 7 days after final grading or if there has been a rainfall between final grading and the seeding date.

10.16. The cleats of a tracked vehicle or a harrow device will be used, where possible, to prepare an adequate seedbed with seedling safe-sites (microsites) substantially free of soil crusts.
10.17. Align cleat marks at right angles on slopes to trap seed and sediment and reduce erosion.

Species Selection

10.18. When selecting species and varieties:
- Use species of local native plant communities.
- Species viability in proposed environment and climatic conditions.
- Capability to effectively control erosion, where required.
- Adaptation to the variable site conditions of undulating topography.
- Consider palatability of some species to herbivores and avoid growing attractants in areas of increased risk to wildlife and visitors.
- Variable life expectancy to produce variable, delayed die-out of seeded species and replacement with indigenous native plants.

Seed Lot Selection

10.19. Select seed lots based on indigenous species variety and quality (guaranteed weed seed free content and highest purity and germination), consult with vegetation restoration specialist or fire/vegetation ecologist.
10.20. Reject any seed lots containing any seed of undesirable crop or weed species.

Seed Mixture Composition

10.21. The proportion of each species should be calculated to provide an adequate quantity of pure live seed (PLS) per unit area of each key component.
10.22. Aim for density of about 140 seedlings/m^2 at the end of the first growing season to provide adequate ground cover and allow native species to re-colonize the site over time.
10.23. Consider that parameters such as seed lot purity, seed germination, seedling establishment, seed size and seeding method affect the final stand composition.

Seeding

10.24. Use approved native seed mixes developed for site-specific conditions for various elevations.
10.25. Seed and stabilize (e.g. mulch/tackifier) bare areas as soon as possible after disturbance, preferably as soon as a significant area is graded and finished and before the next rain event. If there is a risk of seedling mortality as a result of fall frost stabilize until appropriate growing conditions exist.
10.26. Use sod in high traffic areas or places that need extra erosion control. Source sod grown from native species (often called fescue sod) and ensure adequate anchoring and watering is in place.
10.27. Use temporary seeding when outside the seeding dates for permanent vegetation
10.28. Apply a seed mixture which is appropriate for the climate, soil, and drainage conditions of the site.
10.29. Apply seed at a rate appropriate to the seed mixture, seeding method and existing vegetation conditions.

10.30. Conduct broadcast seeding under calm wind conditions. Hydro-seeding is acceptable where access is available.
10.31. Do not exceed 30 kg/ha for the broadcast method, ensure seed is integrated with the soil by light rake or harrow. Broadcast method seeding rate is 25 kg/ha (2.5g/m^2) (e.g., 1x25 kg bag will cover 10,000m^2 or 1 hectare).
10.32. For hydro-seeding do not exceed 75 kg/ha with light mulch rates (500 kg/ha- of mulch with hydro-seeding) and 150 kg/ha with heavy mulch rates (1500 kg/ha of mulch with hydro-seeding).
10.33. Do not increase the seeding rate to compensate for poor seedbed conditions.
10.34. Monitor temporary erosion control measures to prevent seed loss.
10.35. Some seeding procedures may have to be completed or repeated in subsequent years.

Alternatives to Seeding

10.36. Use topsoil seed bank in small areas when there is no risk of erosion or competition from invasive species (i.e., natural regeneration).
10.37. Use native transplants in areas where conventional seeding applications are not applicable or where slope stability is an issue.
10.38. Use conventional forestry planting methods for container grown transplants, see website for guidance.

Reclamation Standards

10.39. Minimum standard for plant density is 25 plants/m^2, with 90% frequency.
10.40. Minimum standard for plant cover is 80% ground cover, with 90% frequency.
10.41. Minimum standard for plant community composition standard is 50% cover and 90% frequency of native species.
10.42. Exclude species designated as weeds in the work sites from the plant density standard consult local vegetation ecologist for current site specific non-native vegetation management program.
10.43. Rock, plant litter and non-vascular species are included in the cover standard.
10.44. Remaining plant cover of seeded native species is acceptable.

Reclamation Plot Evaluation

10.45. Select any site within reclamation area measuring 10 x 10 m, providing 100 plots of 1 square meter.
10.46. Measure the plant density, cover and composition in each of the 100 square meter plots.
10.47. The reclamation standard will have been met if 90 of the 100 plots match or exceed the criteria.
10.48. No fertilizer will be applied one year before the reclamation standard is evaluated.

Time Limits

10.49. Inspect site annually during the growing season.
10.50. Minimum reclamation standard, as above, to be met within one season post planting.
10.51. Apply amendments annually, depending on reclamation progress.

10.52. Re-seed site if the plant density standard is not expected to be achievable within 5 years.

- A new restoration plan will be prepared and implemented when reclamation standards have not been met after 5 years.

11. Drainage Structures Mitigations Module

Drainage structures on roadway, highway and parkways are structures such as culverts, ditches and drains. Drainage structure management activities are undertaken to ensure that surfaces are safe and efficiently drained, water is efficiently channeled to ditches and watercourses, and erosion of highways and adjacent properties is prevented. These mitigations include the cleaning and maintenance of drainage structures and related hardware, as well as the repair or replacement of existing and installation of new drainage structures.

Timing of Works

11.1. Time work in water to respect **timing windows** to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed. Contact your local aquatics specialists and DFO offices for further information on **timing windows** in your region.

11.2. Conduct in-stream work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows.

11.3. Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.

11.4. If the work schedule requires working in the rain, the area of work must be isolated and appropriate sediment controls installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters.

Drainage Structures

11.5. Isolate your work area from any flowing water that may be present. Ensure any flows are temporarily diverted around the portion of the ditch or watercourse where you are working.

11.6. Select appropriate equipment and work access routes to reduce damage to riparian vegetation and watercourse banks when using earth-moving equipment.

11.7. For smaller scale debris and sediment removal activities, remove materials by hand.

11.8. To assist with bank stability and invasive plant prevention, leave topsoil and root systems intact on channel banks surrounding your work area.

11.9. Ensure any works to repair damaged structures retain the pre-repair channel conditions (e.g., streambed profile, substrate, channel cross section) and do not constrict the stream width.

11.10. Maintain effective sediment and erosion control measures until complete re-vegetation of disturbed areas is achieved.

Culverts

If a proposed culvert crosses a stream where fish are present, the crossing should be designed or upgraded to provide fish passage and avoid interference with fish habitat. To mitigate the

impact of culverts on fish movement technical assessment of the water flows and fish species is required to establish a culvert design that will allow for passage of fish. Often there are regional or provincial best practices available online and qualified professionals can assist with designs. Some best management practices for installation or replacement of culverts follows.

Culvert Design and Alternatives

Utilize alternative crossing structures (e.g. clear span bridges, lock blocks and concrete decks) as a replacement for culverts, where possible.

11.11. Ideally, crossings should have natural streambed material through them to allow continuous substrate that matches the streambed below and above the crossing. Open bottom crossings are ideal for maintaining natural substrate.

11.12. Utilize a single large culvert design over a multiple culverts design (i.e. several smaller culverts) to reduce debris blockage and increased fish and wildlife passage, where hydrologically feasible

11.13. Design culvert bottoms to be placed at least 30cm below the stream bed elevation to ensure culverts remain passable by fish and wildlife by preventing culverts from becoming perched.

11.14. A minimum water depth of 200 mm should be provided throughout the culvert length. To maintain this water depth at low flow periods an entrance/downstream pool can be constructed. In some cases, an upstream pool may also be necessary.

11.15. The culvert slope should follow the existing streambed slope where possible.

11.16. The culvert, inlet(s) and outlet(s) should be adequately protected with rip-rap to prevent erosion and scour around the culvert during high runoff events. The following measures should be incorporated when using replacement rock to stabilize the culvert:

- Place appropriately-sized, clean rocks into the eroding bank area by hand or machinery operating outside the water course.
- Do not obtain rocks from below the ordinary high water mark of any water body.
- Where possible, install rock at a slope similar to the stream bank to maintain a uniform stream profile and natural stream alignment. Otherwise, install the rock at the closest slope required to ensure it is stable.
- Ensure rock does not interfere with fish passage or constrict the channel width.

11.17. Trash racks should not be used near the culvert inlet. Accumulated debris may lead to severely restricted fish passage and potential injuries to fish. Where trash racks cannot be avoided in culvert installations, they must only be installed above the water surface indicated by bank full flow. A minimum of 9 inches clear spacing should be provided between trash rack vertical members. If trash racks are used, a long term maintenance plan must be provided along with the design, to allow for timely clearing of debris.

11.18. Natural or artificial supplemental lighting should be considered in new or replacement culverts that are over 150 feet in length.

11.19. Ensure designs locate culvert structures in areas that minimize impacts to riparian vegetation and associated wildlife.

Culvert Installation

11.20. It may be necessary to exclude fish from the immediate construction site while a culvert is being installed. If this practice is necessary, fish shall be salvaged by a qualified aquatics professional from within the exclusion area.

11.21. If dewatering is required refer to the dewatering mitigation module of this BMP for appropriate mitigations.

11.22. Maintain effective sediment and erosion control measures until complete re-vegetation of disturbed areas is achieved.

11.23. Remove any old structures to a suitable upland disposal facility away from the riparian area and floodplain to avoid waste material from re-entering the watercourse

Wildlife Considerations for Culverts

At times, culverts are placed along portions of highways that bisect wetlands or specific habitats that support an abundance of wildlife. Consider building natural rock ledges through culverts to allow for small and medium-sized animals to walk on during periods of high flow.

12. Bridge Maintenance Mitigations Module

Bridge structure management activities include the cleaning and painting of bridge structures as well as the repair, rehabilitation, and replacement of bridge elements including decks, railings, abutments, and bearings. Works may include asphalt, concrete works, chipping, painting, grouting, timber truss, abutment and piling maintenance. These activities help ensure bridge structures remain structurally sound and safe for public use.

Timing of Works

12.1. Time work in water to respect **timing windows** to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed. Contact your local aquatics ecologists, provincial jurisdictions and DFO offices for further information on **timing windows** in your region.

12.2. Conduct in-stream work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows.

12.3. Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.

12.4. Cover or otherwise contain stockpiled materials during heavy rain events or extended absences.

12.5. If the work schedule requires working in the rain, the area of work must be isolated with appropriate sediment controls installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters.

Bridge Cleaning

12.6. Schedule bridge-cleaning activities to coincide with the watercourse's spring freshet when possible. At freshet or during periods of high flow a large watercourse will often have its highest background levels of sediment. At this time, the introduction of a small amount of sediment to a watercourse (from bridge cleaning) will have a lower risk of potential impact when considered against those high natural background levels.

12.7. If works are planned outside the freshet or if your region does not experience a freshet, discuss the protocol and timing of these works with your local aquatics ecologist and/or DFO Officer.

12.8. Dry sweep and collect loose material off bridge surfaces before washing the bridge. Adequately seal drains and any open joints on the bridge deck before sweeping or washing to prevent material or sediment-laden wash water from entering any watercourse

12.9. If dry sweeping and preventing direct runoff to waterway is not a feasible way to clean the surface, discussion and planning with local aquatic ecologists will be required.

12.10. Use water alone. If your cleaning activities require degreasers or any other chemical, approval for use must be obtained from local aquatics specialists and/or DFO.

12.11. Contain any wash water or runoff to the bridge deck. Direct wash water towards the bridge approaches and away from the watercourse, then to a vegetated area or contained settling area (e.g., dry ditch channel unconnected to a watercourse) where it can infiltrate.

12.12. If superstructure cleaning is undertaken above or on the bridge deck level, prevent potentially harmful materials from entering into road drains. Block deck drains with suitable barriers (e.g., polyethylene or drain blocks) to prevent direct discharge to a watercourse, or re-route runoff through temporary piping onto adjacent settling pond or structure, using a hydro vacuum would be another option.

12.13. If water for cleaning is extracted from a watercourse, refer to water withdrawal section of this BMP.

Repairs Using Treated Wood Products

12.14. Untreated wood products are recommended, if treated wood is to be used, ensure it has been treated with a wood preservative appropriate for the project. Refer to the *Parks Canada Guide for the Use, Handling and Disposal of Pressure Treated Wood 2009* and any further updates from Parks Canada Real Property – Environmental Management.

12.15. If treated timber must be cut to size, ensure cutting takes place away from the bridge and watercourse. Sawdust from treated wood is harmful to aquatic organisms and must be prevented from entering any watercourse.

12.16. Wood preservatives should be applied in a contained area and not be applied over or within 200m of water.

Bridge and Structure Painting

12.17. Ensure paint flakes, abrasive grits and abrasive/paint flake mixtures do not enter the watercourse as they may leach toxic heavy metals into receiving waters and/or be ingested by fish.

12.18. Install ground covers and/or vertical drapes such as sheets of plastic or air-permeable cloth (e.g., burlap or canvas) prior to removal activities to capture falling debris. Floating barges may be deployed in watercourses to capture falling debris, such as paint flakes and dust.

12.19. Waste materials collected during removal and application of protective coating operations (e.g., blasting abrasives, paint particles, rust and grease) should be

collected and retained for disposal at appropriate locations. Waste materials must not be deposited into watercourses or riparian areas.

12.20. Use hydro blasting or manual techniques, where possible, when removing road dirt, soluble salts and loose paint to minimize impacts to the watercourse.

12.21. Use water without cleaning agent additives if grease film removal is necessary.

12.22. Avoid use of toxic liquid paints, primers, solvents, degreasers and rust inhibitors.

12.23. Minimize spill potential by storing, mixing and transferring paints and solvents on land.

13. Water Withdrawal and Dewatering Mitigations Module

Construction often requires the use of water, many common methods of excavation and site isolation require dewatering. Temporary, short term water withdrawal provides an efficient uncontaminated water source for local project sites. Dewatering can allow sites to be effectively dry during construction, reducing the impact of sediment laden water entering fish bearing waters.

Timing Windows

13.1. As a general guide to prevent taking more water than aquatic system can support, limit total take of water to less than 5 successive days and less than 10 days in any period of 30 days.

13.2. Avoid water withdrawal during breeding seasons of amphibians and reptiles to avoid destruction of egg masses, consult local aquatics ecologist for site specific guidance.

Water Withdrawal

13.3. Water should not be withdrawn from a wetland or stream less than 5 metres wide at the surface or a lake less than one hectare in area.

13.4. Water withdrawal should follow the 10/90 rule which allows for up to 10% of the stream flow to be withdrawn, as long as the stream flow does not fall below the 90% exceedence flow (eg.1 in 10 chance in a given year).

13.5. No permanent or semi-permanent works for water withdrawal should be placed in the stream channel.

13.6. Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish, amphibians and/or reptiles. Entrainment occurs when a fish or amphibian is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish, reptile or amphibian is held in contact with the intake screen and is unable to free itself.

Pump Screens

13.7. In freshwater, fish-bearing waters design and installation of intake end-of-pipe fish screens:

- Locate screen in areas and depths of water with low concentrations of fish throughout the year away from natural or artificial structures that may attract fish that are migrating, spawning, or in rearing habitat.
- Orient the screen face in the same direction as the flow of water.
- Ensure openings in the guides and seals are less than the opening criteria to make “fish tight”.

- Screens should be located a minimum of 300 mm (12 in.) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the bottom area.
- Provide structural support to the screen panels to prevent sagging and collapse of the screen. Large cylindrical and box type screens should have a manifold installed to ensure even water velocity distribution across the screen surface. The end of the structure should be made of solid materials and the end of the manifold capped.
- Heavier cages or trash racks can be fabricated out of bar or grating to protect the finer fish screen, especially where debris loading (woody material, leaves, algae mats, etc.) is a concern. A 150 mm (6 in.) spacing between bars is typical.
- Provision should be made for the removal, inspection, and cleaning of screens.
- Ensure regular maintenance and repair of cleaning apparatus, seals, and screens to prevent debris fouling and impingement of fish.
- Pumps must be shut down when fish screens are removed for inspection and cleaning.

Dewatering

13.8. A site specific dewatering plan is required be provided before commencing a pump-out sump to dewater excavation sites with specific details on how and where the water will be discharge.

13.9. Site specific mitigations may be required depending on the conditions of the discharge area, freezing conditions operation, overflow avoidance, decanting and settlement pond reclamation.

13.10. Water containing suspended materials shall not be pumped into watercourses, drainage systems or on to land, except with the permission of the SO.

13.11. Soil and vegetation erosion protection is required for water pumped on to land.

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Appendix 1 Regulatory Guidance

Jurisdictions

While all projects on lands managed by Parks Canada must adhere to Federal law and regulation, it is considered best practice to refer to local community, regional, provincial regulation and best practices where federal guidance is silent and/or attempt to meet those targets if it can reduce the overall impact of the project.

Some of the project activities reviewed have potential environmental impacts that are addressed by various provincial, federal and territorial acts and regulations. All activities must meet current environmental law and regulations in their design and construction. The following is a brief description of some of the key federal acts and regulations. Further review, understanding and application of other federal, provincial and territorial environmental laws are part of a rigorous approach to project planning and execution.

Canada National Parks Act and Regulations-Parks Canada

All work inside National Parks and Protected Areas must be performed in accordance with the laws and regulations set out in the *Canada National Parks Act* and Regulations. This includes the requirement for most activities described to only be done under a permit such as: business licence for contractor, disturbance of natural objects, travel in restricted areas, special events or use of disposal sites.

Fisheries Act - Fisheries and Oceans Canada

If a project is to be conducted near water, it is the proponent's responsibility to ensure they avoid causing serious harm to fish in compliance with the *Fisheries Act*. The advice in on the Fisheries and Oceans website will help a proponent avoid causing harm and comply with the Act.

If the water body in the project area has fish or is connected to waters at any time that have fish the project must meet the self assessment criteria on the Fisheries and Oceans website, if not a project review can be made by Fisheries and Oceans Canada to assess whether the project requires authorization or authorization can be requested directly. Given the level of detail required for a review and/or authorization request the EIA officer may need to consider a more involved EIA pathway in those circumstances.

Migratory Bird Convention Act – Environment Canada

The purpose of this Act is to implement the Convention by protecting and conserving migratory birds - as populations and individual birds - and their nests. Section 6 - prohibits the disturbance, destruction, or taking of a nest, egg, or nest shelter of a migratory bird.

In Canada, the general nesting period may start as early as mid-March and may extend until end of August. This is a general nesting period that covers most federally protected migratory bird species. This period varies regionally across Canada mainly due to differences in species assemblages, climate, elevation and habitat type. Generally, the nesting period is delayed in more northerly latitudes, corresponding to vegetation development and food availability. (Environment Canada, 2014). To help with determining regionally relevant periods where

nesting is likely to occur, Environment Canada is publishing estimated regional nesting periods within large geographical areas across Canada referred as "nesting zones". These periods are estimated for each zone and consider the time of first egg-laying until the young have naturally left the vicinity of the nest. Field Units may wish to refine this section and add their known local nesting periods.

Species at Risk Act

If a species listed under the *Species at Risk Act* (SARA) is found within the project area, any potential adverse effects from the proposed project to the individuals of the species, their residences and/or their critical habitat must be understood. Species at risk considerations require specific expertise, due to additional legal requirements under the SARA and CEAA 2012. If the projects or activities to be addressed by the BMP could affect a listed species or its critical habitat, the EIA officer may need to consider a more involved EIA pathway in those circumstances.

APPENDIX B

RELEASE

IN CONSIDERATION of the delivery and unloading of fill material, **THE UNDERSIGNED** hereby for themselves, their administrators, successors and assigns release and forever discharge **Parks Canada Agency** from any and all action, causes of action, claims and demands for upon or by reason of any damage to property which heretofore has been or hereafter may be sustained in consequences of the material delivered in the County of _____, Nova Scotia on or about the _____ day of _____ 20 _____.

THE UNDERSIGNED hereby affirm the disposal site is not a wetland. Further, **THE UNDERSIGNED** hereby agrees the surplus excavated material shall not be placed in a wetland unless specifically permitted by the Nova Scotia Department of Environment and Labour. The **Contractor and/or recipient** of the surplus excavated material will be held responsible for all environmental permitting and liability.

AND FOR THE SAID CONSIDERATION, the undersigned agree not to make claim or take proceedings against any other person or corporation who might claim contribution or indemnity under the provisions of any statute or otherwise.

WITNESS this _____ day of _____, 20 _____.

X_____ **X** _____
Witness *(please print)* **Signature of Witness**

IN THE PRESENCE OF:

X_____ **X** _____
Resident *(please print)* **Contractor** *(please print)*

X_____ **X**_____
Signature of Resident **Signature of Contractor**

Address of Resident:

_____
Civic number, Road name, City/town/village, Postal Code

Location of Material Disposal: *(if different from resident's address)*

_____
Civic number, Road name, City/town/village, Postal Code

APPENDIX C

Environmental Protection Plan Checklist

What is an EPP?

An Environmental Protection Plan (EPP) is a field-ready, stand-alone document describing site-specific environmental protection actions and responsibilities during project implementation. An EPP is a 'user-friendly' and practical tool to ensure commitments and mitigations identified in an Environmental Impact Assessment (EIA) are implemented and monitored. An EPP isn't necessary for all projects. It is typically required the more detailed an impact assessment is and when engineering and design work is still at a relatively high level during the EIA, with more refined details to follow. In the latter case, the EIA should specify the end goals, or outcomes for mitigation and the details of how to achieve the mitigation outcome, can be left to the EPP. The level of detail included in an EPP should be proportional to the complexity and risk of the proposed activity.

How to use this checklist

This checklist is meant to assist in the development and/or review of an EPP to ensure that EPPs for Parks Canada projects are consistent and effective. The EPP format is flexible and can be written in a variety of ways. For example, a detailed sediment control plan can be attached in an Appendix, or measures can be integrated in a more general mitigation measures table. Contractors or specialists are responsible for developing the EPP and Parks Canada employees should review the document to ensure all mitigations in the EIA are addressed adequately in the EPP. The EPP must contain specific and direct instruction for achieving the environmental outcome identified in mitigation measures in the EIA. For example, general statements such as "Prevent sediment from entering streams" are not appropriate.

The table below is meant to be used as a guide as it has most of the content requirement that an EPP should have. However the Impact Assessment practitioner should adapt this table with every project. The mitigation sections are the ones which would usually require modification (e.g., do not keep the fish and fish habitat section if your EIA did not include it as a Valued Component). Keep in mind that some sections are essential in every EPP but the details are proportional to the complexity and risk. Once the modifications are done, carefully review the EPP to make sure all items on the checklist are addressed appropriately.

Contents	Y/N
PROJECT SETTING	
Project Description: • Brief description • Location • Scope of work • List of all construction or related activities to be undertaken (include equipment types and methods as relevant) • Project schedule including restricted work period • Site drawing (eg. Site location, site set-up and layout, in-stream work areas, environmental sensitivities) • Project materials (with emphasis on those whose use carries higher environmental risk e.g. cast in place concrete in/near water bodies)	
IMPLEMENTATION	
Environmental Protection Plan Orientation and Awareness: • Environmental pre-work training and orientation record-attach signed copy • Pre-construction meeting (environmental component) • Contractor start-up meeting • Daily job planning meeting	
EPP Implementation: • Name and contact details for the contractor site representative and Parks Canada staff1 • Other project contacts with key responsibilities • Monitoring reporting • Training and communications strategy • Environmental Compliance • Environmental Suspension Order • Incident reporting • EPP review and update procedures	
REGULATORY FRAMEWORK AND CONTENT REQUIREMENTS OF EPP	
• List of permits, approvals, authorizations (responsibilities for and copies included, if required) • Ensure all relevant environmental and contingency plans/sections are included, such as: - Erosion and sediment control plan - Turbidity control, drainage water and wastewater management plan - Soils and terrain management plan - Vegetation clearing plan - Waste management plan - Hazardous materials management plan - Health and safety plan - Traffic management plan - Wildlife and human conflict management plan - Equipment maintenance and fueling procedure - Air quality, odour, dust control and emission/pollution management plan	

[1] Parks Canada Construction Site Roles and Responsibilities:
http://intranet2/media/2384992/construction_site_roles_and_responsibilities_-_final.pdf

- Noise pollution plan - Noxious weed/invasive alien species control plan - Site cleanup and restoration plan - Emergency and contingency response plans - Emergency key contact list, including Parks Canada contacts - Emergency spill response (Guide for spill response, Fuel and hazardous materials spills, Vehicle emergency spill kit contents…) - Incident report form - Fire response plan - Discovery of cultural resources procedure	
MITIGATION MEASURES *Specify the environmental mitigation measures related to project construction activities for each section/separate plan (i.e. refer to list above). Ensure mitigation measures consider the following:*	
Mitigations related to Environmental Regulations/Authorizations: • Environmental conditions and restrictions of all required project permits, approvals, authorization and notifications • Other regulatory compliance that impacts or restricts the construction project (Buffers, setbacks, timing windows…)	
Mitigations for Valued Components and related plans in the EIA such as: • Fish, Fish Habitat, Aquatic Species • Migratory Birds • Species at Risk • Wetlands, Watercourses and Riparian Areas • Water Quality and Quantity (hydrology, groundwater, surface water) • Air Quality • Soils • Wildlife • Vegetation • Cultural Resources • Visitor Experience • Traditional Use	
APPENDICIES	
• Maps • MSDS • Forms • Plans • CVs	

WHO TO CONTACT FOR HELP:

IA expertise: The National IA Team and the Environmental Services, Infrastructure Planning Team in the Natural Resource Conservation Branch provide expert advice regarding IA processes.