Parks Canada Agency

French to MacKenzie Rehabilitation KM 15.9 to 21.9

Technical Specifications

ISSUED FOR TENDER

February, 2017

PCA Project No: 1114

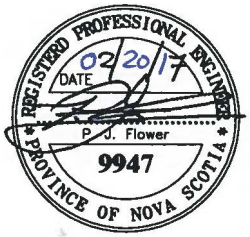
Stantec Project No: 133347336

Specifications
Issued for Tender

Parks Canada Agency

Cabot Trail Rehabilitation
French to MacKenzie
KM 15.9 to 21.9
Cape Breton Highlands National Park

Project No. 1114
Stantec Consulting Limited



Peter Flower, P.Eng.
Senior Civil Engineer
Stantec Consulting Limited

END OF SECTION

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Part 1 General

1.1 REFERENCES

.1 Public Act (Nova Scotia), Pit and Quarry Guidelines, Asphalt Paving Plant Regulations, Environmental Construction Practice Specifications, Forest Improvement Act, National Parks Act and Regulations and Canadian Environmental Protection Act.

1.2 DESCRIPTION OF WORK

.1 The work will be carried out on the Cabot Trail within the boundaries of Cape Breton Highlands National Park from Station 15+900 to 21+860 including the reconstruction of the French Lake and Bog Trail parking lots and construction of a new Canada Trail parking lot. Station 0+000 is at the Park Boundary at the Chéticamp River.

.2 The Contractor shall restrict excavation to subgrade to a 1.0 km maximum, excluding; culvert replacements, Canada Trail, French Lake and Bog Trail parking lots and Fishing Cove Long Trail stockpile/borrow site. The Contractor is permitted to mill the existing asphalt to a maximum length of 3.0 km of the project, provided a minimum thickness of 40mm of asphalt is left in place as a stable driving surface.

.3 At no point shall the road excavation work area extend beyond 1.0 km in length. At the end of each work day, the road shall be graded and compacted with a minimum 300mm thickness of Type 2 & Type 1 granular material, with the top 50 mm thickness being Type 1 (Aggregate Base) material, to the satisfaction of the Departmental Representative. In addition, the adjacent travel lanes shall match grade at the end of each work day prior to opening to public traffic.

.4 Roadway excavation is to start at the Chéticamp end of the project (Station 15+900) and progress up chainage toward Pleasant Bay.

Work on this project consists generally of the following:

.1 Carry out a preconstruction survey, this is considered incidental to the Contract.

.2 **The Contractor shall be required to layout and place wooden grade stakes at every construction stage of the roadway structure (top of backslope, toe of slope, subgrades, granulars, etc.) on both sides of the roadway. Establish and maintain 20 m stationing and placement of offset stakes of the 20 m stations on which is written with the chainage and centreline offset.**

.1 This includes stakes, marks and grades necessary for clearing, grubbing and stripping limits, cuts, fills, and culvert layouts.

.2 The preservation of stakes and marks, shall be the responsibility of the Contractor and are to be maintained throughout the Work.

.3 The Contractor shall ensure access for the Departmental Representative for checking control lines and grades.

.4 The Contractor shall meet the design lines and grades as provided in the contract Drawings.

.5 Remove all grade stakes and markings at the completion of Work.

.3 Record the direction, start station, and end station of all pavement marking passing lanes within the project limits. Establish offset stake at each location and re-establish prior to new pavement marking.

.4 Supply traffic control signs including portable electronic message boards, mobile speed display sign, traffic control personnel and pilot vehicle including means of transporting cyclist and their bicycles thru the traffic control zone.

.5 The Contractor shall develop an Environmental Protection Plan for submission and approval prior to starting work based on the Basic Impact Analysis and Parks Canada's Best Management Practices document as shown in **Appendix C**. *(Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure (May 2015).*

.6 Site erosion and sediment control measures, including check dams, silt fencing, silt curtain, hay/straw bales, vegetation stabilization and other measures as required, maintained for the duration of the Work.

.7 Removal of existing asphalt concrete and reuse/disposal as required.

.8 Construction, maintaining, and removal of all detours.

.9 Supply and placement of RAP material at Skyline Trail as shown on site plan as provided in **Appendix A**. Work at the Skyline Trail is to be completed prior to Victoria Day long weekend (May) or following Labour Day weekend (September).

.10 Construction including; clearing, grubbing, stripping, grading, placement of granulars and RAP material, landscaping, site preparation and site access of the new Canada Trail parking area as shown on the Drawings.

.11 Construction and the redevelopment of existing parking lots at French Lake and Bog Trail.

.12 Removal and disposal of existing culverts and replacement with new culverts as shown on the Drawing; including fish bearing watercourses.

.13 Supply and installation of concrete culvert at Fishing Cove River, complete with associated components to the complete the replacement. This culvert replacement shall be completed at the commencement of Work.

.1 Construction, maintaining and removal of all detours and temporary access roads.

.2 Design, fabrication, supply, transportation, placement, inspection, certification, maintenance and removal of temporary modular bridge. This includes temporary bridge foundations and any geotechnical investigations.

.3 All excavation, trenching and backfill including; loading, hauling, stockpiling, handling, placement and compaction of materials associated with the culvert replacement and detour Work.

.4 Dewatering of site and temporary water control.

.5 Removal and disposal of existing culvert and components.

.6 Supply and placement of new culvert, complete with associated headwalls.

.7 Supply and placement of fish baffles, offtake channels, inlet aprons and outlet pools.

.8 Supply and placement of rip-rap and individual rock placements and landscaping requirements.

.9 Reinstatement of the Fishing Cove River work area to pre-construction conditions.

.14 Clearing, grubbing, stripping, ditching, grading, guiderail, and the placement of rock fill, Type 1 and Type 2 granular materials, rip-rap, asphalt and RAP to the lines and grades shown on the Drawings and as specified in the specifications.

.15 Compact and proof roll new subgrade surface.

.16 Supply, placement, compaction and grading of rock fill, granular sub-base and base materials.

.17 Supply and install guide rail and posts.

.18 Supply and place base and surface course asphalt concrete. A material transfer vehicle (Roadtec SB 2500C or approved equal) is to be used to transfer all hot mix asphalt from haul units to asphalt spreader.

.19 Supply and placement of RAP shouldering material.

.20 Removal of regulatory and warning signs and sign posts and replace with new signs and posts. The Contractor shall provide the new regulatory and warning signs.

.21 Remove Park signs and sign posts and deliver to a location within the Park as directed by the Departmental Representative. The Contractor shall replace sign posts and reinstate signs provided by the Park upon completion of the Work.

.22 Supply and placement of hydroseeding and dry mulch on designated slopes.

.23 Establish the layout of pavement markings, delineation, and arrows etc. prior to line stripping. Provide for review and approval to the Departmental Representative, drawings of new layout locations prior to pavement marking.

.24 Supply and installation of all temporary and permanent pavement markings.

.5 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.

.6 The Contractor must be aware that other construction work may be performed at several different locations within the Park during the time frame of this contract and that coordination with other Contracts may be required. The Contractor must plan their work accordingly. A list of other anticipated work areas along with the appropriate kilometer station of Cabot Trail includes:

.1 French Mountain Culvert Replacement.
.2 French Mountain Rock Slope Stabilization.
.3 MacKenzie River Bridge Replacement.
.4 North Mountain Pavement Rehabilitation.
.5 North Mountain Rock Slope Stabilization.
.6 North Aspy North Branch Bridge Replacement.
.7 North Aspy South Branch Bridge Replacement.
.8 South Mountain Pavement Rehabilitation.
.9 Clyburn Brook Bridge Replacement.
.10 Trout Brook Campground Reconstruction.

1.3 TERMS AND DEFINITIONS

.1 Project Limits: The clearing limits.

.2 Roadway: Portion of right-of-way included within construction limits of grading, drainage, base course, shouldering and surface course improvements and appurtenant structures.

.3 Mass: Term "tonne" means 1000 kg or 1 Mg or t.

.4 Volume: Term "litre" means 1000 mL or L.

1.4 MAINTENANCE OF WORK DURING CONSTRUCTION

.1 Maintain work during construction. Undertake continuous and effective maintenance work day by day, with adequate equipment and forces so that the roadway or structures are continuously kept in a condition satisfactory to Departmental Representative:

.1 The contractor shall ensure that the travelled lanes are adequately covered with a minimum of 50 mm of Aggregate Base (Type 1) at the end of each work day.
.2 The contractor shall stake both sides of roadway and at every stage of the pavement structure construction, Subgrade, Type 2 and 1 surfaces. These stakes are to be maintained throughout each stage of construction and are to replaced when removed or damaged.
.3 The contractor shall be responsible to maintain dust control within the Work area at all times.

1.5 CODES

.1 Perform work in accordance with National Parks Act, Code of Practice of the Department of Labour, as it pertains to the Temporary Workplace Traffic Control Manual (Nova Scotia Department of Transportation and Infrastructure Renewal and any other code of federal, provincial, or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.).

.2 Materials and workmanship must conform to or exceed applicable standards of Canadian General Standards Board (CGSB), Canadian Standards Association (CSA), American Society for Testing and Materials (ASTM) and other standards organizations.

.3 Conform to latest revision of any referenced standard as re-affirmed or revised to date of specification. Standards or codes not dated shall be deemed editions in force on date of tender advertisement.

.4 Vehicle weights and dimensions shall conform to Public Highways Act (Nova Scotia).

1.6 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, both on construction and storage 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 All sources of aggregate and asphalt cement must be submitted to the Departmental Representative for approval at least two weeks prior to the start of any work.

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

.1 Pit and Quarry Guidelines.

.2 Environmental Construction Practice specifications.

.6 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.

1.7 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each of following:

.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 Plan Locating Underground Telephone Lines.
.11 Other Documents as Specified.
.12 Construction Schedule.
.13 Environmental Control Plan.

1.8 SITE CONDITIONS

.1 Before submitting a bid, it is recommended that bidders visit the site to review and verify the form, nature and extent of the work, materials needed, the means of access and the temporary facilities required to perform the Work.

.2 Obtain prior permission from the Parks Canada Asset Manager before carrying out such site inspection.

.3 All persons visiting the site are to review specification Section 01 35 29.06 – Health and Safety Requirements before arrival on site. Take all appropriate safety measures for any visit to site, either before or after acceptance of bid.

.4 For geotechnical and borehole information, refer to report prepared by Stantec Consulting Ltd. dated May, 2016, attached in **Appendix D**. Any interpretations of its findings will be made at the Contractor's own risk and the Departmental Representative will not be held responsible for the interpretation of this document.

.5 Promptly notify the Departmental Representative if subsurface conditions differ materially for those indicated in the Contract Documents or a reasonable assumption of probable conditions based on thereon.

1.9 WASTE DISPOSAL

.1 Waste material from common excavation may be disposed of at Fishing Cove Long Trail as approved by the Departmental Representative. All other waste generated from this project will be disposed of outside of Park boundaries.

1.10 WORK SCHEDULE

.1 Provide to the Departmental Representative in writing and within 5 working days after Contract award, a detailed construction schedule and traffic control plan. The schedule shall show proposed work to be undertaken and anticipated completion dates for each category of work in the Unit Price Table.

.2 After receiving the Contractor's plan and prior to start of construction, a meeting involving Contractor, Departmental Representative and Parks Canada will be held at a place and time to be determined by the Departmental Representative. This meeting will review implications of the contract, design, schedule of work, methods of construction, environment protection methods and traffic control.

.3 Complete all cutting and patching areas within the Park prior to the operation.

.4 The final completion date shall be **September 30, 2017**.

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

.6 No work will begin until the pre-construction meeting is held.

.7 Following the pre-construction meeting and approval of the schedule and traffic control plan, the work will be so scheduled to meet the time restraints and have the project completed on time.

1.11 PARTIAL OCCUPANCY OR USE

.1 The Contractor shall provide and maintain sanitary facilities for the use of workers at locations specified by the Departmental Representative. Provision of sanitary facilities shall meet requirements of provincial government and municipal statutes and authorities.

1.12 CONTRACTOR'S USE OF SITE

.1 Use of site: for execution of work within roadway right of way and those areas specified by the Departmental Representative. Project Limits/Construction Limits are as follows:

.1 Lateral: Clearing limits.

.2 Maintain one lane of traffic at all times.

.2 The Departmental Representative will specify the areas for work and storage:

.1 Stockpile, disposal sites and borrow sources are available as follows:

.1 Fishing Cove Long Trail, to be used for long term material stockpile and disposal site of approved excavated material. This site also contains borrow material to be used for this project.

.2 The material storage, stockpile and disposal sites are to be reinstated to pre-construction activities as directed by the Departmental Representative.

1.13 PROJECT MEETINGS

.1 The Contractor will arrange project meetings at the call of the Departmental Representative and assume responsibility for setting times and recording and distributing minutes.

1.14 SETTING OUT OF WORK

.1 Contractor shall carry out all layouts.

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

.3 Contractor shall supply such devices as straight edges and templates required to facilitate Departmental Representative's inspection of work.

.4 Contractor shall supply pre and post construction cross sections at 20m intervals to ensure that lines and grades of the project can be checked by the Departmental Representative including toe of slope, rounding and centerline offsets, etc.

1.15 EXISTING SERVICES

.1 Cut and patch as required to make work fit.

.2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.

.3 Carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to pedestrian and vehicular traffic.

.4 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.

.5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.

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

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

.8 Ensure that at least one lane of traffic is maintained at construction sites at all times.

.9 Ensure pedestrian and other traffic is not unduly impeded, interrupted or endangered by execution or existence of work or plant.

.10 Maintain existing signs at all times. When it is necessary to temporarily remove a sign, it shall be dismantled and re-established on a temporary post or stand set back from construction area. The work is considered to be incidental and no separate payment will be made for maintaining or moving signs.

.11 There are (2) two existing underground Bell Aliant communication cables located within the work area. The utility company will temporarily relocate these lines out of the existing shoulder location, prior to May 12, 2017. The Contractor shall obtain clearance reports from all utilities and ensure temporary lines are not disturbed during the duration of this project. The Contractor will be required to coordinate their work with utility companies and schedule the works accordingly.

.12 The contractor is required to coordinate, schedule and facilitate the reinstatement of new underground Bell Aliant communications cables within the shoulder area prior to fine grading of the granulars and asphalt paving.

1.16 TRUCK MANAGEMENT PLAN

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

.2 Submit site-specific Truck Management Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Truck Management Plan shall include, but not limited to:

.1 Speed and Unsafe Driving: Contractor shall outline how they will monitor and discipline trucks for any violations. The Plan must indicate the progressive steps that will be followed should violations occur.

.2 Over Weight Loads: Departmental Representative will periodically spot check and divert loads (i.e. any material without weigh slips) to scales for random compliance check.

.1 Any material hauled in excess of the maximum weight limits of Section 191, Weights and Dimensions of Vehicles Regulations under the NS Motor Vehicle Act, will be not paid for or considered eligible for payment as part of the work under any Section of the Contract.

.3 Tarping: All loads delivered to site shall be tarped. Loads delivered to site not tarped will not be paid for.

.3 The Contractor shall be responsible to provide a Daily Weighers Report to the Departmental Representative to cross reference delivered material. The Report shall include, but not limited to:

.1 Driver name;
.2 Company;
.3 License plate number;
.4 Tare, including gross and net weight.

.4 Any work days with missing Daily Weighers Reports or weigh slips will not be paid for.

.5 Submit other data, information and documentation upon request as stipulated elsewhere in this Section.

1.17 ADDITIONAL DRAWINGS

.1 Departmental Representative may furnish additional drawings for clarification. These additional drawings have same meaning and intent as if they were included with plans referred to in Contract documents.

1.18 RELICS, ANTIQUES & WILDLIFE HABITAT

.1 Protect relics, antiquities, wildlife habitat, items of historical or scientific interest such as cornerstones and contents, animal nesting sites, commemorative plaques, inscribed tablets, and similar objects found during course of work.

.2 Give immediate notice to Departmental Representative and await Departmental Representative's written instructions before proceeding with work in this area.

.3 Relics, antiquities and items of historical or scientific interest remain her Majesty's property.

1.19 NATIONAL PARKS ACT

.1 For projects within boundaries of National Park, perform work in accordance with for arrears.

1.20 MEASUREMENT OF QUANTITIES

.1 Linear: Items which are measured by metre or kilometre, such as pavement markings will be measured along centreline of installation unless otherwise shown on plans.

.2 Area:

.1 Longitudinal and transverse measurements for areas to be measured horizontally.

.2 Longitudinal and transverse measurements for such items as hydroseeding and mulching to be made on actual flat or sloped surface seeded or sodded.

.3 Volume:

.1 In computing volumes of excavation, average end area method will be used unless otherwise directed by Departmental Representative in writing.

.2 Term: Litre shall mean 1000 mL or L.

.4 All volume measurements refer to in place measure unless specified elsewhere in specification.

.5 Mass:

.1 Term "tonne" shall mean 1000 kg.

.2 Materials which are specified for measurement by mass shall be weighed on scales at a location determined by the Contractor. Units used to haul material being paid for by mass shall bear legible identification numbers plainly visible to scale person as it approaches and leaves scale-house.

.6 Time:

.1 Unless otherwise provided for elsewhere or by written authority of Departmental Representative, hourly rental of equipment will be measured in actual working time and necessary travelling time of equipment within limits of project at an all-inclusive rate. Equip each unit of mobile equipment with an approved device to register hours of operation. Devices which only measure hours of running of motor will not be accepted.

1.21 PERMITS/AUTHORITIES

.1 The Contractor shall obtain, and pay for, permits from authorities as required for all operations and construction. The Contractor shall also comply with all pertinent regulations of all authorities having jurisdiction over the work. The Contractor shall provide copies of all permits and approvals to the Owner prior to starting the work. The Contractor shall be responsible for obtaining all applicable permits, inspections and approvals required and shall pay all changes in connection therewith.

1.22 EQUIPMENT RENTAL RATES

.1 Upon written request, the Contractor will supply the Departmental Representative with a list of the rental equipment to be used on work beyond the scope of bid items. Equipment rental rates will be in accordance with current rates published by the Nova Scotia Road Builders Association.

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 AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, in accordance with relevant municipal, provincial, and other regulations.

1.2 USE OF SITE AND FACILITIES

.1 The Contractor shall provide survey layout with stakes on both sides of the road/alignment at 20 m stations (top of back slope, toe of slope, subgrade, granulars, shoulders, etc.) with centreline offsets.

.2 The Contractor shall restrict excavation to subgrade to a 1.0 km maximum, excluding; culvert replacements, Canada Trail, French Lake and Bog Trail parking lots and work activities at the Fishing Cove Long Trail stockpile site. The Contractor is permitted to mill the existing asphalt to a maximum length of 3.0 km of the project, provided a minimum thickness of 40 mm of asphalt is left in place as a stable driving surface.

.3 At no point shall the road excavation work area extend beyond 1.0 km in length. At the end of each work day, the road shall be graded and compacted with a minimum 300 mm thickness of Type 2 & Type 1 granular material, with the top 50 mm thickness being Type 1 (Aggregate Base) material, to the satisfaction of the Departmental Representative. In addition, the adjacent travel lanes shall match grade at the end of each work day prior to opening to public traffic.

.4 Maintain Road and Site Signage at all times during the Contract (dust control, no potholes, bumps, PVMS, etc.)

.5 Any materials deemed salvageable such as Guide Rail, signage etc. The Contractor shall deliver these materials to the Park Compounds. Guide Rail shall be unbolted and neatly stored with hardware provided.

.1 The Contractor shall coordinate with Park staff:

.1 Cheticamp Compound: Jerry LeBlanc (902-224-2041)

.2 Ingonish Compound: Hand Etheridge (902-776-0397)

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

.7 Water extraction within the Park is not permitted.

.8 Blasting is prohibited.

.9 Maintenance work on Contractor/Sub-Contractor equipment is prohibited within the Park boundary.

.10 Relics, Antiques, Artifacts and Wildlife Habitat encountered must be reported to Parks Canada and the Departmental Representative as per Contract.

.11 Provide for personnel and vehicle access.

.12 Special Move Permit (over weight and over dimension) from the Province shall be submitted to the Departmental Representative for review and approval prior to activity.

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

.14 The Work shall be conducted in accordance with Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure (May 2015), Environmental Construction Practice Specifications, National Parks Act and Regulations, Canadian Environmental Protection Act and the Basic Impact Analysis Document **(Appendix C).**

.15 The Contractor is required to record As-Built information and provide at the end of the project as per the Contract.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS

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

.2 The Contractor may install pipe culverts outside of the 1 kilometer work zone. Any culvert areas outside of the 1 kilometer work zone shall be resurfaced using RAP material immediately prior to reestablishment of full traffic availability.

.3 If native topsoil is encountered, the Contractor shall maintain so embankments and designated areas can be dressed at the end of the project prior to hydroseeding and dry mulch.

1.4 EXISTING SERVICES

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

.1 On the west side of Cabot Trail there are two (2) existing underground Bell Aliant communication cables (fibre line and copper) located within the work area. The utility company will temporarily relocate these lines out of the existing shoulder location, prior to May 12, 2017. The Contractor shall obtain clearance reports from all utilities and ensure temporary lines are not disturbed during the duration of this project, this information shall indicate depth, location, protection measures if required, etc. The Contractor will be required to coordinate their work with utility companies and schedule the works accordingly.

.2 The Contractor is required to coordinate and facilitate the reinstatement of new underground Bell Aliant communications cables within the shoulder area prior to fine grading of the granulars and asphalt paving.

.3 The Contractor is required to coordinate and facilitate the replacement of the Road Weather Information System (RWIS) within the travel lanes adjacent the weather station.

.2 Provide for personnel, pedestrian and vehicular traffic. Provide for one lane traffic during working hours and provide two lane traffic at the end of each working day.

1.5 SPECIAL REQUIREMENTS

.1 Work outside of normal working hours will require 48 hours written notice to the Departmental Representative. There are no restrictions on working on nights, weekends, or statutory holidays. It shall be noted that there will be no Work during the Cabot Trail Relay Race from May 27-28, 2017.

.2 The maximum cumulative traffic delay within the project limits during the peak season (July 1 – August 31) between the hours of 9am and 4pm shall be 10 minutes. The maximum cumulative traffic delay within the project limits shall be 20 minutes during the off peak season. Parks Canada is anticipating higher than normal visitations to the Park during the 2017 season due to the Canada 150 celebrations. The Contractor shall be aware of the Road Rental clause associated with Traffic Delays as specified in Section 01 35 00.06, subsection 3.1.5.1.

.3 During the school year, minimize delays for school buses.

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

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

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

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 MEASUREMENT PROCEDURES

.1 See Section 01 29 00 – Payment Procedures.

1.3 PRIME COST SUM

.1 Include in Contract Price a total Prime Cost Sum of $125,000.

.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 Supply, placement, coordination and pay for the reinstatement of the underground Bell Aliant communication cables, within the limits of Work.

.1 The Contractor shall schedule and coordinate the Work with Bell Aliant.

Allister MacLean

C: 1 (902) 565-7431

Allister.maclean@bellaliant.ca

.2 Supply, placement, coordination and pay for the reinstatement of the Road Weather Information System (RWIS) infrastructure within the travel lanes adjacent the existing weather station.

.1 The work shall include replacement of the two (2) road surface sensors and associated sub surface sensors.

.2 The Contractor shall schedule and coordinate the Work with the RWIS supplier at Amec Foster Wheeler Environment & Infrastructure.

J. Chris Innes
Information Management Group Lead
Met-Ocean Services
Amec Foster Wheeler Environment & Infrastructure
210 Colonnade Road South, Unit 300
Ottawa, ON
Canada
K2E 7L5

O: 1 (613) 727-0658 ext 2475
C: 1 (613) 220-7966
chris.innes@amecfw.com

.5 Once a Prime Cost Sum has been agreed upon with Parks Canada, it shall be included as an item on the Project Schedule. This shall occur on the next update of the Project 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 REQUIREMENTS

.1 Section 01 11 00 – Summary of Work.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.3 DESCRIPTION

.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.

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 prices and Lump Sum prices bid 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 All measurement shall be along a horizontal plane unless otherwise indicated.

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

.4 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.

.5 The numbers of the items described below correspond to the items in the Bid and Acceptance Form.

.6 There will be no measurement of payment for Work carried out beyond the limits defined on the Drawings.

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 – Prime Cost Sum

.1 Terms of Payment: Lump Sum.

.2 This Item includes:

.1 Supply, placement and coordination efforts for the reinstatement of the underground Bell Aliant communication cables to the satisfaction of the Departmental Representative.

.2 Supply, placement and coordination for the reinstatement of the Road Weather Information System (RWIS) within the travel lanes adjacent the weather station to the satisfaction of the Departmental Representative.

.3 All incidentals to this work not covered in other contract items shall be included.

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

.1 Terms of Payment: Lump Sum.

.2 This Item includes:

.1 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, buildings, shops, offices,

and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other agencies having jurisdiction.

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

.1 Terms of Payment: Lump Sum.

.2 This Item includes:

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

.2 Provision, installation, and maintenance of temporary traffic control devices, including detour signs, construction signage, trail closure signage and barricades, portable variable message signs, mobile speed radar units and temporary pad sites.

.3 Provision, maintenance and removal of **all** detours and reinstatement to pre-detour conditions.

.4 Vehicles including pilot vehicle including means of transporting cyclist and their bicycles through the work area, equipment, supplies, and additional manpower required by traffic accommodation persons.

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

.6 Trailer Mounted Speed Radar Signs:

.1 The Contractor shall supply, install and maintain two (2) trailer – mounted speed radar signs during construction at locations identified by the Departmental Representative, including the construction of temporary pads, if required.

.2 The units shall be installed as per manufacturer's specifications. Upon initial installation, a manufacturer's representative shall inspect the units to ensure they are operating properly (radar display, solar/battery backup, data logging, etc.).

.3 The Contractor shall be advised that the locations where these units are to be placed, may not be part of the temporary traffic control setup, but may be at other locations within the Cape Breton Highlands National Park.

.4 Upon completion of construction, the Contractor shall turn over the ownership of the two (2) operable units to the Owner. The Contractor shall provide all necessary title/ownership documentation to the Departmental Representative prior to final payment. The units are to be in good operating condition prior to acceptance.

.5 Upon completion of construction, the Departmental Representative will provide the location where the units are to be delivered inside Cape Breton Highlands National Park.

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

.1 Terms of Payment: Lump Sum

.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, temporary ground covers, and rock flow checks in accordance with the Basic Impact Analysis and Parks Canada National Best Management Practices – Roadway, Highway, Parkway, and Related Infrastructure (May 2015).

.3 Submission of the Environmental Protection Plan (EPP) as per **Appendix C**. Development of the EPP shall reference the EPP checklist as provided in **Appendix G** and is to be submitted to the Departmental Representative for review and approval.

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

.1 Terms of Payment: Lump Sum.

.2 This item includes:

.1 Provide and maintain adequate access to project site.

.2 Build and maintain temporary roads during period of the Work.

.3 Upon completion of the Work, rehabilitate any temporary roads to the satisfaction of the Departmental Representative.

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

.5 Provide, erect and maintain project identification site signs, safety and instruction signs, trail closure signs and notices.

.6 Provide sanitary facilities.

.7 Construction Site Trailer.

.8 Asphalt and Aggregate Lab facilities.

.9 Removal of temporary facilities from site as directed by the Departmental Representative.

.7 Lump Sum Item 6 – Section 10 14 53 – Traffic Signage

.1 Terms of Payment: Lump Sum.

.2 This item includes:

.1 Supply and installation of new regulatory and warning signs and timber posts, including all hardware including common excavation and backfill as indicated on the Plans. Regulatory and warning signs to be supplied by the Contractor.

.2 Supply and installation of new timber posts and reinstatement of salvaged Parks Canada signs; including all hardware, common excavation, backfill

as indicated on the Plans. Regulatory and warning signs to be supplied by the Contractor. Parks Canada signs to be supplied by the Departmental Representative.

.8 Lump Sum Item 7 – Section 32 17 23 – Pavement Markings

.1 Terms of Payment: Lump Sum

.2 This item includes: The supply and application of paint in the colours, sizes, and configurations shown on the Drawings and as specified by the Departmental Representative. Also includes layout and pre-marking. All intersection markings, arrows, delineation, and parking lot markings and other special markings in the sections will be considered incidental to this item. No additional payment for traffic control associated with the application of pavement markings shall be made.

.9 Lump Sum Item 8 – Section 33 42 13 – Pipe Culverts – Fishing Cove River

.1 Terms of Payment: Lump Sum

.2 This item includes:

.1 Design, fabrication, supply, transportation, placing, inspection, maintenance and removal of temporary modular bridge at location and alignment indicated on contract Drawings. This includes temporary bridge foundations and any geotechnical investigations. The detour bridge shall be open to traffic prior to opening of detour at Fishing Cove River and shall remain in service until the culvert is installed and the roadway is open to traffic. All incidentals to this work not covered in other contract items shall be included.

.2 Provision, construction, maintenance, and removal of roadway detours at location and alignment indicated on contract Drawings. Reinstatement to pre-construction conditions to the satisfaction of the Departmental Representative.

.3 Dewatering of site and temporary water control.

.4 Construction staging and sequencing of the works to install the culvert.

.5 The removal of existing culvert and any foundations.

.6 All excavation associated with the installation of the culvert, supply and placement of bedding and backfill material, and disposal of all unsuitable excavated material and culvert material, as well as any extra excavated material required to install new culvert.

.7 Reconstruction of the roadway embankment to subgrade using originally excavated material from this location. The work includes all excavation, loading, hauling, stockpiling, reloading, hauling, placement and compaction to the lines and grades indicated on the contract Drawings.

.8 There will be no additional payment for loading, hauling, stockpiling, handling, placement and compaction of materials to complete construction of the detours, culvert installation, detour removals and reconstruction of the roadway embankment to subgrade.

.9 Supply and placement of new culvert, complete with associated cast-in-place concrete cut-off walls and footings, headwalls and collars.

.10 Supply and placement of fish baffles as shown on contract Drawings.

.11 Supply and placement of temporary and permanent channels, inlet aprons and outlet pools as specified on contract Drawings.

.12 Supply and placement of Rip-Rap and Individual Rock Placements, Trees and Shrubs and landscaping requirements.

.13 Supply and placement of impermeable material for the impermeable blanket shown on the contract Drawings. Material shall be a cohesive soil conforming to the inorganic Clay classification of the Unified Soil Classification System (ASTM D2487-10). Impermeable borrow shall have a minimum undrained shear strength of 50 kPa. Impermeable material shall be placed in a compact, uniform blanket free of seams or fissures and shall have a maximum lift thickness of 300 mm when compacted to a minimum of 90% of the maximum dry density.

.14 The limits of Work for this item shall be defined as the culvert excavation limits, the detours to the finished lines and grades as indicated on the Drawings and Cabot Trail (Station 19+960 to Station 20+340) to the designed subgrade as defined by the lines and grades as indicated on the Drawings.

.15 For all other items required to complete reconstruction of Cabot Trail such as, removal of guard rail and posts, asphalt removal, clearing, grubbing, soil stripping and stockpiling, roadway granulars, asphalt, asphalt gutter, guard rails, hydroseeding, mulch and pavement markings; are deemed to be included in those respective items.

.10 Lump Sum Item 9 – Other Items Not Included in the Unit Price Table

.1 Unit of Measurement: Lump Sum.

.2 This item includes: All other work considered incidental to the work and which are not specifically mentioned or accounted for in the Unit Price Table or other items 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 is not limited to the following; project layout and surveying, weigh scales, permits, water control, fish rescue for the work. Including landscaping features, berm construction, trail connections and drainage at French Lake, Bog Trail and Canada Trail Parking Lots, and approvals required to complete the work.

.11 Unit Price Item 1 - Section 02 41 13 - Selective Site Demolition - Removal of Guard Rail and Posts.

.1 Unit of Measurement: Lineal Metre.

.2 Method of Measurement: End points of measurements will be at centreline of the guide rail and at the ends of each section of guide rail.

.3 This item includes: Transporting, dismantling, salvage, stockpiling, and disposal of guide rail, hardware, wooden guide posts and offset blocks as indicated in the Contract Documents and to the approval of the Departmental Representative.

.4 For all other items to be removed such as (but not limited to) fencing, driveway markers, etc. including location and protection (in operating condition) of utilities traversing the site there shall be no measurement for payment and the work is considered incidental to the overall work of the project.

.12 Unit Price Item 2 - Section 02 41 13 - Selective Site Demolition - Removal of Signs and Sign Posts.

.1 Unit of Measurement: Each.

.2 Method of Measurement: Number of signs removed, including associated posts.

.3 This item includes: dismantling, salvaging and transporting of information signs and hardware to a location within Cape Breton Highlands National Park, along with with disposal of associated posts. Work also includes dismantling, disposal of regulatory and warning signs and associated hardware, along with disposal of associated posts.

.4 Posts that are deemed salvageable by the Departmental Representative shall be delivered to the Park Compound (Cheticamp). Posts that are non-salvageable shall be disposed of by the Contractor.

.5 There shall be no payment for transporting and stockpiling materials.

.6 For all other items to be removed such as (but not limited to) fencing, driveway markers, etc. including location and protection (in operating condition) of utilities traversing the site there shall be no measurement for payment and the work is considered incidental to the overall work of the project

.13 Unit Price Item 3 - Section 02 41 13.14 - Asphalt Pavement Removal

.1 Unit of Measurement: Square Metres (m^2).

.2 Method of Measurement: Horizontal measurement of surface area.

.3 This item includes: the supply of all necessary materials, labour and equipment required for the **full depth removal** (existing full asphalt thickness according to the geotechnical report ranges between approximately 130 to 290 mm). The bottom 40 mm of existing asphalt is to be removed incrementally prior to paving or earthworks, regardless of depth removed or number operations required. Payment for this remaining depth is included with this item. Milling of the asphalt will be required to allow for re-use in shoulder materials, parking lots, base asphalt and granulars as indicated. The 2016 Geotechnical report as shown in **Appendix D** is included and the Contractor shall at no additional costs, supplement with additional coring as required. Payment will include all milling cutting, removal, hauling, stockpiling, disposal of asphalt. This item also includes removal of asphalt swales and drainage gutters. The Contractor shall replace at no extra cost to the Departmental Representative, asphalt driving surface in any areas where milling operations break through to underlying granulars. This item also includes all temporary tapers and keyed joints as directed by the Departmental Representative.

.4 Asphalt concrete used to construct tapers shall not be measured and shall be considered incidental to the overall work of the project.

.14 Unit Price Item 4 - Section 31 05 16 – Aggregate Materials – Rock Fill (200mm minus)

.1 Unit of Measurement: Metric Tonne (1000 kg).

.2 Method of Measurement: Scale tickets signed by the Departmental Representative.

.3 This item includes: Supply, haulage, placement and compaction of rock fill material to the limits and at the locations indicated on the Drawings or as directed by the Departmental Representative.

.4 There shall be no payment for extra thickness of aggregate materials placed outside of limits. Whenever in the opinion of the Departmental Representative there is extra thickness or width, the appropriate weight will be deducted.

.15 Unit Price Item 5 - Section 31 11 00 – Clearing

.1 Unit of Measurement: Hectare (ha)

.1 Clearing will be measured in hectares by plan area within limits indicated or as directed by the Departmental Representative.

.2 This Section includes: The cutting and disposal of all trees and brush from areas indicated.

.3 Any Work at stockpile and disposal sites are incidental to the Contract.

.4 There will be no payment for areas cleared outside the Work area unless approved by the Departmental Representative.

.16 Unit Price Item 6 - Section 31 11 00 – Grubbing

.1 Unit of Measurement: Hectare (ha)

.1 Grubbing will be measured in hectares by plan area within the limits indicated or as directed by the Departmental Representative.

.2 This Section includes: The removal and disposal of all stumps, roots, downed timber, slash embedded logs, rootmat, humus, and topsoil from areas indicated.

.3 Any Work at stockpiles and disposal sites is incidental to the Contract.

.4 There will be no payment for areas grubbed outside the Work area unless approved by the Departmental Representative.

.17 Unit Price Item 7 - Section 31 14 13 – Soil Stripping and Stockpiling

.1 Unit of Measurement: Square metres of surface area (slope measurement)

.1 Soil Stripping will be measured jointly with the Departmental Representative by plan area within the limits indicated or as directed by the Departmental Representative.

.2 This Section includes: The removal and disposal of identified areas of stripping along the foreslope, backslope and or toe of slope.

.3 Any topsoil encountered shall be salvaged, hauled and stored at Fishing Cove Long Trail for placement in designated areas along embankments

and landscaped areas as directed by the Departmental Representative. There shall be no payment for loading, hauling or placement of topsoil from storage area.

.4 There will be no payment for areas stripped outside the construction limits unless approved by the Departmental Representative.

.18 Unit Price Item 8 - Section 31 23 16.26 – Rock Removal

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

.2 Method of Measurement: Average end area method between cross sections taken after rock is exposed to lines and elevations indicated. Boulders one cubic metre or larger will be classified as rock. Boulders removed from the excavation shall be measured along the three maximum perpendicular axes.

.3 For rock in trench, dimensions used to calculate end areas shall be theoretical trench width as indicated on the Drawings, and depth from surface of rock as exposed on sides of trench after excavation to bottom of specified bedding for each pipe in trench. Boulders larger than one cubic metre, any portion of which is within theoretical trench, will be classified as rock. Boulders removed from trench shall be measured along the three maximum perpendicular axes. Blasting will not be permitted in this contract.

.4 This item includes: Excavation, hauling, placement and compaction to lines and elevations indicated, and disposal of surplus or unsuitable material. This item includes shoring, bracing, cofferdams, underpinning and de-watering of excavation if required.

.19 Unit Price Item 9 – Section 31 23 33.01 – Excavating, Trenching and Backfilling

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

.2 Method of Measurement: To the theoretical lines and grades as indicated on the Drawings, along with final cross sections to the finished lines and grades.

.3 This item includes: Excavation, loading, hauling, disposal of surplus or unsuitable material, placement and compaction of excavated material as indicated on the Drawings, including areas where culverts are being removed and not replaced. Surplus material not incorporated into the roadway cross section shall become the property of the Contractor and disposed of outside the Park with the exception of Fishing Cove Long Trail storage area to the approval of the Departmental Representative.

.4 This item does **not** include excavation required for the Fishing Cove River culvert replacement Work which is defined as the culvert excavation limits, the detours to the finished lines and grades, and Cabot Trail reconstruction (Station 19+960 to Station 20+340) as indicated on the Drawings.

.5 This item does **not** include all other culvert replacement locations, grubbing, stripping, asphalt removal, guard rail removals and installations which are deemed to be included in those respective items.

.6 This item includes shoring, bracing, cofferdams, underpinning and de-watering of excavation if required.

.7 There shall be no payment for excavation beyond the limits indicated on the Drawings.

.8 Any additional backfill material required to complete the Work is to be sourced from the Fishing Cove Long Trail storage area to the approval of the Departmental Representative and will not be measured separately for payment and shall be considered as incidental to the Work.

.9 Excavation and Disposal of unsuitable materials due to Contractor activities will not be measured separately for payment.

.10 Re-ditching of the existing roadway embankments in distress areas at locations as indicated on the Drawings will not be measured separately for payment and shall be considered as incidental to the Work.

.20 Unit Price Item 10 – Section 31 32 19.01 – Geotextiles (Provisional Item)

.1 Unit of Measurement: Square Metres (m^2)

.2 This item includes: All labour, equipment and incidentals required for the supply and placement of geotextiles along roadways, embankments, and areas as directed by the Departmental Representative.

.3 This item does **not** include geotextile requirements for culvert replacements and ditch slopes which are deemed to be included in those respective items.

.4 No additional payment will be made for any required overlapping.

.21 Unit Price Item 11 – Section 31 37 00 – Rip-Rap – R-25

.1 Unit of Measurement: Metric Tonne (1000 kg)

.2 Method of Measurement: Scale tickets signed by the Departmental Representative.

.3 This item includes: Supply, placement and compaction of rip-rap and geotextile materials along steep ditch slopes, roadway backslopes and areas as indicated on the contract Drawings at the direction of the Departmental Representative.

.4 This item does **not** include rip-rap requirements for culvert replacements which are deemed to be included in those respective items.

.22 Unit Price Item 12 - Section 32 11 23 - Shoulder Material - Reclaimed Asphalt Product (RAP)

.1 Unit of Measurement: Metric Tonne (1000 kg).

.2 Method of Measurement: To the theoretical lines and grades as indicated on the Drawings, along with scale tickets signed by the Departmental Representative.

.3 This item includes: Supply, haulage, processing, placement and compaction of shoulder material (RAP) to the limits and at the locations indicated on the Drawings including the Skyline Trail Parking Lot as provided in **Appendix A**.

.4 There shall be no payment for extra thickness or width of shoulder material placed outside of the theoretical lines and grades as indicated on the Drawings unless approved or directed by the Departmental Representative.

.23 Unit Price Item 13 - Section 32 11 16.01 – Granular Sub-Base – Type 2 Gravel

.1 Unit of Measurement: Metric Tonne (1000 kg).

.2 Method of Measurement: From scale and ticket generated and signed by the Departmental Representative.

.3 This item includes: Supply, handling, loading, hauling, placing, fine grading and compaction of granular sub-base materials, as well as any incidentals, to the limits and at the locations indicated on the Drawings.

.4 There shall be no payment for extra thickness or width of sub-base materials placed outside of the theoretical lines and grades as indicated on the Drawings. Whenever in the opinion of the Departmental Representative there is extra thickness or width, the appropriate weight will be deducted.

.24 Unit Price Item 14 - Section 32 11 23 – Aggregate Base Courses – Type 1 Gravel

.1 Unit of Measurement: Metric Tonne (1000 kg).

.2 Method of Measurement: From scale and ticket generated and signed by the Departmental Representative.

.3 This item includes: Supply, handling, loading, hauling, placing, fine grading and compaction of granular base materials, as well as any incidentals, to the limits and at the locations indicated on the Drawings.

.4 There shall be no payment for extra thickness or width of base materials placed outside of the theoretical lines and grades as indicated on the Drawings. Whenever in the opinion of the Departmental Representative there is extra thickness or width, the appropriate weight will be deducted.

.25 Unit Price Item 15 - Section 32 12 16 – Asphalt Paving – Type "D–HF"

.1 Unit of Measurement: Type "D-HF" – Metric Tonne (1000 kg)

.2 Method of Measurement: From scale and ticket generated and signed by the Departmental Representative.

.3 Payment adjustment will be made for escalation/de-escalation in the price of liquid asphalt in accordance with the supplementary conditions of the contract documents.

.4 There shall be no payment for extra thickness or extra width of asphalt placed outside of the theoretical lines and grades as indicated on the Drawings. Wherever in the opinion of the Departmental Representative there is extra thickness or width, the appropriate weight will be deducted.

.5 This item includes: Supply, loading, hauling, placement and compaction as indicated and all equipment, labour, materials required, **including the material transfer vehicle. It includes the supply and application of tack coat as required** and temporary pavement markings. Asphalt Cement will be paid for separately.

.26 Unit Price Item 16 - Section 32 12 16 – Asphalt Paving – Type "B–HF"

.1 Unit of Measurement: Type "B-HF" – Metric Tonne (1000 kg)

.2 Method of Measurement: From scale and ticket generated and signed by the Departmental Representative.

.3 Payment adjustment will be made for escalation/de-escalation in the price of liquid asphalt in accordance with the supplementary conditions of the contract documents.

.4 There shall be no payment for extra thickness or extra width of asphalt placed outside of the theoretical lines and grades as indicated on the Drawings. Wherever in the opinion of the Departmental Representative there is extra thickness or width, the appropriate weight will be deducted.

.5 This item includes: supply, loading, hauling, placement and compaction as indicated and all equipment, labour, materials required, **including the material transfer vehicle** and temporary pavement markings. Asphalt Cement will be paid for separately.

.27 Unit Price Item 17 – Section 32 12 16 – Asphalt Paving – Asphalt Swale/Gutter

.1 Unit of Measurement: Lineal Metre (m)

.2 Method of Measurement: Slope measure along centreline of swale/gutter.

.3 Payment adjustment will be made for escalation/de-escalation in the price of liquid asphalt in accordance per the supplementary conditions of the contract documents.

.4 This item includes: Preparation, supply, loading, hauling, placement and construction of new asphalt gutters including paved takeoffs as directed by the Departmental Representative. Asphalt Cement will be paid for separately.

.28 Unit Price Item 18 – Section 32 12 16 – Asphalt Paving - Asphalt Cement

.1 Unit of Measurement: – Metric Tonne (1000 kg)

.2 Method of Measurement: Performance Graded Asphalt Binder (PGAB) shall be paid at the contract bid Unit Price per tonne. The quantity of PGAB to be paid for under this section shall be calculated on the basis of the PGAB delivered to the plant and adjustments will be made for initial and final tank measurements corrected to 15ºC, Contractor shall provide inbound delivery tank slips. The quantity of PGAB contributed to the B-HF mix from the use of RAP shall not be considered for payment.

.3 The Contractor will not be reimbursed for PGAB that is used in other work or any that is wasted. If other work is undertaken by the Contractor, additional tank measurements will be undertaken to determine the quantity of PGAB used in the other work.

.4 The payment adjustment for PGAB will be made for escalation/de-escalation in the price of liquid asphalt in accordance per the supplementary conditions of the contract documents.

.29 Unit Price Item 19 – Section 32 15 60 – Roadway Dust Control – Water

.1 Unit of Measurement: Kilolitres

.2 Method of Measurement: Water shall be measured in kilolitres. This item includes: Supply, loading, hauling and placement of water and at times as directed by the Departmental Representative.

.30 Unit Price Item 20 – Section 32 15 60 – Roadway Dust Control – Magnesium Chloride

.1 Unit of Measurement: Metric Tonne (t)

.2 Method of Measurement: Magnesium Chloride solution shall be measured in tonnes. This item includes: Supply, loading, hauling and placement of magnesium chloride in quantities and at times as directed by the Departmental Representative.

.31 Unit Price Item 21 – Section 32 92 19.16 – Hydraulic Seeding – Hydroseeding

.1 Unit of Measurement: Square Metre (m²).

.2 Method of Measurement: Slope measure

.3 This item includes: Supply, haulage and placement of hydroseed mix, erosion control agent, water and fertilizer as specified and maintenance.

.32 Unit Price Item 22 – Section 32 92 19.16 – Hydraulic Seeding – Dry Mulch

.1 Unit of Measurement: Square Metre (m²).

.2 Method of Measurement: Slope measure.

.3 This item includes: Supply, haulage and placement of dry mulch, erosion control agent, water and fertilizer as specified and maintenance.

.4 Mulch shall be blown.

.33 Unit Price Items 23, 24, 25, 26 - Section 33 42 13 – Pipe Culverts (Various Sizes)

.1 Unit of Measurement: Lineal Metre (m) for each size and type of culvert.

.2 Method of Measurement: Along centreline of new culvert pipe, from end to end of culvert, as laid and as accepted by the Departmental Representative.

.3 Payment for this item includes:

.1 Dewatering of site and temporary water control.

.2 The removal of existing culverts, headwalls, cut off walls and foundations shall be incidental to the Work.

.3 Excavation, removal, and disposal of existing asphalt concrete at culvert replacement locations if prior to cold milling operations.

.4 Excavation of trench, supply and placement of bedding and backfill material, and disposal of all old fill and culvert material, as well as any extra excavated material required to install new culvert. If existing fill material to top of subgrade is deemed suitable by the Departmental Representative, it shall be used for backfilling. Unsuitable fill material shall be disposed of, as directed by the Departmental Representative.

.5 Supply and placement of new culverts.

.6 Supply and placement of fish baffles as shown on contract Drawings.

.7 Supply and placement of concrete blocks as shown on contract Drawings.

.8 Supply and placement of Geotextiles, offtake channels and inlet and outlet treatments as specified on contract Drawings.

.9 Supply and placement of Rip-Rap and Individual Rock Placements as provided on contract Drawings.

.34 Unit Price Item 27 – Section 34 71 13.25 – Vehicle W-Beam Guide Rail (Weak Post)

.1 Unit of Measurement: Lineal Metre.

.2 Method of Measurement: Lineal metres of guide rail installed as indicated on the Drawings. The measurement shall be taken along the centre of the guide rail from end to end of each section of guide rail including buried ends, not including overlaps.

.3 This item includes: Common excavation and backfill, supply and placing posts and surface reinstatement. Supply and installation of new guide rail, hardware, delineators, accessories, offset blocks, and hardware. There shall be no payment for guide rail overlaps.

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 31 05 16 – Aggregate Materials.

.2 Section 31 23 33.01 – Excavating, Trenching & Backfilling.

.3 Section 31 24 13 – Roadway Embankments.

.4 Section 31 25 05 – Erosion and Sedimentation Control.

.5 Section 31 32 19.01 – Geotextiles.

.6 Section 31 37 00 – Rip-Rap.

.7 Section 32 11 16.01 – Granular Sub-Base.

.8 Section 32 11 23 - Aggregate Base Courses.

.9 Section 32 12 13.16 –Asphalt Tack Coat.

.10 Section 32 12 16 – Asphalt Paving.

.11 Particular requirements for inspection and testing to be carried out by testing laboratory designated by the Departmental Representative are specified under various sections.

1.2 APPOINTMENT AND PAYMENT

.1 The Departmental Representative will appoint and pay for services of testing laboratory except as follows:

- .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
- .2 Inspection and testing performed exclusively for Contractor's convenience.
- .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
- .4 Mill tests and certificates of compliance.
- .5 Tests specified to be carried out by Contractor under the supervision of the Departmental Representative.

.2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by the Departmental Representative to verify acceptability of corrected work.

1.3 CONTRACTOR'S RESPONSIBILITIES

.1 Provide labour, equipment and facilities to:

.1 Provide access to Work for inspection and testing.

.2 Facilitate inspections and tests.

.3 Make good Work disturbed by inspection and test.

.4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify the Departmental Representative sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by the Departmental 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 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants, affected parties not in attendance and the Departmental Representative.

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

1.2 PRECONSTRUCTION MEETING

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Senior representatives of Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 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 submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.3 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

.4 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

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

.6 Owner provided products.

.7 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

.8 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.

.9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

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

.11 Appointment of inspection and testing agencies or firms.

.12 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

.1 During course of Work and two weeks prior to project completion, schedule progress meetings bi-weekly.

.2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.

.3 Notify parties minimum 7 days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 4 days after meeting.

.5 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 effect 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 work weeks.

.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.

.1 The Project Schedule shall include a breakdown of activities and planned dates for the culvert replacement work at Fishing Cove River.

.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 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

.4 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 ACTION AND INFORMATIONAL SUBMITTALS

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

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

.3 Submit Project Schedule to Departmental Representative within 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 5 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

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

1.5 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

1.6 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly basis 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.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

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 35 29.06 – Health and Safety Requirements.

.2 Section 01 35 43 – Environmental Procedures.

.3 Section 31 32 19.01 – Geotextiles.

.4 Section 32 12 16 – Asphalt Paving.

.5 Section 33 42 13 – Pipe Culverts.

.6 Section 34 71 13.25 - Vehicle W-Beam Guide Rail.

1.2 ADMINISTRATIVE

.1 Submit to the Departmental Representative submittals listed for review in each specification 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.

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 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in the Province of Nova Scotia.

.3 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.

.4 Allow 10 days for the Departmental Representative’s review of each submission.

.5 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.

.6 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.

.7 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.

.8 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 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

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

.10 Submit 6 prints of shop drawings for each requirement requested in specification sections and as the Departmental Representative may reasonably request.

.11 Submit 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.

.12 Submit 6 copies of test reports for requirements requested in specification sections and as requested by the Departmental Representative:

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit 6 copies of certificates for requirements requested in specification sections and as requested by the Departmental Representative:

.1 Statements printed on Manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit 6 copies of Manufacturer's instructions for requirements requested in specification sections and as requested by the Departmental Representative:

.1 Statements printed on Manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.15 Submit 6 copies of manufacturer's instructions for requirements requested in specification sections and as requested by Departmental Representative:

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.16 Submit 6 copies of Manufacturer's Field Reports for requirements requested in specification sections and as requested by Departmental Representative:

.1 Documentation of the testing and verification of actions taken by manufacturer's representative to confirm compliance with Manufacturer's standards or instructions.

.17 Submit 6 copies of Operation and Maintenance Data for requirements requested in specification sections and as requested by Departmental Representative.

.18 Delete information not applicable to project.

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

.20 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.

.21 The review of shop drawings by Parks Canada is for sole purpose of ascertaining conformance with general concept:

.1 This review shall not mean that Parks Canada approve 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 Submit for review samples in duplicate as requested in respective specification sections. Label samples with origin and intended use.

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

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

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.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 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

1.6 MEASUREMENT PROCEDURES

.1 The work for this section will not be measured for payment, but will be incidental to the 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 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

.2 Payment for traffic control persons and traffic accommodation person(s) shall be considered incidental to the work, and will not be measured separately for payment.

.3 Provision, installation, and maintenance of temporary traffic control devices, including detour signs, are considered incidental to the work, and will not be measured for payment.

.4 Provision and maintenance of detours are considered incidental to work and will not be measured for payment.

.5 No payment to be made for vehicles, equipment, supplies, and additional manpower required by traffic accommodations persons.

1.2 REFERENCES

.1 Nova Scotia Department of Transportation and Infrastructure Renewal:

.1 Temporary Workplace Traffic Control Manual (Latest Edition).

.2 Standard Specification – Highway Construction and Maintenance (Latest Edition).

.2 Manual of Uniform Traffic Control Devices for Canada (MUTCD-C) – (Latest Edition).

1.3 DESCRIPTION

.1 This section specifies requirements and procedures for traffic regulation to ensure protection of work and safety of public to satisfaction of Departmental Representative.

1.4 TRAFFIC CONTROL PERSONS TO BE INSTRUCTED

.1 Contractor shall ensure that only employees who are in possession of "Traffic Control Persons Certificate" as per the Nova Scotia Department of Transportation and Infrastructure Renewal Temporary Workplace Traffic Control Manual (Latest Edition).

Part 2 Products

2.1 TRAFFIC CONTROL DEVICES

.1 Barricades, signs, delineators, warning lights, traffic control person’s paddles and other devices shall be in strict accordance with the Nova Scotia Department of Transportation and Infrastructure Renewal Temporary Workplace Traffic Control Manual.

.2 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.

.3 Signs to be bilingual and symbolic.

.4 All detour, lane restriction, traffic control and speed restriction signs required at an individual frost heave repair site must be in place before any road excavation at that site commences.

.5 Contractor to supply a pilot vehicle including means of transporting cyclists and their bicycles through the work area.

2.2 TRAILER-MOUNTED SPEED RADAR SIGNS

.1 The Contractor shall supply two (2) trailer-mounted speed radar signs. Units shall be solar powered with battery backup and have a fold down sign, removable hitch and a spare tire. Each unit shall be provided with a data package and wireless Bluetooth communications.

.1 Units shall be complete with five (5) speed plate numbers with a white background as requested by the Departmental Representative.

.2 Trailer-mounted speed radar signs shall be Traffic Logix Classic Cruiser Trailer SafePace 450 radar sign trailers by Trans Canada Traffic Inc. or approved equivalent.

.3 The units shall be installed as per manufacturer's specifications. Upon initial installation, a manufacturer's representative shall inspect the units to ensure they are operating properly (radar, display, solar/battery backup, data logging, etc.).

Part 3 Execution

3.1 GENERAL

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

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

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

.4 At least one week prior to commencing work; submit to Departmental Representative a traffic control signing plan. This layout shall indicate the quantity, spacing and detail of signs, to be used during construction for each work area site (including adjustments for various stages of work). Work shall not commence until Departmental Representative has approved layout.

.5 Accommodating Traffic and hours of work:

.1 **Road Rental for Traffic Delays**: Parks Canada Agency (PCA) and the Contractor agree that the **maximum cumulative time delay to traffic through the Contract limits shall be ten (10) minutes from nine (9) am to four (4) pm during July and August and twenty (20) minutes during remaining time periods**. In the event that this time limit is not met by the Contractor, PCA will suffer damages which are very difficult to identify with precision because of the nature of the project. PCA and the Contractor agree that a fair pre-estimate of the amount of set damages is **One Thousand Dollars ($1,000.00)** per 15 minute interval or part thereof for which the traffic delay extends beyond maximums identified. Therefore, the parties agree that the Contractor shall pay to PCA for

each and every 15 minute increment the traffic delay extends after maximum time limit identified, the sum of **One Thousand Dollars ($1,000.00)** determined by the parties hereto to be liquidated damages, not a penalty.

.2 During the school year, minimize delays for school buses.

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

3.2 PROTECTION OF PUBLIC TRAFFIC

.1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 When working on travelled way:

.1 Place equipment in position to minimize 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.

.3 Close one lane of road only after receipt of written approval from Departmental Representative:

.1 One lane of traffic must remain open at all times.

.4 Both lanes are to be open at the end of each work day and Contractor to ensure that the travelled lanes are adequately covered with a minimum Aggregate Base (Type 1) as specified in Section 01 11 00, subsection 1.4.1.1.

.5 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic.

3.3 TRAFFIC INTERUPTIONS

.1 Period and timing of any traffic interruptions greater than 10 minutes must have prior approval of the Departmental Representative.

3.4 DETOURS

.1 Construct and maintain detour roads as may be required, to the approval of the Departmental Representative.

3.5 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.

.6 For Work at the new parking lots and Fishing Cove Long Trail material storage area the Contractor shall provide TC-64A Light Barricades at the Fishing Cove Trail entrance with signs (1-TC-141 (NS) and 1-TC-142 (NS)) that indicates the Area is closed to the public. This must be maintained and put in place at all times during the project.

3.6 SPEED ZONES

.1 Speed zone signing within a construction zone shall be established following authorization as per the Nova Scotia Department of Transportation and Infrastructure Renewal Temporary Workplace Traffic Control Manual.

.2 There will be strict enforcement of the Speed limits by the RCMP, Environmental Protection Officer and Parks Canada Warden Service.

3.7 TRAFFIC ACCOMODATION PERSON

.1 The Contractor shall provide for services 24 hrs per day.

.2 Major responsibilities of the traffic accommodation person:

.1 Maintain traffic control devices and signs during regular shutdown on weekends and at night throughout the week.

.2 Clean signs, flares, barricades, etc. used to control and accommodate traffic.

.3 Assist the travelling public the event of an emergency.

.4 Contact proper authorities in the event of an emergency, i.e., Contractor's Supervisor, Park Warden, and Departmental Representative.

END OF SECTION

Part 1 General

1.1 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.

1.2 DEFINITIONS

.1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

.2 Competent Person means a person to who is:

.1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace.

.2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work.

.3 Knowledgeable about potential or actual danger to health or safety associated with the Work.

.3 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.

.4 PPE: personal protective equipment.

.5 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.

1.3 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit site-specific Health and Safety Plan prior to commencement of Work:

.1 Submit within ten (10) work days of notification of Bid Acceptance. Provide three (3) hard copies and one (1) electronic PDF file.

.2 Departmental Representative will review Health and Safety Plan and provide comments.

.3 Revise the Plan as appropriate and resubmit within five (5) work days after receipt of comments.

.4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.

.5 Submit revision and updates made to the Plan during the course of Work.

.3 Submit name of designated Health & Safety Site Representative and support documentation specified in the Safety Plan.

.4 Submit building permit, compliance certificates and other permits obtained.

.5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other department of labour organization:

.1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.

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

.7 Submit copies of incident reports.

.8 Submit WHMIS MSDS - Material Safety Data Sheets.

1.4 COMPLIANCE REQUIREMENTS

.1 Comply with the Occupational Health and Safety Act for the Province of Nova Scotia, and the Regulations made pursuant to the Act.

.2 Comply with Canada Labour Code Part II, and the Canada Occupational Safety and Health Regulations made under Part II of the Canada Labour Code.

.3 Observe and enforce construction safety measures required by:

.1 1995 National Building Code of Canada, Part 8.

.2 Provincial Worker's Compensation Board.

.3 Municipal statutes and ordinances.

.4 Comply with Occupational R.S.Q., c. S-2.1, an Act respecting Health and Safety Code for the Construction Industry.

.4 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

.5 A copy of the Canada Labour Code Part II may be obtained by contacting:

Canadian Government Publishing
Public Works & Government Services Canada
Ottawa, Ontario K1A 0S9
Tel: (819) 956-5800 (1-800-635-7943)
Publication No. L31-85/2000 E or F)

.6 Observe construction safety measures of:

.1 Part 8 of National Building Code.

.2 Municipal by-laws and ordinances.

.7 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.

.8 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.

.9 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

1.5 SITE CONTROL AND ACCESS

.1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons:

.1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.

.2 Isolate Work Site from other areas of the premises by use of appropriate means:

.1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment. See Section 01 56 00 for minimum acceptable requirements.

.2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.

.3 Use professionally made signs with bilingual message in the two (2) official languages or international known graphic symbols.

.3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.

.4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.

.5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm.

1.6 PROTECTION

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

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

1.7 RESPONSIBILITY

.1 Be responsible for safety of persons and property on work site and for protection of building employees and general public circulating adjacent to work operations to extent that they may be affected by conduct of work.

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

1.8 FILING OF NOTICE

.1 File Notice of Project and other Notices with Provincial authorities prior to commencement of Work.

.2 Upon request, Departmental Representative will provide name and mailing address of provincial department to whom the Notice of Project must be sent.

.3 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

1.9 PERMITS

.1 Obtain permits, licenses and compliance certificates, at appropriate 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 work.

.3 Post all permits on site. Submit copies to Departmental Representative.

1.10 SAFETY ASSESSMENTS

.1 Implement and carry out a health and safety hazard assessment program as part of the work. Program to include:

.1 Initial hazard assessment carried out immediately upon notification of contract award and prior to commencement of work.

.2 On-going hazard assessments performed during the progress of work identifying new or potential health risks and safety hazards not previously known. As a minimum hazard assessments shall be carried out when:

.1 New subtrade work, new subcontractor(s) or new workers arrive at the site to commence another portion of the work.

.2 The scope of work has been changed by Change Order.

.3 Potential hazard or weakness in current health and safety practices are identified by Departmental Representative or by an authorized safety representative.

.3 Hazard assessments to be project and site specific, based on review of contract documents, site and weather conditions.

.4 Each hazard assessment to be made in writing. Keep copies of all assessments on site for duration of work. Upon request, make available to Departmental Representative for inspection.

1.11 PROJECT/SITE CONDITIONS

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

.1 Work immediately adjacent/atop high steep embankments and cliffs with heavy equipment and construction personnel.

.2 Highway Traffic.

.3 Working adjacent highway rockcuts which have potential to release rock into ditches and onto roadway below.

.4 Other construction contractors work on site.

.2 Obtain from Departmental Representative, copy of MSDS Data sheets of existing hazardous materials stored on site or being used by Facility and Tenant personnel in the course of their operations.

.3 Above lists shall not be construed as being complete and inclusive of 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.

1.12 SAFETY MEETINGS

.1 Prior to commencement of work attend health and safety meeting conducted by Departmental Representative. Have Contractor's Site Superintendent in attendance. Departmental Representative will advise of time and location.

.2 Provide site safety orientation session to all workers and other authorized persons prior to granting them access to work site. Brief persons on site conditions and on the minimum site safety rules in force at site.

.3 Conduct site specific occupational health and safety meetings during the entire work as follows:

.1 Formal meetings on a minimum monthly basis.

.2 Informal tool box meetings on a regular basis from a predetermined schedule.

.4 Keep workers informed of anticipated hazards, on safety practices and procedures to be followed and of other pertinent safety information related to:

.1 Progress of Work.

.2 New sub-trades arriving on site.

.3 Changes in site and project conditions.

.5 Record and post minutes of meetings. Make copies available to Departmental Representative upon request.

1.13 HEALTH AND SAFETY PLAN

.1 Develop written site-specific Project Health and Safety Plan, based on hazard assessments, prior to commencement of work. Submit plan to Departmental Representative within 7 calendar days of Contract Award date.

.2 Health and Safety Plan shall contain the following three (3) parts:

.1 Part 1: List of individual health risks and safety hazards identified by hazard assessments.

.2 Part 2: List of specific measures to control or mitigate each hazard and risk identified in part one of Plan. Describe the engineering controls, personnel protective equipment and safe work practises to be implemented and followed when performing work related to each identified hazard or risk.

.3 Part 3: Emergency Measures and Communications Procedures as follows:

.1 Emergency Measures: on-site operating procedures, evacuation measures and emergency response to be implemented in the occurrence of an incident. Procedures to be specific and relevant to identified hazards.

Measures to complement and be integrated with the facility and tenants Emergency Response Plans in place at site:

.1 Obtain information on existing emergency and evacuation plans from Departmental Representative and incorporate appropriate data.

.2 Communication Procedures:

.1 List of names and telephone numbers of designated officials, to be contacted should an incident or emergency situation occur, including the following:

.1 General Contractor and all Subcontractors.

.2 Federal and Provincial Departments and local emergency resources organizations, as resources organizations, as applicable laws and regulations.

.3 Officials from Parks Canada. Departmental Representative will provide list of names to be included.

.2 Procedures implemented at site to communicate and share information between workers, subcontractors, and General Contractor on work activities.

.3 Prepare Health and Safety Plan in a three column format, addressing the three parts specified above, as follows:

Column 1	Column 2	Column 3
Identified Hazard	Control Measures	Emergency Measures & Communications Implemented Procedures

.4 Develop Health and Safety Plan in collaboration with all subcontractors. Address all work and activities of subcontractors as they arrive on site. Immediately update Plan and submit to Departmental Representative.

.5 Implement, maintain and enforce compliance with requirements of the Health and Safety Plan until final completion of work and demobilization from site.

.6 As work progresses, review and update Plan addressing additional health risks and safety hazards identified by on-going hazard assessments.

.7 Submit revised versions of Plan to Departmental Representative.

.8 Post a typed written copy, including all updates, of the Health and Safety Plan in a common visible location at work site.

.9 Submission of the Health and Safety Plan, and updates, to the Departmental Representative is for review and information purposes only. It's submission shall not be construed to imply approval by Departmental Representative, be interpreted as a warranty of being complete, accurate and legislative compliant and shall not relieve Contractor of his legal obligations for the provision Health and Safety on the construction project.

1.14 SAFETY SUPERVISION AND INSPECTIONS

.1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work.

.2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and will be assigned the responsibility and authority to:

.1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work.

.2 Monitor and enforce Contractor's site-specific Health and Safety Plan.

.3 Conduct site safety orientation session to persons granted access to Work Site.

.4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.

.5 Stop the Work as deemed necessary for reasons of health and safety.

.3 Health & Safety Site Representative must:

.1 Be qualified and competent person in occupational health and safety.

.2 Have site-related working experience specific to activities of the Work.

.3 Be on Work Site at all times during execution of the Work.

.4 All supervisory personnel assigned to the Work must also be competent persons.

.5 Inspections:

.1 Conduct regularly scheduled safety inspections of the Work on a minimum weekly basis. Record deficiencies and remedial action taken.

.2 Conduct Formal Inspections on a minimum monthly basis. Use standardized safety inspection forms. Distribute to subcontractors.

.3 Follow-up and ensure corrective measures are taken.

.6 Cooperate with Facility's Occupational Health and Safety representative should one be designated by Departmental Representative.

.7 Keep inspection reports and supervision related documentation on site.

1.15 TRAINING

.1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.

.2 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.

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

1.16 MINIMUM SITE SAFETY RULES

.1 Notwithstanding the requirement to abide by federal and provincial health and safety regulations, the following safety rules shall be considered minimum requirements at the work site and obeyed by all persons granted access:

.1 Wear personnel protective equipment (PPE) appropriate to function and task on site; the minimum requirements being hard hat, safety footwear (and eye protection where appropriate).

.2 Immediately report unsafe activities, conditions, near-miss accidents, injuries and damages.

.3 Maintain site in tidy condition.

.4 Obey warning signs and safety tags.

.2 Brief workers on site safety rules, and on the disciplinary measures to be taken for violation or non compliance of such rules. Post such information on site.

1.17 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 will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.18 INCIDENT REPORTING

.1 Investigate and report 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 results, or has the potential of resulting in:

.1 Injuries requiring medical aid.

.2 Property damage in excess of $10,000.00.

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

.4 Interruptions to Facility operations resulting in an operational lost to a Federal department in excess of $5000.00.

.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.

.4 Submit report in writing.

1.19 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.

1.20 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 Post all MSDS data sheets on site, in a common area, visible to workers.

.4 On building renovation projects where work is adjacent to occupied areas, locate data sheets in a public location accessible to tenant employees.

1.21 BLASTING

.1 Blasting or other use of explosives is not permitted without prior written instructions from Departmental Representative.

.2 Do blasting operations in accordance with Section 31 23 16.26 - Rock Removal.

1.22 POWDER ACTUATED DEVICES

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

1.23 POSTING OF DOCUMENTS

.1 Post documents indicated herein and as required by Authority having jurisdiction.

.2 Post other documents as specified herein, including:

.1 Site specific Health and Safety Plan.

.2 WHMIS data sheets.

1.24 RECORDS ON SITE

.1 Maintain on site copy of safety documentation as specified in this section and other safety related reports and documents issued to or received from authorities having jurisdiction.

.2 Make available to Departmental Representative, or authorized safety representative, for inspection upon request.

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 31 25 05 – Erosion and Sedimentation Control.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.3 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.

.2 Reference Standards:

.1 Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure (May 2015), Environmental Construction Practice Specifications, National Parks Act and Regulations, Canadian Environmental Protection Act and the Basic Impact Analysis Document. **(Appendix C)**

.2 U.S. Environmental Protection Agency (EPA)/Office of Water.

.1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.

.2 EPA General Construction Permit (GCP) 2012.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan as per **Appendix C** and as per this section for review and approval by the Departmental Representative.

.3 Ensure Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.4 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.5 Include in Environmental Protection Plan:

.1 Name of person responsible for ensuring adherence to Environmental Protection Plan.

.2 Name and qualifications of person responsible for manifesting hazardous waste to be removed from site.

.3 Name and qualifications of person responsible for training site personnel.

.4 Descriptions of environmental protection personnel training program.

.5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including 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 and EPA 832/R-92-005, Chapter 3 requirements.

.6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.

.1 Plans to include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.

.8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

.1 Plans to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

.9 Spill Control Plan include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.13 Waste Water Management Plan identifying methods and procedures for management discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, and dewatering of ground water.

.14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

.15 Pesticide treatment plan to be included and updated, as required.

1.5 FIRES

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

1.6 DRAINAGE

.1 Develop and submit erosion and sediment control plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include 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 and US EPA General Construction Permit.

.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, 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.

1.7 SITE CLEARING AND PLANT PROTECTION

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

.2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.

.3 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.

.4 Minimize stripping of topsoil and vegetation.

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

.6 Dispose of all harvested trees off-site or as directed by the Departmental Representative.

1.8 WORK ADJACENT TO WATERWAYS

.1 Construction equipment to be operated on land only.

.2 Use waterway beds for borrow material only after written receipt of approval from Departmental Representative.

.3 Waterways to be kept free of excavated fill, waste material and debris.

.4 Design and construct temporary crossings to minimize erosion to waterways.

.5 Do not skid logs or construction materials across waterways.

.6 Avoid indicated spawning beds when constructing temporary crossings of waterways.

1.9 POLLUTION CONTROL

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

.2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area:

.1 Provide temporary enclosures where directed by the Departmental Representative.

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

1.10 PARK REQUIREMENTS

.1 Work under this contract is to be carried out in a National Park, and environmental protection must be given a high priority by all staff involved with the work.

.2 An Environmental Briefing will be held prior to work commencing at the site, which will outline environmental factors to be considered during the work. It is mandatory that all current staff of the Contractor attend this meeting with the Departmental Representative and Environmental Protection Officer (EPO).

.3 Mitigation requirements are outlined in the Basic Impact Analysis Document appended to the Specifications. This document is not all-inclusive, and site adjustment of the mitigation methods for the work may be required. The Departmental Representative will advise the Contractor of any additional requirements as they arise.

1.11 SITE SET-UP AND USE

.1 Confine all site activities related to construction within the defined project boundaries. Confine construction activities to as small an area as necessary to safely complete the project.

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

.3 Littering is prohibited.

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

1.12 ENVIRONMENTAL PROTECTION PLAN

.1 Submit a plan showing all pollution control measures that will be used to fulfill the requirements of the Environmental Protection Section and Basic Impact Analysis attached to this document. This plan will be reviewed by the Departmental Representative and the Environmental Protection Officer prior to commencement of any work. Any deviation from this plan will require further approval by the Departmental Representative. Submit the protection plan prior to the pre-construction meeting.

.2 The Environmental Plan will outline how the Contractor will address the environmental protection requirements, including removal and installation of culverts, and ensure pollution created by the construction is controlled. It must show sufficient detail on products to be used and physical placement on site to determine effectiveness of these items.

1.13 ENVIRONMENTAL PERFORMANCE

.1 Follow the Canadian Environmental Protection Act.

.2 Confirm all necessary permits related to Environmental Protection have been obtained and that necessary documentation is available on-site.

1.14 EROSION CONTROL

.1 Construct sediment fences and erosion control structures in roadside ditches or at culvert inlets prior to any excavation as directed by Departmental Representative.

.2 To minimize run-off, curtain work on slopes which may affect water body during periods of heavy rainfall, as directed by the Departmental Representative.

1.15 HISTORICAL/ARCHAEOLOGICAL CONTROL

.1 Provide historical, archaeological, cultural resources, biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.

.2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and the Departmental Representative.

1.16 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 Hazardous material spill.
.4 Sewage spill.
.5 Contaminated water into waterways.

.2 The Contractor or his employees must:

.1 Notify the Contractor’s job superintendent.
.2 Call the local emergency services and give type of emergency.
.3 Submit to Departmental Representative a copy of its Environmental/Spill Response Plan for approval.

1.17 NOTIFICATION

.1 The Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform the Departmental Representative of proposed corrective action and take such action for approval by the Departmental Representative.

.1 Take action only after receipt of written approval by the Departmental Representative.

.3 The Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

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 33 00 – Submittal Procedures.

1.2 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 will order 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.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 An Inspection/Testing Agency will be engaged by the Departmental Representative for the purpose of inspecting and/or testing portions of Work.

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

.3 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Departmental Representative at no cost to the Departmental Representative. Pay costs for retesting and re-inspection.

1.4 PORTABLE SITE LABORATORY

.1 The contractor is to provide a testing laboratory for the following tasks:

- .1 Conducting gradation analysis during the production of granular materials including the asphalt aggregates.
- .2 Testing asphalt concrete during paving operations.

.2 The site laboratory shall be located near the aggregate production or asphalt plant location or as agreed upon with the Departmental Representative.

.3 The Portable Site Laboratory shall include the following:

.1 Safe access

.2 Electricity as necessary to operate typical laboratory equipment

.3 A continuous source of water

.4 Heating/air conditioning as necessary to maintain a comfortable work environment

.5 Work benches for testing equipment

.6 A desk, chair and file cabinet

.4 The Inspection/Testing Agency will provide the required testing equipment for the work.

1.5 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.

1.6 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.

1.7 REJECTED WORK

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

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of 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.

1.8 REPORTS

.1 Submit 4 copies of inspection and test reports to the Departmental Representative.

1.9 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

.2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by the Departmental Representative and may be authorized as recoverable.

1.10 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Construct in locations acceptable to the Departmental Representative as specified in specific section.

.2 Prepare mock-ups for the Departmental Representative's review with reasonable promptness and in orderly sequence, to not cause delays in Work.

.3 Failure to prepare mock-ups 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.

.4 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.11 MEASUREMENT PROCEDURES

.1 The work for this section will not be measured for payment, but will be incidental to the work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

2.2 Execution

2.3 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.2 ACCESS

.1 Provide and maintain adequate access to project site.

.2 Build and maintain temporary roads during period of work. Parks Canada must approve prior to their use, any proposed temporary roads within the Park.

.3 Upon completion of contract work, rehabilitate any temporary roads to the satisfaction of the Departmental Representative.

.4 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.

.5 Clean roads and parking areas where used by Contractor's equipment or employees' vehicles.

1.3 DEPARTMENTAL REPRESENTATIVE'S SITE OFFICE

.1 Contractor to provide Departmental Representative's office trailer/space. Minimum office trailer/space size is 3.0 m x 12.5 m. The office space shall be fully functional and operational prior to the start of Work.

.2 Insulate building and provide heating system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.

.3 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colors. Finish floor with 19 mm thick plywood.

.4 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10% upward light component.

.5 Contractor to arrange and pay for fax machine, internet connection and photocopier in Departmental Representative's office for its exclusive use. Capacity of internet connection to be suitable for business applications.

.6 Contractor to equip office with two 1 m x 2 m tables, one 1 m x 2 m drafting table, 4 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.

.7 Upon completion of the Contract; all equipment and furniture provided by the Contractor shall be returned to it.

.8 Supply of the Departmental Representative's office, supplies and services will be incidental to the work.

.9 Contractor to provide laboratory space for the Departmental Representative at the aggregate crushing operation, laboratory to include the following.

.1 Ability to secure laboratory.

.2 Minimum laboratory trailer/space size is 3.0 m x 7.5 m.

.3 Contractor to supply continual access to clean water.

.4 One work desk and one chair.

.5 Contractor to supply continual access to electricity and lighting. Sufficient electricity and outlets to power two 120v/240v warming ovens, one 120v hot plate, one electronic scale, one 120v sieve shaker and three table fans simultaneously.

.6 Sink for washing samples.

.7 Secure storage for a nuclear density gauge.

.8 Minimum 1.0 m x 3.0 m work bench.

.10 Contractor to provide laboratory space for the Departmental Representative at the Asphalt Plant, laboratory to include the following.

.1 Ability to secure laboratory.

.2 Minimum laboratory trailer/space size is 3.0 m x 10.0 m.

.3 Contractor to supply continual access to clean water.

.4 One work desk and one chair.

.5 Contractor to supply continual access to electricity and lighting. Sufficient electricity and outlets to power one NCAT 240v Ignition oven, two 120v/240v warming ovens, one 120v hot plate, one electronic scale, one 120v sieve shaker , one 120v vacuum pump and three table fans simultaneously.

.6 Sink for washing samples.

.7 Secure storage for a nuclear density gauge.

.8 Minimum 1.0 m x 5.0 m work bench.

1.4 SANITARY FACILITIES

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

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

1.5 PARKING

.1 Parking space for work force will be limited to the construction limits for each area under construction.

1.6 REMOVAL OF TEMPORARY FACILITIES

.1 Remove temporary facilities from site when directed by Departmental Representative.

1.7 CONTRACTOR'S CAMP

.1 The Contractor will not be permitted to set up a camp within Cape Breton Highlands National Park.

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 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards. Conform to these reference standards, in whole or in part as specifically requested in specifications.

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

.3 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 QUALITY

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

.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

.3 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.

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

.5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store sheet materials on flat, solid supports and keep clear of ground. Slope to shed moisture.

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

1.4 TRANSPORTATION

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

.2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

1.5 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 will 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.

1.6 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.

1.7 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

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

1.8 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate 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.

1.9 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 building occupants and 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 REQUIREMENTS

.1 Section 01 78 00 – Closeout Submittals.

1.2 REFERENCES

.1 Control reference from the LiDAR survey data collected by Leading Edge Geomatics in June, 2015 shall be the only approved source for the project. Survey control based on the CAN-NET (www.can-netgps.ca), Nova Scotia active control network at CAN-NET stations NHBR (Neils Harbour) and CHET (Cheticamp).

1.3 QUALIFICATIONS OF SURVEYOR

.1 Qualified registered land surveyor, licensed to practice in Nova Scotia and acceptable to the Departmental Representative.

1.4 SURVEY REFERENCE POINTS

.1 Survey control is based on the CAN-NET (www.can-netgps.ca), Nova Scotia active control network at CAN-NET stations NHBR (Neils Harbour) and CHET (Cheticamp).

.2 Locate, place, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

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

.4 Report to the Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

.5 Require surveyor to replace control points in accordance with original survey control.

1.5 SURVEY REQUIREMENTS

.1 Establish at minimum two permanent benchmarks on site, referenced to the established survey control network at CAN-NET stations NHBR (Neils Harbour) and CHET (Cheticamp). Record locations, with horizontal and vertical data in Project Record Documents.

.2 Establish lines and levels, locate and layout, by instrumentation.

.3 Stake for all grading, fill placement, granular materials, and culvert placements.

.4 Stake slopes and berms.

.5 Establish pipe invert elevations and location of any exposed pipe not being removed under this contract.

1.6 EXISTING SERVICES

.1 Before commencing work, establish location and extent of all existing service lines in area of Work and notify the Departmental Representative of findings.

.2 Remove abandoned service lines as directed by the Departmental Representative.

1.7 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform the Departmental Representative of impending installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by the Departmental Representative.

1.8 RECORDS

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.

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

1.9 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit name and address of Surveyor to the Departmental Representative.

.2 On request of the Departmental Representative, submit documentation to verify accuracy of field engineering work.

.3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.

1.10 SUBSURFACE CONDITIONS

.1 Promptly notify the Departmental Representative if subsurface conditions within project area differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should the Departmental Representative determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

1.11 MEASUREMENT PROCEDURES

.1 The work for this section will not be measured for payment, but will be incidental to the 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 REFERENCES

.1 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC) – ID: R0202D, Title: General Conditions "C", In Effect as Of: May 14, 2004.

1.2 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

.3 Clear snow and ice from access to site or facilities of the work, bank/pile snow in designated areas only.

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

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

.6 Provide and use marked separate bins for recycling.

.7 Dispose of waste materials and debris outside the limits of the National Park at a location/facility approved by the Authority having jurisdiction.

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

.9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

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 other than 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, unless approved by Departmental Representative.

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

.7 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.9 Remove dirt and other disfiguration from exterior surfaces.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

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 Canadian Environmental Protection Act (CEPA):

.1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents:

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.2 Request Departmental Representative inspection.

.2 Departmental Representative Inspection:

.1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.3 Completion Tasks: submit written certificates that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Equipment and systems: tested, adjusted and balanced and fully operational.

.4 Operation of systems: demonstrated to Owner's personnel.

.5 Work: complete and ready for final inspection.

.4 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.

.2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

1.3 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 – Cleaning:

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for reuse and recycling.

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 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting one week prior to contract completion with contractor's representative and the Departmental Representative to:

.1 Verify Project requirements.

.2 Review manufacturer's installation instructions and warranty requirements.

.2 The Departmental Representative to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Provide evidence, if requested, for type, source and quality of products supplied.

1.4 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.

1.5 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume: provide title of project:

.1 Date of submission, names.

.2 Addresses and telephone numbers of Consultant and Contractor with name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data:

.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.6 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.

1.7 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 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress:

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

.4 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 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.3 Field changes of dimension and detail.

.4 Changes made by change orders.

.5 Details not on original Contract Drawings.

.6 References to related shop drawings and modifications.

.5 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.

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

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

1.8 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.

1.9 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to the Departmental Representative approval.

.3 Warranty management plan to include required actions and documents to assure that the Departmental Representative receives warranties to which it is entitled.

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.5 Submit, warranty information made available during construction phase, to the Departmental Representative for approval prior to each monthly pay estimate.

.6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

.7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.8 Conduct joint 10 month warranty inspection, measured from time of acceptance, by the Departmental Representative.

.9 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.3 Contractor's plans for attendance at 10 month post-construction warranty inspections.

.4 Procedure and status of tagging of equipment covered by extended warranties.

.5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.10 Respond in timely manner to oral or written notification of required construction warranty repair work.

.11 Written verification to follow oral instructions:

.1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.10 MEASUREMENT PROCEDURES

.1 The work for this section will not be measured for payment, but will be incidental to the 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 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 01 35 43 - Environmental Procedures.

.4 Section 01 35 29.06 – Health and Safety Requirements.

.5 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

1.2 MEASURMENT FOR PAYMENT

.1 Guard Rail and Posts Removal: See Section 01 29 00 – Payment Procedures.

.2 Signs and Sign Posts: See Section 01 29 00 – Payment Procedures.

.3 For all other items to be removed such as (but not limited to) fencing, underground Bell Aliant communication cables, driveway markers, etc. there shall be no measurement for payment and the work is considered incidental to the overall work of the project.

1.3 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS):

.1 Material Safety Data Sheets (MSDS).

1.4 SUMMARY

.1 Section includes:

.1 Methods and procedures for demolishing, salvaging, recycling and removing sitework items designated to be removed in whole or in part, and for backfilling resulting trenches and excavations.

1.5 DEFINITIONS

.1 Demolition: rapid destruction of building following removal of hazardous materials.

.2 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

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

1.7 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial/Territorial regulations.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Store and manage hazardous materials in accordance with Section 01 35 43 – Environmental Procedures.

.2 Storage and Protection:

.1 Protect in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Departmental Representative.

.3 Remove and store materials to be salvaged, in manner to prevent damage.

.4 Store and protect in accordance with requirements for maximum preservation of material.

.5 Handle salvaged materials as new materials.

1.9 SITE CONDITIONS

.1 Site Environmental Requirements:

.1 Perform work in accordance with Section 01 35 43 - Environmental Procedures.

.2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

.1 Ensure proper disposal procedures are maintained throughout the project.

.4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities as directed by Departmental Representative.

.6 Protect trees, plants and foliage on site and adjacent properties where indicated.

.2 Existing Conditions:

.1 Remove contaminated or hazardous materials as defined by authorities having jurisdiction as directed by Departmental Representative from site, prior to start of demolition Work, and dispose of at designated disposal facilities in safe manner in accordance with TDGA and other applicable regulatory requirements.

Part 2 Products

2.1 EQUIPMENT

.1 Contractor shall supply all equipment necessary to complete the Work.

.2 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 PREPARATION

.1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

3.2 REMOVAL OF HAZARDOUS WASTES

.1 Remove contaminated or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

3.3 REMOVAL OPERATIONS

.1 Remove items as indicated.

.2 Do not disturb items designated to remain in place.

.3 Prevent contamination with base course aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving.

.4 Excavate 300 mm below pipe invert, when removing pipes under existing or future pavement area.

.5 Decommission water wells and monitoring wells in accordance with Municipal regulations.

.6 Remove designated trees during demolition:

.1 Obtain written approval of Departmental Representative prior to removal of trees not designated.

.7 Sell trees designated for removal and identified by Departmental Representative to be marketable:

.1 Grind, chip, or shred other vegetation for mulching and composting.

.8 Provide erosion control, hydroseeding and dry mulch if not immediately used.

.9 Disposal of Material:

.1 Dispose of materials not designated for salvage or reuse on site as instructed by Departmental Representative at authorized facilities approved in Waste Reduction Workplan.

.10 Backfill:

.1 Backfill in areas as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.11 Parks Canada signs will be removed, salvaged and delivered for reinstallation.

3.4 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.

.4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.5 REMOVAL FROM SITE

.1 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project.

.2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

.3 Transport material designated for alternate disposal using approved facilities listed in Waste Reduction Workplan and in accordance with applicable regulations:

.1 Written authorization from Departmental Representative is required to deviate from facilities listed in Waste Reduction Workplan.

.4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations:

.1 Disposal Facilities: approved and listed in Waste Reduction Workplan.

.2 Written authorization from Departmental Representative is required to deviate from disposal facilities listed in Waste Reduction Workplan.

3.6 RESTORATION

.1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.

.2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.7 CLEANING

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

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

.2 Remove debris, trim surfaces and leave work site clean, upon completion of Work.

.3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

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

3.8 PROTECTION

.1 Repair damage to adjacent materials or property caused by selective site demolition.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 32 12 16 - Asphalt Paving.

.2 Section 32 11 16.01 - Granular Sub-base.

.3 Section 32 12 23 – Aggregate Base Courses.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 Project Particulars and Measurement.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Milled / Reclaimed Asphalt Pavement (RAP) shall be reused in the following manners:

- .1 Shall be incorporated into Hot Mix Asphalt Type B-HF at 20 +/- 5% in accordance with Section 32 12 16 – Hot Mix Asphalt Concrete.
- .2 Shall be screened and placed as shoulder material.
- .3 Shall be screened and placed at Skyline Trail Parking Lot.
- .4 May be mixed with granular materials in accordance with Sections 32 11 16.01 – Granular Sub-base and 32 12 23 – Granular Base Courses.
- .5 Only RAP obtained from this project may be reincorporated.
- .6 Unused RAP to be disposed of by the contractor outside of Park limits. All costs related to disposing of the surplus material to be borne by the Contractor.

Part 2 Products

2.1 EQUIPMENT

.1 Where required to key into existing asphalt pavements or where a specified depth of material is to be removed, use cold milling or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

Part 3 Execution

3.1 PREPARATION

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

3.2 PROTECTION

.1 Protect existing pavement not designated for removal from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.3 REMOVAL

.1 Remove existing asphalt pavement to specified depths:

.1 Unless directed by Departmental Representative, contractor is to leave 40 mm of hot mix asphalt for traffic to travel on.

.2 Current asphalt thicknesses are included in Geotechnical Report **(Appendix D)**, the contractor shall supplement the information as required to ensure the specified thickness remains after milling.

.3 The contractor shall ensure that traffic does not travel on subgrade or sub-base at any time during construction unless directed by Departmental Representative.

.4 Remaining 40 mm of asphalt only to be removed immediately prior to reconstruction activities, and after traffic has been diverted.

.5 Contractor to replace 40 mm asphalt driving surface in any areas where milling operations break through to underlying granulars.

.2 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

.3 Supress dust generated by removal process.

3.4 CLEANING

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

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

.3 Removed asphalt pavement which is to be recycled in hot mix asphalt concrete under this contract may be stockpiled at designated asphalt plant site.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 The Work in this section includes the supply of all labour, supervision, materials, plant, equipment, and transportation necessary for the placement of steel reinforcement in concrete as shown on the Drawings, per the Specifications, and as directed by the Departmental Representative, complete in every respect.

1.2 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 35 29.06 - Health and Safety Requirements.

.3 Section 01 45 00 - Quality Control.

.4 Section 03 30 00 – Cast-In-Place Concrete.

.5 Section 33 42 13 – Pipe Culverts.

1.3 REFERENCES

.1 American Concrete Institute (ACI)

.1 SP-66-04, ACI Detailing Manual 2004.

.2 ASTM International

.1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

.2 ASTM A143/A143M-07, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

.3 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

.4 ASTM A775/A775M-07b, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

.3 CSA International

.1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.

.3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

.4 CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.5 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.6 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.

.4 Reinforcing Steel Institute of Canada (RSIC)

.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.4 SUBMITTALS

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

.2 Prepare reinforcement drawings in accordance with SP-66.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Nova Scotia of Canada.

.1 Indicate placing of reinforcement and:

.1 Bar bending details.

.2 Lists.

.3 Quantities of reinforcement.

.4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.

.5 Indicate sizes, spacings and locations of chairs, spacers and hangers.

.2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.

.4 When Chromate solution is used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by Departmental Representative prior to its use.

1.5 QUALITY ASSURANCE

.1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.

.1 Mill Test Report: upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.

.2 Upon request, submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations.

.2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by Departmental Representative.

.2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.

.3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.

.4 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.

.5 Deformed steel wire for concrete reinforcement: to ASTM A82/A82M.

.6 Welded steel wire fabric: to ASTM A185/A185M.

.1 Provide in flat sheets only.

.7 Welded deformed steel wire fabric: to [ASTM A82/A82M].

.1 Provide in flat sheets only.

.8 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.

.9 Mechanical splices: subject to approval of Departmental Representative.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada, SP-66 and CSA-A23.1/A23.2.

.1 SP-66 unless indicated otherwise.

.2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.

.4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 SOURCE QUALITY CONTROL

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.

.2 Upon request inform Departmental Representative of proposed source of material to be supplied.

Part 3 Execution

3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.

.2 When field bending is authorized, bend without heat, applying slow and steady pressure.

.3 Replace bars, which develop cracks or splits.

3.2 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on placing drawings in accordance with CSA-A23.1/A23.2.

.2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.

.3 Ensure cover to reinforcement is maintained during concrete pour.

3.3 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

Part 1 General

1.1 SUMMARY

.1 The Work in this section includes the supply of all labour, supervision, materials, plant, equipment, and transportation necessary for the placing and finishing of reinforced concrete work as shown on the Drawings, per the Specifications, and as directed by the Departmental Representative, complete in every respect.

1.2 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 35 29.06 - Health and Safety Requirements.

.3 Section 01 45 00 - Quality Control.

.4 Section 03 20 00 – Concrete Reinforcing.

.5 Section 33 42 13 – Pipe Culverts.

1.3 REFERENCES

.1 CSA International:

.1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA A283-06 (R2011), Qualification Code for Concrete Testing Laboratories.

.3 CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3004 and A3005).

.2 ASTM International, latest edition:

.1 ASTM C260/C260M, Standard Specification for Air-Entraining Admixtures for Concrete.

.2 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.3 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.

.4 ASTM C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.

.5 ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.6 ASTM A563, Standard Specification for Carbon and Alloy Steel Nuts.

.7 ASTM F436, Standard Specification for Hardened Steel Washers.

.8 ASTM F1554, Standard Specification for Anchor Bolts, Steel, 36, 55 and 105 ksi Yield Strength.

.3 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.

.2 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.3 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.

.4 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

.5 CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.4 Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR), Standard Specification:

.1 Division 5, Section 7, Cast in Place Concrete

1.4 SUBMITTALS

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

.2 Submit concrete mix designs for approval by Departmental Representative at least 4 weeks prior to concrete placement. The mix designs are to include aggregate physical properties as specified.

.3 Concrete hauling time: provide for review by Departmental Representative demonstrating that the maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching is adhered to.

.4 Submit shop drawings for formwork.

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Nova Scotia, Canada.

.2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints. Comply with CAN/CSA-S269.3 for formwork drawings.

.3 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.

.5 Submit shop drawings for reinforcement:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Nova Scotia, Canada.

.2 Indicate placing of reinforcement and:

.1 Bar bending details.

.2 Lists.

.3 Quantities of reinforcement.

.4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.

.3 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.

.4 Mill Test Report: provide Departmental Representative with certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.

.6 Provide two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Site Meetings: one week prior to beginning concrete works:

.1 Ensure key personnel including site supervisor, Departmental Representative, specialty contractors for finishing, forming, concrete producer attend.

.2 Verify project requirements.

.3 Submit to Departmental Representative, minimum 4 weeks prior to starting concrete work, valid and recognized certificate from plant delivering concrete:

.1 When plant does not hold valid certification, provide test data and certification by qualified independent inspection and testing laboratory that materials used in concrete mixture will meet specified requirements.

.4 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:

.1 Falsework erection
.2 Hot weather concrete
.3 Cold weather concrete
.4 Curing
.5 Finishes
.6 Formwork removal
.7 Joints

.5 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Concrete hauling time: maximum allowable time for concrete to be delivered to site of Work and discharged not to exceed 120 minutes after batching:

.1 Modifications to maximum time limit must be approved by Departmental Representative and concrete supplier as described in CSA A23.1/A23.2.

.2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

.3 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.2 Divert unused concrete materials from landfill to local facility approved by Departmental Representative. Unused concrete to be disposed of outside the Park limits.

.3 Provide an appropriate area on the job site where concrete trucks can be safely washed. Truck wash site to be approved by the Departmental Representative prior to use.

Part 2 Products

2.1 DESIGN CRITERIA

.1 CSA A23.1/A23.2, Alternative 1.

.2 NSTIR Standard Specification, Division 5, Section 7, Cast in Place Concrete.

2.2 MATERIALS

.1 Portland Cement: to CSA A3001, Type GU.

.2 Supplementary cementing materials: to CAN/CSA-A3000.

.3 Water: to CSA-A23.1 and to be free from injurious amounts of oil, acid, alkali soluble chloride, organic matter, sedimentation and other deleterious substances.

.4 Admixtures:

.1 Air entraining admixture: to ASTM C260.

.2 Chemical admixture: to CSA A23.1 Clause 4.2.4.2 or 4.2.4.3.

.3 The Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

.5 Aggregates:

.1 To CAN/CSA-A23.1/A23.2 and the additional requirements of NSTIR Division 5, Section 7, Item 3.3.1.

.2 The maximum Petrographic Number of course aggregate shall not exceed 140.

.3 The maximum absorption of coarse aggregate shall not exceed 2%.

.6 Curing compound: to ASTM C309, Type 2.

.7 Formwork:

.1 Use wood and wood product formwork materials to CAN/CSA-O86.

.2 Use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.

.3 Form release agent: non-toxic, low VOC.

.8 Reinforcing Steel:

.1 Substitute different size bars only if permitted in writing by Departmental Representative.

.2 Reinforcing steel: billet steel, grade 300, deformed bars to CSA-G30.18, unless indicated otherwise.

.3 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.

.4 Epoxy Coating: to ASTM A775/A775M.

2.3 MIXES

.1 Alternative 1 performance criteria in accordance with to CAN/CSA A23.1/A23.2:

.1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION.

.2 Concrete mixtures shall be designed to meet the following:

.1 Class of exposure: C-1.

.2 Normal size of aggregate: 20 mm.

.3 Maximum water to cement ratio: 0.40

.4 Minimum cementitious content: 415 kg/m3.

.5 Air content: 4 - 7%.

.6 Rapid concrete permeability @ 91 days: <1500 coulombs.

Part 3 Execution

3.1 PREPARATION

.1 Obtain Departmental Representative's written approval before placing concrete:

.1 Provide 24 hours minimum notice prior to placing of concrete.

.2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.

.3 During concreting operations:

.1 Development of cold joints not allowed.

.2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.

.4 Pumping of concrete is permitted only after review of equipment and mix by Departmental Representative.

.5 Ensure reinforcement and inserts are not disturbed during concrete placement.

.6 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing.

.7 Protect previous Work from staining.

.8 Clean and remove stains prior to application of concrete finishes.

.9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.10 Remove all debris including sawdust, chips and any other deleterious materials from the interior of the forms.

.11 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 INSTALLATION/APPLICATION

.1 Do cast-in-place concrete work to CSA A23.1/A23.2.

.2 Reinforcement:

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.

.2 When field bending is authorized, bend without heat, applying slow and steady pressure.

.3 Replace bars, which develop cracks or splits.

.4 Place reinforcing steel as indicated on placing drawings in accordance with CSA-A23.1/A23.2.

.5 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.

.6 Ensure cover to reinforcement is maintained during concrete pour.

.7 Protect epoxy coated portions of bars with covering during transportation and handling.

.8 Touch up damaged and cut ends of epoxy coated reinforcing steel with compatible finish to provide continuous coating.

.3 Placing of concrete:

.1 Consolidation:

.1 All methods of consolidation shall be subject to the approval of the Departmental Representative.

.2 Concrete shall be consolidated thoroughly and uniformly by means of vibrators to obtain a dense, homogeneous structure, free from cold joints, voids and honeycomb.

.3 A sufficient number of vibrators shall be employed to adequately handle the anticipated rate of placement. The size and frequency of vibrators shall be as specified in CSA A23.1. A stand-by vibrator shall be available on the site at all times.

.4 Internal vibrators shall be used wherever practicable. External type vibrators may be used where surfaces cannot be properly consolidated with the internal type alone.

.5 Insertion of internal vibrators shall be made systematically at intervals such that the zones of influence of the vibrator overlap.

.6 Extreme care shall be taken to ensure that the internal type vibrators do not displace the reinforcing steel or the forms. Vibrators shall have rubber or non-metallic vibrating heads if epoxy coated reinforcing steel is used.

.2 Curing concrete:

.1 Concrete shall be protected from freezing, premature drying, high temperature and moisture loss for a period of time necessary to develop the desired properties of the concrete.

.2 Curing shall be applied to concrete as soon as possible without damaging or marring the surface.

.3 The curing time shall be as indicated in CSA A23.1 or this specification. Curing shall be achieved by one or more of the following:

.1 Burlap. Two layers of pre-soaked burlap shall be carefully laid on the surface as soon as the concrete has set sufficiently to support the mass of the burlap without marking the surface. Strips shall be overlapped 150 mm, secured to the surface and kept wet throughout the curing period.

.2 White Pigment Liquid Membrane. Curing compounds shall not be used on a surface where a bond is required for additional concrete. Curing compounds shall be applied at the Manufacturer's recommended application rate.

.3 Hot and Cold Weather Concreting: To CSA A23.1, Section 7.1. Concrete temperatures shall not exceed those specified in CSA A23.1, Table 14.

.4 Finishing and curing:

.1 Basic treatment:

.1 Upon removal of the forms, all cavities, honeycomb, and other deficiencies shall be patched with a sand cement mortar of the same composition as that used in the concrete.

.1 Mortar shall be composed of cement, fine aggregate and water, proportioned and mixed as specified.

.2 When the proportioning of cement and fine aggregate is not specified, the mortar shall consist of one (1) part by volume of cement and two (2) parts of fine aggregate.

.3 The quantity of water used in mixing the mortar shall be sufficient to make it capable of being freely spread with the trowel.

.4 Mortar shall be mixed in quantities which can be utilized within 60 minutes.

.5 Mortar shall not be re-tempered or re-mixed with water after initial set.

.2 All bolts, ties, nails, or other metal not specifically required for construction purposes, shall be removed or cut back to a depth of 25 mm from the surface of the concrete unless otherwise directed by the Departmental Representative.

.1 The cavity shall be kept saturated for 60 minutes prior to the application of a latex bonding agent or neat cement paste.

.2 The mortar shall be pressed or packed into the depressions so as to completely fill the cavity and then finished to match the adjacent surface.

.3 Fins, unsightly ridges, or other imperfections shall be chipped or rubbed off flush with the surface.

.4 Mortar patches in excess of 25 mm shall be applied in layers not exceeding 25 mm with a 30 minute interval between the placing of layers.

.5 The surface of the patch shall be textured equivalent to the adjacent concrete.

.6 Honeycomb areas or cavities over 25 mm in diameter shall not be repaired until inspected by the Departmental Representative.

.1 Where honeycombing has occurred, the corrective method of treatment shall be carried out as directed by the Departmental Representative.

.7 All concrete and mortar shall be cured and protected in accordance with CSA A23.1.

.2 Smooth form finish:

.1 A Smooth Form Finish shall be a uniform, high quality concrete which has been homogeneously placed and thoroughly compacted.

.2 A Smooth Form Finish shall be uniform in colour, pattern and texture.

.5 Damp-proof membrane:

.1 The back face of head walls as well as top and sides where the concrete will be in contact with backfill material, shall be damp-proofed.

.2 Damp-proofing material shall conform to NSTIR Division 5, Section 7, Item 5.10.

3.3 SURFACE TOLERANCE

.1 Concrete tolerance to CSA A23.1.

3.4 FIELD QUALITY CONTROL

.1 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative in accordance with CSA-A23.1/A23.2. Testing of concrete shall be paid by Departmental Representative and will include:

.1 Slump tests

.2 Air content

.3 Compressive strength at 7 and 28 days

.2 Departmental Representative will take additional test cylinders as required. Cure cylinders on job site under same conditions as concrete which they represent.

.3 Non-Destructive Methods for Testing Concrete: in accordance with to CSA A23.1/A23.2.

.4 Inspection or testing by the Departmental Representative will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 78 00 – Closeout Submittals.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.3 REFERENCES

.1 Manual of Uniform Traffic Control Devices for Canada (MUTCD-C) – (most recent version).

.2 American Association of State Highway and Transportation Officials (AASHTO):

.1 Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, (5th Edition).

.3 ASTM International:

.1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A276-10, Standard Specification for Stainless Steel Bars and Shapes.

.3 ASTM B209M-10, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate Metric.

.4 ASTM B210M-05, Standard Specification for Aluminum-Alloy Drawn Seamless Tubes Metric.

.5 ASTM B211M-03, Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod and Wire Metric.

.4 Canadian General Standards Board (CGSB):

.1 CGSB 62-GP-9M-80, Prefabricated Markings, Positionable, Exterior, for Aircraft Ground Equipment and Facilities.

.2 CGSB 62-GP-11M-78, Marking Material, Retroreflective, Enclosed Lens, Adhesive Backing and Amendment.

.5 CSA International:

.1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CAN/CSA O80 Series-08, Wood Preservation.

.3 CSA O121-08, Douglas Fir Plywood.

.4 CSA W47.2-11, Certification of Companies for Fusion Welding of Aluminum.

.5 CAN/CSA-Z809-08, Sustainable Forest Management.

.6 The Master Painters Institute (MPI):

.1 Architectural Painting Specification Manual - current edition.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit shop drawings in accordance with Section 01 33 00 Submittal Procedures.

.3 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for traffic signage, including product characteristics, performance criteria, physical size, finish and limitations.

.4 Sustainable Design Submittals:

.1 Wood Certification: submit manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.

.5 Indicate dimensions, sizes, assembly, anchorage and installation details for each furnishing specified.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.4 Develop Waste Reduction Workplan related to Work of this Section.

1.6 DESIGN REQUIREMENTS

.1 Sign supports to be capable of withstanding summation of following loads:

.1 Wind load in any direction of 0.60 kPa on signboards and 0.60kPa on sign supports and appurtenances.

.2 Dead load of signboards, sign supports and appurtenances.

.3 Ice load of 0.25kPa on one face of signboards and around surface of all structural members and appurtenances.

.2 Structural deflections and vibration in accordance with American Association of State Highway and Transportation Officials (AASHTO), "Specifications for the Design and Construction of Structural Supports for Highway Signs".

Part 2 Products

2.1 MATERIALS

.1 Sawn Timber Posts:

.1 Acceptable Material:

.1 Accepted species: Eastern Hemlock, Red Pine, Mixed Hardwood (Birch, Maple, Oak or Ash.

.2 Type: pressure treated in accordance with CAN/CSA-O80 Series.

.3 Grade: in accordance NST & IR Standards.

.2 Dimensions: As shown on drawings.

.2 Fasteners: Bolts, nuts, washers and other hardware for roadside sign to be cast aluminum alloy, or galvanized steel.

2.2 SIGNBOARDS

.1 Aluminum sheet: to ASTMB209M, precut to required dimensions. Thickness to be 1.6 mm for signboards up to 750 mm wide. Thickness to be 2.1 mm for sign boards 7501200 mm wide. Use 1.0 mm thickness for refurbishing existing sign panel.

.2 Aluminum extrusions: to ASTMB211M, 150 mm or 300 mm panels suitable for bolting together.

.3 T-shape stiffeners for signboards: to ASTMB210M.

.4 Connecting straps and brackets: to ASTMB209M.

.5 Aluminum materials: to ASTMB209M.

.6 Xylene thinner: to CAN/CGSB1.94.

.7 Chemical conversion coating for aluminum: to CGSB31GP101Ma.

.8 Primer for aluminum: to CAN/CGSB1.132.

.9 Finish paint: to CAN/CGSB1.59.

.10 Silk screen ink.

.11 Transparent or opaque colours: to CGSB1GP12c, and as indicated.

.12 Reflective sheeting and tape: to CGSB62GP11M.Adhesive, class of reflectivity and colour as indicated.

.13 Transparent tape: flexible, smooth surfaced and moisture resistant tape.

2.3 FABRICATION

.1 Signboards:

.1 Aluminum blanks:

.1 Degrease, etch and bonderize with chemical conversion coating.

.2 Clean surfaces with xylene thinner. Dry.

.3 For non-reflective signs, spray face with one coat vinyl pretreatment coating and two finish coats of required colour.

.4 For aluminum signboards that are to be painted before installation, spray and bake face of signboards with two coats of enamel in accordance with CAN/CGSB-1.104.

.5 Cut and apply in accordance with Manufacturer's instructions.

.6 Apply adhesive coated material with heat lamp vacuum applicator or by squeeze roll application method. Apply pressure sensitive material with roller or squeegee.

.7 Edge wrap sheeting on each extrusion prior to bolting extrusions. Match pieces of sheeting from different rolls for each signboard to ensure uniform appearance and brilliance by day and night.

.8 Reflective signboard faces may be prepared using silk screen transparent ink.

.2 Reflective background sheeting and lettering.

.3 Non-reflective lettering and symbols: cut from vinyl film as specified in CGSB62-GP-9M, or paint using required colour of finish paint or silk screen transparent ink.

.4 Clean signboards completely and apply transparent tape over top edge and extending 25 mm minimum down back and front of signboard.

.2 Sign identification:

.1 Apply sign number and date of installation with 25mm high stencil painted black letters on lower left back face of each signboard.

.3 Hardware:

.1 All hardware and fasteners shall be double tip galvanized.

Part 3 Execution

3.1 INSTALLATION

.1 All regulatory and warning signs shall be new and mounted on new sign supports.

.2 All Parks Canada signs shall be salvaged and reposted on new sign supports.

.3 Posts:

.1 Set posts by instrument for alignment, and locations as indicated and as directed by Departmental Representative.

.2 Excavate post holes to depths as indicated and to diameter of 360 mm plus or minus 20 mm. Compact bottom to provide firm foundation. Set post plumb and square in hole.

.3 Backfill around posts using excavated material and compact in uniform layers not exceeding 150 mm compacted thickness.

.4 Cut off tops of posts as indicated, with tops parallel to grade of pavement edge.

.5 Worker protection: workers must wear gloves respirators dust masks long sleeved clothing eye protection protective clothing when handling, drilling, sawing, cutting or sanding preservative treated wood and applying preservative materials.

.6 Treat cut tops with two coats of 2% copper napthenate wood preservative.

.4 Signboard:

.1 Fasten signboards to supporting posts and brackets as indicated.

.2 Use T-shape aluminum stiffeners to join portions of sign panel on site. Cover face of T-stiffener with material identical to face of sign panel.

3.2 PROTECTION

.1 Place temporary covering on signboards where indicated. Covering to be capable of withstanding rain, snow, and wind and be non-injurious to signboard. Replace deteriorated covering and remove covers as directed by Departmental Representative.

3.3 CORRECTING DEFECTS

.1 Correct defects, identified by Departmental Representative, in sign message, consistency of reflectivity, colour or illumination. Correct angle of signboard and adjust luminaire aiming angle for optimum performance during night conditions to approval of Departmental Representative.

3.4 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.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by traffic signage installation and salvage operations.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 31 19 - Project Meetings.

.2 Section 01 33 00 - Submittal Procedures.

.3 Section 01 74 11 - Cleaning.

.4 Section 03 30 00 - Cast-In-Place Concrete.

1.2 REFERENCES

.1 Nova Scotia Transportation and Infrastructure Renewal:

.1 Nova Scotia Transportation and Infrastructure Renewal (NSTIR), Division 5.

.2 Canadian Standards Association (CSA International):

.1 CSA W47.1-09(R2014), Certification of Companies for Fusion Welding of Steel Structures.

.2 CSA W47.2-11(R2015), Certification of Companies for Fusion Welding of Aluminum.

.3 CSA W59-03(R2008), Welded Steel Construction, Metal Arc Welding.

.4 CSA W59.2 M1991(R2013), Welded Aluminum Construction.

.5 CAN/CSA S6-14 - Canadian Highway Bridge Design Code.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meetings:

.1 Convene pre-installation meeting one week prior to beginning on-site installation with Departmental Representative in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other construction crews.

.4 Review manufacturer's written installation instructions and warranty requirements.

.2 Arrange for site visit with Departmental Representative prior to start of Work to examine existing site conditions.

1.4 DEFINITIONS

.1 Foundations: means cast-in-place concrete footing meeting the requirements of Section 03 30 00 - Cast-In-Place Concrete, or approved alternative, to accommodate Modular Bridge and associated loading as per CAN/CSA S6-14.

.2 Modular Bridge: means a superstructure comprised of prefabricated components that can be assembled and disassembled on site. Bridge designed for loading indicated on Contract Documents and conforming to CAN/CSA S6-14.

.3 Temporary Installation: means an installation that is erected to provide for maintenance of traffic at a construction site for a length of time not exceeding the contract length.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Working Drawings and Fabricator Certification:

.1 At least one week prior to commencement of construction, the following information shall be submitted to the Departmental Representative:

.1 Certification of the welding fabricator as required in the Materials section.

.2 Working drawings showing the proposed modular bridge and associated foundations.

.3 Method and procedures for launching, erecting and removing as recommended by the modular bridge manufacturer and supplementary methods and procedures proposed by the Contractor.

.4 Design calculations indicating that the modular bridge and foundations conforms to the requirements of CAN/CSA S6-14.

.5 Load test information, provided by the manufacturer of the modular bridge, indicating the superstructure conforms to the requirements of Section 14 of CAN/CSA S6-14.

.2 The working drawings, design calculations and load test information shall bear the seals and signatures of the design and checking professional engineers registered or licensed in Province of Nova Scotia:

.1 Submit drawings for fabricator designed assemblies, components, and connections.

.3 Erection:

.1 The Departmental Representative shall be given written notice at least one week in advance of the commencement of erection of the modular bridge.

.2 Submit erection drawings to Departmental Representative for approval, before construction.

.3 Indicate erection dimensions and methods.

.4 Certificate of Conformance:

.1 The Contractor shall have a representative from the temporary bridge manufacturer/supplier on site to approve the installation of the structure prior to opening to traffic.

.2 Prior to opening the bridge to traffic and payment for this item, the Contractor shall provide the Departmental Representative with a stamped letter from a Professional Engineer licensed to practice in the Province of Nova Scotia

certifying the temporary bridge has been properly constructed, in conformance with the stamped working drawing, manufacturer's instructions and is capable of carrying the required design loadings. The Contractor shall also be responsible for pressure washing all components of the newly installed structure prior to opening the bridge to traffic.

.5 Design Requirements:

.1 The modular bridge structure shall be designed according to the Canadian Highway Bridge Design Code (CAN/CSA S6-14) except that:

.1 The following requirements of the Canadian Highway Bridge Design Code are not mandatory:

.1 Traffic lane widths, and side clearance.

.2 Deck crossfall and drain outlets.

.3 Limitation of maximum deflection. Designing floor beam and diaphragms for jacking and provision of a protective coating.

.4 Fatigue.

.5 Accessibility for inspection, cleaning and coating, the avoidance of pockets and the provision of drain holes in pockets and their filling with waterproofing.

.6 Camber.

.7 Provision of two bolts at the end of bracing members.

.8 Welding procedures approval when the components are manufactured outside Canada.

.2 The following are additional requirements:

.1 The traffic lanes, and side clearance shall be the same as those on the approaches unless specified otherwise.

.2 Welding design and practice shall conform to CSA W59M, CSA W59.2M or shall conform to an equivalent recognized national standard effective in the jurisdiction in which the modular bridge is fabricated.

.3 Unless otherwise specified, to ensure the requirements for a multiload path structure are satisfied, single trusses shall not be used.

.3 The following modification is acceptable:

.1 Nuts with safety pins or snap rings may be used instead of hexagonal recessed nuts or hexagonal solid nuts with washers.

.4 Indicate detailed description of mechanical, electrical and other systems in Work.

.2 Submit erection drawings to Departmental Representative for approval, before construction.

.3 Indicate erection dimensions and methods.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect components and equipment from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 General:

.1 All material shall comply with the details specified and shown on the working drawings.

.2 Modular Bridge:

.1 The modular bridge shall be a commercially available standardized proprietary product.

.2 The fabricator shall be certified according to Division 2.1 of CSA W47.1 for steel fabrication or W47.2M for aluminum fabrication or certified according to an equivalent recognized National Standard effective in the jurisdiction in which the modular bridge is fabricated.

.3 Used components shall be certified by a professional engineer, within 6 months prior to use, to be equivalent to new.

.3 Miscellaneous Hardware:

.1 The miscellaneous hardware and other structural steel used in the erection and assembly of the modular bridge shall be according to the modular bridge manufacturers requirements.

.4 Railings:

.1 Railings shall meet the requirements of the Canadian Highway Bridge Design Code CAN/CSA S6-14 and shall be shown on working drawings.

.5 Foundations:

.1 Foundations shall be cast-in-place concrete as per Section 03 30 00 – Cast-In-Place Concrete or an approved alternative, provided the requirements of the Canadian Highway Bridge Design Code CAN/CSA S6-14 are met.

2.2 DESIGN CRITERIA

.1 Design modular bridge in accordance with CAN/CSA S6-14 requirements using the CL-625 (+10%) loading for live load:

.1 Modular bridge shall be designed for loads incurred in structure during installation, service and removal.

.2 Design superstructure elements to accommodate, by means of expansion joints, movement in wall and structural movements without permanent distortion, damage to structure.

.3 Design foundations in accordance with CAN/CSA S6-14 requirements to permissible soil loads listed. The Contractor shall confirm to satisfy soil conditions for the temporary modular bridge structure and slopes.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for construction of foundation and modular bridge erection installation in accordance with manufacturer's written instructions:

.1 Contractor is responsible to assess location and conduct their own geotechnical investigation at their own discretion.

.2 Visually inspect substrate in presence of Departmental Representative.

.3 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 CONSTRUCTION

.1 General:

.1 Prior to erection of the modular bridge, documentation shall be submitted to the Departmental Representative indicating that the foreman who will be in charge of the erection of the modular bridge has successfully performed the duties of foreman on similar work.

.2 Prior to opening the modular bridge to vehicular traffic, documentation bearing the seal and signature of a professional engineer registered or licensed in the Province of Nova Scotia shall be submitted to the Departmental Representative indicating the bridge has been assessed and inspected and meets the requirements of the design.

.2 Maintenance of Installation:

.1 During the working time of the Contract, the superstructure, bank seats, ramps, decking, railing and approaches shall be maintained in a safe and useable condition.

.2 The substructure and pile bents shall be kept clear of debris and ice during the working time of the contract.

.3 Foundations:

.1 Fill under foundations shall be compacted to a minimum of 95% of the maximum dry density.

.4 Erection and Removal of Modular Bridge:

.1 The modular bridge including all appurtenances shall be erected, assembled and removed according to the manufacturers recommendations.

.2 When not detailed otherwise the construction of the decking shall be according to the modular bridge manufacturers requirements.

3.3 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Obtain written report from manufacturer's verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Ensure manufacturer's representative is present before and during critical periods of installation.

.4 Schedule site visits:

.1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.

.2 Twice during progress of Work at 25% and 60% complete.

.3 Upon completion of Work, after cleaning is carried out.

3.4 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.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 Project Particulars and Measurement.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM) – Most recent edition:

.1 ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.2 ASTM C117, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.

.3 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.4 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.5 ASTM 127, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.

.2 Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR):

.1 Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) - Standard Specification – (Latest Edition) – Division 3 – Granular Materials.

.2 Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) – TPW TM-1.

.3 Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) – TPW TM-3.

.3 Nova Scotia Environment and Labour:

.1 Pit and Quarry Guidelines.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Samples:

.1 Allow continual sampling by the Owner during production.

.2 Provide the Owner with access to source and processed material for sampling.

.3 Install sampling facilities at discharge end of production conveyor, to allow the Owner to obtain representative samples of items being produced. Stop conveyor belt when requested by the Owner to permit full cross section sampling.

Part 2 Products

2.1 MATERIALS

.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.

.2 Granular Sub-Base:

.1 See Section 32 11 16.01.

.3 Granular Backfill:

.1 Conform to Granular Sub-Base, Section 32 11 16.01.

.4 Granular base course:

.1 See Section 32 11 23.

.5 Bedding Material:

.1 Conform to Aggregate Base Course, Section 32 11 23.

.6 Approved Fill, Canada Trail, French Lake and Bog Trail Parking Areas:

.1 Parking Area to be constructed to grades and elevations on provided drawings.

.2 Approved Fill material to be reclaimed granular material from road reconstruction areas and Fishing Cove Long Trail Borrow site.

.3 Fines content (passing 75µm) maximum 15%.

.4 Use of material subject to approval by Departmental Representative.

.7 Rock Fill:

.1 Produced from quarry stone and of such sizes as may be approved or specified. All pieces of stone shall be sound and subject to approval.

.2 Physical Properties: Rock fill shall conform to the following physical properties:

Property	Test Method	Rock Fill
Absorption % max.	ASTM C 127	2.00
LA Abrasion % max	ASTM C 131	40

.3 Construction Methods:

.1 Rock Fill shall be machine placed and compacted as directed by the Departmental Representative.

.8 200 mm Minus Rock Fill:

.1 The stone must be crushed quarry stone and conform to the grading specified below.

Sieve Size, *µm*	Percent Passing by Weight
200,000	100
150,000	90 - 100
112,000	25 – 35
80,000	0- 20
20,000	0 – 10

2.2 SOURCE QUALITY CONTROL

.1 Inform the Owner of proposed source of aggregates and provide access for sampling at least two (2) weeks minimum before starting production.

.2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.

.3 Advise the Owner at least two (2) weeks minimum in advance of proposed change of material source.

.4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

Part 3 Execution

3.1 PREPARATION

.1 Aggregate Source Preparation:

.1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as approved by authority having jurisdiction.

.2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.

.3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

.4 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.

.5 Trim off and dress slopes of waste material piles and leave site in neat condition.

.6 Provide silt fence of other means to prevent contamination of existing watercourse or natural wetland features.

.2 Processing:

.1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.

.2 Blend aggregates, as required, include reclaimed materials that meet physical requirements of specification is permitted in order to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes, as specified:

.1 Use methods and equipment approved in writing by the Departmental Representative.

.3 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.

.4 Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.

.3 Handling:

.1 Handle and transport aggregates to avoid segregation, contamination and degradation.

.4 Stockpiling:

.1 Stockpile aggregates in sufficient quantities to meet project schedules.

.2 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.3 Stockpile aggregates on ground but do not incorporate bottom 200 mm of pile into Work.

.4 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.

.5 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by the Departmental Representative within 48 h of rejection.

.6 Do not cone piles or spill material over edges of piles.

3.2 CLEANING

.1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

.2 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 35 29.06 – Health and Safety Requirements.

.2 Section 01 35 43 – Environmental Procedures.

.3 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.3 REFERENCES

.1 Nova Scotia Department of Transportation and Infrastructure Renewal – Standard Specification – (Latest Edition) – Division 2 – Earthworks, Section 1 - Clearing.

.2 Nova Scotia Department of Transportation and Infrastructure Renewal – Standard Specification – (Latest Edition) – Division 2 – Earthworks, Section 2 - Grubbing.

1.4 DEFINITIONS

.1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.

.2 Grubbing consists of excavation and disposal of stumps and roots to a maximum depth of 150 mm below existing ground surface.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit manufacturer's installation instructions.

1.6 QUALITY ASSURANCE

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 STORAGE AND PROTECTION

.1 Prevent damage to fencing, bench marks, underground utilities, water courses, and root systems of trees which are to remain.

Part 2 Products

2.1 MATERIALS

.1 Not Used.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 All installation and maintenance of temporary erosion and sedimentation control shall be completed in accordance to the latest version of the Standard Specification, Nova Scotia Department of Transportation and Infrastructure Renewal – Division 7 – Environmental Protection, Section 1- Sediment Barriers, and Section 2 – Flow Check and Section 01 35 43 Environmental Procedures.

.2 Provide temporary erosion and sedimentation control measures (silt fencing and erosion control structures) to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

.3 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION

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

.2 Locate and protect utility lines: preserve in operating condition active utilities traversing site:

.1 Notify Departmental Representative immediately of damage to or when unknown existing utility lines are encountered.

.2 When utility lines which are to be removed are encountered within area of operations, notify Departmental Representative in ample time to minimize interruption of service.

.3 Notify utility authorities before starting clearing and grubbing.

.4 Keep roads and walks free of dirt and debris.

3.3 CLEARING

.1 Clearing includes felling, trimming and cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, brush and rubbish occurring within cleared areas.

.2 Clear as directed by the Departmental Representative, by cutting at height of not more than 300 mm.

.3 Timber materials less than 100 mm in diameter must be chipped and spread evenly as directed by the Department Representative.

.4 The maximum chip size shall be no more than 300 mm long by 75 mm in thickness.

.5 Timber greater than 100 mm in diameter must be; cut to 1200 mm lengths, transported and stockpiled neatly at the Fishing Cove Long Trail stockpile location, as directed by the Departmental Representative for future use by the Park.

3.4 GRUBBING

.1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas.

.2 Grub out stumps and roots to a maximum depth of 200 mm below ground surface.

.3 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.

3.5 REMOVAL AND DISPOSAL

.1 Remove grubbed materials outside the Park to a disposal area approved for such materials by applicable regulations.

3.6 FINISHED SURFACE

.1 Leave ground surface in condition suitable for positive drainage with no ponding areas to approval of the Departmental Representative.

3.7 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 35 29.06 – Health and Safety Requirements.

.2 Section 01 35 43 – Environmental Procedures.

.3 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.3 REFERENCES

.1 Nova Scotia Department of Transportation and Infrastructure Renewal – Standard Specification – (Latest Edition) – Division 2 – Earthworks, Section 3 – Roadway and Drainage Excavation.

.2 Canadian Environmental Protection Act (Available on-line Government of Canada Website).

.3 Nova Scotia Environmental Act and Regulations.

.4 Nova Scotia Department of Environment:

.1 Erosion and Sedimentation Control Handbook for Construction Sites – Section 2.2 Guidelines for Preparing Erosion and Sedimentation Control Plans.

.5 Occupational Health & Safety Act – Province of Nova Scotia.

1.4 STANDARD

.1 All work of this section shall comply with the requirements of the most recent version of the Nova Scotia Department of Transportation and Infrastructure Renewal – Standard Specification – (Latest Edition) – Division 2 – Earthworks, Section 3 – Roadway and Drainage Excavation, except as amended herein.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction, sediment and

erosion control drawings and sediment and erosion control plan, specific to site, that complies with the requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 STRIPPING OF TOPSOIL

.1 Ensure that procedures are conducted in accordance with applicable Provincial requirements.

.2 Remove topsoil before construction procedures commence to avoid compaction of topsoil.

.3 Handle topsoil only when it is dry and warm.

.4 Any suitable topsoil material from stripping shall be salvaged and stockpiled at a location as directed by the Departmental Representative.

.5 Remove vegetation from targeted areas by non-chemical means and dispose of stripped vegetation as directed by Departmental Representative.

.6 Remove brush from targeted area by non-chemical means and dispose of as directed by Departmental Representative.

.7 Soil Stripping by scraper to a depth of 150 mm as directed by Departmental Representative

.1 Avoid mixing topsoil with subsoil.

.8 Remove and dispose of all stripped materials outside the Park to a disposal area approved for such materials by applicable regulations.

.9 Protect any stockpiles from contamination and compaction.

.10 Cover topsoil that has been piled for long term storage, with trefoil or grass to maintain agricultural potential of soil.

3.3 PREPARATION OF GRADE

.1 Verify that grades are correct and notify Departmental Representative if discrepancies occur do not begin work until instructed by Departmental Representative.

.1 Grade area only when soil is dry to lessen soil compaction.

.2 Grade soil with scrapers establishing natural contours and eliminating uneven areas and low spots, ensuring positive drainage.

3.4 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 35 29.06 - Health and Safety Requirements.

.3 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 – Payment Procedures.

1.3 REFERENCES

.1 Definitions:

.1 Rock: any solid material in excess of 1.00 m^3 and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m^3 bucket. Frozen material not classified as rock.

.2 PPV: peak particle velocity.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Sustainable Standards Certification:

.1 Construction Waste Management: submit copy of Waste Management Plan for project highlighting recycling and salvage requirements.

.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.

.3 Erosion and Sedimentation Control: submit copy of Erosion and Sedimentation Control Plan for project highlighting implementation measures.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic packaging corrugated cardboard in accordance with Waste Management Plan.

.2 Place materials defined as hazardous or toxic in designated containers.

.3 Ensure emptied containers are sealed and stored safely.

Part 2 Products

2.1 MATERIALS

.1 Not used.

Part 3 Execution

3.1 ROCK REMOVAL

.1 Perform excavation in accordance with Erosion and Sedimentation Control Plan.

.2 Co-ordinate this section with Section 01 35 29.06 - Health and Safety Requirements.

.3 Remove rock to alignments, profiles, and cross sections as indicated.

.4 Use rock removal procedures to produce uniform and stable excavation surfaces. Minimize overbreak, and to avoid damage to adjacent structures.

.5 Excavate rock to horizontal surfaces with slope not to exceed 5%.

.6 Prepare rock surfaces which are to bond to concrete, by scaling, pressure washing and broom cleaning surfaces.

.7 Excavate trenches to lines and grades to minimum of 300 mm below pipe invert indicated. Provide recesses for bell and spigot pipe to ensure bearing will occur uniformly along barrel of pipe.

.8 Cut trenches to widths as indicated.

.9 Use pre-shearing or other smooth wall drilling unless specified otherwise or directed by Departmental Representative.

.10 Remove boulders and fragments which may slide or roll into excavated areas.

.11 Correct unauthorized rock removal at no extra cost, in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.2 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

3.3 PROTECTION

.1 Prevent damage to surroundings and injury to persons.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Excavation for levelling and rough grading and including the trenching for the installation of culverts under Section 33 42 13 – Pipe Culverts.

1.2 RELATED REQUIREMENTS

.1 Section 01 35 43 – Environmental Procedures.

.2 Section 31 24 13 – Roadway Embankments.

.3 Section 33 42 13 – Pipe Culverts.

1.3 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.4 REFERENCES

.1 American Society for Testing and Materials International (ASTM): latest edition:

.1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m ^{3}).

.5 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian Standards Association (CSA International); latest edition:

.1 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.1 CSA-A3001, Cementitious Materials for Use in Concrete.

.2 CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.

.3 Nova Scotia Department of Transportation and Infrastructure Renewal – Standard Specification – (Latest Edition) – Division 2 - Earthworks, Section 3 – Roadway and Drainage Excavation.

.4 Nova Scotia Department of Transportation and Infrastructure Renewal – Standard Specification – (Latest Edition) – Division 5 - Structures, Section 12 – Underground Drainage Systems.

.5 Canadian Environmental Protection Act (Available on-line Government of Canada Website).

.6 Nova Scotia Environmental Act and Regulations.

.7 Nova Scotia Department of Environment:

.1 Erosion and Sedimentation Control Handbook for Construction Sites – Section 2.2 Guidelines for Preparing Erosion and Sedimentation Control Plans.

.8 Occupational Health & Safety Act – Province of Nova Scotia.

1.5 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation:

.1 Rock: solid material in excess of 1.00 m^3 and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m^3 bucket. Frozen material not classified as rock.

.2 Common excavation: excavation of materials of whatever nature up to required depth, which are not included under definitions of rock excavation.

.2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

.3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.4 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.5 Fill material: rock fill meeting the requirements of specified in Section 31 05 16, maximum size 200 mm in any dimension.

.6 Unsuitable materials:

.1 Weak, chemically unstable, and compressible materials.

.2 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136.

.2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45

.3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

.7 Backslope: the slope in a cut between the invert of the roadside ditch and the point where the slope intersects original ground.

.8 Rock Face: the vertical or near vertical face between the top of the existing rock surface and the designated rock or ditch grade line.

1.6 QUALITY ASSURANCE

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

.2 Where the Consultant is employee of the Contractor, submit proof that Work by the Consultant is included in Contractor's insurance coverage.

.3 Submit design and supporting data at least two (2) weeks prior to beginning Work.

.4 Design and supporting data submitted to bear stamp and signature of qualified Professional Engineer registered or licensed in the Province of Nova Scotia.

.5 Keep design and supporting data on site.

.6 Engage services of a qualified Professional Engineer who is registered or licensed in the Province of Nova Scotia in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.

.7 Do not use soil material until written report of soil test results are reviewed and approved by the Departmental Representative.

.8 Health and Safety Requirements:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Samples:

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

1.8 EXISTING SITE CONDITIONS

.1 Contractor to visit site prior to submission of tender.

Part 2 Products

2.1 MATERIALS

.1 Granular Backfill: properties to Section 31 05 16 – Aggregate Materials.

.2 Bedding Material: properties to Section 31 05 16 - Aggregate Materials.

.3 Geotextile: woven material with properties to 31 32 19.01 – Geotextiles.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with the Nova Scotia Environment Act and Regulations, in accordance with the Nova Scotia Erosion and Sedimentation Control Handbook for Construction Sites or requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

.1 Remove obstructions, debris, ice and snow, from surfaces to be excavated within limits indicated.

3.3 PREPARATION/PROTECTION

.1 Protect existing features in accordance with applicable local regulations.

.2 Keep excavations clean, free of standing water, snow, ice and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to the Departmental Representative approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.5 Protect buried services that are required to remain undisturbed.

3.4 STOCKPILING

.1 Stockpile fill materials in areas designated by the Departmental Representative:

.1 Stockpile of fill materials generated by roadway excavation shall be stockpiled at Fishing Cove Long Trail storage yard or in areas as approved and directed by the Departmental Representative.

.2 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.5 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Provide for the Departmental Representative's approval details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur:

.1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved collection areas and in a manner not detrimental to public and private property, or portion of Work completed or under construction:

.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

.6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.6 EXCAVATION

.1 Advise the Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.

.2 Excavate to lines, grades, elevations and dimensions as directed by the Departmental Representative.

.3 Complete mass site excavation as specified in Section 31 24 13, Items 3.3.1, 3.3.2 and 3.3.3 and 3.3.4.

.4 All surplus excavated material shall be stockpiled at Fishing Cove Long Trail storage yard as directed by the Departmental Representative.

.5 One lane traffic must be kept at all time during construction and two lane traffic must be reinstated during non-construction hours.

.6 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by the Departmental Representative.

.7 Restrict vehicle operations directly adjacent to open trenches.

.8 Dispose of surplus by stockpiling on site as directed by the Departmental Representative.

.9 Do not obstruct flow of surface drainage or natural watercourses.

.10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.11 Notify the Departmental Representative when bottom of excavation is reached.

.12 Obtain the Departmental Representative's approval of completed excavation.

.13 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by the Departmental Representative.

.14 Correct unauthorized over-excavation as follows:

.1 Fill over excavated space with approved fill compacted to not less than 100% of Standard Proctor maximum dry density.

.2 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.15 Hand trim, make firm and remove loose material and debris from excavations:

.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

.2 Clean out rock seams and fill with concrete mortar or grout to approval of the Representative.

.16 Install geotextiles in accordance with Section 31 32 19.01 – Geotextiles.

3.7 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698:

.1 Embankments: compact to 98%.

.2 Backfilling: compact to 98%.

3.8 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Place and compact granular material for bedding and surround of underground services as specified in Section 33 42 13 – Pipe Culverts.

.2 Place bedding and surround material in unfrozen condition.

3.9 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:

- .1 The Departmental Representative has inspected and approved installations.
- .2 The Departmental Representative has inspected and approved of construction below finish grade.
- .3 Inspection, testing, approval, and recording location of underground utilities.
- .4 Removal of concrete formwork.
- .5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 200 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations:

- .1 Place bedding and surround material as specified elsewhere.
- .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
- .3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 0.2 m.
- .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
  - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from the Departmental Representative.
  - .2 If approved by the Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by the Departmental Representative.

.6 Place fill in areas as indicated.

.7 Consolidate and level unshrinkable fill with internal vibrators.

.8 Install drainage system in backfill as directed by the Departmental Representative.

.9 This project is anticipated to be a cut/fill balance (approximately 3,000 cu. m surplus) and no borrow is anticipated.

3.10 RESTORATION

.1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 11 00 - Clearing and Grubbing.

.2 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.3 Section 31 23 19.01 – Geotextiles.

.4 Section 31 37 00 – Rip-Rap.

1.2 MEASUREMENT PROCEDURES

.1 See Section 01 29 00 – Payment Procedures.

1.3 REFERENCES

.1 Definitions:

.1 Rock Excavation: excavation of:

.1 Material from solid masses of igneous, sedimentary or metamorphic rock which, prior to removal, was integral with parent mass. Material that cannot be ripped with reasonable effort from Caterpillar D9L or equivalent to be considered integral with parent mass.

.2 Boulder or rock fragments measuring in volume one (1) cubic metre or more.

.2 Common Excavation: excavation of materials that are not Rock Excavation or Stripping.

.3 Unclassified Excavation: excavation of whatever character other than stripping encountered in the work.

.4 Free Haul: distance that excavated material is hauled without compensation. Free haul distance to be unlimited.

.5 Stripping: excavation of organic material covering original ground.

.6 Over Haul: authorized hauling in excess of free haul distance that excavated material is moved.

.7 Embankment: material derived from usable excavation and placed above original ground or stripped surface up to top of subgrade.

.8 Waste Material: material unsuitable for embankment, embankment foundation or material surplus to requirements.

.9 Borrow Material: material obtained from areas outside right-of-way and required for construction of embankments or for other portions of work.

.2 Reference Standards:

.1 American Society for Testing and Materials International, (ASTM):

.1 ASTM D698-07e1, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m^3).

.2 Nova Scotia Department of Transportation and Infrastructure Renewal - Standard Specification – (Latest Edition) - Division 2 – Earthworks, Section 3 – Roadway and Drainage Excavation.

1.4 PROTECTION

.1 Protect excavations from freezing.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to the Departmental Representative's approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.5 Protect buried services that are required to remain undisturbed.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 Adhere to regulations of authority having jurisdiction when blasting is required.

.2 Adhere to Provincial and National Environmental requirements when potentially toxic materials are involved.

.2 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

Part 2 Products

2.1 MATERIALS

.1 Embankment materials require approval by the Departmental Representative.

.2 Material used for embankment not to contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps or other unsuitable material.

.3 Borrow material:

.1 Obtain from borrow pit approved by the Departmental Representative.

.2 Material shall meet the requirements of NSTIR Specifications – Division 2, Earthworks, Section 5 – Borrow.

.4 Rock fill to meet the requirements of NSTIR – Division 3, Section 9:

.1 Rock fill shall not exceed 200 mm minus particle size.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that condition of substrate is acceptable for roadway embankment Work:

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

3.2 COMPACTION EQUIPMENT

.1 Compaction equipment: vibratory rollers or vibrating plate compactors capable of obtaining required density in materials on project:

.1 Demonstrate compaction equipment effectiveness on specified material and lift thickness by documented performance of test-strip before start of Work.

.2 Replace or supplement equipment that does not achieve specified densities.

.2 Operate compaction equipment continuously in each embankment when placing material.

3.3 WATER DISTRIBUTORS

.1 Apply water with equipment capable of uniform distribution.

3.4 EXCAVATING

.1 General:

.1 Notify the Departmental Representative when waste materials are encountered and remove to depth and extent directed.

.2 Excavation limits as provided in contract drawings, unless directed otherwise directed by the Departmental Representative. In the event that undercut is required as directed by the Departmental Representative, compact top 150 mm below undercut to minimum 95% maximum dry density. ASTM D698 (AASHTO T99). Final/top 150 mm shall be compacted to 98% SP. Replace with approved rock fill material and compact.

.3 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points as directed by the Departmental Representative.

.2 Drainage:

.1 Maintain profiles, crowns and cross slopes to provide good surface drainage.

.2 Provide ditches as work progresses to provide drainage.

.3 Construct interceptor ditches as indicated or as directed before excavating or placing embankment in adjacent area.

.3 Rock excavation:

.1 Notify the Departmental Representative, when material appearing to conform to classification for rock is encountered. Provide 12 hour notification.

.2 All rock excavation is to be completed by ripping or jack-hammering.

.4 Borrow Excavation:

.1 Completely use in embankments, suitable materials removed from existing roadway excavations before taking material from borrow areas.

.2 Obtain embankment materials, in excess of what is available from cut areas, from designated borrow areas:

.1 The Departmental Representative to designate extent of borrow areas and allowable depth of excavation.

.2 Remove waste and stripping material from borrow pits to designated locations.

.3 Slope edges of borrow areas to minimum 2:1 and provide drainage as directed.

.4 Trim and leave borrow pits in condition to permit accurate measurement of material removed.

3.5 EMBANKMENTS

.1 Scarify or bench existing slopes in accordance with Nova Scotia Department of Transportation and Infrastructure Renewal - Standard Drawing – Benching of Embankment Slopes, File No. S-2009-016, located in Appendix D.

.2 Break up or scarify existing road surface prior to placing embankment material.

.3 Do not place material which is frozen nor place material on frozen surfaces except in areas authorized.

.4 Maintain crowned surface during construction to ensure ready run-off of surface water.

.5 Drain low areas before placing materials:

.1 Place and compact to full width in layers not exceeding 200 mm loose thickness. The Departmental Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.

.6 Where material consists of rock:

.1 Place to full width in layers of sufficient depth to contain maximum sized rocks, but in no case is layer thickness to exceed 1 m.

.2 Distribute rock material to fill voids with smaller fragments to form compact mass.

.3 Fill surface voids at subgrade level with rock spalls or selected material to form earth-tight surface.

.4 Do not place boulders and rock fragments with dimensions exceeding 150 mm within 300 mm of subgrade elevation.

.7 In the event that undercut is required as directed by the Departmental Representative, rock fill material shall be placed in the top 750 mm to subgrade. Material shall be placed in maximum 500 mm lifts using a vibratory roller of at least 11 tonnes mass.

.8 Deductions from excavation will be made for overbuild of embankments.

3.6 SUBGRADE COMPACTION

.1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.

.2 Compact each layer to minimum 95% maximum dry density, ASTM D698 (AASHTO T99) except top 150 mm of subgrade. Compact top 150 mm to 98% maximum dry density.

.3 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

3.7 FINISHING

.1 Shape entire roadbed to within 25 mm of design elevations.

.2 Finish slopes, ditch bottoms and borrow pits true to lines, grades and drawings where applicable. Scale slope by removing loose fragments, for cut slopes in bedrock steeper than 1:1.

.3 Remove rocks over 150 mm in dimension from slopes and ditch bottoms.

.4 Hand finish slopes that cannot be finished satisfactorily by machine.

.5 Round top of backslope 1.5 m both sides of top of slope.

.6 Run tractor tracks over slopes exceeding 3 m in height to leave tracks parallel to centreline of highway.

.7 Trim between constructed slopes and edge of clearing to provide drainage and free of humps, sags and ruts.

3.8 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.

3.9 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.3 Section 31 24 13 – Roadway Embankments.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM), most recent edition:

.1 ASTM D 4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

.2 ASTM D 4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

.3 ASTM D 4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.4 ASTM D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

.5 ASTM D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

.6 ASTM D4355, Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.

.2 Canadian General Standards Board (CGSB), most recent edition:

.1 CAN/CSA-G40.21, General Requirements for Rolled or Welded Structural Quality Steel.

.2 CAN/CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit product information of proposed product a minimum of 2 weeks prior to beginning work.

1.5 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 MATERIAL

.1 Physical properties as indicated in Table 1 – Requirements of woven geotextile materials.

.2 Geotextile: woven synthetic fibre fabric, supplied in rolls:

.1 Width: 3.5 m minimum.

.2 Length: 79 m minimum.

.3 Composed of: minimum 85% by mass of polypropylene and/or polyester, with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure for 30 days.

.3 Securing pins and washers: to CAN/CSA-G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to CAN/CSA G164.

.4 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

Table 1- Requirements of Woven Geotextiles

Property (Note 1)	Unit	ASTM	W2
Tearing Strength (Trapezoid Method)	N	D4533	500
Grab Tensile Strength (Both Directions)	N	D4632	1200
Elongation At Break	%	D4632	25 max.
Effective Opening Size	µm	D4751	300
UV Degradation at 500 HRS	% Ret.	D4355	50
Permeability	cm/s	D4491	5*10-3

Part 3 Execution

3.1 INSTALLATION

.1 Place geotextile material, at locations directed by the Departmental Representative, by unrolling onto graded surface and retain in position with securing pins or fill.

.2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.

.3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.

.4 Overlap each successive strip of geotextile 300 mm over previously laid strip.

.5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.

.6 After installation, cover with overlying layer within 4 hours of placement.

.7 Replace damaged or deteriorated geotextile to approval of the Departmental Representative.

.8 Place and compact soil layers in accordance with Section 31 23 33.01 – Excavating, Trenching and Backfilling.

3.2 CLEANING

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

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

3.3 PROTECTION

.1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 32 19.01 - Geotextiles.

.2 Section 33 42 13 – Pipe Culverts.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.3 REFERENCES

.1 Nova Scotia Department of Transportation and Infrastructure Renewal - Standard Specification – (Latest Edition) – Division 3 – Granular Materials, Section 6 – Loose Laid Rip-Rap.

.2 American Society for Testing and Materials (ASTM):

.1 ASTM C144-99, Standard Specification for Aggregate for Masonry Mortar.

.2 ASTM C618-00, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

.3 Canadian Standards Association (CSA):

.1 CAN/CSA-A23.1-00, Concrete Materials and Methods of Concrete Construction.

.2 CAN/CSA-A3000-98, Cementitions Materials Compendium.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Place materials defined as hazardous or toxic in designated containers.

.2 Fold up metal banding, flatten and place in designated area for recycling.

.3 Divert left over aggregate materials from landfill to local facility for reuse as approved by Departmental Representative.

.4 Divert left over geotextiles to local plastic recycling facility as approved by Departmental Representative.

Part 2 Products

2.1 STONE

.1 Random Rip Rap:

.1 Hard, durable, angular quarry stone, free from seams, cracks or other structural defects, to meet the size distribution for use intended, as shown on contract drawings. (See table "Random Rip-Rap Grading Limits" next page.).

2.2 GEOTEXTILE FILTER

.1 Geotextile: as indicated on Plans and in accordance with Section 31 32 19.01 – Geotextiles, Type N2.

Part 3 Execution

3.1 PLACING

.1 Rip-rap shall be machine placed.

.2 Where rip-rap is to be placed on slopes and at the ends of culverts, excavate trench at toe of slope to dimensions as indicated.

.3 Fine grade area to be rip-rapped to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.

.4 Place geotextile on prepared surface in accordance with Section 31 32 19.01 - Geotextiles and as indicated. Avoid puncturing geotextile. Vehicular traffic over geotextile not permitted.

.5 Place rip-rap to thickness as indicated.

.6 Place stones in manner approved by the Departmental Representative to secure surface and create a stable mass. Place larger stones at bottom of slopes.

Random Rip-Rap Grading Limits

Mass	Size (Note 1)	Finer by Mass (%)								
(kg)	(mm)	R-A (Note 2)	R-5	R-25	R-50	R-100	R-250	R-500	R-1000	R-2000
6000	1600									100
4000	1400									70 -90
3000	1300								100	
2000	1100								70 - 90	40 - 55
1500	1000							100		
1000	900							70 - 90	40 - 55	
750	820						100			
500	710						70 - 90	40 - 55		
300	600					100				
250	570						40 - 55			
200	530					70 - 90				0 - 15
150	480				100					
100	420				70 - 90	40 - 55			0 - 15	
75	380			100						
50	330			70 - 90	40 - 55			0 - 15		
25	260			40 - 55			0 - 15			
15	220	100	100							
10	190		70 - 90			0 - 15				
5	150		40 - 55		0 - 15					
2.5	120	0		0 -15						
0.5	70		0 -15							
Thickness (mm) (Note 3)		300	300	500	600	800	1100	1400	1600	2200

Note 1	Approximate diameter (for information only)
Note 2	Random riprap for abutment and slope protection
Note 3	Measured perpendicular to the prepared surface

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This section specifies requirements for supplying, producing and placing crushed quarry stone as a granular subbase (Type 2 Gravel, Except for gradation adjustment) to lines, grades and typical cross sections indicated, or as directed by Departmental Representative.

1.2 RELATED REQUIREMENTS

.1 Section 31 05 16 - Aggregate Materials.

1.3 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.4 REFERENCES

.1 Nova Scotia Transportation and Infrastructure Renewal:

.1 Nova Scotia Transportation and Infrastructure Renewal (NSTIR), Division 3 Section 2.

.2 ASTM International – Most recent edition:

.1 ASTM C117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.

.2 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.3 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.4 ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.

.5 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3).

.6 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.3 Ministry of Transportation of Ontario:

.1 LS-618 Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.

.4 Nova Scotia Environment and Labour:

.1 Pit and Quarry Guidelines.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

Part 2 Products

2.1 MATERIALS

.1 Granular subbase: to meet NSTIR Type 2 Gravel and the following requirements:

.1 Granular sub-base to be quarried, crushed rock.

.2 Gradations to be within limits as follows:

Sieve Size, μm	Type 2 - Percent Passing by Weight
80,000	100
56,000	70 – 100
28,000	50 – 80
14,000	35 – 65
5,000	20 – 50
160	3 – 10
80	2 – 5

.3 Granular sub-base to be supplied by Contractor.

.2 Reclaimed Asphalt Product (RAP):

.1 The contractor may be responsible for the incorporation of RAP into the virgin granular material.

.2 Sub-base gravels may contain up to 20% by weight, RAP. Final blended product to meet gradation specified in 2.1.1.2

.3 To avoid agglomeration of crushed RAP, it should be blended as soon as possible with conventional aggregate into a homogeneous mixture. However, blended material that is stockpiled for a considerable period of time, particularly in warm weather, may harden and require recrushing and rescreening before it can be incorporated into granular subbase applications.

.4 Blended RAP-aggregate stockpiles should not be allowed to remain in place for extended time periods because the stockpiled material is likely to become overly wet, possibly requiring some drying prior to use.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of subgrade are acceptable for Granular Sub-base installation in:

.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 after receipt of approval to proceed from Departmental Representative.

3.2 PLACING

.1 Place Granular Sub-base after subgrade is inspected and approved by the Departmental Representative.

.2 Construct Granular Sub-base to depth and grade in areas indicated on the plans or as directed by the Departmental Representative.

.3 Ensure no frozen material is used in placing.

.4 Place material only on clean unfrozen surface, properly shaped and compacted and free from snow or ice.

.5 Begin spreading sub-base material on crown line or high side of one-way slope.

.6 Place Granular Sub-base materials using methods which do not lead to segregation or degradation.

.7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. The Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.

.8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.9 Remove and replace portion of layer in which material has become segregated during spreading.

3.3 COMPACTION

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Compact to density of not less than 100% maximum dry density in accordance with ASTM D698.

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.

.4 Apply water as necessary during compaction to obtain specified density. If aggregate is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.

.5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by the Departmental Representative.

.6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 CLEANING

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

3.5 SITE TOLERANCES

.1 Finished sub-base surface to be within 25 mm of elevation as indicated but not uniformly high or low.

3.6 PROTECTION

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

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This section specifies requirements for supplying, producing and placing crushed quarried stone as Type 1 granular base (except for gradation adjustment), to lines, grades and typical cross sections indicated, or as directed by Departmental Representative.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.3 REFERENCES

.1 Nova Scotia Transportation and Infrastructure Renewal:

.1 Nova Scotia Transportation and Infrastructure Renewal (NSTIR), Standard Specification Division 3 Section 2.

.2 American Society for Testing and Materials (ASTM) – Most recent edition:

.1 ASTM C117, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.3 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.4 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.5 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3).

.6 ASTM D2922- Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods.

.3 Ministry of Transportation of Ontario:

.1 LS-618 Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.

.4 Nova Scotia Environment and Labour:

.1 Pit and Quarry Guidelines.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

Part 2 Products

2.1 MATERIALS

.1 Granular base: to meet NSTIR Type 1 Gravel and the following requirements:

.1 Crushed rock consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, and other deleterious materials.

.2 Type 1 gravel shall be produced from quarried rock source.

.3 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117:

Sieve Size, μm	Type 1 - Percent Passing by Weight
20,000	100
14,000	50-85
5,000	20-50
160	5-12
80	3-5

.4 Plasticity Index: to ASTM D4318, Maximum 3.

.5 Los Angeles Abrasion: to ASTM C131. Max. % loss by weight: 40.

.6 Crushed particles: 100% of particles by mass to have at least 2 freshly fractured face.

.2 Reclaimed Asphalt Product (RAP):

.1 The contractor may be responsible for the incorporation of RAP into the virgin granular material.

.2 Base gravels may contain up to 20% by weight, RAP.

.3 Final blended product to meet gradation specified in 2.1.1.2.

.4 To avoid agglomeration of crushed RAP, it should be blended as soon as possible with conventional aggregate into a homogeneous mixture. However, blended material that is stockpiled for a considerable period of time, particularly in warm weather, may harden and require recrushing and rescreening before it can be incorporated into granular base applications.

.5 Blended RAP-aggregate stockpiles should not be allowed to remain in place for extended time periods because the stockpiled material is likely to become overly wet, possibly requiring some drying prior to use.

.3 Shoulder Material:

.1 Shoulder material shall be RAP generated from cold milling on this project and supplied from stockpile under Section 02 41.13.14 – Asphalt Paving Removal.

Part 3 Execution

3.1 INSPECTION OF UNDERLYING SUB-BASE

.1 Place granular base after surface is inspected and approved by Departmental Representative.

3.2 PLACING

.1 Construct granular base to depth and grade in areas indicated on the plans or as directed by the Departmental Representative.

.2 Ensure no frozen material is used in placing.

.3 Place material only on clean unfrozen surface, properly shaped and compacted and free from snow and ice.

.4 Begin spreading base material on crown line or high side of one-way slope.

.5 Place granular base materials using methods which do not lead to segregation or degradation.

.6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.7 Remove and replace that portion of layer in which material becomes segregated during spreading.

.8 Shoulder material (RAP) shall be placed as indicated on the Contract Drawings.

.9 Compacted shouldering to be flush with asphalt concrete surface.

.10 Hand work will be required to form base for asphalt concrete gutters/offtakes.

.11 Place, hand rake and compact new shoulder material under and behind guiderail.

3.3 COMPACTION EQUIPMENT

.1 Vibratory compaction equipment must be used and capable of obtaining required densities on aggregates on project.

3.4 COMPACTING

.1 Density of granular base course will be determined according to ASTM D2922.

.2 Compaction equipment to be capable of obtaining required material densities.

.3 Compact to density not less than 100% maximum dry density in accordance with ASTM D698:

.1 Compaction of RAP for shoulder material shall be based on attained maximum density as determined from a test rolling strip.

.4 Shape and roll alternately to obtain smooth, even and uniformly compacted base.

.5 Apply water as necessary during compacting to obtain specified density. If aggregate is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.

.6 In areas not accessible to rolling equipment, compact to specified density with vibratory mechanical tampers approved by the Departmental Representative.

.7 Equipment:

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from the Departmental Representative before use.

.3 Equipped with device that records hours of work, not motor running hours.

3.5 FINISH TOLERANCES

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

.2 Density of Granular Base Course will be determined according to ASTM2922.

.3 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.6 CLEANING

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

3.7 PROTECTION

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 32 12 16 – Asphalt Paving.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM) – Most Recent Edition:

.1 ASTM D140/D140M, Standard Practice for Sampling Bituminous Materials.

.2 Nova Scotia Transportation and Infrastructure Renewal:

.1 Nova Scotia Transportation and Infrastructure Renewal (NSTIR), Division 4 Section 1.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for asphalt tack coat and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:

.1 Submit two - 1 L samples of asphalt tack coat material proposed for use in new, clean, airtight, sealed, wide mouth plastic lined cans to Departmental Representative, at least 2 weeks prior to beginning Work.

.2 Sample asphalt tack coat material to: ASTM D140.

.3 Provide access on tank truck for Departmental Representative to sample asphalt material to be incorporated into Work to ASTM D140.

1.4 QUALITY ASSURANCE

.1 Submit manufacturer's test data and certification that asphalt tack coat material meets requirements of this Section.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer’s written instructions.

Part 2 Products

2.1 MATERIALS

.1 To NSTIR, Standard Specification, Division 4 Section 1, Table 4.1.1 grade: RS-1.

.2 Water: clean, potable, free from foreign matter.

Part 3 Execution

3.1 EQUIPMENT

.1 Equipment required for Work of this Section to be in satisfactory working condition and maintained for duration of Work.

.2 Pressure distributor:

.1 Designed, equipped, maintained and operated so that asphalt material can be:

.1 Maintained at a temperature not less than 20 ºC nor more than 70ºC.

.2 Applied uniformly on variable widths of surface up to 5 m.

.3 Applied at readily determined and controlled rates from 0.1 to 5.4 L/m² with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m².

.4 Distribute in uniform spray without atomization at temperature required.

.2 Equipped with nozzle spray bar capable of being raised or lowered.

.3 Equipped with hand application wand.

.4 Cleaned if previously used with incompatible asphalt material.

3.2 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt tack coat installation in accordance with manufacturer's written instructions:

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and approved to proceed by Departmental Representative.

3.3 APPLICATION

.1 All milled and unmilled asphalt concrete surfaces to be tack coated before placement of new Hot Mix Asphalt (HMA).

.2 Tack coat to be applied between lifts of new HMA.

.3 Apply asphalt tack coat only on clean and dry surface.

.4 Dilute asphalt emulsion as per manufacturer’s recommendations.

.5 Departmental RepresentativeTack coat to be applied at a rate of 0.14 l/m^2 unless otherwise directed by Departmental Representative.

.6 Apply asphalt tack coat evenly to pavement surface.

.7 Paint contact surfaces of curbs, gutters, and like structures with thin, uniform coat of asphalt tack coat material.

.8 Apply asphalt tack coat only when air temperature greater than 10 ºC and when rain is not forecast within 2 hours minimum of application.

.9 Apply asphalt tack coat only on unfrozen surface.

.10 Evenly distribute localized excessive deposits of tack coat by brooming as directed by Departmental Representative.

.11 Keep traffic off tacked areas until asphalt tack coat has set.

.12 Re-tack contaminated or disturbed areas as directed by Departmental Representative.

.13 Permit asphalt tack coat to break before placing asphalt pavement.

.14 Inspect tack coat application to ensure uniformity:

.1 Re-spray areas of insufficient or non-uniform tack coat coverage as directed by Departmental Representative.

.2 Ensure tack coating performed using hand held devices is consistent in appearance with adjacent areas of machine applied material.

END OF SECTION

Part 1 General

1.1 DESCRIPTIONS

.1 This section covers asphalt concrete on reconstructed roadbed and shall meet the general requirement of Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) Type "B-HF" and "D-HF" except where noted. It also covers the construction of asphalt concrete gutters, French Lake and Bog Trail Parking Lots, and other required asphalt work.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.3 REFERENCES

.1 Nova Scotia Transportation and Infrastructure Renewal:

.1 Nova Scotia Department of Transportation and Infrastructure Renewal, Division 4, Section 2, Performance Graded Asphalt Binder (PGAB).

.2 Nova Scotia Transportation and Infrastructure Renewal, Division 4, Section 4, Asphalt concrete Hot Mixed – Hot Placed (Method Specification).

.3 Nova Scotia Department of Transportation and Infrastructure Renewal, Division 4, Section 19, Asphalt Concrete End Product Specification (EPS).

.4 Nova Scotia Department of Transportation and Infrastructure Renewal, Test Method TPW TM-2, Modified Petrographic Analysis.

.5 Nova Scotia Department of Transportation and Infrastructure Renewal, Test Method TPW TM-3, Fractured Particle Test.

.2 AASHTO, most recent edition:

.1 AASHTO T283 - Standard Method of Test for Resistance of Compacted Bituminous Mixture to Moisture Induced Damage.

.2 AASHTO MP1, Standard Specification for Performance Graded Asphalt Binder.

.3 AASHTO PP6, Standard Practice for Grading or Verifying the Performance Grade of an Asphalt.

.4 AASHTO TP33- Standard Test Method for Uncompacted Void Content of Fine Aggregate.

.5 AASHTO M156, Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

.3 ASTM International, most recent edition:

.1 ASTM C88, Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.

.2 ASTM C117, Test Method for Material Finer than 0.075 mm Sieve in Mineral Aggregates by Washing.

.3 ASTM C127, Test Method for Specific Gravity and Absorption of Coarse Aggregate.

.4 ASTM C128, Test Method for Specific Gravity and Absorption of Fine Aggregate.

.5 ASTM C131, Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.6 ASTM C136, Method for Sieve Analysis of Fine and Coarse Aggregates.

.7 ASTM D2041, Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.

.8 ASTM D2419, Test method for Sand Equivalent Values of Soils and Fine Aggregate.

.9 ASTM D2726, Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.

.10 ASTM D2950, Standard Test Method for Density of Bituminous Concrete in place by Nuclear Methods.

.11 ASTM D3203, Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.

.12 ASTM D4469, Standard Method for Calculating Percent Asphalt Absorption by the Aggregate in an Asphalt Pavement Mixture.

.13 ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.14 ASTM D6927, Standard Test Method for Marshall Stability and Flow of Asphalt Mixtures.

.4 Asphalt Institute, Manual Series No. 2 (MS-2), Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types, Seventh Edition

.5 Nova Scotia Environment and Labour:

.1 1981 Asphalt Paving Plant Regulation.

1.4 SAMPLES

.1 Submit samples in accordance with Section 01 33 00-Submissions/Shop Drawings.

.2 At least 4 weeks prior to commencing work, submit samples of following materials proposed for use:

.1 One 4 L container of asphalt cement.

1.5 MATERIAL CERTIFICATION

.1 At least 4 weeks prior to commencing work, submit viscosity-temperature chart for asphalt cement to be supplied showing kinematic viscosity in mm^2/s versus temperature range from 105^o to 175^o C.

.2 At least 4 weeks before commencing work, submit refinery's test data and certification that asphalt cement meets the required Performance Graded (PG) grade, including the specific gravity of the asphalt cement.

1.6 SUBMISSION OF MIX DESIGN

.1 Samples of aggregate for mix design shall be derived from stockpiles not less than 1000 tonnes of each of fine and course aggregate.

.2 The Contractor shall submit, in writing, asphalt concrete mix design and trial mix test results to Departmental Representative for review at least 2 weeks prior to commencing work. The mix design shall contain the job mix formula which shall include the following:

.1 Grade, supplier and specific gravity of asphalt cement

.2 Asphalt cement content

.3 Gradation of each aggregate

.4 Specific gravity and absorption of each aggregate

.5 Percentage of each aggregate

.6 Combined mix gradation

.7 Marshall stability and flow

.8 Mix bulk specific gravity

.9 Mix maximum theoretical density

.10 Percentage voids in mineral aggregate (VMA)

.11 Percentage air voids

.12 Percentage voids filled with asphalt (VFA)

.13 Percentage of absorbed asphalt cement

.14 Tensile Strength ratio (TSR, AASHTO T283)

1.7 DELIVERY AND STORAGE

.1 Deliver and stockpile aggregates. Stockpile outside of park boundaries, a minimum 50% of total amount of aggregate required before commencing asphalt concrete operations.

.2 When necessary to blend aggregates from one or more sources to produce required gradation, do not blend in stockpiles.

.3 Stockpile fine aggregate separately from coarse aggregate.

.4 Provide approved storage, heating tanks and pumping facilities for asphalt cement.

.5 There will be no separate payment for mobilization and demobilization to site.

Part 2 Products

2.0 MATERIALS

.1 Asphalt cement: to AASHTO PP6, PG 58-28 Grade.

.2 The contractor shall be responsible for incorporation of RAP into the Type "B-HF" asphalt mix:

.1 RAP shall be free of contamination and shall be processed in such a manner that all particles pass the 40 000 μm sieve.

.2 RAP stockpiles shall conform to the following requirements:

.1 Stockpiles shall be constructed in a conical manner to reduce moisture accumulation.

.2 Material handling equipment shall not be permitted to operate on the stockpile.

.3 Stockpiles shall be constructed on a properly prepared sloped surface to provide positive drainage.

.4 RAP shall be stored in a separate asphalt plant feed bin.

.5 RAP shall be added to the B-HF asphalt mix at a rate of 20 ± 5%.

.6 Only RAP produced from this project is permitted in the mix.

.3 The physical requirements of asphalt concrete containing RAP shall conform to the NSTIR's standard specification for Asphalt Type B-HF as outlined in Division 4 Section 4, Asphalt Concrete Hot Mixed - Hot Placed.

.4 Aggregate shall be crushed quarried stone.

.5 The total aggregate incorporated in the asphalt mix shall meet the following gradation requirements.

Sieve Designation	Cumulative % Passing Surface, Type D-HF	Cumulative % Passing Base, Type B-HF
28 000		100
20 000		95 – 100
14 000	100	70 – 90
10 000	95 - 100	60 – 75
5 000	55 - 70	45 – 70
2 500	25 - 55	25 – 45
315	5 - 20	3 – 20
80	2 – 7	2 – 6.5

.6 Aggregate Physical Properties

.1 Coarse aggregate is aggregate retained on 5000 µm sieve and fine aggregate is aggregate passing 5000 µm sieve when tested to ASTM C136.

.2 Fine aggregate angularity: AASHTO TP33, Min 45%

.3 Sand equivalent: to ASTM D2419, Min: 50%

.4 Sodium sulphate soundness: to ASTM C88, Max loss by mass:

.1 Coarse aggregate: 15%

.2 Fine aggregate: 10%

.5 Los Angeles abrasion: to ASTM C131, Max loss by mass, 30%.

.6 Absorption: to ASTM C127. Max by mass:

.1 Coarse aggregate: 1.75%

.2 Fine aggregate: 2.00%

.7 Flat and elongated particles: to ASTM D 4791 (with length to thickness ratio greater than 4): Max by mass, 10%

.8 Crushed fragments: to TPW TM-2, Min. 100% of particles by mass to have at least 2 freshly fractured faces. Material to be crushed from quarried aggregate source.

.9 Regardless of compliance with specified physical requirements, fine aggregates may be accepted or rejected on basis of past field performance.

.10 Petrographic Analysis: TPW TM-2 Modified Petrographic Analysis, Max. 135

.7 Mineral Filler:

.1 Finely ground particles of limestone, hydrated lime, Portland cement or other approved non-plastic mineral matter, thoroughly dry and free from lumps.

.2 Add mineral filler when necessary to meet job mix aggregate gradation or as directed to improve mix properties.

.3 Mineral filler to be dry and free flowing when added to aggregate.

.8 Anti-Stripping Agents:

.1 Do not use anti-strip agent without the approval of the Departmental Representative.

.2 Approval for the use of a liquid anti-stripping agent will only be granted should the testing (AASHTO T283) yield a long term TSR of the mix with anti-stripping is equal to or greater than 0.80:

.3 Requirements for Liquid anti-stripping agent will also be based on past history of aggregates, and visual examination of test specimens.

.4 No additional payment shall be made for the use of anti-stripping agent in the mix.

Part 3 Asphalt Concrete Mix

3.1 MIX DESIGN

.1 Mix design and Job Mix Formula to be provided by Contractor.

.2 Design mix by Marshall Method to requirements below and as directed by Departmental Representative:

.1 Compaction blows on each face of test specimens: 75.

.2 Mix Properties:

Property	Surface Type D-HF	Base Type B-HF
Marshall Stability at 60°, kN, min	7.5	7.5
Marshall Flow Value, mm	2 - 4	2 - 4
Air Voids, %	2.5 - 4.0	2.5 - 4.0
Voids in Mineral Aggregate (VMA), % min	15.0	13.0
Voids Filled with Asphalt (VFA), %	65 - 78	65 - 78
Asphalt Stripping Test, % min	80	80

.3 Asphalt cement content shall be determined by mix design.

.4 On this contract, the contractor shall incorporate 20 ± 5% RAP into the Asphalt Concrete Type B-HF:

.5 Preparation and submission of an Asphalt Design Mix Formula (including all supporting documentation) for the asphalt mixture containing RAP is the responsibility of the Contractor.

.6 The Contractor shall use professional engineering services and a qualified testing laboratory to assess the aggregate materials, asphalt binders, blending sands, mineral fillers, anti-stripping agents and asphalt cement rejuvenation agents proposed for use and to carry out the design of the asphalt concrete mix.

.7 RAP from this project to be used.

.8 Measure physical requirements as follows:

.1 Marshall stability and flow value: to ASTM D6927.

.2 Compute void properties on basis of bulk specific gravity of aggregate (to ASTM D2041 and ASTM D2726). Make allowance for volume of asphalt cement absorbed into pores of aggregate.

.3 Air voids: to ASTM D3203.

.4 Asphalt Stripping: to AASHTO T283.

.9 Do not change job-mix without prior approval of Departmental Representative. Should change in material be proposed, submit new to Departmental Representative for approval.

.10 Return plant dust collected during processing to mix in quantities acceptable to Departmental Representative.

.3 Asphalt mix tolerances:

.1 Allowable variations from the JMF shall not exceed the limits provided in Section 2.5.5.

.2 Mix air voids to conform to Section 3.1.2.

.3 Contractor to submit a Job Mix Formula with production targets for the following parameters:

.1 Gradation on the 5000µm and 80 µm sizes

.2 Asphalt cement content

.4 Permissible variation from Job Mix Formula:

.1	Gradation, 5000µm sieve size	6.0%
.2	Gradation, 80µm sieve size	2.0%
.3	Asphalt cement, B-HF mix	0.4%
.4	Asphalt cement, D-HF mix	0.3%

.5 Permissible variation of asphalt concrete temperature at discharge from plant, 5°C.

3.2 PLANT AND MIXING REQUIREMENTS

.1 Feeder lines for loading asphalt cement to the asphalt tanks shall be elevated and drained and the use of diesel fuel to clean asphalt cement pump feeder lines is not permitted. When necessary to use diesel to flush lines and pump, all flushed material shall be collected and not permitted to enter asphalt cement tanks or dumped on the ground.

.2 Individual cold feed bins are required for the RAP and no intermingling of materials shall be permitted.

.3 RAP shall not be directly exposed to open flame during and/or after introduction into the plant.

.4 Batch and continuous mixing plants:

.1 Heat asphalt cement and aggregates to mixing temperatures specified as per the approved mix design. Do not heat asphalt cement above 164°.

.2 Before mixing, dry aggregates to a moisture content not greater than 0.5% by mass or to a lesser moisture content if required to meet mix design requirements.

.3 Based on current asphalt cement viscosity and specific gravity data measured at the plant, the required temperature of completed asphalt at the plant and at the paver is to be determined based on the consideration of current hauling and placing conditions.

.4 Feed aggregates from individual stockpiles through separate bins to cold elevator feeders. Aggregate will not be fed directly to the plant from the crusher.

.5 Feed cold aggregates to plant in proportions that will ensure continuous operations.

.6 Immediately after drying, screen aggregates into hot storage bins in sizes to permit recombining into gradation meeting job-mix requirements.

.7 Store hot screened aggregates in a manner to minimize segregation and temperature loss.

.8 Maintain temperature of materials within plus or minus 5°C of specified mix temperature during mixing.

.9 Mixing time:

.1 In batch plants, wet mixing shall continue as long as necessary to obtain a thoroughly blended asphalt concrete but not less than 30 s or more than 75 s.

.2 In continuous mixing plants, mixing time shall be not less than 45 s.

.3 Do not alter mixing time unless directed by Departmental Representatives.

.5 Dryer drum mixing plant:

.1 Feed aggregates to burner end of dryer drum by means of a multi-bin cold feed unit and blend to meet job-mix requirements by adjustments of variable speed feed belts and gates on each bin.

.2 Meter total flow of aggregate by an electronic weigh belt system with an indicator that can be monitored by plant operator and which is interlocked with asphalt pump so that proportions of aggregate and asphalt cement entering mixer remain constant.

.3 Provide for easy calibration of weighing systems for aggregates without having material enter drum.

.4 Make provisions for conveniently sampling the full flow of aggregate from the cold feed.

.5 Provide screens or other suitable devices to reject oversize particles or lumps of aggregates from cold feed prior to entering drum.

.6 Provide a system interlock which will stop all feed components if either asphalt or aggregate from any bin stops flowing.

.7 Accomplish heating and mixing of asphalt concrete in an approved parallel flow dryer-mixer in which aggregate and asphalt cement enter drum at burner end and travel parallel to flame and exhaust gas stream. Control heating to prevent fracture of aggregate or excessive oxidation of asphalt cement. Equip systems with automatic burner controls and provide for continuous temperature sensing of asphalt concrete at discharge, with a printing recorder that can be monitored by plant operator. Submit printer record of mix temperatures at end of each week.

.8 Mixing period and temperature to produce a uniform mixture in which particles are thoroughly coated, and moisture content of material as it leaves plant to be less than 0.5%.

.9 For drum mix plants processing RAP, the mixing time shall be adjusted so that all heat transfer occurs in the drum.

.6 Temporary storage of hot asphalt concrete:

.1 Provide storage of sufficient capacity to permit continuous operation and designed to prevent segregation.

.2 Do not keep in storage bins in excess of 3 h.

.3 While producing asphalt concrete for this project, do not produce it for other users unless separate storage facilities are provided for materials supplied to this project.

Part 4 Execution

4.0 EQUIPMENT

.1 General: All equipment used on this project shall be in top operating condition because the project is located on a roadway with very steep grades and sharp curves.

.2 Pavers: Mechanical grade controlled self-powered pavers capable of spreading asphalt concrete within specified tolerances, true to line, grade and crown indicated:

.1 Pavers to be equipped with automatic screed controls, as recommended by manufacturer for control on longitudinal grade and transverse slope.

.2 Pavers to be equipped with joint matching shoe to operate with longitudinal grade control.

.3 Transverse slope control shall be capable of operating from either side of paver.

.4 Pavers to be equipped with an approved 12 m ski:

.1 Where such ski is a flexible unit, it shall be equipped with a spring tensioned wire extending between brackets fitted on and slightly above each end of ski.

.2 Sensing grid shall ride on wire and not on ski.

.3 Equivalent paving technology may be submitted for approval by Departmental Representative.

.3 Rollers: Sufficient number of rollers of type and mass to obtain specified density of compacted mix:

.1 Vibrator rollers:

.1 Minimum drum diameter: 1200 mm.

.2 At least one pneumatic roller shall be used.

.4 Haul trucks: of adequate size, speed and condition to ensure orderly and continuous operation and as follows:

.1 Boxes with tight metal bottoms.

.2 Covers (tarps) of sufficient size and weight to completely cover and protect asphalt concrete when truck fully loaded.

.3 In cool weather for long hauls, insulate entire contact area of each truck box.

.4 Truck tailgate assemblies must be such that they do not strike paver hoppers when emptying into the hopper.

.5 Hand tools:

.1 Lutes or rakes with covered teeth for spreading and finishing operations.

.2 Tamping irons having mass not less than 12 kg and a bearing area not exceeding 310 cm^2 for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Departmental Representative, may be used instead of tamping irons.

.3 Straight edges, 3 m in length, to test finished surface.

.6 Material Transfer Vehicle: Transfer asphalt concrete from haul units to spreader with an approved Material Transfer Vehicle.

4.1 PREPARATION

.1 Apply tack coat in accordance with Section 32 12 15 – Asphalt Tack Coat prior to paving.

.2 Verify all grades prior to paving.

4.2 TRANSPORTATION OF ASPHALT CONCRETE

.1 Transport asphalt concrete to job site in vehicles clean of foreign material.

.2 Paint or spray truck beds with limewater, soap or detergent solution, at least once a day or as required. Elevate truck bed and thoroughly drain. No excess solution will be permitted. **Diesel fuel is not permitted.**

.3 Schedule delivery of asphalt concrete for placing in daylight, unless Departmental Representative approves artificial lighting.

.4 Deliver asphalt concrete to paver at a uniform rate and in an amount within capacity of paving and compacting equipment.

.5 Deliver loads continuously in covered vehicles and immediately spread and compact. Deliver and place asphalt concrete at temperature within range as directed by Departmental Representative but not less than 135°.

.6 Tarpaulins or other coverings for trucks must be of sufficient mass to prevent rapid cooling of asphalt concrete surface.

4.3 PLACING

.1 Obtain approval of asphalt base and existing surface from the Departmental Representative and tack coat prior to placing asphalt.

.2 Place asphalt concrete to thickness, grades and lines as indicated or as directed by Departmental Representative.

.3 Placing Conditions:

.1 Place asphalt concrete only when air temperature is above 5°C and rising.

.2 When temperature of surface on which asphalt concrete is to be placed falls below 10°C, provide extra rollers as necessary to obtain required compaction before cooling.

.3 Do not place asphalt concrete when pools of standing water exist on surface to be paved, or during rain, or when surface is damp.

.4 Place asphalt concrete in compacted lifts of thickness as indicated on drawings.

.5 Spread and strike off asphalt concrete overlay with self-propelled mechanical finisher.

.6 Place individual mats so that the days paving leaves minimal exposed longitudinal cold joint (<10m).

.7 Construct longitudinal joints and edges true to design.

.8 If segregation occurs, immediately suspend spreading operation until cause is determined and corrected.

.9 Correct irregularities in alignment left by paver by trimming directly behind machine.

.10 Correct irregularities in surface of pavement course directly behind paver. Remove by shovel or lute excess asphalt concrete forming high points. Fill and smooth dips with asphalt concrete.

.11 Do not broadcast asphalt concrete over surface.

.12 The forward speed of the paver shall be regulated by capacity of the plant and the rollers but shall not exceed a forward speed of 10m/min.

.13 When hand spreading is used:

.1 Approved wood or steel forms, rigidly supported to ensure correct grade and cross section, may be used. Use measuring blocks and intermediate strips to aid in obtaining required cross-section.

.2 Distribute material uniformly. Do not broadcast material.

.3 During spreading operation, thoroughly loosen and uniformly distribute asphalt concrete by lutes or covered rakes. Reject asphalt concrete that has formed into lumps and does not break down readily.

.4 After placing and before rolling, check surface with templates and straightedges and correct irregularities.

.5 Provide heating equipment to keep hand tools free from asphalt. Avoid high temperatures which may burn asphalt concrete. Do not use tools at a higher temperature than temperature of asphalt concrete being placed.

4.4 COMPACTING

.1 Compact asphalt concrete continuously using established rolling pattern.

.2 Do not change rolling pattern unless asphalt concrete changes or lift thickness changes. Change rolling pattern only as directed by Departmental Representative.

.3 General:

.1 Provide at least three rollers or as many additional rollers as necessary to achieve specified pavement density.

.2 Start rolling operations as soon as asphalt concrete can bear mass of roller without undue displacement of asphalt concrete or cracking of surface.

.3 Operate roller slowly initially to avoid displacement of asphalt concrete. For subsequent rolling do not exceed 5 km/h for static steel – wheeled rollers and 8km/h for pneumatic – tired rollers.

.4 For lifts 50 mm thick and greater, adjust speed and vibration frequency of vibratory rollers to produce minimum of 20 impacts per meter of travel.

.5 Overlap successive passes of roller by at least one half width of roller and vary pass lengths.

.6 Keep wheels of roller slightly moistened with water to prevent pick-up of asphalt concrete but do not over-water and do not use diesel fuel.

.7 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism operating.

.8 Do not permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.

.9 After traverse and longitudinal joints and outside edge have been compacted, start rolling longitudinally at low side and progress to high side.

.10 Where rolling causes displacement of asphalt concrete, loosen affected areas at once with lutes or shovels and restore to original grade of loose asphalt concrete before re-rolling.

.11 Do not refuel rollers on fresh asphalt concrete.

.4 Breakdown rolling:

.1 Commence breakdown rolling with static steel wheeled roller vibratory roller immediately following rolling of transverse and longitudinal joint and edges.

.2 Operate rollers as close to paver as necessary to obtain the specified density without causing undue displacement.

.3 Operate breakdown roller with drive roll or wheel nearest finishing machine. Exceptions may be made when working on steep slopes or super-elevated sections.

.4 Use only experienced roller operators for this work.

.5 Second rolling:

.1 Use pneumatic-tired, steel wheel or vibratory rollers and follow breakdown rolling as closely as possible and while paving asphalt concrete temperatures allows maximum density from this operation.

.2 Rolling shall be continuous after initial rolling until asphalt concrete placed has been thoroughly compacted.

.6 Finish rolling:

.1 Use static finish roller to remove roller marks and achieve smooth driving surface.

.7 All asphalt concrete shall be compacted to 92.5% of Theoretical Maximum Relative Density (TMRD) in accordance with ASTM D3203.

.8 The Contractor will supply additional compaction equipment if required density is not achieved.

.9 Gutters will be compacted with vibratory compactors which operate perpendicular to the direction of the gutter.

4.5 JOINTS

.1 General:

.1 Trim vertical face to provide true surface and cross section against which new pavement may be laid. Remove loose particles.

.2 Paint joint face with tack coat emulsified asphalt cement prior to placing of fresh asphalt concrete.

.3 Overlap previously laid strip with spreader by 100 mm.

.4 Rake fresh asphalt concrete against joint and thoroughly tamp and roll.

.5 Remove surplus material from surface of previously laid strip. Dispose of surplus material as directed by Departmental Representative.

.6 Do not throw surplus material on freshly screened mat surface.

.2 Transverse Joints:

.1 Carefully construct and thoroughly compact transverse joints to provide a smooth riding surface.

.2 Hold transverse joints to a minimum. When paving single width and maintaining traffic, construct one lane no farther than one-half total paving day.

.3 Stagger joint locations 1.5 to 3.0 m. Schedule each day's paving operation to terminate adjacent lanes in any one area to within above specified joint locations.

.4 Offset transverse joint in succeeding course by at least 600 mm.

.3 Longitudinal Joints:

.1 Before rolling, carefully remove with a lute or rake and discard coarse aggregate in asphalt concrete overlapping joint.

.2 Roll longitudinal joints directly behind paving operation.

.1 Do not allow the temperature of the longitudinal to drop below 80ºC before placing the adjoining lane.

.2 Joint heaters may be required by the Departmental Representative if joint temperatures drop below 80ºC before placing the next lane.

.3 When rolling with static roller, shift roller cover onto previously placed lane in order that no more than 150 mm of roll rides on edge of newly laid lane, then operate roller to pinch and press fines gradually across joint. Continue rolling until a thoroughly compacted neat joint is obtained.

.4 When rolling with vibratory roller, have most of drum width ride on newly placed lane with remaining 100 to 150 mm extending onto previously placed and compacted lane.

.5 When abutting lane is not placed in same day, or when joint is distorted during day's work by traffic or other means, carefully trim edge of lane to line and paint with a thin coating of asphalt before abutting lane is placed.

.6 Ensure joints are offset at least 150 to 200 mm from those in lower layers.

4.6 FINISH TOLERANCES

.1 Finished asphalt concrete to be within 6 mm of design elevation but not uniformly high or low.

.2 Finished asphalt concrete not to have irregularities exceeding 6 mm when checked with a 3 m straight edge placed in any direction.

4.7 TEMPORARY MARKINGS

.1 The Contractor shall place temporary pavement markings before sunset following each day's work. Marking material, spacing and type shall be approved by the Departmental Representative.

4.8 DEFECTIVE WORK

.1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form a true and even surface and compact immediately to specified density.

.2 Repair areas showing checking or rippling. Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

4.9 QUALITY ASSURANCE/PAYMENT ADJUSTMENT

.1 Quality Assurance testing for payment adjustment to be performed by Departmental Representative.

.2 Smoothness:

.1 Rate adjustment for smoothness will be based on average IRI measured per 100 m per lane on surface course of asphalt concrete.

.2 Smoothness testing will be performed by Departmental Representative, using a Class 1 Inertial Laser Profiler.

.3 Rate adjustments will be applied to 100 m sections as follows.

IRI (mm/m)	Rate Adjustment ($/100m Section)
0.00-0.30	$400
0.31-0.50	$350
0.51-0.60	$300
0.61-0.70	$250

IRI (mm/m)	Rate Adjustment ($/100m Section)
0.71-0.80	$200
0.81-0.90	$-200
0.91-1.00	$-250
1.01-1.10	$-490
1.11-1.20	$-760
1.21-1.30	$-1040
1.31-1.40	$-1350
1.41-1.50	$-1700
1.51-1.60	$-2110
1.61-1.70	$-2630
1.71-1.80	$-3800
1.81-1.90	$-4690
1.91-2.00	$-4700
>2.00	Mandatory Repair

.4 Any 100 m having an average IRI above 1.25 mm/m is deemed an optional repair and the Departmental Representative will decide on course of action.

.5 Any 100 m section having an average IRI above 2.00 mm/m is considered a mandatory repair.

.6 Repair will consist of milling and replacing the full depth and width of the surface, as determined by Departmental Representative. Repairs due to smoothness deficiencies are not paid by the Department.

.3 Mix Tolerance:

.1 Loose mix samples will be collected every 800 tonnes by Departmental Representative, with a minimum of one (1) per day.

.2 Mix tolerances as per Sections 2.5 and 3.1, if two consecutive samples deviate from the tolerances set forth in Sections 2.5 and 3.1, the Departmental Representative may direct contractor to cease production until corrective action is taken to remedy production problems.

.3 Departmental Representative will determine sampling locations.

.4 Asphalt Compaction:

.1 Compaction will be based on the average compaction of three (3) cores from stratified random locations each day of paving as determined by the Departmental Representative.

.2 Theoretical maximum density will be based on the average of the day's loose mix samples.

.3 Payment adjustments as per the following table. Pay adjustments will be calculated based on daily compaction results.

Average Compaction (% of maximum theoretical density)	Adjustment $/Tonne
>93.0	+0.50
92.5-93.0	+0.25
92.5	0.00
92.0-92.4	-0.25
91.5-91.9	-1.00
91.0-91.4	-2.00
90.5-90.9	-4.00
90.0-90.4	-6.00
89.5-89.9	-11.00
89.0-89.4	-16.00
<89.0	Reject

.4 Reject hot mix asphalt will not be paid by Department and contractor will bear the cost of repairs, only original contract quantity will be paid.

.5 Rejected hot mix asphalt will not be paid by Department and contractor will bear the cost of repairs.

.6 Rejected asphalt to be removed and replaced.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 – Submittal Procedures.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.3 REFERENCES

.1 Nova Scotia Department of Transportation and Infrastructure Renewal – Standard Specification – (Latest Edition) – Division 6 – Miscellaneous, Section 7 – Calcium Chloride Water Solution and Section 11 – Magnesium Chloride.

.2 Ontario Provincial Standard Specification, OPSS 2503 Magnesium Chloride Flake and Magnesium Chloride Solution.

.3 Environment Canada, Best Practices for the Use of Chloride-Based Dust Suppressants, February, 2007.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Supply magnesium chloride in quantities and at times as directed by Departmental Representative.

.3 Deliver magnesium chloride to site. Indicate name of manufacturer, name of product, net weight or mass, and percentage of magnesium guaranteed by manufacturer.

Part 2 Products

2.1 MATERIALS

.1 Liquid magnesium chlorides shall possess the following quantities (by mass) of constituent chemicals.

.1 Magnesium chloride, min. 30%

.2 Total alkali chlorides, max. 2%

.3 Impurities, including $MgCl_2$, max. 2%

.4 Other impurities, max. 1%

.2 Water: to Departmental Representative's approval. All water required for roadway dust control must be acquired from outside the Park boundaries.

.3 Liquid magnesium chloride shall have a minimum specific gravity of 1.30 when tested in accordance with ASTM D1475.

Part 3 Execution

3.1 APPLICATION

.1 Apply magnesium chloride and water with equipment approved by Departmental Representative.

.2 The initial application rate shall be 1.4 to 1.7 L/m^2 and subsequent applications if required shall be 0.6 to 0.8 L/m^2, using a minimum 30% solution by weight of magnesium chloride or as directed by the Departmental Representative.

.1 Do not permit ponding or surface runoff.

.3 Apply water or aqueous magnesium chloride with distributors equipped with means of shut-off and with spray system to ensure uniform application.

.4 Application equipment shall be calibrated to provide the proper application rate.

.5 Do not apply in periods of rain.

3.2 CLEANING

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

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

END OF SECTION

Part 1 General

1.1 STANDARD

.1 All work of this section shall comply with the requirement of the most recent version of Nova Scotia Department of Transportation and Infrastructure Renewal - Standard Specification – (Latest Edition) - Division 6 – Miscellaneous, Section 6 – Non-Coning Traffic Paint, except as amended herein.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

.2 No separate payment for:

- .1 Painted Arrows
- .2 Stop Bars
- .3 Cross-hatching
- .4 Symbols and Letters
- .5 Parking Stall Lines

1.3 REFERENCES

.1 Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) - Standard Specification – (Latest Edition) - Division 6 – Miscellaneous, Section 6 – Non-Coning Traffic Paint.

.2 All pavement lines and markings shall be applied and performed in accordance with the Transportation of Canada (TAC) Manual on Uniform Traffic Control Devices for Canada (MUTDC), Part C.

.3 Temporary Workplace Traffic Control Manual (TWTCM) (most recent version)

Part 2 Products

2.1 MATERIALS

.1 Per the most recent version of the NSTIR- Standard Specification – (Latest Edition) - Division 6 – Miscellaneous, Section 6 – Non-Coning Traffic Paint.

Part 3 Execution

3.1 GENERAL

.1 As per the requirements of the most recent version of the NSTIR- Standard Specification – (Latest Edition) - Division 6 – Miscellaneous, Section 6 – Non-Coning Traffic Paint, and in conformance with the Contract Documents.

.1 The Contractor shall coordinate and complete pavement pre-marking. The pre-markings are to be accepted by the Departmental Representative prior to installation.

.2 **TRAFFIC CONTROL**

.1 Traffic control shall be provided as per the NSTIR & PW TWTCM.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

1.2 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.3 REFERENCES

.1 Nova Scotia Department of Transportation and Infrastructure Renewal - Standard Specification – (Latest Edition) – Division 7 – Environmental Protection, Section 5 – Hydroseeding.

.2 Nova Scotia Department of Transportation and Infrastructure Renewal - Standard Specification – (Latest Edition) – Division 7 Section 6 – Dry Mulching.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for seed, mulch, tackifier, fertilizer, liquid soil amendments and micronutrients.

.2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Submit in writing ten (10) days prior to commencing work:

.1 Volume capacity of hydraulic seeder in litres.

.2 Amount of material to be used per tank based on volume.

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

.4 Samples:

.1 Submit 0.5 kg container of each type of fertilizer used.

.5 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

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

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements:

.1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.

.2 Inoculant containers to be tagged with expiry date.

.3 Storage and Handling Requirements:

.1 Store fertilizer off ground and in accordance with manufacturer's recommendations.

.2 Replace defective or damaged materials with new.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with good environmental practice.

.2 Divert unused fertilizer from landfill to official hazardous material collections site approved by the Departmental Representative.

.3 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

1.7 WARRANTY

.1 For hydroseeding, 12 months warranty period is extended to 1 full growing season.

.2 Contractor hereby warrants that hydroseeding will remain free of defects in accordance with General Conditions CCDC GC 12.3, but for 1 full growing season.

.3 End-of-warranty inspection will be conducted by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations:

.1 Seed mixture: "Nova Scotia Highway Seed Mix":

.1 Mixture composition:

.1 40% Creeping Red Fescue.

.2 15% Timothy.

.3 15% Tall Fescue.

.4 10% Kentucky Blue Grass.

.5 10% Alsike Clover.

.6 5% Red Top.

.7 5% Perennial Rye.

.2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:

.1 Type I mulch:

.1 Made from wood cellulose fibre.

.2 Organic matter content: 95% plus or minus 0.5%.

.3 Value of pH: 6.0.

.4 Potential water absorption: 900%.

.2 Type II mulch:

.1 Made from straw, processed to produce fibre lengths of 15 mm minimum and 25 mm maximum. Greater proportions of ingredients to be straw.

.3 Tackifier: water soluble vegetable carbohydrate powder.

.4 Water: free of impurities that would inhibit germination and growth.

.5 Fertilizer:

.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".

.2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.

.6 Inoculants: inoculant containers to be tagged with expiry date.

Part 3 Execution

3.1 WORKMANSHIP

.1 Do not spray onto structures, signs, guide rails, fences, plant material, utilities and other than surfaces intended.

.2 Clean-up immediately, any material sprayed where not intended, to satisfaction of the Departmental Representative.

.3 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.

.4 Protect seeded areas from trespass until plants are established.

3.2 PREPARATION OF SURFACES

.1 Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.

.2 Cultivated areas identified as requiring cultivation to depth of 25 mm.

.3 Ensure areas to be seeded are moist to depth of 150 mm before seeding.

3.3 PREPARATION OF SLURRY

.1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to the Departmental Representative. Supply equipment required for this work.

.2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.

.3 After all materials are in the seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

3.4 SLURRY APPLICATION

.1 Hydraulic seeding equipment:

.1 Slurry tank.

.2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.

.3 Capable of seeding by 50 m hand operated hoses and appropriate nozzles.

.4 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".

.2 Slurry mixture application:

.1 Apply fertilizer, mulch and seeded slurry with hydraulic seeder at rate of 275 Kg per 100 square metres evenly in one pass.

.3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed:

.1 Using correct nozzle for application.

.2 Using hoses for surfaces difficult to reach and to control application.

.4 Blend application 300 mm into adjacent grass areas or sodded areas to form uniform surfaces.

.5 Re-apply where application is not uniform.

.6 Remove slurry from items and areas not designated to be sprayed.

.7 Protect seeded areas from trespass satisfactory to the Departmental Representative.

.8 Remove protection devices as directed by the Departmental Representative.

3.5 MULCH

.1 Dry mulch in accordance with the Nova Scotia Transportation and Infrastructure Renewal Standard Specification (Latest Edition). Dry Mulch shall be applied through blowing.

3.6 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following operations from time of seed application until acceptance by the Departmental Representative.

.2 Grass Mixture:

.1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.

.2 Fertilize seeded areas 10 weeks after germination provided plants have mature true leafs. Spread half of required amount of fertilizer in one direction and remainder at right angles; water in well.

3.7 ACCEPTANCE

.1 Seeded areas will be accepted by the Departmental Representative provided that:

.1 Seeded areas are free of rutted, eroded, bare or dead spots.

.2 Areas have been fertilized.

.2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.8 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform following operations from time of acceptance until end of warranty period:

.1 Repair and reseed dead or bare spots to satisfaction of Departmental Representative.

3.9 CLEANING

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

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 The Work in this section includes the supply of all labour, supervision, materials, plant, equipment, and transportation necessary for the installation of pipe culverts as shown on the Drawings, per the Specifications, and as directed by the Departmental Representative, complete in every respect. All new culverts shall be reinforced concrete pipes, with the exception of the new culvert at Fishing Cove River, which shall be a thermo plastic copolymer coated structural plate corrugated steel pipe (CorPlate by Canada Culvert Inc., or approved equivalent)

1.2 SECTION INCLUDES

.1 Materials and installation for pipe culverts.

1.3 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 31 05 16 - Aggregate Materials.

.3 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.4 Section 31 24 13 - Roadway Embankment.

.5 Section 31 32 19.01 – Geotextiles.

.6 Section 31 37 00 – Rip-Rap.

.7 Section 03 20 00 – Concrete Reinforcing

.8 Section 03 30 00 - Cast-In-Place Concrete

1.4 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.5 REFERENCES

.1 American Society for Testing and Materials International, (ASTM):

- .1 ASTM C14M-99, Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe (Metric).
- .2 ASTM C76M-02, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).
- .3 ASTM C117-95, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.

.4 ASTM C136-01, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.5 ASTM C144-02, Standard Specification for Aggregate for Masonry Mortar.

.6 ASTM C443M-02, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).

.7 ASTM D698-00a, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m^3).

.2 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 Canadian Standards Association (CSA International):

.1 CAN/CSA-A3000-08, Cementitious Materials Compendium:

.1 CAN/CSA-A5-98, Portland Cement.

.2 CAN/CSA-A257 Series-09, Standards for Concrete Pipe.

.3 CAN/CSA G401-07, Corrugated Steel Pipe Products.

.4 Nova Scotia Department of Transportation and Infrastructure Renewal - Standard Specification – (Latest Editions) – Division 2 – Earthworks – Section 12 – Foundation Excavation.

.5 Nova Scotia Department of Transportation and Infrastructure Renewal - Standard Specification – (Latest Editions) – Division 3 – Granular Materials – Section 2 – Gravel Type 1, 1S, 2 & M.

.6 Nova Scotia Department of Transportation and Infrastructure Renewal - Standard Specification – (Latest Editions) – Division 5 – Structures – Section 10 – Corrugated Structural Plate Pipe Structures.

.7 Nova Scotia Department of Transportation and Infrastructure Renewal - Standard Specification – (Latest Editions) – Division 5 – Structures – Section 12 – Underground Drainage Systems.

1.6 SUBMITTALS

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

.2 Inform the Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of bedding materials and provide access for sampling.

.3 Submit to Departmental Representative for testing, at least 4 weeks prior to beginning Work, samples of materials proposed for use.

.4 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work.

.5 Certification to be marked on pipe.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in suitable locations as to not interfere with the work and protect it from damage.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

.2 Divert unused concrete materials from landfill to local facility as approved by Departmental Representative.

.3 Divert unused aggregate materials from landfill to facility for reuse as approved by Departmental Representative.

.4 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 CONCRETE PIPE

.1 Reinforced concrete pipe: to CSA A257.

.2 Rubber gaskets for joints: to CSA A257.

.3 Cement mortar joint filler:

.1 Portland cement: to CSA A3000 - type 10.

.2 Sand: to ASTM C144.

.3 Mortar: one part by volume of cement to two parts of clean, sharp sand mixed dry. Add sufficient water after mixing to give optimum consistency for hand application.

2.2 CORRUGATED STEEL PIPE

.1 Corrugated steel pipe: to CAN/CSA-G401.

.2 Metal pipe per NSTIR Standard Specifications.

.3 Cast-in-place concrete cut-off walls, headwalls and collars per 03 20 00 and 03 30 00.

2.3 MATERIALS

.1 The culvert replacement at Fishing Cove River shall consist of the following, and must provide a 75-year design life and meet a design loading of 16 metres of fill:

.1 Polymer Coated SPCSP Corplate pipe or equivalent with a step beveled end treatment and cast-in-place concrete cut-off walls and footings, headwalls and collars.

.2 Precast Concrete pipe with beveled end sections and precast concrete cut-off walls.

.2 Pipe designs (classes, thickness, bolt configurations, etc.) to be by manufacturer.

.3 Precast and Cast-in-place concrete features to be designed by Contractor per manufacturer recommendations subject to the approval of the Departmental Representative.

2.4 GRANULAR BEDDING

.1 Granular bedding and backfill material to Section 31 05 16 - Aggregate Materials.

Part 3 Execution

3.1 TRENCHING

.1 Do trenching Work in accordance with the contract drawings and NSTIR Standard Specifications.

.2 Obtain the Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe.

3.2 BEDDING

.1 Place bedding in accordance with the contract drawings, NSTIR Standard Specifications or the manufacturer specifications; whichever is the most stringent.

.2 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.

.3 Place minimum thickness of 300 mm of approved granular material on bottom of excavation and compact to minimum 95% maximum density to ASTM D698.

.4 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by the Departmental Representative.

.5 Place bedding in unfrozen condition.

3.3 LAYING CONCRETE PIPE CULVERTS

.1 Begin at downstream end of culvert with flanged end of first pipe section facing upstream.

.2 Ensure first and last pipe sections are properly positioned and secured in cut-off wall.

.3 Ensure barrel of each pipe is in contact with shaped bed throughout its length.

.4 Allow water to flow through pipes during construction only as permitted by Departmental Representative.

3.4 LAYING CORRUGATED STEEL PIPE CULVERTS

.1 The culvert can be assembled in sections prior to placement within the excavation and attached once all of the sections are placed at the proper alignment and grade.

.2 Ensure pipe is in contact with shaped bed throughout its length.

.3 Complete headwalls and place riprap after pipe is backfilled at least 2 metres above top of pipe.

.4 Allow water to flow through pipes during construction only as permitted by Departmental Representative.

3.5 JOINTS: CONCRETE PIPE CULVERTS

.1 Joints may be made with rubber gaskets, bituminous jointing compound or Portland cement mortar:

- .1 Rubber gasket joints:
  - .1 Install in accordance with manufacturer's written recommendations.
  - .2 Ensure that tapered ends are fully entered into flanged ends.
- .2 Bituminous filled joint:
  - .1 Make joint with excess of filler to form continuous bead around outside of pipe and finish smooth on inside.
- .3 Mortar joints:
  - .1 Prepare mortar as specified herein.
  - .2 Clean pipe ends and wet with water before joint is made.
  - .3 Place mortar in lower half of flanged end of pipe section in place.
  - .4 Apply mortar to upper half of tapered end of pipe section being installed.
  - .5 Join pipe ends and force joint up tight, taking care to ensure inner surfaces of abutting pipe sections are flush and even.
  - .6 Clean inside of pipe and annular space between ends of pipes after each joint is made.
  - .7 Fill joint with mortar and finish smooth and even.
  - .8 For pipes 800 mm or less diameter, fill joints before mortar in joints has set.
  - .9 For pipes over 800 mm diameter, postpone filling joint until backfilling has been completed. Re-clean joints before applying mortar.

3.6 JOINTS: CORRUGATED STEEL CULVERTS

.1 Structural plate:

.1 Erect in final position by connecting plates with bolts at longitudinal and circumferential seams.

.2 Drift pins may be used to facilitate matching of holes.

.3 Place plates in sequence recommended by manufacturer with joints staggered so that not more than three plates come together at any one point.

.4 Draw bolts up tight, without overstress, before beginning backfill.

.5 Repair spots where damage has occurred to spelter coating by applying two coats of manufacturer approved material approved by Departmental Representative.

3.7 BACKFILLING

.1 Place backfill in accordance with contract drawings, NSTIR Standard Specifications and to the Approval of the Departmental Representative.

.2 Backfill around and over culverts as indicated or as directed by the Departmental Representative.

.3 Place backfill material, approved by the Departmental Representative in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.

.4 Compact each layer to 95% maximum density to ASTM D698 taking special care to obtain required density under haunches.

.5 Protect installed culvert with minimum 900 mm cover (or as recommended by the Manufacturer) of compacted fill before heavy equipment is permitted to cross. During construction, width of fill, at its top, to be at least twice diameter or span of pipe and with slopes not steeper than 1:2.

.6 Place backfill in unfrozen condition.

3.8 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

Part 1 General

1.1 STANDARD

.1 All work of this section shall comply with the requirement of the most recent version of the Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) - Standard Specification – (Latest Edition) - Division 5 – Section 6 – Steel Guard Rail Systems and Wooden Guide Posts, except as amended herein.

1.2 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

1.3 MEASUREMENT FOR PAYMENT

.1 See Section 01 29 00 - Payment Procedures

1.4 REFERENCES

.1 Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) - Standard Specification – (Latest Edition) - Division 5 – Section 6 – Steel Guard Rail Systems and Wooden Guide Posts

Part 2 Products

2.1 MATERIALS

.1 Per the most recent version of the Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) - Standard Specification – (Latest Edition) - Division 5 – Section 6 – Steel Guard Rail Systems and Wooden Guide Posts.

Part 3 Execution

3.1 GENERAL

.1 As per the requirements of the most recent version of the Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) - Standard Specification – (Latest Edition) - Division 5 – Section 6 – Steel Guard Rail Systems and Wooden Guide Posts.

.2 150 mm x 150 mm posts and blocks will not be permitted. All posts and blocks shall be 200 mm x 200 mm.

.3 Bury both ends of guard rail, as per NSTIR standard drawing (HS520.)

END OF SECTION

Appendix A

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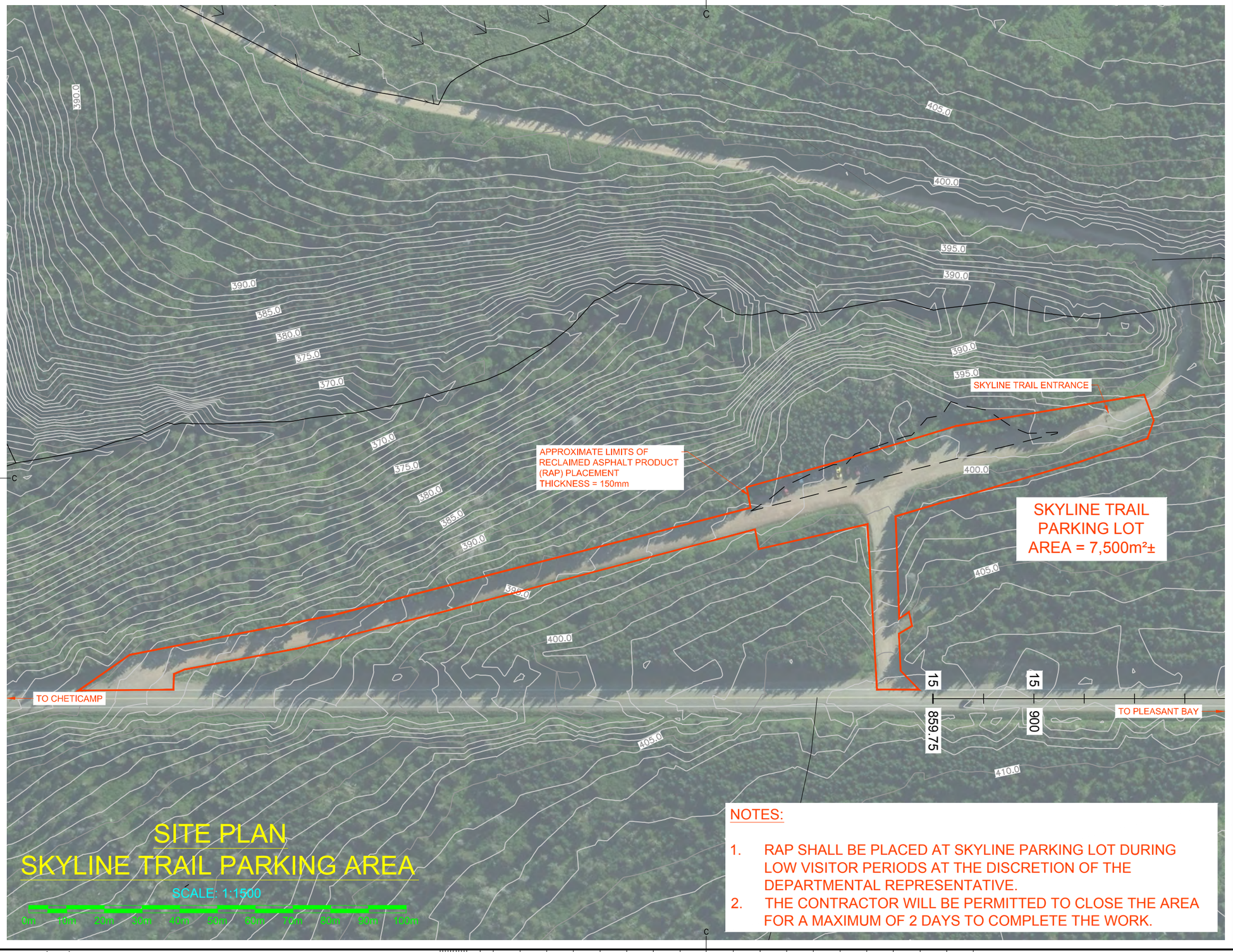


NOTES:

1. RAP SHALL BE PLACED AT SKYLINE PARKING LOT DURING LOW VISITOR PERIODS AT THE DISCRETION OF THE DEPARTMENTAL REPRESENTATIVE.
2. THE CONTRACTOR WILL BE PERMITTED TO CLOSE THE AREA FOR A MAXIMUM OF 2 DAYS TO COMPLETE THE WORK.

Parks Canada Parcs Canada

N

revisions		date

project / projet

CABOT TRAIL REHABILITATION
FRENCH TO MACKENZIE
CAPE BRETON HIGHLANDS NATIONAL PARK

drawing / dessin

SITE PLAN
SKYLINE TRAIL PARKING LOT
AREAS REQUIRED FOR RAP PLACEMENT

designed / conçu	Parks Canada	
date	DEC. 01, 201	
drawn / dessiné	JLD	
date	FEB. 20, 2017	
approved / approuvé	RMB	
date	FEB. 20, 2017	
Tender / Soumission	.	
PCA Project Manager / Administrateur de projets PCA		

project number / no. du projet: 1114

drawing no. / no. du dessin: Appendix A

PWGSC L3 (2004)

0 10 20mm 40 60 80 100 120 140 160 180 200mm

E-DRM/GDD-E: NOT IN SYSTEM

Appendix B

Photo 1 – Fishing Cove Long Trail Borrow Site, Station 24+500 RHS (November, 2016).

- Only approved fill material shall be used as directed by the Departmental Representative.
- Contractor is responsible for reinstatement and grading of area following construction, as directed by the Departmental Representative.

Photo 2 – Fishing Cove Long Trail Borrow Site, Station 24+500 RHS (November, 2016).

- Only approved fill material shall be used as directed by the Departmental Representative.
- Contractor is responsible for reinstatement and grading of area following construction, as directed by the Departmental Representative.

Photo 3 – Existing Entrance Access to Fishing Cove Long Trail Borrow Site, Station 24+500 RHS (November, 2016).

- Contractor is responsible for access, traffic control, and appropriate signage.
- Contractor is responsible for reinstatement and grading of area following construction, as directed by the Departmental Representative.

Appendix C

Basic Impact Analysis

French to MacKenzie Road Reconstruction (Phase II)

Cape Breton Highlands National Park of Canada

Cape Breton Field Unit

File #: CBFU2017-001

January, 2017

Parks Canada Parcs Canada

Canada

PROJECT TITLE	***French to MacKenzie Road Reconstruction (Phase II)***
PROJECT LOCATION	Cabot Trail Roadway CBHNPC (west)
PROJECT SITE	Cabot Trail – Benjie's Lake to French Mountain (top)
PROPONENT	Steve Babstock, Steve.Babstock@pc.gc.ca
INTERNAL PROJECT #	CBFU2017-001

PROJECT DESCRIPTION

This project calls for the reconstruction of a 6 kilometer section of roadway within Cape Breton Highlands National Park; beginning at the top of French Mountain and extending to Benjie's Lake parking lot. Work is scheduled for May 2017 and continue until October 2017. Reconstruction generally involves the removal and reinstatement of the existing pavement along the already established highway corridor.

PROJECT COMPONENTS

Proposed Highway Profile.

Cross-Section Details	***Minor (F) Collector***
Travel Lane Width	*3.3 m*
Paved Shoulder Width	*1.0 m*
Gravel Shoulder Width (useable)	*0.5 m*
Shoulder Rounding Width	*0.4 m*
Side Slope Rates Fill height < 3.0 m *Fill height > 3.0 m (Guardrail Required)*	*2:1* *2:1*
Back Slope (Common) *Back Slope (Rock)*	*2:1* *1:4*
Normal Crossfall	*2%*
Maximum Superelevation Rate	*6%*
Minimum Ditch Depth to Subgrade	*0.5 m*
Minimum Ditch Width	*1.0 m*

Canada Trail Parking Lot (new)

The proposal calls for the development of a new parking lot to be situated across from the French Mountain Emergency Shelter. This space, designed to accommodate 40 vehicles, will provide parking for hikers using the planned Canada Trail and the Skyline Trail (overflow).

Early investigations by Resource Conservation staff determined selection of this site would likely not impact Bicknell's Thrush, in terms of individual species and their habitat (pers. comm. J. Bridgland).

Potential 40m by 40m Parking Canada Trail (Background Imagery Summer 2015)

Fishing Cove River Culvert

Figure 1 Existing 2.2m culvert with corroded base.

The existing culvert is undersized, in poor condition and perched (i.e., elevated outlet). These conditions create periodic challenges for fish migrating in and around the area. For example, during dry periods, flows have been known to disappear entirely through the corroded base.

Design of culvert infrastructure at each watercourse crossing is in accordance with the *Guidelines for the design of fish passage for culverts in Nova Scotia* (DFO 2015). The replacement culvert will be designed for the 1:100 year flow return cycle with a 1:200 year check. Fish baffles will be to create a series of pools that will increase the hydraulic roughness of the culvert, increase water depth, and decrease velocity to facilitate fish passage.

The flow area occupied by the baffle was considered in detailed design, which can occupy between 15-30% of the cross sectional area of the culvert. A minimum flow depth of 150 mm will be designed above the notch sill to facilitate fish passage, designed to match the downstream hydraulic control riffle elevation.

Figure 2. Illustration of proposed new culvert with baffle inserts (not to scale)

Dissipation Pool

An energy dissipation pool will be installed at the outlet of the culvert to dissipate energy, reduce flow velocity thus reducing downstream scour and erosion, part of which usually contribute to perched culvert effects. The pool will be stabilized with rock rip-rap scour protection sized for the design flood event. A three boulder cluster of rocks in a triangle pattern will be installed in the pool. Minimum pool dimensions at the pool bottom is three times the culvert diameter (length), by two times the diameter design flow (width), and a minimum depth of 1 m. A layer of gravel is placed underneath the riprap as a filter to resist erosion. Similar to an energy dissipation pool at the outlet of the structure, an inlet pool can be constructed to create a depositional basin for sediment prior to entering the culvert.

Figure 2 Overview Dissipation Pool

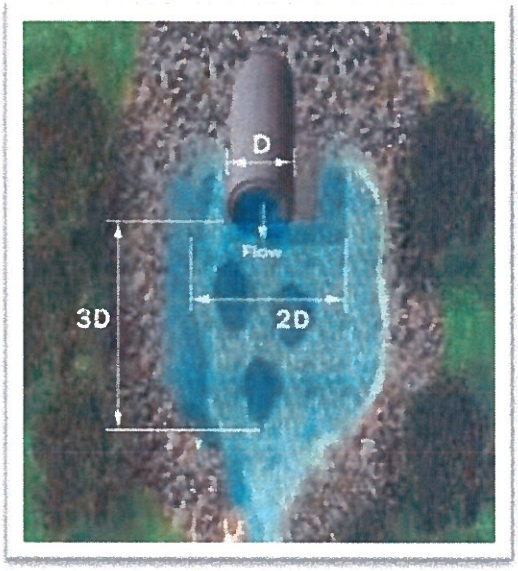


Figure 3a Cross-sectional

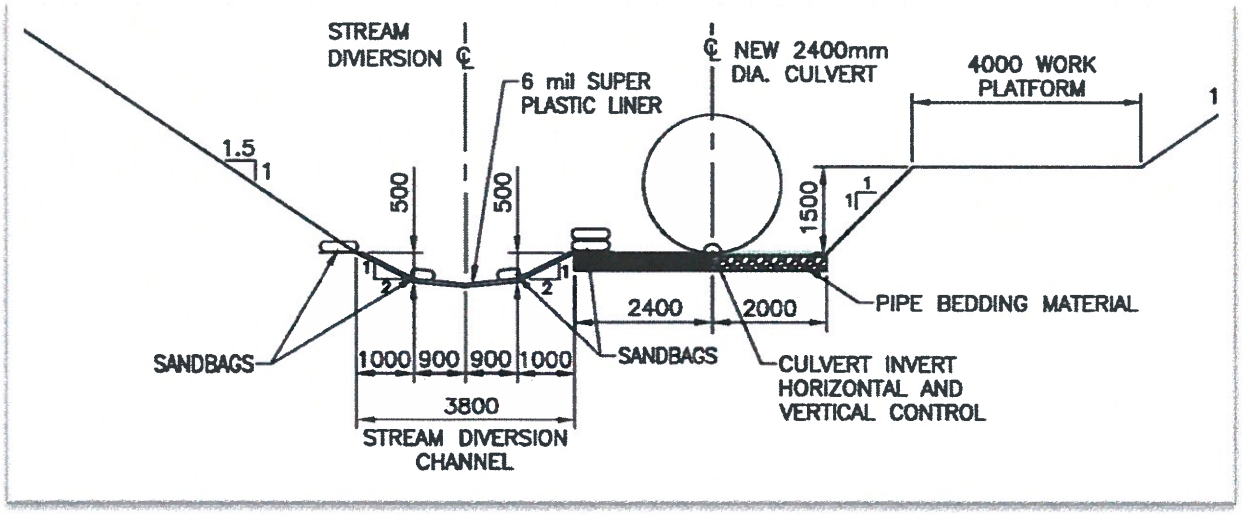
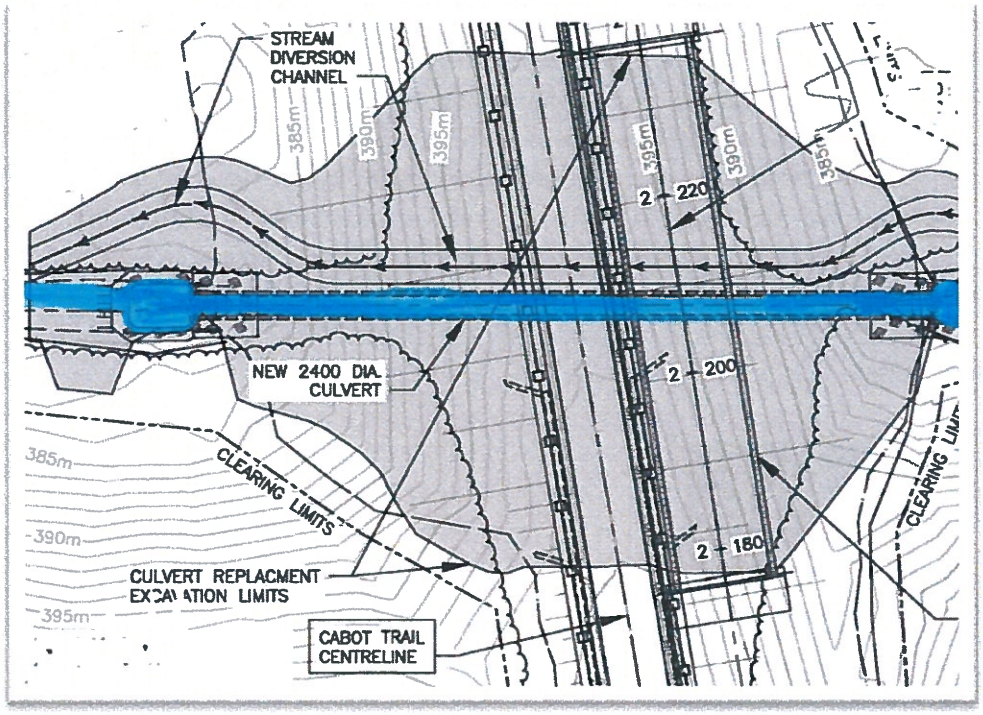


Figure 4b Longitudinal

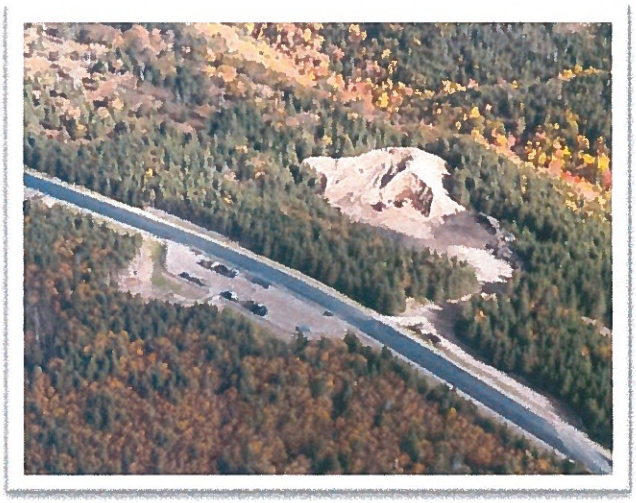


Riparian vegetation such as hydroseed, shrubs, and trees will be planted along the edge of the watercourse, in areas disturbed by construction above the highwater line to help stabilize banks and reduce erosion.

Stockpile Location: Fishing Cove Long

The stockpile situated at Fishing Cove Long-trail will be used for Phase II activities.

Figure 4. Fishing Cove Long Trail



PCA management will determine site remediation requirements and/ or the need for longterm usage following the completion of Phase II operations.

Project Activities

Sedimentation and Erosion Control

A sedimentation and erosion control plan will be developed for the project to use as a guideline during construction. Particular attention will be paid to the work involving culvert replacement, fibre optic cable relocation and material storage sites. The plan will outline measures to prevent soil erosion and sediment laden runoff from leaving the construction site. The plan will focus on prevention of soil erosion, with removal of sediment prior to discharge into any nearby watercourses.

Traffic Management

The overall principles for traffic management are to:

- maintain at least one-way traffic during construction by using appropriate control measures;
- manage and control vehicular movements through the site;
- maintain safety for workers, cyclists, motorists, pedestrians, etc.;
- provide appropriate access to the site for construction traffic;
- implement proper signage along the roadway during construction.
- restrict roadway construction to one work area with a maximum length of 1.0 km;
- limit all school bus delays to a maximum of 10 minutes;
- limit delays through project limits to a maximum of 10 minutes during peak visitation months (July/August). Up to 20 minute delays during non-peak periods*;
- open both driving lanes at night;
- use a follow-me pilot vehicle in the construction zone that can double as a shuttle for cyclists;
- require the use of electronic message boards as part of the contractor's traffic control plan;
- require driving lanes be surfaced with granular base on a daily basis to increase the flow of traffic;
- dust control measures will be implemented during periods of need.
- require a completion date no later than September 30, 2017 to facilitate placing the surface asphalt.

* Parks Canada (CBH) will be notified well in advance of any significant delays directly linked to this road reconstruction project (beyond the 10 minute standard during peak times).

Upon notification, park staff will ensure such delays are relayed to park visitors where deemed appropriate to do so.

Project Phasing (Sequencing)

Road reconstruction involves:

1. Surveying and delineation of limits
2. Mobilize equipment and material
3. Implement Traffic Control measures (e.g., site safety signage, directional barricades, etc.)
4. Install environmental control and prevention measures
5. Transport and stockpile of materials and equipment
6. Remove guard rails in areas deemed necessary
7. Relocate of fibre optic cable
8. Replace culverts
9. Mill asphalt
10. Place and compact roadway embankment, sub-base and base gravel
11. Asphalt operations
12. Construct parking lot
13. Construct berms
14. Install guard rails in areas where deemed necessary
15. Remediation of impacted sites (top-soiling, hydroseeding, revegetation as deemed necessary, etc.)
16. Demobilization and re-establishment of two-way traffic

It is anticipated the entire project will require 20 - 22 weeks of construction for the highway realignment. Posting for project tender is scheduled for February 2017.

More specific information of project activities is available upon request.

VALUED ECOSYSTEM COMPONENTS

Valued Ecosystem Components (VECs) are environmental elements with scientific, social, cultural, economic, archaeological or aesthetic importance. VECs with potential to interact with project components are listed below:

VECs	Potential Environmental Effects
Water Resources - Surface/ groundwater hydrology, surface/ groundwater quality and quantity	❑ Adverse modifications to surface drainage patterns ❑ Potential runoff, erosion, sedimentation, and altered drainage, ❑ Reduced water quality due to increased erosion, sedimentation, transportation of debris and contamination (i.e. from leaks and accidental spills, nutrients from improper wastewater disposal, etc.)
Land Resources - soil, topography, geology & landscape	❑ Changes in slopes, landforms, and landscape ❑ Soil compaction and rutting ❑ Soil contamination
Air & Noise - altered air quality and increased noise levels.	❑ Decreased ambient air quality (i.e. from dust, emissions, etc.) ❑ Increased ambient noise levels ❑ Increased levels of CO2 and other pollutants ❑ Increased localized temperatures
Flora and Fauna - aquatic & terrestrial species /population, communities & habitats	❑ Impacts vegetation in immediate or adjacent areas ❑ Introduction of invasive species ❑ Sensory disturbance causing displacement/habitat avoidance ❑ Wildlife habituation/attraction to artificial food sources ❑ Impeded/altered wildlife movement ❑ Loss of habitat (food & cover) ❑ Damage to nests/disruption of nesting animals
Human Environment - public safety, visitor experience, and cultural resources	❑ Disruption to park visitor experience due to noise, air and water quality, changed traffic patterns & aesthetics ❑ Increased risk to public and workers from project activities ❑ Loss/disruption of unknown heritage, archaeological and paleontological features

MITIGATION MEASURES (PCA general)

Aquatic Resources

1) Develop and implement a *Sediment and Erosion Control/ Prevention Plan* for areas of concern.
2) Erosion control mechanisms must be installed around work areas to for containment purposes.
3) Continually reassess as required *(i.e. traps, straws, bales, erosion blankets, silt fencing).*
4) Fuels, and other petroleum-based products must not be stored within 100m of any waterbody.
5) Minimize clearing, grubbing, and grading near waterbodies, including wetlands.
6) Apply road surface seal coats to dry surfaces and not prior to or during rainfall events.
7) Backfill and compact excavations as soon as reasonably possible.
8) Optimize degree of compaction to minimize erosion and allow for revegetation.

Land Resources

9) Maintain tidy storage areas, free from the accumulation of waste products, debris and litter.
10) All construction-generated waste must be properly disposed at an appropriate facility.
11) Construction sites must undergo thorough clean up at project completion.
12) Restrict travel to approved access routes along the construction zone.
13) Construction materials shall be stored within delineated work sites or designated areas.
14) Restore vegetation or surface cover as soon as possible to minimize duration of soil exposure.
15) Phase work to minimize duration of exposure of disturbed areas.
16) Minimize length of trench or area and exposure time.
17) Dewater all excavations at appropriate locations.
18) Ensure backfilling is undertaken using suitable materials and that adequate soil compaction is conducted to avoid ground subsidence.
19) Delay slope clearing until before scheduled construction. Reclaim upon work completion.
20) Prepare an *Emergency Response Plan* to cover such incidents as accidents and malfunctions, fires, high winds, heavy rainfall and runoff, etc.
21) Develop an onsite *Spill Response Plan* that ensures spill contingency resources and measures are in place before work begins.
22) Capture, contain, and clean up spills and leaks immediately.
23) All hazardous materials and wastes must be clearly labeled with WHMIS labels and information and handled as required.
24) If contamination is discovered, ensure prompt removal and disposal.

Air Quality

25) Equipment and vehicles must not be left idling between work periods.
26) Ensure materials being stored/transported are covered with tarps or equivalent material to contain fine particulate matter.
27) Avoid site preparation during dusty, dry, windy periods.
28) Confine "noise" activities to daytime hours as approved by Park authority.

Flora and Fauna

29) All construction equipment/materials must be cleaned prior to entering park to minimize the risk of introducing weeds and invasive species.
30) Use existing roadways/disturbed areas for site access and travel within the site.
31) Clearly mark vegetation that is not to be removed.
32) Minimize site clearing and retain vegetation when possible to reduce habitat loss/fragmentation.
33) If appropriate, re-establish native vegetation where it has been removed/damaged.
34) Where possible preserve wildlife trees if they are not hazard trees.
35) Depending on presence of wildlife, schedule high noise level activities and other intrusive construction activities to avoid critical life stages *(i.e. breeding, nesting, rearing, and migration).* (Consult Park personnel).
36) Survey area for active nests/dens prior to start of work.
37) Fence excavations to prevent injuries to wildlife.
38) Construct and orient fences in a manner that reduces impact to wildlife movement.
39) Feeding, enticement, or harassment of wildlife is strictly prohibited.
40) Toxic materials and any materials, which may pose a hazard to wildlife, must be stored in secured buildings or containers.
41) Store food, garbage, and other smelling products in sealed containers.
42) Pack all garbage out from the site daily, unless permanent garbage facilities exist at the site.
43) Minimize time boreholes/test pits remain open to reduce small terrestrial wildlife mortality.

Human Environment

44) Evaluate proposed site layout, access routes, and construction activities to minimize their visual impact.
45) Schedule construction activities to minimize vehicle conflicts.
46) When possible, use natural pruning methods, which minimize damage to trees and retain (as much as possible) their natural appearance and form (avoid leaving protruding half-cut branches).
47) Cut vegetation low/flush to the ground and avoid leaving pointy ended stumps.

Cultural Resources

48) Archaeological surveys should be conducted or at least considered prior to construction (Consult with Cultural Resource Personnel beforehand – Maura McKeough 902.733.3530).
49) Prior to construction, the new road corridor should be surveyed by qualified personnel to determine presence of cultural resources.
50) Should previously unknown archaeological resources/cultural artifacts be discovered, immediately cease work, and notify PCA archaeology (Maura McKeough – 902.733.3530).

Accidents and Malfunctions

The likelihood of accidents or malfunctions occurring and causing negative environmental impacts due to project activities is minimal. Potential accidents and malfunctions may occur at the staging

location and during the construction and operation phases. These may include: vehicle collisions; spills from equipment operated on site; structural failures; spills or leaks (from paint, chemicals, and concrete) into the terrestrial or aquatic environment. Project activities that could result in accidents and malfunctions largely relate to the operation and maintenance of heavy machinery, vehicles, and hand machinery. Structural failures, vehicle collisions, spills, and leaks would likely be attributed to human error. Spills resulting from improperly stored materials are also possible.

Accidents and malfunctions will be avoided through compliance with mitigation measures.

In addition to the above-noted mitigation, the Proponent is also expected to adhere to mitigation contained within Parks Canada's *National Best Management Practices for Roadway, Highway and Parkway and Related Infrastructure* where appropriate (Appendix 2).

CONSIDERATION OF THE NEED FOR PUBLIC PARTICIPATION & ABORIGINAL CONSULTATION

Due to the limited scope, public participation is not warranted. During project implementation, the project will likely cause temporary delays and inconveniencies. Upon completion, motorists will benefit in ways of increased safety of roadway and greater convenience (e.g., reduced need for continual delays associated with ongoing maintenance).

Formal Indigenous Consultation on this project was initiated with the representatives of the Mi'kmaq of Nova Scotia. Based on the Mi'kmaq response, several measures to mitigate impacts on archeological resources are set out in this BIA.

SITE INSPECTION

Periodic surveillance monitoring is required by qualified PCA personnel and may include daily site visits during work activity, attending related meetings and briefings, evaluating effectiveness of mitigation measures, and consultation with staff and work crews during work activity. The PCA environmental protection officer shall be continuously updated on project developments as they unfold.

EFFECT SIGNIFICANCE

The most important **positive** effect is the safer and improved highway conditions resulting in a more positive visitor experience as they travel through the park.

The most important **negative** effect are impacts to the natural environment associated affected by slightly increased roadbed footprint (i.e., Canadian Trail Parking Lot) (*Refer to Appendix 1 Effects Matrix).*

Taking into account the specific mitigation measures mentioned above, the project is not likely to cause significant residual environmental effects. Implementation of the chosen alternative would have a limited effect on natural resources and therefore no cumulative environmental impacts are forecasted.

DECISION

Taking into account implementation of mitigation measures outlined, the project is:

_____Unlikely to cause significant adverse environmental effects.

_____Likely to cause significant adverse environmental effects.

SIGNATURES AND APPROVAL

BIA Author

Name: Archie Doucette *Environmental Assessment Coordinator,* CBFU

Signature: Archie Doucette Date: 8 February 2017

BIA Recommender

Name: Maura McKeough, *A/ Cultural Resource Manager,* CBFU

Signature: _____ Date:

Project Functional Manager

Name: Steve Babstock, Highway Engineer

Signature: Steve Babstock Date: 10 February 2017

BIA Recommender

Name: Robert Howey, *Resource Conservation Manager,* CBHNPC

Signature: Rob Howey Date: 2017/02/16

Approved by:

Name: Éric Le Bel, *Superintendent CBHNPC*

Signature: _____ Date: 2017/02/17

Comment:

_____

_____

_____

_____

_____

APPENDIX 1

Effects Identification Matrix:

French to MacKenzie

Road Reconstruction

Effects Identification Matrix: ***French to MacKenzie Road Realignment Project (Phase II)***

Direct Effects (during preparation/construction phases)													
			Components potentially directly affected by the proposed project										
			Natural Resources					Cultural Resources		Visitor Experience			
			Air	Soil & geology	Hydrology	Flora	Fauna	~ Landscapes	~ Resources	Visitor access	Recreational	Viewscapes	Soundscapes	Visitor Safety
	Phase	Associated Activities												
Project Components	Preparation / construction	Material storage	√	√	√	√	√					√	√	√
		Clearing	√	√	√	√	√			√	√	√	√	√
		Detour set up	√	√	√	√	√			√	√	√	√	√
		Waste disposal	√	√	√	√	√						√	√
		Dredging	√	√	√	√	√			√	√	√	√	√
		Drainage	√	√	√	√	√			√	√	√	√	√
		Excavation	√	√	√	√	√	√	√	√	√	√	√	√
		Grading	√	√	√	√	√	√	√	√	√	√	√	√
		Backfilling	√	√	√	√	√	√	√	√	√	√	√	√
		Machinery use	√	√	√	√	√	√	√	√	√	√	√	√
		Transport - materials & equipment	√	√	√	√	√			√	√	√	√	√
		Sedimentation	√	√	√	√	√	√	√	√	√	√	√	√
		Use of chemicals	√	√	√	√	√			√	√	√	√	√
		Temporary facilities	√	√	√	√	√			√	√	√	√	√
		Vehicle traffic	√	√	√	√	√			√	√	√	√	√
		Decommissioning	√	√	√	√	√			√	√	√	√	√
		Remediation	√	√	√	√	√			√	√	√	√	√

APPENDIX 2

Parks Canada's
Best Management Practice
(*Environmental Protection Measures*)

By: Archie Doucette ***Environmental Assessment & Ecosystem Restoration***

Parks Canada Parcs Canada

Parks Canada National Best Management Practices

Roadway, Highway, Parkway and Related Infrastructure

Canada

By: Archie Doucette *Environmental Assessment & Ecosystem Restoration*

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

Approved by

Original signed by Mike Wong

Mike Wong, Executive Director Natural Resource Conservation Branch

Original signed by Kalvin Mercer

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

July 23, 2015

Date

Contents

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
    - Removal of Temporary Concrete Washout Facilities
    - Onsite concrete management
5. Paving, Resurfacing and Grading
    - Grading
    - Paving and Resurfacing
    - Pavement Marking and Barrier and Guardrail Reinstatement
6. Barriers and Guardrails
    - Repair, replacement and upgrades of barriers and guardrails
7. Vegetation Removal
    - Vegetation Removal
    - Grubbing
    - Brushing
    - Disposal of Vegetation Debris
    - Integrated Pest Management
8. Excavation, Soil Stripping and Overburden Removal
    - Excavation
    - Soil Stripping
    - Topsoil Salvage
    - Excavated Material Storage
    - Excess Material and Waste (overburden removal)
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
    - Topsoil Replacement
    - 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.

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[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 CO_2 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.

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[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.

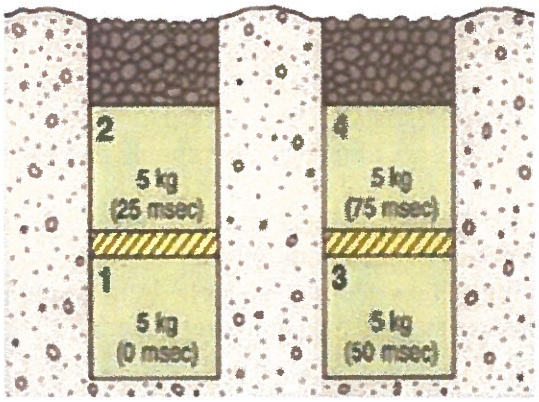
9.19. Avoid using explosives in or near water. Use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs. Blasting vibrations may also kill or damage fish eggs or larvae.

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 D

STATEMENT OF GENERAL CONDITIONS

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Stantec Consulting Ltd. and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Stantec Consulting Ltd.'s present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Stantec Consulting Ltd. is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state or province of execution for the specific professional service provided to the Client. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Stantec Consulting Ltd. at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Stantec Consulting Ltd. must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Stantec Consulting Ltd. will not be responsible to any party for damages incurred as a result of failing to notify Stantec Consulting Ltd. that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Stantec Consulting Ltd., sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Stantec Consulting Ltd. cannot be responsible for site work carried out without being present.

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

Rootmat	- vegetation, roots and moss with organic matter and topsoil typically forming a mattress at the ground surface
Topsoil	- mixture of soil and humus capable of supporting vegetative growth
Peat	- mixture of visible and invisible fragments of decayed organic matter
Till	- unstratified glacial deposit which may range from clay to boulders
Fill	- material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

Desiccated	- having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
Fissured	- having cracks, and hence a blocky structure
Varved	- composed of regular alternating layers of silt and clay
Stratified	- composed of alternating successions of different soil types, e.g. silt and sand
Layer	- > 75 mm in thickness
Seam	- 2 mm to 75 mm in thickness
Parting	- < 2 mm in thickness

Terminology describing soil types:
The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488) which excludes particles larger than 75 mm. For particles larger than 75 mm, and for defining percent clay fraction in hydrometer results, definitions proposed by Canadian Foundation Engineering Manual, 4th Edition are used. The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):
Terminology describing materials outside the USCS, (e.g. particles larger than 75 mm, visible organic matter, and construction debris) is based upon the proportion of these materials present:

Trace, or occasional	Less than 10%
Some	10-20%
Frequent	> 20%

Terminology describing compactness of cohesionless soils:
The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test (SPT) N-Value - also known as N-Index. The SPT N-Value is described further on page 3. A relationship between compactness condition and N-Value is shown in the following table.

Compactness Condition	SPT N-Value
Very Loose	<4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

Terminology describing consistency of cohesive soils:
The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests. Consistency may be crudely estimated from SPT N-Value based on the correlation shown in the following table (Terzaghi and Peck, 1967). The correlation to SPT N-Value is used with caution as it is only very approximate.

Consistency	Undrained Shear Strength		Approximate SPT N-Value
	kips/sq.ft.	kPa	
Very Soft	<0.25	<12.5	<2
Soft	0.25 - 0.5	12.5 - 25	2-4
Firm	0.5 - 1.0	25 - 50	4-8
Stiff	1.0 - 2.0	50 – 100	8-15
Very Stiff	2.0 - 4.0	100 - 200	15-30
Hard	>4.0	>200	>30

ROCK DESCRIPTION

Except where specified below, terminology for describing rock is as defined by the International Society for Rock Mechanics (ISRM) 2007 publication "The Complete ISRM Suggested Methods for Rock Characterization, Testing and Monitoring: 1974-2006"

Terminology describing rock quality:

RQD	Rock Mass Quality
0-25	*Very Poor Quality*
25-50	*Poor Quality*
50-75	*Fair Quality*
75-90	*Good Quality*
90-100	*Excellent Quality*

Alternate (Colloquial) Rock Mass Quality	
Very Severely Fractured	*Crushed*
Severely Fractured	*Shattered or Very Blocky*
Fractured	*Blocky*
Moderately Jointed	*Sound*
Intact	*Very Sound*

RQD (Rock Quality Designation) denotes the percentage of intact and sound rock retrieved from a borehole of any orientation. All pieces of intact and sound rock core equal to or greater than 100 mm (4 in.) long are summed and divided by the total length of the core run. RQD is determined in accordance with ASTM D6032.

SCR (Solid Core Recovery) denotes the percentage of solid core (cylindrical) retrieved from a borehole of any orientation. All pieces of solid (cylindrical) core are summed and divided by the total length of the core run (It excludes all portions of core pieces that are not fully cylindrical as well as crushed or rubble zones).

Fracture Index (FI) is defined as the number of naturally occurring fractures within a given length of core. The Fracture Index is reported as a simple count of natural occurring fractures.

Terminology describing rock with respect to discontinuity and bedding spacing:

Spacing (mm)	Discontinuities	Bedding
>6000	*Extremely Wide*	-
2000-6000	*Very Wide*	*Very Thick*
600-2000	*Wide*	*Thick*
200-600	*Moderate*	*Medium*
60-200	*Close*	*Thin*
20-60	*Very Close*	*Very Thin*
<20	*Extremely Close*	*Laminated*
<6	-	*Thinly Laminated*

Terminology describing rock strength:

Strength Classification	Grade	Unconfined Compressive Strength (MPa)
Extremely Weak	R0	<1
Very Weak	R1	1 – 5
Weak	R2	5 – 25
Medium Strong	R3	25 – 50
Strong	R4	50 – 100
Very Strong	R5	100 – 250
Extremely Strong	R6	>250

Terminology describing rock weathering:

Term	Symbol	Description
Fresh	W1	No visible signs of rock weathering. Slight discoloration along major discontinuities
Slightly	W2	Discoloration indicates weathering of rock on discontinuity surfaces. All the rock material may be discolored.
Moderately	W3	Less than half the rock is decomposed and/or disintegrated into soil.
Highly	W4	More than half the rock is decomposed and/or disintegrated into soil.
Completely	W5	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.
Residual Soil	W6	All the rock converted to soil. Structure and fabric destroyed.

STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.

Boulders Cobbles Gravel | Sand | Silt | Clay | Organics | Asphalt | Concrete | Fill | Igneous Bedrock | Meta-morphic Bedrock | Sedi-mentary Bedrock

SAMPLE TYPE

SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby tube or thin wall tube
DP	Direct-Push sample (small diameter tube sampler hydraulically advanced)
PS	Piston sample
BS	Bulk sample
HQ, NQ, BQ, etc.	Rock core samples obtained with the use of standard size diamond coring bits.

WATER LEVEL MEASUREMENT

measured in standpipe, piezometer, or well

inferred

RECOVERY

For soil samples, the recovery is recorded as the length of the soil sample recovered. For rock core, recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

N-VALUE

Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (63.5 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (300 mm) into the soil. In accordance with ASTM D1586, the N-Value equals the sum of the number of blows (N) required to drive the sampler over the interval of 6 to 18 in. (150 to 450 mm). However, when a 24 in. (610 mm) sampler is used, the number of blows (N) required to drive the sampler over the interval of 12 to 24 in. (300 to 610 mm) may be reported if this value is lower. For split spoon samples where insufficient penetration was achieved and N-Values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50/75). Some design methods make use of N-values corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to 'A' size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (300 mm) into the soil. The DCPT is used as a probe to assess soil variability.

OTHER TESTS

S	Sieve analysis
H	Hydrometer analysis
k	Laboratory permeability
γ	Unit weight
G_s	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
C	Consolidation
Q_u	Unconfined compression
I_p	Point Load Index (I_p on Borehole Record equals $I_p(50)$ in which the index is corrected to a reference diameter of 50 mm)

	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer

KM 21.9

AP-24
21+850

AP-23
21+400

AP-22
20+850

AP-21
20+500

AP-20
20+400

AP-19
19+900

AP-18
19+400

AP-17
18+900

AP-16
18+400

AP-15
17+850

AP-14
17+600

AP-13
17+350

AP-12
16+800

AP-11
16+300

AP-10
15+700

KM 15.9

AP-09
15+250

0 200 400m
SCALE

LEGEND:

AP-13 17+350 — BOREHOLE LOCATION STATION

NOTE: THIS DRAWING ILLUSTRATES INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. PROJECT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference: MAP DATA: GOOGLE, DIGITALGLOBE, DATASIO, NOAA, U.S. NAVY, NGA, GEBCO, LANDSAT -	**Scale:** 1:15,000 **Date:** 2016 05 27 **Dwn. By:** JCB **App'd By:** PMW	**Job No.:** 133347336 **Client:** PARKS CANADA -	CABOT TRAIL REHABILITATION FRENCH TO MACKENZIE - CAPE BRETON HIGHLANDS NATIONAL PARK	BOREHOLE LOCATION PLAN PROJECT 2 - KM 15.9 TO 21.9	**Dwg. No.:** 02

Stantec

V:\01216\active\other PC projects\133347336_cape_breton_national_park\05_drawings\dwg_jcb_20160526_133347336-01_bh_plan.dwg PRINTED: Jun 14, 2016

Stantec

AUGER PROBE RECORD

11 (16+300)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **11 (16+300)**

DATES: BORING **2016/05/20** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (180mm)			AS	1		
		GRANULAR BASE: red poorly-graded gravel with silt and sand			AU	2		
		SUBGRADE: brown silty sand with gravel (SM) - inferred cobbles			AU	3		
1					AU	4		
					AU	5		
					AU	6		
		End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

12 (16+800)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **12 (16+800)**

DATES: BORING **2016/05/20** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (215mm)			AS	1		
		GRANULAR BASE: red poorly-graded gravel with silt and sand			AU	2		
		SUBGRADE: brown silty SAND with gravel (SM) - inferred cobbles			AU	3		
1					AU	4		
					AU	5		
					AU	6		
		Auger Refusal: Inferred Bedrock End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

13 (17+350)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **13 (17+350)**

DATES: BORING **2016/05/20** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (195mm)			AS	1		
		GRANULAR BASE: red well-graded gravel with silt and sand			AU	2		
		SUBGRADE: brown silty sand with gravel (SM) - inferred cobbles			AU	3		
1					AU	4		
					AU	5		
		SUBGRADE: brown silty sand (SM)			AU	6		
		End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

14 (17+600)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **14 (17+600)**

DATES: BORING **2016/05/20** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (260mm)			AS	1		
		GRANULAR BASE: red poorly-graded gravel with silt and sand			AU	2		
		SUBGRADE: brown silty sand with gravel (SM) - inferred cobbles			AU	3		
1					AU	4		
					AU	5		
					AU	6		
		End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

15 (17+850)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **15 (17+850)**

DATES: BORING **2016/05/20** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (200mm)			AS	1		
		GRANULAR BASE: red poorly-graded gravel with silt and sand			AU	2		
		SUBGRADE: brown silty sand with gravel (SM) - inferred cobbles			AU	3		
1					AU	4		
					AU	5		
		SUBGRADE: brown silty sand (SM)			AU	6		
		End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

16 (18+400)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **16 (18+400)**

DATES: BORING **2016/05/19** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (290mm)			AS	1		
		GRANULAR BASE: red poorly-graded sand with silt and gravel			AU	2		
		SUBGRADE: brown silty sand with gravel (SM) - inferred cobbles			AU	3		
1					AU	4		
					AU	5		
					AU	6		
		End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

17 (18+900)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **17 (18+900)**

DATES: BORING **2016/05/19** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (240mm)			AS	1		
		GRANULAR BASE: red poorly-graded gravel with silt and sand			AU	2		
					AU	3		
		SUBGRADE: Brown silty sand with gravel - inferred cobbles			AU	4		
1					AU	5		
					AU	6		
		-wet						
		End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

18 (19+400)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **18 (19+400)**

DATES: BORING **2016/05/19** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (210mm)			AS	1		
		GRANULAR BASE: red poorly-graded gravel with silt and sand			AU	2		
		SUBGRADE: brown silty sand (SM) - inferred cobbles			AU	3		
1					AU	4		
					AU	5		
					AU	6		
		End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

19 (19+900)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **19 (19+900)**

DATES: BORING **2016/05/19** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (270mm)			AS	1		
		GRANULAR BASE: red poorly-graded gravel with silt and sand			AU	2		
		SUBGRADE: brown silty sand with gravel (SM) - inferred cobbles			AU	3		
1					AU	4		
					AU	5		
					AU	6		
		End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

20 (20+400)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **20 (20+400)**

DATES: BORING **2016/05/19** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (130mm)			AS	1		
		GRANULAR BASE: red poorly-graded gravel with silt and sand			AU	2		
		SUBGRADE: brown silty sand with gravel (SM) - inferred cobbles			AU	3		
1					AU	4		
					AU	5		
					AU	6		
		End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

21 (20+500)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **21 (20+500)**

DATES: BORING **2016/05/19** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (230mm)			AS	1		
		GRANULAR BASE: red poorly-graded gravel with silt and sand			AU	2		
					AU	3		
		SUBGRADE: brown silty sand with gravel (SM) - inferred cobbles -wet			AU	4		
1					AU	5		
					AU	6		
		End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

22 (20+850)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **22 (20+850)**

DATES: BORING **2016/05/19** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (230mm)			AS	1		
		GRANULAR BASE: red poorly-graded gravel with silt and sand			AU	2		
		SUBGRADE: light brown silty sand (SM)			AU	3		
		Auger Refusal: Inferred Bedrock End of Auger Hole			AU	4		
1					AU	5		
					AU	6		
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

23 (21+400)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **23 (21+400)**

DATES: BORING **2016/05/19** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (230mm)			AS	1		
		GRANULAR BASE: red well-graded sand with silt and gravel			AU	2		
					AU	3		
		SUBGRADE: brown silty sand with gravel (SM) - inferred cobbles			AU	4		
1					AU	5		
					AU	6		
		End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone

Stantec

AUGER PROBE RECORD

24 (21+850)

CLIENT **PARKS CANADA AGENCY** PROJECT No. **133347336**

LOCATION **Cabot Trail Km 15.9 to Km 21.9 (Project 2)** BOREHOLE No. **24 (21+850)**

DATES: BORING **2016/05/19** WATER LEVEL **Not Encountered** DATUM

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD
							mm	
0		ASPHALT CONCRETE (220mm)			AS	1		
		GRANULAR BASE: red poorly-graded sand with silt and gravel			AU	2		
		SUBGRADE: light brown silty sand (SM)			AU	3		
1					AU	4		
					AU	5		
					AU	6		
		End of Auger Hole						
2								

Undrained Shear Strength - kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

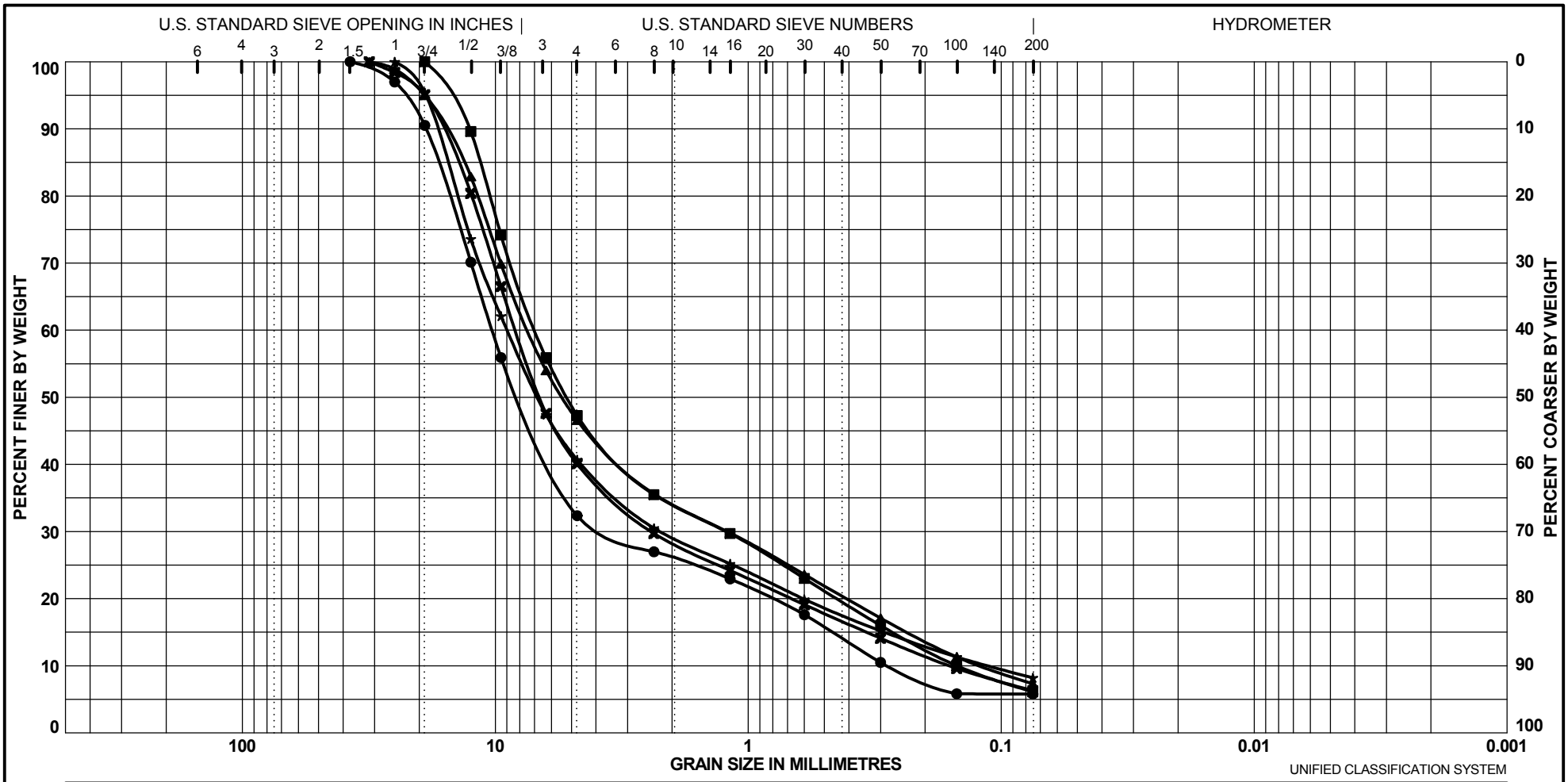
Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

✖ Fall Cone



COBBLES	GRAVEL		SAND			SILT and CLAY	
	coarse	fine	coarse	medium	fine	SILT	CLAY

Source		Depth	Description	W%	W_L	W_P	I_P	%Gravel	%Sand	%Silt	%Clay
●	11 (16+300)	0.2	GRANULAR BASE: Poorly-graded gravel with silt and sand					67.6	26.6	5.8	
■	12 (16+800)	0.3	GRANULAR BASE: Poorly-graded gravel with silt and sand					52.7	41.2	6.1	
▲	13 (17+350)	0.3	GRANULAR BASE: Well-graded gravel with silt and sand					53.4	39.3	7.3	
★	14 (17+600)	0.3	GRANULAR BASE: Poorly-graded gravel with silt and sand					59.3	32.5	8.2	
✖	15 (17+850)	0.3	GRANULAR BASE: Poorly-graded gravel with silt and sand					59.9	33.8	6.3	

Stantec

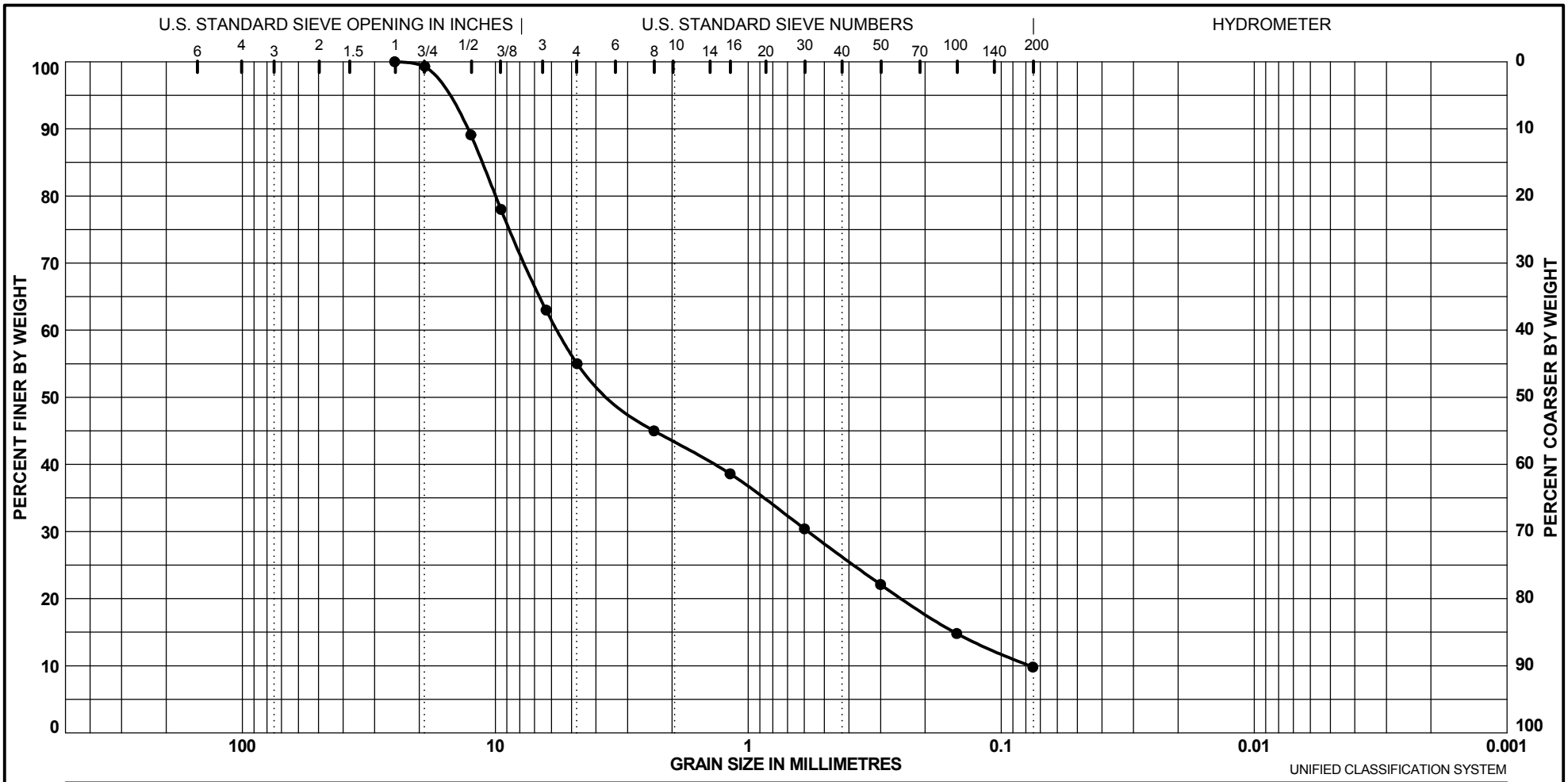
Project: **Cabot Trail**	Location: **Km 15.9 to Km 21.9 (Project 2)**
Job No.: **133347336**	Notes:
Date: **May 20, 2016**	**GRADATION CURVES**

COBBLES	GRAVEL		SAND			SILT and CLAY	
	coarse	fine	coarse	medium	fine	SILT	CLAY

Source		Depth	Description	W%	W_L	W_P	I_P	%Gravel	%Sand	%Silt	%Clay
●	16 (18+400)	0.3	GRANULAR BASE: Poorly-graded sand with silt and gravel					38.9	51.6	9.5	
■	18 (19+400)	0.3	GRANULAR BASE: Poorly-graded gravel with silt and sand					58.3	36.0	5.7	
▲	19 (19+900)	0.3	GRANULAR BASE: Poorly-graded gravel with silt and sand					61.2	33.9	4.9	
★	22 (20+850)	0.3	GRANULAR BASE: Poorly-graded gravel with silt and sand					46.0	44.8	9.2	
✖	23 (21+400)	0.3	GRANULAR BASE: Well-graded sand with silt and gravel					33.1	58.2	8.7	

Stantec

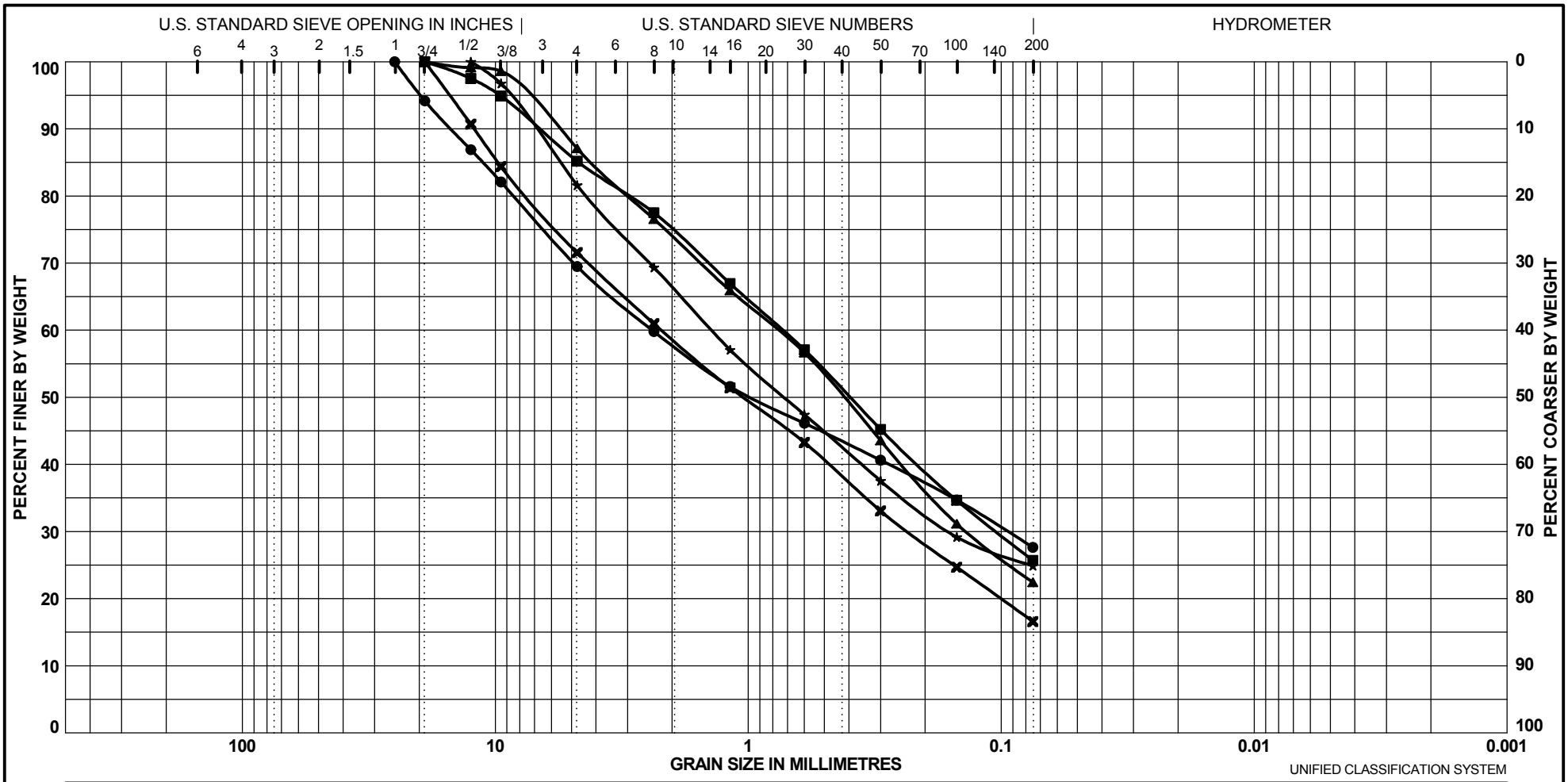
Project: **Cabot Trail**	Location: **Km 15.9 to Km 21.9 (Project 2)**
Job No.: **133347336**	Notes:
Date: **May 20, 2016**	**GRADATION CURVES**



Source	Depth	Description	W%	W_L	W_P	I_P	%Gravel	%Sand	%Silt	%Clay
● 24 (21+850)	0.3	GRANULAR BASE: Poorly-graded sand with silt and gravel					45.0	45.2	9.8	

Stantec

Project: **Cabot Trail**	Location: **Km 15.9 to Km 21.9 (Project 2)**
Job No.: **133347336**	Notes:
Date: **May 20, 2016**	**GRADATION CURVES**



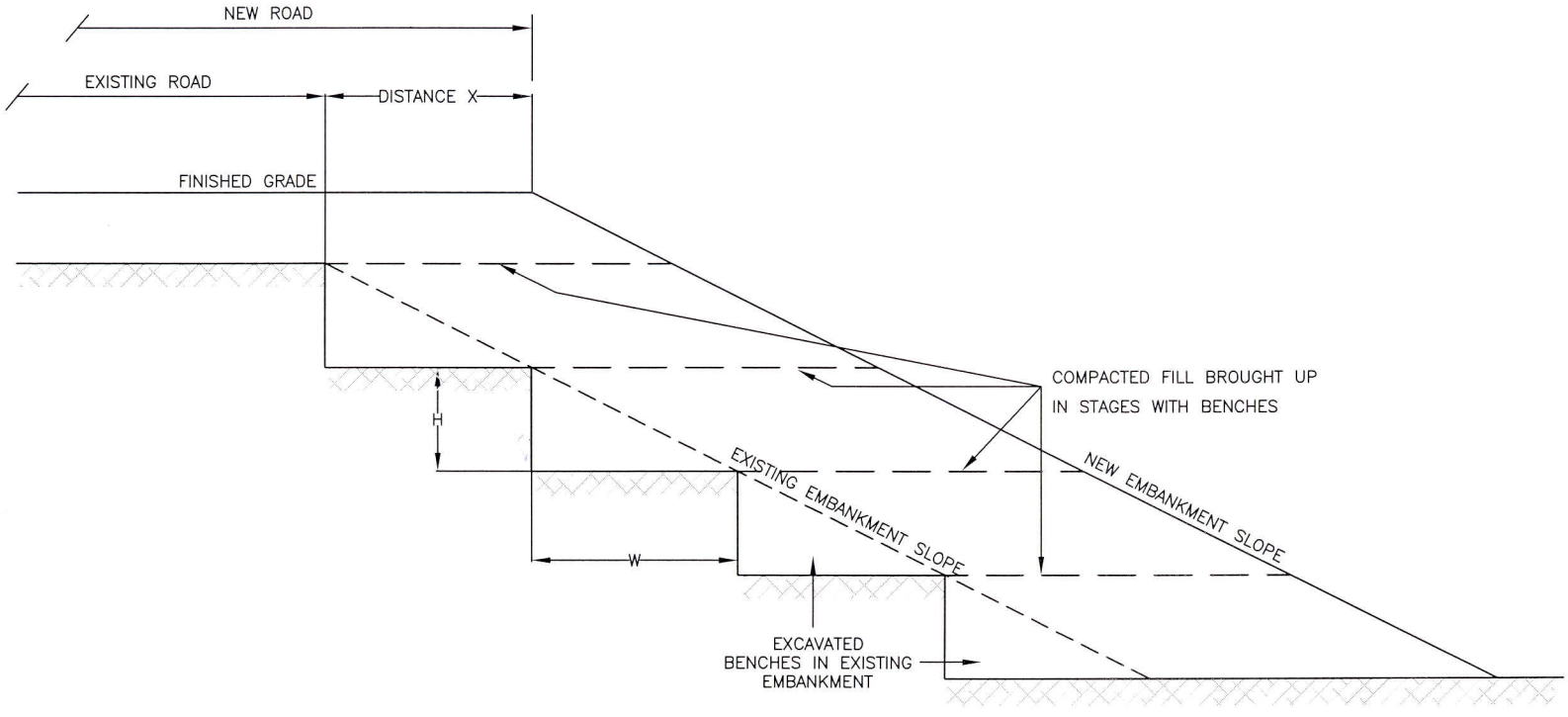
COBBLES	GRAVEL		SAND			SILT and CLAY	
	coarse	fine	coarse	medium	fine	SILT	CLAY

Source		Depth	Description	W%	W_L	W_P	I_P	%Gravel	%Sand	%Silt	%Clay
●	12 (16+800)	0.6	SUBGRADE: Silty sand with gravel	5.9				30.5	41.9	27.6	
■	15 (17+850)	1.5	SUBGRADE: Silty sand	14.0				14.8	59.5	25.7	
▲	18 (19+400)	0.9	SUBGRADE: Silty sand	7.6				12.9	64.7	22.4	
★	19 (19+900)	1.5	SUBGRADE: Silty sand with gravel	13.0				18.4	56.7	24.9	
✖	20 (20+400)	0.6	SUBGRADE: Silty sand with gravel	4.6				28.4	55.0	16.6	

Stantec

Project: **Cabot Trail**	Location: **Km 15.9 to Km 21.9 (Project 2)**
Job No.: **133347336**	Notes:
Date: **May 20, 2016**	**GRADATION CURVES**

Appendix E



MAXIMUM BENCH HEIGHT & WIDTH DIMENSIONS		
EXISTING SLOPES	FILLS >= 4.0m	FILLS < 4.0m
3:1 TO 2:1	W=2.5m H=VARIES	W=1.25m H=VARIES
2:1	W=VARIES H=1.25m	W=VARIES H=0.75m

NOTES:
1. THIS STANDARD APPLIES TO WIDENING OF EMBANKMENTS WHEN DISTANCE X >= 1.0m AT FINISHED GRADE LEVEL OF NEW ROADBED.
2. BENCHING NOT REQUIRED ON SLOPES FLATTER THAN 3:1 OR WHERE FIELD CONDITIONS SHOW IT UNNECESSARY AS DETERMINED BY THE ENGINEER.
3. BENCHES TO BE EXCAVATED ONE LEVEL AT A TIME AND COMPACTED FILL BROUGHT UP BEFORE NEXT LEVEL IS EXCAVATED.

Manager Highway Planning and Design

Director Highway Engineering Services

Executive Director Highway Engineering and Construction

NOVA SCOTIA
Transportation and Infrastructure Renewal

No.	REVISION

Scale : N.T.S.
Drawn by : M.LABRECHE
Checked by : K.BODDY
Date of Plan : AUG2009
File No. : S-2009-016

BENCHING OF EMBANKMENT SLOPES

Appendix F

APPENDIX F

Material Disposal Site Release

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 G

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.