SPECIFICATIONS

FOR

PAVEMENT REHABILITATION PROJECT

PARKS CANADA

L'ANSE AUX MEADOWS NATIONAL HISTORIC SITE, NL

PCA Project No.: 1348
Date: March 2023

Specifications
Issued for Tender

PARKS CANADA
Pavement Rehabilitation Project – L'Anse Aux Meadows, Newfoundland

Standing Offer Agreement: # 5P301 – 14 - 0001
PCA Project No.: 1348

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Parks Canada
Pavement Rehabilitation Project
L'Anse Aux Meadows National Historic Site, Newfoundland

GEMTEC Consulting Engineers and Scientists Limited Issued for Tender – Technical Specifications						
	Prepared By	Init	Date	Checked by	Init	Date
Civil						
Project Manager						

Appendices

List of Drawings

PART 1 - GENERAL

1.1 Description of Work

.1 The work will be carried out in L'Anse Aux Meadows, within the boundaries of these National Historic Sites.

.2 The work of this contract includes the provision of all materials, labour, equipment, and ancillaries, all as necessary for the completion of the work as indicated on the drawings and as described in the specifications and notes. Work on this project consists generally of, but is not limited to, the following:

.1 Supply and install all environmental protection measures required such as site erosion and sediment control measures, check dams, silt fencing, straw bales, vegetative stabilization and other measures, to be maintained for the duration of the project and removed following completion.

.2 Excavation, removal and disposal of existing culverts indicated for replacement on Route 436, and the supply and installation of new culverts (complete with geotextiles and rip-rap), the sizes and materials of which to be as designated on drawings.

.3 Pulverizing to 150 mm depth and fine grading of Route 436 to the limits shown on the drawings.

.4 Removal of existing guide rail and installation of new W-Beam guiderail on Route 436 to the limits shown on the drawings.

.5 Supply, placement and compaction of 150mm of Granular "A", 50 mm base course asphalt and 50 mm Surface Course asphalt and shouldering granulars on Route 436 to the limits shown on the drawings.

.6 Excavation, removal and disposal of existing culverts indicated for replacement on Norstead Road, and the supply and installation of new culverts (complete with geotextiles and rip-rap), the sizes of which to be as designated on

drawings.

.7 Cleaning of Norstead Road to the limits shown on the drawings.

.8 Supply, placement and compaction of 50mm Surface Course asphalt and shouldering granulars on Norstead Road to the limits shown on the drawings.

.9 Cleaning of L'Anse Aux Meadows asphalt to limits shown on the drawings.

.10 Supply, placement and compaction of 50mm Surface Course asphalt on the existing road and parking area at L'Anse Aux Meadows Visitor's Centre to the limits shown on the drawings.

.11 Excavate existing landscaped area to approved subgrade of L'Anse Aux Meadows Visitor's Centre parking area and fill with rock borrow material to subgrade elevation. Supply, place and compact 300mm of Granular "B", 150mm of Granular "A", 100mm of Surface Course asphalt to the limits shown on the drawings.

.12 For new parking areas at L'Anse Aux Meadows Visitor's Centre excavate to approved subgrade, supply, place and compact 300mm of Granular "B", 150mm of Granular "A", 100mm of Surface Course asphalt to the limits shown on the drawings.

.13 Scarifying to 100mm depth and fine grading of the L'Anse Aux Meadows bus loop area to the limits shown on the drawings.

.14 Supply, placement and compaction of 50mm of Granular "A", 50 mm base course asphalt and 50mm Surface Course asphalt and shouldering granulars L'Anse Aux Meadows bus loop to the limits shown on the drawings.

.15 For all roads and parking lots requiring them, paint pavement markings.

.16 Remove and replace all existing signs within the limits of grading.

.3 All work to be carried out in accordance with applicable federal and provincial regulations for those agencies having jurisdiction for the work. The work is subject to the National Park

Act and Regulations, Basic Impact Analysis (BIA), Canadian Environmental Protection Act, Canada Labour Code and the NL Occupational Health and Safety Act and Regulations.

1.2 Work Restrictions

.1 A maximum section of highway no longer than 3 km will be permitted to be under construction for the purpose of placing new asphalt pavement at any given time, with traffic control as required.

.2 A maximum of four (4) culvert replacement or construction locations will be permitted to be under construction at any given time, with traffic control as required.

1.3 Familiarization

.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 The chainages referred to are located along the centerlines of the road.

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

.4 Contractors, bidders or those they invite to site are to review specification Section 01 35 29 – Health and Safety Requirements before visiting site. Take all appropriate safety measures for any visit to site, both before and after acceptance of bid.

1.4 Interpretation of Documents

.1 Supplementary to the Order of Precedence article of the General Conditions of the Contract, the Division 01 sections take precedence over the technical specification sections in other Divisions of the Specification Manual.

1.5 Term Engineer

.1 Unless specifically stated otherwise, the term Engineer where used in the Specifications and on the Drawings shall mean the Departmental Representative as defined in the General

Conditions of the Contract.

1.6 Setting Out Work .1 The Departmental Representative will provide initial layout.

1.7 Measurement For Payment .1 Notify Departmental Representative sufficiently in advance of operations to permit required measurements for payment.

1.8 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.

1.9 Codes and Standards .1 Perform work in accordance with National Parks Act, Code of Practice of the Department of Labour, as it pertains to the Traffic Control Manual (Department of Transportation & Works) 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.

1.10 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.

.2 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.

.3 If Contractor fails to repair damage to the satisfaction of the Departmental Representative, the Departmental Representative may have repairs completed by others at the Contractor's expense.

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

.5 The Contractor shall ensure that no damage will be done to any existing underground telephone cables.

.6 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.

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

.1 Pit and Quarry Guidelines

.2 Environmental Construction Practice specifications

.8 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 offers.

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

.1 Contract drawings.

.2 Specifications.

.3 Addenda.

.4 Reviewed drawings.

.5 Change orders.

.6 Other modifications to Contract.

.7 Copy of approved work schedule.

.8 Field test reports.

.9 Manufacturer's installation and application instructions.

.10 Site specific Health and Safety Plan and

other safety related documents.

.11 Other documents as stipulated elsewhere in the Contract Documents.

1.12 Site Conditions

.1 The Contractor will be responsible to visit the site and review existing site conditions.

1.13 Departmental Representative

.1 Departmental Representative will be assigned after contract award.

1.14 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.

1.15 Sanitary Services

.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.

1.16 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.

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

1.17 Project Meetings

.1 Contractor will arrange project meetings and are to occur every two (2) weeks and assume responsibility for setting times and recording and distributing minutes.

.2 After receiving the Contractor's schedule, traffic control plan, health and safety hazard assessment, and environmental protection 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 health and safety, methods of construction, environment protection methods and traffic control.

.3 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.

.4 No work will begin until the preconstruction meeting is held, and all submittals have been approved.

.5 Following the pre-construction meeting and approval of submittals, the work will be carried out to meet the time restraints and have the project completed on time.

1.18 Cutting & Patching .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.

1.19 Existing Services .1 Carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to pedestrian and vehicular traffic.

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

.3 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.

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

.5 Record locations of maintained, re-routed and

abandoned service lines.

.6 Ensure that at least one (1) lane of alternating two-way traffic is maintained at construction sites at all times.

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

.8 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.

.9 Verify locations of any underground utilities.

1.20 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.

1.21 Relics, Antiquities and 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 the property of Canada.

1.22 National Park Act .1 For projects within boundaries of National Park, perform work in accordance with Canada National Parks Act and Regulations.

1.23 Measurement of Quantities .1 Linear: Items which are measured by metre or kilometre are to be measured along centreline of installation unless otherwise shown on

plans.

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

.3 Mass:
.1 Term "tonne" shall mean 1000 kg.
.2 Materials which are specified for measurement by mass shall be weighed on scales approved by and at locations designated by Departmental Representative. 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.

.4 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.

1.24 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 to the Departmental Representative prior to starting the work. The Contractor shall be responsible for obtaining all applicable permits, inspections and approvals required and shall pay all charges in connection therewith.

1.25 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 Newfoundland and Labrador Department of Transportation and Works.

1.26 Existing Survey

.1 Topographic survey used in the preparation of these Contract Documents was provided by PCA and supplemented by GEMTEC Limited.

1.27 Protection

.1 Store all materials and equipment to be incorporated into work to prevent damage by any means.

.2 Repair and replace all materials or equipment damaged in transit or storage to the satisfaction of the Departmental Representative and at no cost to Canada.

.3 Contractor will take adequate precautions to protect existing structures when operating tracked equipment.

.4 Exercise care so as not to obstruct or damage public or private property in the area.

.5 At completion of work, restore area to its original condition. Damage to ground and property will be repaired by Contractor. Remove all construction materials, residue, excess, etc., and leave site in a condition acceptable to Departmental Representative.

END OF SECTION

PART 1 – GENERAL

1.1 Submittals

.1 Upon acceptance of bid and prior to commencement of work, submit to Departmental Representative the following work management documents:
  .1 Work Schedule as specified herein.
  .2 Health and Safety Plan as specified in Section 01 35 29 – Health and Safety Requirements.
  .3 Environmental Protection Plan as specified in Section 01 35 43 – Environmental Procedures.
  .4 Traffic Control Plan as specified in Section 01 55 26 – Traffic Regulation.

1.2 Work Schedule

.1 Upon acceptance of bid submit:
  .1 Preliminary work schedule within 10 calendar days of contract award.

.2 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.

.3 Provide sufficient details in schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.

.4 Work schedule content to include as a minimum the following:
  .1 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones supported with;
    .1 Written narrative on key elements of work illustrated in bar chart, providing sufficient details to demonstrate a reasonable implementation plan for completion of project within designated time.
    .2 Generally Bar Charts derived from commercially available computerized project management system are

preferred but not mandatory.

.5 Work schedule must take into consideration and reflect the work phasing.

.6 Schedule work in cooperation with the Departmental Representative.

.7 Completed schedule shall be approved by Departmental Representative. When approved, take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.

.8 Ensure that all sub-trades and subcontractors are made aware of the work restraints and operational restrictions specified.

.9 Schedule Updates:
- .1 Submit when requested by Departmental Representative.
- .2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.
- .3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.

.10 Departmental Representative will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.

.11 In every instance, any change or deviation from the Work Schedule, no matter how minimal the risk or impact on safety or inconvenience to tenant or public might appear, will be subject to prior review and approval by the Departmental Representative.

1.3 Project Meetings

.1 Schedule and administer project meetings every two (2) weeks for entire duration of work.

.2 Prepare agenda for meetings.

.3 Notify participants by e-mail 4 days in advance of an unscheduled meeting date.

.1 Ensure attendance of all subcontractors.
.2 Departmental Representative will provide list of other attendees to be notified.

.4 Hold meetings at project site or where approved by Departmental Representative.

.5 Preside at meetings and record minutes.
.1 Indicate significant proceedings and decisions. Identify action items by parties.
.2 Distribute to participants by e-mail or by facsimile within 3 calendar days after each meeting.
.3 Make revisions as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 General Requirements

.1 The Form of Tender unit priced items.

.2 The total tendered price shall be the amounts calculated from the unit priced items based on the approximate quantities identified for each of the unit priced items.

.3 The Contractor in submitting their Tender for the project understand that they will only be entitled to payment under the unit priced items when prior written authorization has been received from the Departmental Representative for utilization and then only to the extent of the work authorized by the Departmental Representative.

.4 Additional instructions for measurement and/or payment for items of the work may be contained in specific sections of the Technical Specifications. In the case of a conflict between the instructions for measurement and payment contained in this section with that of any other section, the requirement of this section shall apply.

.5 The submitted tender prices will be inclusive of all costs for the complete supply and installation of all materials, labour and equipment required to complete the work. No separate payment will be made for any testing, inspections and approvals required by Contractor.

.6 All measurement shall be along a horizontal plane unless otherwise indicated.

1.2 Unit Price Items

.1 Terms of Payment: Lump Sum

.1 This Item includes:

.1 Mobilization and Demobilization for the project.

.2 Special Procedures for Traffic Control.

.1 Flag persons and traffic accommodation person(s)

.2 Provision, installation and maintenance of temporary traffic control devices, including detour signs, construction signage and

electronic message boards.
.3 Provision and maintenance of detours.
.4 Vehicles, equipment, supplies, and additional manpower required by traffic accommodations persons.
.3 Environmental Procedures.
.1 Installation and general maintenance of all erosion control measures in accordance with BIA, PCA's Best Practices and/or Departmental Representative.
.4 Construction Facilities.
.1 Construction Site Trailer.
.5 Weigh Scales
.1 A suitably installed and certified weigh scale.
.6 All other items not included in Unit Price Table.
.1 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 are considered items necessary to complete the work in accordance with the contract, drawings, and specifications.

.2 02 41 13.15 - Asphalt Pulverization

.1 Unit of Measurement: Square metres of surface area (m^2).

.2 This item includes the existing asphalt pavement and underlying granular materials will be pulverized in place and reshaped to suit the new subgrade.

.3 No adjustments will be made for extra depth of asphalt pulverization.

.3 31 23 10 - Ditching
.1 Unit of Measurements: Hour(hr) of crew time.
.2 Method of Measurement: From accepted time sheets, signed by Departmental Representative.

.3 Grubbing (Section 31 11 00) is considered incidental to this work and will not be measured for payment.

.4 This Item Includes a crew consisting of the following; One (1) 25 tonne excavator; Four (4) Tandem Dump Trucks; Five (5) Operators for above equipment, flagpersons, etc. as required; Equipment and personnel as required at the dump site including all costs to rehabilitate dump site to meet standards of those having jurisdiction. Ditching to be completed at project locations as directed by Departmental Representative.

.4 31 23 33.01 - Excavation, Trenching And Backfilling - Common Excavation

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

.2 Method of Measurement: Average end area method between cross sections taken before and after removal to lines and elevations indicated. Departmental Representative and Contractor shall agree on quantity measurements at the end of each day's work.

3. This item includes all labour, materials and equipment required to remove all common excavation/unsuitable materials and loading, hauling and disposing of the removed materials at approved disposal locations.

.5 31 23 33.01 - Excavation, Trenching And Backfilling - Rock Excavation

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

.2 Method of Measurement: Rock will be measured in its original position, by the cross-section method. Cross sections will be measured at five (5) metre intervals. Rock excavation cuts at culvert locations or for parking lot reconstruction shall be shattered to a depth of 500 mm below the subgrade for the full width of the cut section.

.3 This item includes: The unit price will be full compensation for material, equipment, and work required for rock removal excavation, shattering rock to a depth of 500 mm below top of subgrade

elevation indicated on the Drawing, filling the shattered surface by spreading placement of approved rock fill materials in fill areas along the proposed culvert locations and parking lot reconstruction to lines and levels indicated on the Drawings, loading and disposal of rock material off site. Remove rock 300mm below invert of culverts. Remove rock as required to construct backslopes and ditches, as indicated on the drawings or as directed by Departmental Representative in the Field. All approved disposal locations are to be outside of the Park boundary.

.6 31 23 33.01 - Excavation, Trenching And Backfilling - Rock Borrow
- .1 Unit of Measurement: Cubic metre (m^3)
- .2 Method of Measurement: Average end area method.
- .3 This item includes: supply, placement and compaction of rock borrow to backfill culvert as indicated on the drawings.
- .4 There shall be no payment for extra thickness of rock borrow or sub-base and base materials placed outside of limits. Whenever in the opinion of the Departmental Representative there is extra thickness, the appropriate weight will be deducted.

.7 31 37 00 – Rip Rap:
- .1 Unit of Measurement: Metric Tonne (1000kg).
- .2 Method of Measurement: Scale tickets signed by Departmental Representative, except as provided below.
- .3 This items include: supply, placement, hauling and compaction.
- .4 There shall be no payment for extra thickness of materials placed outside of limits. Whenever in the opinion of the Departmental Representative there is extra thickness, the appropriate weight will be deducted.
- .5 This item also includes geotextile at the locations of rip rap dispersion aprons.

.8 32 11 16.01 - Granular Sub-Base – Granular "B":
.1 Unit of Measurement: Metric Tonne (1000kg).
.2 Method of Measurement: Scale tickets signed by Departmental Representative, except as provided below.
.3 These items include: supply, placement, hauling and compaction of granular materials for culvert installations, shoulder reconstruction, roadway granular base and subbase. This item also includes grading and compaction of existing subgrade below granular materials prior to their installation to provide required subgrades.
.4 There shall be no payment for extra thickness of subbase and base materials placed outside of specified limits. Whenever in the opinion of the Departmental Representative there is extra thickness, the appropriate weight will be deducted.

.9 32 11 17 - Reshaping Granular Roadbed – Scarifying Existing Granulars – 100mm Depth:
.1 Unit of Measurement: Square metre(m^2).
.2 Scarify roadbed to width as indicated unless directed otherwise by Departmental Representative to minimum depth of 100 mm.
.3 This item includes: all scarifying, blading and trimming, fine grading, and compaction required to complete scarifying operations.

.10 32 11 23 - Aggregate Base Courses - Granular "A":
.1 Unit of Measurement: Metric Tonne (1000kg).
.2 Method of Measurement: Scale tickets signed by Departmental Representative, except as provided below.
.3 These items include: supply, placement, hauling and compaction of granular materials for culvert installations, shoulder reconstruction, roadway granular base and subbase. This item also includes grading and compaction of

existing subgrade below granular materials prior to their installation to provide required subgrades.

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

.11 32 12 13.16 - Asphalt Tack Coats

.1 Unit of measurement: square metre (m^2).

.2 Method of Measurement: horizontal surface area, rounded to one decimal place.

.3 This item includes: labour, materials and equipment used to clean the existing surface, and supply and apply tack coat. This item also includes tack coat application on any vertical joints at limits of surface areas.

.12 32 12 16 - Asphalt Concrete

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

.2 Method of Measurement: from accepted truck slips, except as provided below.

.3 There shall be no payment for extra thickness or extra width of asphalt placed. Wherever in the opinion of the Departmental Representative there is extra thickness, the appropriate weight will be deducted.

.13 Asphalt Cement

.1 Asphalt cement shall be paid by the tonnage delivered to the plant and incorporated and accepted into the work as shown on the bills of lading. The Departmental Representative reserves the right to have the asphalt cement weighed at the asphalt plant to verify quantities incorporated and accepted into the work. Adjustments will be made for the initial and final tank measurements corrected to 15 degrees C. See Section 32 12 16.

.14 32 17 23 - Pavement Markings:

.1 Measurement for payment for pavement markings, including reflective glass beads, shall be in lineal kilometres (km), measured along the centreline of the roadway, and will include centrelines to match existing layout (single solid), two shoulder lines, as well as all parking spaces, and intersections.

.2 Painted traffic signs, turning arrows, etc. are considered incidental and no additional payment shall be made for these items.

.3 No additional payment for traffic control associated with the application of pavement markings shall be made.

.4 All pavement markings to be in accordance with the Manual of Uniform Traffic Devices for Canada, latest edition. Pre-marking by contractor will be coordinated by the Departmental Representative. Temporary pavement markings shall be incidental to the Work.

.15 33 42 13 - Pipe Culverts

.1 Unit of Measurement: lineal metre (m).
  .1 Pipe Culvert Supply (lineal metre).
  .2 Pipe Culvert Install (lineal metre).

.2 Method of Measurement: along centerline of new culvert pipe, from end to end of culvert.

.3 Supply and installation of culverts will be measured and paid separately.

.4 Supply item includes: supply of new culvert pipe including couplers, bolts, etc. and delivery to site.

.5 Geotextiles (Section 31 32 19.01) are considered incidental to this item and will not be measured for payment.

.6 Payment for Culvert Installation item includes:
  .1 Dewatering of site and temporary water control works.
  .2 Removal and disposal of existing asphalt concrete by excavation

only. These areas are not to be milled.

.3 Excavation and removal of existing culverts and existing soil material, and disposal of any unsuitable material.

.4 Installation of new culvert.

.5 Providing end treatment/beveling of culverts as indicated.

.6 Supply and placement of backfill material (granulars, rock borrow) around culverts as detailed on drawings considered to be incidental to the culvert installation.

.7 All other cost not included with other units in this contract.

.16 34 17 13.25 - W-Beam Guiderail:

.1 Unit of Measurement: lineal metre (m).

.2 This item includes: removal and disposal of existing guide rail, the common excavation and backfill, supply and placing posts, steel W-beam guiderail, reflectors, hardware, all accessories, and surface reinstatement and all materials and labour for the finished product, including concrete.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 01 35 29 - Health and Safety Requirements.

.2 Section 01 35 43 - Environmental Procedures.

.3 Section 32 12 16 – Asphalt Paving.

.4 Section 33 42 13 - Pipe Culverts.

.5 Section 34 17 13.25 – Vehicle W-Beam Guide Rail.

.6 Section 01 55 26 – Traffic Regulation

.7 Section 01 74 21 – Construction/Demolition & Waste Management Disposal.

.8 Section 01 77 00 – Closeout Procedures.

.9 Section 01 78 00 – Closeout Submittals.

.10 Section 32 12 13.16 – Asphalt Tack Coat.

1.2 Administrative

.1 Submit to Departmental Representative submittals listed for review. 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 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 Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated 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 Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify that field measurements and affected adjacent Work are coordinated.

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

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative'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 Province of Newfoundland and Labrador, Canada.

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

.4 Allow 5 days for Departmental Representative to review each submission.

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

.6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify 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 Departmental Representative's review, distribute copies.

.10 Submit one (1) transparency on plastic film, six (6) prints and one (1) electronic copy of shop drawings for each requirement requested

1.4 Samples

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

.2 Deliver samples prepaid to Departmental Representative business address.

.3 Notify 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 Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in samples which 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 Workplace NL status.

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

END OF SECTION

1.1 Definitions

.1 NL OHS – NL Occupational Health and Safety Act.

.2 TCM – NL DWT Traffic Control Manual.

.3 Competent Person: means a person 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, and;
- .2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
- .3 Knowledgeable about potential or actual danger to health or safety associated with the Work.

.4 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.

.5 PPE: personal protective equipment

.6 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.

1.2 Submittals

.1 Make submittals in accordance with Section 01 33 00.

.2 Submit site-specific Health and Safety Plan prior to commencement of Work.
- .1 Submit within 10 work days of notification of Bid Acceptance. Provide 3 copies.
- .2 Departmental Representative will review Health and Safety Plan and provide comments.
- .3 Revise the Plan as appropriate and resubmit within 10 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 revisions 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.

1.3 Compliance Requirements

.1 Comply with Occupational Health and Safety Act for Province of Newfoundland and Labrador, and Occupational Health & Safety Regulations made pursuant to the Act.

.2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) as well as any other regulations made pursuant to the Act.

.1 The Canada Labour Code can be viewed at: www.http://laws.justice.gc.ca/en/L-2/

.2 A copy may be obtained at: Canadian Government Publishing Public Works & Government Services Canada Ottawa, Ontario, K1A 0S9 Tel: (819) 956-4800 (1- 800-635-7943) Publication No. L31-85/2000 E or F.

.3 Observe construction safety measures of:
.1 Part 8 of National Building Code
.2 Provincial Worker's Compensation Board.
.3 Municipal by-laws and ordinances.

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

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

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

.7 Comply with all works outlined in the Department of Transportation and Works, Traffic Control Manual, Revised April 2014.

1.4 Responsibility

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

.2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.

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 – Temporary Barriers and Enclosures 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 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. Provide security guard where adequate protection cannot be achieved by other means.

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 Filing of Notice

.1 File Notice of Project with pertinent Work NL authorities prior to beginning of Work.
  .1 Departmental Representative will assist in locating address if needed.

1.8 Permits

.1 Post permits, licenses and compliance certificates, specified in section 01 11 00 – General Instructions, at Work Site.

.2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

1.9 Hazard Assessments

.1 Perform site specific health and safety hazard assessment of the Work and its site.

.2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, including when new trades and subcontractors arrive on site.

.3 Record results and address in Health and Safety Plan.

.4 Keep documentation on site for entire duration of the Work.

1.10 Project/Site Conditions

.1 Following are potential health, environmental and safety hazards at the site for which Work may involve contact with:
  .1 Known latent site and environmental conditions:
    .1 Steep slopes and rock faces.
    .2 Streams, brooks and other water bodies.
    .3 Wildlife.

.2 Facility on-going operations:
  .1 Highway traffic.
  .2 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during Work.
  .3 Include above items in the hazard assessment of the Work.

1.11 Meetings

.1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:
- .1 Superintendent of Work
- .2 Designated Health & Safety Site Representative
- .3 Subcontractors

.2 Conduct regularly scheduled tool box and safety meetings during the Work in conformance with Occupational Health and Safety regulations.

.3 Keep documents on site.

1.12 Health And Safety Plan

.1 Prior to commencement of Work, develop written Health and Safety Plan and Safety Control Plan specific to the Work. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.

.2 Health and Safety Plan shall include the following components:
- .1 List of health risks and safety hazards identified by hazard assessment.
- .2 Control measures used to mitigate risks and hazards identified.
- .3 On-site Contingency and Emergency Response Plan as specified below.
- .4 On-site Communication Plan as specified below.
- .5 Name of Contractor's designated Health & Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company.
- .6 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes.
- .7 Ensure field laboratory meets or exceeds Section 111 Field Laboratory in the Government of Newfoundland and Labrador

Department of Transportation and Works Highway Design Division Specifications.

.3 On-site Contingency and Emergency Response Plan shall include:
- .1 Operational procedures, evacuation measures and communication process to be implemented in the event of an emergency.
- .2 Evacuation Plan: site and floor plan layouts showing escape routes, marshalling areas. Details on alarm notification methods, fire drills, location of fire fighting equipment and other related data.
- .3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.
- .4 Emergency Contacts: name and telephone number of officials from:
  - .1 General Contractor and subcontractors.
  - .2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.
  - .3 Local emergency resource organizations.
- .5 Harmonize Plan with Facility's Emergency Response and Evacuation Plan. Departmental Representative will provide pertinent data including name of PCA and Facility Management contacts.

.4 On-site Communication Plan:
- .1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.
- .2 List of critical work activities to be communicated with Facility Manager which have a risk of endangering health and safety of Facility users.

.5 Address all activities of the Work including those of subcontractors.

.6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at

Work Site.

.7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.

.8 Post copy of the Plan, and updates, prominently on Work Site.

1.13 Safety Supervision

.1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work. Representative to be trained in occupational health and safety procedures and practices.

.2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall 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 shall also be competent persons.

.5 Inspections:

.1 Conduct regularly scheduled safety inspections of the Work on a minimum bi-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.

1.14 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.

1.15 Minimum Site Safety Rules

.1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:
.1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses, hearing protection and high-visibility workwear.
.2 Immediately report unsafe condition at site, near-miss accident, injury and damage.
.3 Maintain site and storage areas in a

tidy condition free of hazards causing injury.
.4 Obey warning signs and safety tags.

.2 Brief persons of disciplinary protocols to be taken for non compliance. Post rules on site.

1.16 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.

1.17 Incident Reporting

.1 Investigate and report the following incidents to Departmental Representative:
.1 Incidents requiring notification to Provincial Department of Occupational Safety and Health, Workers Compensation Board or to other regulatory Agency.
.2 Medical aid injuries.
.3 Property damage in excess of $10,000.00,
.4 Interruptions to Facility operations resulting in an operational lost to a Federal department in excess of $5000.00.

.2 Submit report in writing.

1.18 Hazardous Products

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

.2 Keep MSDS data sheets for all products delivered to site.
.1 Post on site.
.2 Submit copy to Departmental Representative.
.3 For interior work in an occupied Facility, post additional copy in one or more publically accessible locations.

1.19 Blasting

.1 Blasting or other use of explosives is not permitted on site without prior receipt of written permission and instructions from Departmental Representative.

1.20 Powder Actuated Devices

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

1.21 Confined Spaces

.1 Abide by occupational health and safety regulations regarding work in confined spaces.

.2 Obtain an Entry Permit in accordance with Part XI of the Canada Occupational Health and Safety Regulations for entry into an existing identified confined space located at the Facility or premises of Work.
.1 Obtain permit from Facility Manager
.2 Keep copy of permit issued.

.3 Safety for Inspectors:
.1 Provide PPE and training to Departmental Representative and other persons who require entry into confined space to perform inspections.
.2 Be responsible for efficacy of equipment and safety of persons during their entry and occupancy in the confined space.

1.22 Site Records

.1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.

.2 Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.

1.23 Posting of Documents

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction.

.2 Post other documents as specified herein, including:
.1 Site specific Health and Safety Plan
.2 WHMIS data sheets
.3 Incident reports

.4 Tool box and safety meeting minutes.

1.24 Scalehouse

.1 Ensure Scalehouse is a sufficient distance away from scales to prevent roll-over accidents.

.2 Ensure scalehouse is equipped with washroom facilities and air conditioning/heat.

END OF SECTION

PART 1 - GENERAL

1.1 Precedence	.1	For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.
1.2 Related Sections	.1	Section 01 35 45 – Environmental Protection Refueling Vehicles.
	.2	Section 01 74 21 – Constructional Demolition Management and Disposal.
	.3	Appendix 2 – Basic Impact Analysis.
1.3 Fires	.1	Fires and burning of rubbish on site not permitted.
1.4 Disposal of Wastes	.1	Do not bury rubbish and waste materials on site unless approved by Departmental Representative.
	.2	Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
	.3	Dispose of uncontaminated construction/demolition material which cannot be recycled or reused, at an approved construction and debris disposal site.
1.4 Drainage	.1	Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
	.2	Do not pump water containing suspended materials into waterways, sewer or drainage systems.
	.3	Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
1.5 Site Clearing and Plant Protection	.1	Protect trees and plants on site and adjacent properties where indicated.
	.2	Wrap in burlap, 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.

.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 vegetation removal to areas indicated or designated by Departmental Representative.

.6 Vegetation and topsoil should not be removed to obtain fill for road construction purposes.

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

1.6 Work Adjacent to Waterways

.1 Do not operate construction equipment in waterways.

.2 Do not use waterway beds for borrow material without Departmental Representative's approval.

.3 Do not dump excavated fill, waste material or debris in waterways.

.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.

.7 Do not blast under water or within 100 m of indicated spawning beds.

.8 Temporary diversion ditches, approved by the

Departmental Representative, are to be plastic lined.

.9 Temporary storage sites for debris generated from clearing operations should be deposited away from watercourses and should be surrounded by a natural vegetative buffer.

.10 Do not pump or drain water containing suspended materials into waterways. Water containing suspended materials shall be pumped into vegetation a minimum of 30 m away from watercourses.

1.7 Pollution Control

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

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

.3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads. Chemicals used in dust control must have prior approval of the Departmental Representative.

1.8 General 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. Perform work in accordance with Canada National Parks Act and Regulations.

.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).

1.9 Site Set-up and Use

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

boundaries.

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

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

.4 Littering is prohibited.

.5 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.

1.10 Environmental Protection Plan

.1 The Contractor is required to submit a plan showing all pollution control measures that will be used to fulfill the requirements of the Environmental Protection Section. 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. The protection plan shall be submitted 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 will show sufficient detail on products to be used and physical placement on site to determine effectiveness of these items.

.3 The plan must cover all activities within the limits of all construction, laydown and traffic diversion areas.

1.11 Environmental Performance

.1 The Contractor is required to follow the Canadian Environmental Protection Act and Canadian National Parks Act.

.2 The Contractor is held responsible to ensure that all necessary permits related to Environmental Protection have been obtained and that necessary documentation is available on-site.

1.12 Vehicular Movements .1 Restrict movement of vehicles and equipment to existing disturbed areas (access roads, borrow pits, disposal areas and right-of-ways).

1.13 Storage and Handling of Fuels and Dangerous Fluids .1 Locate fuel storage facility a minimum of 100 m from any water body in an area approved by Departmental Representative and construct impermeable dykes so that any spillage is contained. Fueling of vehicles or equipment will not be permitted within 100 m of any water body. Maintenance of vehicles and equipment will be permitted only in designated areas as directed by the Departmental Representative.

.2 Exercise care in handling of fuels or dangerous materials to minimize potential for spills. Report immediately any spills to Departmental Representative. Contractor is responsible for responding immediately to any spill to minimize environmental damage and for clean-up, repair or rehabilitation resulting from any spills to the satisfaction of the Departmental Representative.

.3 Supply and maintain on site emergency response material to contain spills and minimize environmental damage, i.e. absorbent material, to the approval of Departmental Representative. Disposal of all contaminated material shall be off-site at an approved facility.

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

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

.6 The management of fuels, lubricants and chemicals must meet with the requirements of the Newfoundland & Labrador Department of Environment & Conservation and all other appropriate provincial and federal regulations.

.7 Fuel storage containers must be accompanied by impermeable structures that would provide containment of 125% of the container capacity in the event of a leak or spill.

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

.9 The Departmental Representative and the Park's Environmental Protection Officer (EPO) must be immediately contacted after a spill of fuel or lubricant, and after any amount of other chemical products has escaped.

.10 Storage of any fuel has to occur only in previously approved locations, and with Park consent. The Contractor must submit plans for fuel management and a Spill Contingency Plan seven days prior to the start of the Work. The Contractor is expected to be prepared to effect the containment and cleanup of all spills related to the Work.

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

.12 Emulsion storage tanker and transfer of

emulsion from tanker to spray vehicle are not permitted.

1.14 Erosion and Sediment Control

.1 Appropriate preventative controls should be in place at all times during construction to prevent undue erosion and sedimentation. The Contractor is required to provide to the Departmental Representative for approval ten (10) working days before start-up an erosion And sedimentation control plan, as part of the Environmental Protection Plan. The plan shall incorporate all necessary silt fences, silt traps, plastic lined trenches and ditches as approved by the Departmental Representative.

.2 The Contractor shall install and maintain all sedimentation and erosion control features for the duration of the project, in accordance with the approved plan. The Contractor shall remove all sedimentation and erosion control upon completion of the work and when requested by the Departmental Representative.

.3 Sediment fences and erosion control structures shall be constructed in roadside ditches or at culvert inlets prior to any excavation as directed by Departmental Representative.

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

.5 Prior to carrying out work, check long range weather forecast to ensure that there is adequate time before forecast of heavy rain storms to stabilize the work. Provide details of stabilization plan to Departmental Representative for review.

.6 Maintain a stockpile of appropriate erosion and environmental protection materials (e.g. silt fences, straw bales, wood chips, clean rock fill and aggregate base course) on site at all times.

.7 Install additional erosion control measures as required by site conditions to prevent sediment from entering drainage courses.

.8 Inspect erosion and sediment control measures on a daily basis and maintain as necessary.

1.15 Fisheries Regulations

.1 Obtain proper permits or authorization from Federal Department of Fisheries and Oceans and maintain a copy of said permit on site. Regulations stipulated in the Permit will be strictly enforced.

1.16 Relics and Antiquities

.1 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found on site or in structures to be demolished, shall remain property of Canada. Protect such articles and request direction from Departmental Representative.

.2 Give immediate notice to Departmental Representative if evidence of archaeological finds are encountered during construction and await his written instructions before proceeding with work in this area.

1.17 Treated Wood

.1 Workers shall be made aware of the possible health risks associated with exposure to CCA or creosote treated timber as well as the recommended safe practices for handling such materials.

.2 Disposal of treated wood wastes including sawdust must be outside of the site, and in accordance with all applicable Provincial and Municipal regulations. Similar attention must be given to disposal of any replaced guiderail posts which have been treated with creosote, which must also be removed from the park for disposal.

1.18 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.
.6 The Contractor or his employees shall immediately:
.1 Notify the Contractor's job superintendent.
.2 Call the local emergency services and give type of emergency.
.3 Notify the Departmental Representative and the Park's Environmental Protection Officer (EPO).

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

1.19 Site Decommissioning

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

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

1.20 Site Clearing

.1 Timber and vegetation shall not be cleared unless approved by Departmental Representative.

.2 Vegetation and topsoil shall not be removed to obtain fill for road construction purposes.

.3 All cleared trees and timber shall become the property of the Contractor, and are to be disposed of outside the park boundaries.

.4 All cut shrub vegetation and underbrush shall be chipped and evenly dispersed on-site or

dragged from sight into the adjacent forest edge. No burning of any vegetation or debris will be permitted in the park boundaries.

.5 No roadside vegetation clearing will be permitted during the annual songbird nesting period of June and July.

1.21 Non-Compliance of Environmental Requirements

.1 The failure to adhere to the environmental protection measures sited in the Basic Impact Analysis (BIA) or any clause of in Section 01 35 43 of the specifications, and following the issuances of an environmental non-compliance notice, the Contractor is subjected to permanent retention of sums applicable as a fine for each infraction factually noted by the Departmental Representative. The fine sum per infraction is based on the total construction contract value as stated below:

.1 Total Contract Value <$1M = $1,000
.2 Total Contract Value >$1M < $3M = $2,000
.3 Total Contract Value >$3M < $5M = $3,000
.4 Total Contract Value >$5M = $5,000

.2 Any infraction that shall not be corrected by the following day shall be subjected to an additional permanent retention of sums of the same amount. Each following day shall be subject to the same until the infraction is corrected. Additionally, any expense related to the damage caused to the environment shall be at the cost of the Contractor, notably an analysis, report and works required to manage restoration of fauna, flora and indemnities.

.3 In the case of non-execution by the Contractor of repairs or damages, the Departmental Representative shall proceed with corrective works and will charge the Contractor the cost of such work and delays as permanent retention of sums.

END OF SECTION

PART 1 - GENERAL

1.1 Refueling

.1 Refueling of equipment to be performed in accordance with the Basic Impact Analysis (BIA).

.2 Do not refuel equipment within 100 metres of any watercourse or storm water catch basin unless protection against spills is in place and location is approved by Departmental Representative.

.3 Use petroleum containers approved for products with no spill fill spouts for dispensing fuels. The sure pour nozzle to have self closing valve, prevent any flow of fuel until the nozzle is inserted into the receiving container. On removal from the receiving container the slide valve closes to eliminate any fuel spill. Nozzle to be equipped with its own automatic vent eliminating the need for the user to open or close air inlets on the pouring container.

.4 Nozzle to support the weight of the pouring container. Nozzles to automatically stop the flow when the receiving container becomes full. The nozzle to be such that it reduces evaporative losses of volatile organic compounds during the fuel transfer.

.5 All spills of hydrocarbon based products such as gasoline, kerosene, naphtha, lubricating oils, engine oils, greases and de-icing fluids or antifreeze **no** matter how large or small to be reported to Departmental Representative and the Park's Environmental Protection Officer (EPO).

.6 Oil changes or equipment repairs in the field or on Parks Canada land are not permitted.

.7 Refueling to be performed on level surfaces, PCC Portland cement concrete or HMAC surfaces when approved by the Departmental Representative unless otherwise directed.

.8 Contractor to have drip pans sized for amounts of product to be recovered and customized to fit under pieces of equipment to perform routine maintenance to equipment while maintaining equipment on property. Drip Pans to be used whenever leaving equipment on site or parking overnight when not in use.

.9 Parking of equipment on site to be on level ground in locations away from watercourses and as approved by Departmental Representative. Equipment with leaks or poor mechanical repair to be removed from site when so ordered by Departmental Representative.

1.2 Spill Control Kit

.1 Contractor to have at the work site a spill control kit consisting of the following minimum types of equipment:

.1 a spaded shovel;
.2 a stable broom;
.3 a broad nosed shovel;
.4 a container(s) suitable, compatible to and of sufficient size to contain petroleum products being used with equipment;
.5 Absorbents;
.6 rags;
.7 metal container for soiled rags;
.8 Booms when working next to a watercourse that will traverse the width of the watercourse by two times; and
.9 Spill control kit to be inspected and approved by both the Newfoundland and Labrador Department of Environment & Conservation and the Departmental Representative prior to Work commencing. Spill control kits to be available to Contractor employees at all areas where Work of the Contract is being performed and at all times during the course of the Contract.
.10 Contractor employees to be trained in the use of the spill control kit and the equipment they contain.

1.3 Spills

.1 Disposal of spilled materials to be off Parks Canada property and at approved locations for materials to be disposed of.

.2 When parking of equipment on site, the equipment is to be secured from entry, inspected for leaks and the ground protected from leaks.

.3 Contractor to protect all wells, catch basins, drywells, drains and watercourses from contamination in event of a spill.

.4 All equipment to be used for the Work of the Contract to be inspected by the Departmental Representative for leaks. Equipment not in good repair to be removed/repaired when directed by Departmental Representative.

.5 Spills to be reported immediately to Departmental Representative, the Park's Environmental Protection Officer (EPO) and the Newfoundland and Labrador Department of Environment and Conservation.

.6 Contractor to immediately remove as much or all of the contaminated soils as possible, from any spills created from Work of the Contractor.

.7 Contaminated soils/materials to be placed in containers compatible to the contaminants.

.8 Any remaining clean-up to be performed at no extra cost to Parks Canada. Clean-up to be to the Departmental Representative's satisfaction.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures

1.2 Inspection

.1 Give minimum 24 hours notice requesting inspection of Work designated for special tests, inspections or approvals by Departmental Representative or by inspection authorities having jurisdiction.

.2 In accordance with the General Conditions, Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.

.3 If Contractor covers or permits to be covered Work designated for special tests, inspections or approvals before such is made, uncover Work until particular inspections or tests have been fully and satisfactorily completed and until such time as Departmental Representative gives permission to proceed.

.4 Pay costs to uncover and make good work disturbed by inspections and tests.

1.3 Testing

.1 Tests on materials, as specified in various sections of the Specifications are the responsibility of the Department except where stipulated otherwise.

.2 Departmental Representative will engage and pay for service of Independent Inspection and Testing Agencies for purpose of inspecting and testing portions of Work except for the following which remain part of Contractor's responsibilities:

.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 Mill tests and certificates of compliance.

.4 Tests as specified within various sections

designated to be carried out by Contractor under the supervision of Departmental Representative.

.5 Additional tests specified in Clause 1.3.2.

1.5 Access to Work

.1 Facilitate Departmental Representative's access to Work. If part of Work is being fabricated at locations other than construction site, make preparations to allow access to such Work whenever it is in progress.

.2 Furnish labour and facility to provide access to the work being inspected and tested.

.3 Co-operate to facilitate such inspections and tests.

1.6 Rejected Work

.1 Remove and replace defective Work, whether result of poor workmanship, use of defective or damaged products and whether incorporated in Work or not, which has been identified by Departmental Representative as failing to conform to Contract Documents.

.2 Make good damages to new construction and finishes resulting from removal or replacement of defective work.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes
.1 Construction aids.
.2 Office and sheds.
.3 Parking.
.4 Project identification.

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

1.3 Related Sections
.1 Section 01 56 00 - Temporary Barriers and Enclosures.

1.4 References
.1 Canadian General Standards Board (CGSB)
.1 CGSB 1-GP-189M-84, Primer, Alkyd, Wood, Exterior.
.2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA International)
.1 CAN3-A23.1-/A23.2-94, Concrete Materials and Methods for Concrete Construction/Method of Test for Concrete.
.2 CSA-0121-M1978, Douglas Fir Plywood.
.3 CAN/CSA-Z321-96, Signs and Symbols for the Occupational Environment.

1.5 Installation and Removal
.1 Provide construction facilities in order to execute work expeditiously.
.2 Remove from site all such work after use.

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

1.7 Construction Parking
.1 Parking will be limited to Contractor vehicles and equipment required to carry out work only, provided it does not disrupt performance of

Work.

.2 Provide and maintain adequate access to project site.

.3 Build and maintain temporary roads where indicated or directed by Departmental Representative and provide snow removal during period of Work.

.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 Contractors' use of roads.

1.8 Security

.1 Contractor shall provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays (24 hours per day, 7 days per week).

1.9 Departmental Representative's Site Offices

.1 Contractor to provide Departmental Representative's office trailer/space. Minimum office trailer/space size is 40 m^2.

.2 Contractor to arrange and pay for phone, fax machine, internet connection and photocopier in Departmental Representative's office for its exclusive use. Long distance calls placed on this phone and fax to be paid for by Departmental Representative. Replacement cartridges for printer and photocopier to be supplied by contractor.

.3 Contractor to equip office with washroom, kitchen and one separate office, 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.

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

.5 Supply of the Departmental Representative's office, supplies and services will be incidental to the work. Payment to be included in the lump sum portion of the work.

.6 Contractor to ensure site office is supplied and operational within 14 days after contract award.

.7 Provide garbage and cleaning services biweekly.

.8 Maintain inside air temperature at 20 degrees.

1.10 Testing Laboratory

.1 Provide testing laboratory at aggregate production site and at asphalt concrete plant for exclusive use of Departmental Representative.

.1 Provide water, electrical power and propane to testing laboratory at aggregate production site, and at asphalt concrete plant.

.2 Notify Departmental Representative sufficiently in advance of operations to allow for assignment of Laboratory personnel and scheduling of tests.

.3 No separate payment to be made for Testing Laboratory. Cost shall be deemed incidental to Contract, and deemed to be included in the lump sum portion of the work.

.4 If testing laboratory at aggregate production site is required at the same time as testing laboratory at asphalt concrete production site, provide additional laboratory as required.

.5 Maintain inside air temperature at 20 degrees.

.6 Refer to the DTW Specifications Book, standard drawing 1203, for minimum size and equipment requirements.

1.11 Equipment, Tool and Materials Storage

.1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities
.

1.12 Sanitary Facilities

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

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

1.13 Construction Signage

.1 No other signs or advertisements, other than warning signs, are permitted on site.

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

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

1.14 Weigh Scale and Scale House

.1 The scales shall be of such capacity to accurately weigh any single loaded truck arriving on the site. The contractor is advised that split weighing will not be permitted under any circumstances. The vehicle being weighed must be fully supported by the scale platform. Split or axle weighing is a method to be used only for highway weight restriction control.

.2 The scale shall be equipped with a portable scale house complete with furniture and adequate provision for heat, air conditioning and light.

.3 The Contractor shall periodically clean the scale house and maintain all lights, air conditioning, and heating in good working condition at all times when the scales are in use.

.4 The scale platform and mechanism shall at all times be maintained clean and free from encumbrances such as gravel, asphalt, snow, and ice.

.5 Scale houses must be equipped with suitable washroom facilities that meet the OHS Act and Regulations under Sections 13 and 14 of the Regulations. These facilities must be located within 100m of the scale house.

.6 These facilities must be provided for use of the Department of Transportation and Works employees only for the duration of the project while scales are being used. These facilities must be cleaned twice weekly and in the case of a portable toilet, emptied of sewage as well. Contractor must also supply toiletries for the facility.

.7 Ensure scale house is sufficient distance away from scales to prevent roll-over accidents.

END OF SECTION

PART 1 - GENERAL

1.1 Description

.1 This section is to provide traffic control as stipulated in the Department of Transportation and Works Traffic Control Manual (TCM).

.2 Given the nature of the highway, its critical transportation link, effect on motorists, etc. it is imperative that Park personnel be kept notified as to the number of construction areas, their locations, duration of work, etc. This information must be provided by the contractor to the Park Communications staff on an ongoing basis.

.3 A Traffic Control Plan must be approved by the Departmental Representative prior to commencing any work. Traffic Control Plan to be submitted prior to the pre-construction meeting.

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

1.2 Related Work

.1 Section 01 11 10 - General Instructions.

.2 Section 01 35 29 - Health and Safety Requirements.

.3 Section 01 56 00 - Temporary Barriers and Enclosures.

.4 Section 32 15 60 – Roadway Dust Control.

1.3 Reference Standard

.1 Government of Newfoundland and Labrador Department of Transportation and works, Highway Design Division.

.1 Traffic Control Manual (TCM), latest edition.

1.4 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 present minimum of interference and hazard to travelling public.
- .2 Keep equipment units as close together as working conditions will permit and preferably on same side of travelled way.
- .3 Do not leave equipment on travelled way overnight.

.3 Do not close any lanes of roadway without Approval of Departmental Representative. Before re-routing traffic, erect suitable signs and devices in accordance with instructions contained in the TCM. Provide sufficient crushed gravel to Ensure a smooth riding surface during work.

.4 Keep travelled way well graded, free of pot Holes and of sufficient width that required number of lanes of traffic may pass.

.5 Ensure at least one (1) lane of alternating two-way traffic at all times.

.6 When directed by Departmental Representative, provide well graded, detours or temporary roads to facilitate passage of traffic around restricted construction area. Provide and maintain signs and lights and maintain roadway.

.7 Provide and maintain reasonable road access and egress to property fronting along or in Vicinity of work under Contract unless approved otherwise by Departmental Representative.

.8 All flag persons and traffic control personnel shall have successfully completed a traffic control training course approved by the

Workplace Health, Safety and Compensation Commission of Newfoundland and Labrador. Proof of training for all persons shall be available on site at all times.

1.5 Informational and Warning Devices

.1 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from project work which may require road user response.

.2 All traffic signs are to be bilingual or Symbolic and shall be Level 1 reflectivity.

.3 Supply and erect signs, declinators, barricades and miscellaneous warning devices as specified in TCM.

.4 Place signs and other devices in locations recommended in the TCM.

.5 The contractor shall provide an Accredited Sign Supervisor to be on site at all times when active construction is taking place. The Accredited Traffic Control Sign Supervisor will be responsible to supervise the placement and dismantling of all temporary condition signs and devices that indicate to the road user that highway construction activity exist and also to ensure that proper traffic control procedures are carried out in accordance with the TCM. The Accredited Sign Supervisor is considered part of the contractor's supervision and administration staff and compensation for the provision this individual is considered incidental to the work.

.6 A Traffic Control Plan must be approved by the Departmental Representative prior to commencing any work.

.7 Continually maintain traffic control devices in use by:

.1 Checking signs daily for legibility,

damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.

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

.8 A portable variable message sign will be required for the duration of the project.

1.6 Control of Public Traffic

.1 Provide traffic control personnel who have valid provincial certification and are trained in accordance with and properly equipped as specified in the TCM, in following situations:

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

.2 When it is necessary to institute one way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.

.3 When workers or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.

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

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

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

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

.3 All construction vehicles shall operate in accordance with and are subject to traffic

control restrictions and operations in place on the project.

.4 In addition to traffic control during the normal hours of work, the contractor shall have a responsible person on site at all times to monitor that the traffic signage is working properly (including nights, weekends and holidays).

.5 Flagpersons are to be equipped with portable radios only, not cellular devices. Any flagperson using cellular devices, except for emergency use only, shall be deemed incompetent and shall be removed from site immediately. PCA shall not be held responsible for lost time incurred due to the removal of such an individual.

1.7 Traffic Management Plan Requirement

.1 Contractor to provide a Traffic Control plan, prior to construction, for approval by the Departmental Representative.

1.8 Operational Requirements

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

.1 In accordance with TCM.

.2 Individual traffic control zone delay shall not exceed **10 minutes**.

.2 Maintain existing conditions for traffic crossing right-of-way containing work except that, when required for construction under this Contract and when measures have been taken as specified herein and approved by Departmental Representative, to protect and control public traffic.

.3 A maximum section of highway no longer than 8 km will be permitted to be under construction for the purpose of pulverization of old

asphalt at any given time, with traffic control as required.

.4 A maximum section of highway no longer than 2 km will be permitted to be under construction for the purpose of placing new asphalt pavement at any given time, with traffic control as required.

.5 A maximum of four (4) culvert replacements will be permitted to be under construction at any given time, with traffic control as required.

END OF SECTION

PART 1 - GENERAL

1.1 Precedence

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

1.2 Related Sections

.1 Section 01 52 00 - Construction Facilities.

.2 Section 01 55 26 – Traffic Regulation.

1.3 References

.1 Canadian General Standards Board (CGSB)
- .1 CGSB 1.189M-84, Primer, Alkyd, Wood, Exterior.
- .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA International)
- .1 CSA-O121-M1978, Douglas Fir Plywood.

.3 Government of Newfoundland and Labrador, Department of Transportation and works, Highway Design Division.
- .1 Traffic Control Manual (TCM), latest edition.

1.4 Installation and Removal

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

.2 Remove from site all such work after use.

1.5 Guard Rails and Barricades

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.

.2 Provide as required by governing authorities.

.3 Provide Traffic Control guard rails, barricades and delineators in accordance with Section 01 55 26 – Traffic Regulation.

1.6 Access to Site

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

1.7 Public Traffic Flow	.1	Provide Traffic Control in accordance with Section 01 55 26 – Traffic Regulation.
1.8 Fire Routes	.1	Maintain access to properties for use by emergency response vehicles.
1.9 Protection for Off-Site and Public Property	.1	Protect surrounding private and public property from damage during performance of Work.
	.2	Be responsible for damage incurred.

END OF SECTION

PART 1 - GENERAL

1.1 Precedence

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

1.2 Reference Standards

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

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

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

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

.5 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

1.3 Quality

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

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove

and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

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

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

.5 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.

1.4 Availability

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

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

1.5 Storage, Handling and Protection

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

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

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

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

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

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

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

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.6 Transportation

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

1.7 Manufacturer's Instructions

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

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

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

1.8 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.

1.9 Co-Ordination

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

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

1.10 Remedial Work

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

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

1.11 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.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections .1 Section 01 78 00 - Closeout Submittals.

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

1.3 References .1 Owner's identification of existing survey control points and property limits. Departmental Representative is responsible for surveys and layout of work.

1.4 Survey Reference Points .1 Contractor is to locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

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

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

.4 The contractor is responsible to hire surveyor to replace control points in accordance with original survey control, if disturbed unnecessarily during construction activities.

1.5 Survey Requirements Departmental Representative will:

.1 Establish permanent bench marks on site, as required, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.

.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Stake for grading, fill and topsoil placement.
.4 Stake slopes.
.5 Establish pipe invert elevations and location

of any exposed pipe not being removed under this contract.

.6 Record elevation and location of all existing and installed end caps of abandoned underground services.

.7 Provide coordinates, elevations and dimensions in the field, as required by the Departmental Representative.

1.6 Existing Services

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

1.7 Records

Departmental Representative will:

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

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

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

END OF SECTION

PART 1 - GENERAL

1.1 Precedence

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

1.2 Related Section

.1 Section 01 77 00 - Closeout Procedures.

1.3 Project Cleanliness

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

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

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

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

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

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

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

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

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

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

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

.7 Remove dirt and other disfiguration from exterior surfaces.

.8 Sweep and wash clean paved areas.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

1.2 Precedence

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

1.3 Definitions

.1 Materials Source Separation Program (MSSP): Consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.2 Recyclable: Ability of product or material to be recovered at end of its life cycle and remanufactured into new product for reuse by others.

.3 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.4 Recycling: Process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.5 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from remodeling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

.2 Returning reusable items including pallets or unused products to vendors.

.6 Salvage: Removal of structural and nonstructural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.7 Separate Condition: Refers to waste sorted into individual types.

.8 Source Separation: Acts of keeping different types of waste materials separate beginning from first time they became waste.

1.4 Documents

.1 Maintain at job site, one copy of following documents:
.1 Material Source Separation Plan.

1.5 Submittals

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

.2 Prepare and submit following prior to project start-up:
.1 Submit 2 copies of Materials Source Separation Program (MSSP) description.

1.6 Waste Reduction Workplan (WRW)

.1 Prepare, Waste Reduction Workplan.

.2 Structure WRW to prioritize actions and follow as first priority Reuse, then followed by Recycle.

.3 Describe management of waste.

.4 Post workplan or summary where workers at site are able to review its content.

1.7 Materials Source Separation Program (MSSP)

.1 Prepare MSSP and have ready for use prior to project start-up. The Demolition Waste Audit (DWA), with related weight bills and/or receipt must be submitted on a monthly basis with the Contractor's monthly Progress claim.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.

.3 Provide on-site facilities for collection,

handling, and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide containers to deposit reusable and recyclable materials.

.5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

.6 Locate separated materials in areas which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, salvaged materials in separated condition.

.1 Transport to approved and authorized recycling facility.

1.8 Storage, Handling and Protection

.1 Store, materials to be reused, recycled and salvaged in locations as specified in MSSP.

.2 Unless specified otherwise, materials for removal become Contractor's property.

.3 Protect, stockpile, store and catalogue salvaged items.

.4 Separate non-salvageable materials from salvaged items. Transport and deliver nonsalvageable items to licensed disposal facility.

.5 Protect structural components not removed for demolition from movement or damage.

.6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.

.7 Protect surface drainage, mechanical and electrical from damage and blockage.

.8 Separate and store materials produced during

dismantling of structures in designated areas.

.9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
- .1 On-site source separation is recommended.
- .2 Remove co-mingled materials to off-site processing facility for separation.
- .3 Provide waybills for separated materials.

1.9 Disposal of Wastes

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste, volatile materials, mineral spirits, oil or paint thinner into waterways, storm, or sanitary sewers.

.3 Keep records of construction waste including:
- .1 Number and size of bins.
- .2 Waste type of each bin.
- .3 Total tonnage generated.
- .4 Tonnage reused or recycled.
- .5 Reused or recycled waste destination.

.4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

.5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.10 Use of Site and Facilities

.1 Execute work with least possible interference or disturbance to normal use of premises.

.2 Maintain security measures established by PCA.

1.11 Scheduling

.1 Coordinate Work with other activities at site to ensure timely and orderly progress of Work.

PART 2 - PRODUCTS

.1 Not Applicable

PART 3 - EXECUTION

3.1 Application

.1 Do Work in compliance with WRW.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate

regulations and codes.

3.2 Cleaning

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION

PART 1 - GENERAL

1.1 Precedence

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

1.2 Related Sections

.1 Section 01 78 00 - Closeout Submittals.

.2 Section 01 74 11 - Cleaning.

1.3 Inspection and Declaration

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

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

.2 Request Departmental Representative's Inspection.

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

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Work has been completed and in compliance with Workplace Health, Safety and Compliance Commission of Newfoundland and Labrador (WHSCC).

.4 Operation of systems have been demonstrated to Departmental Representative's personnel.

.5 Work is complete and ready for Final Inspection.

.4 Final Inspection: when items noted above are

completed, request final inspection of Work by Departmental Representative, in conjunction with Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

END OF SECTION

PART 1 - GENERAL

1.1 Precedence

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

1.2 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 – Testing and Quality Control.

.3 Section 01 71 00 - Examination and Preparation.

.4 Section 01 77 00 - Closeout Procedures.

1.3 Submission

.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.2 Copy will be returned after final inspection, with Departmental Representative's comments.

.3 Revise content of documents as required prior to final submittal.

.4 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English.

.5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged, free of defects, and of same quality and manufacture as products provided in Work.

.6 If requested, furnish evidence as to type, source and quality of products provided.

.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.8 Pay costs of transportation.

1.4 Format

.1 Organize data in the form of an 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. 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. Bind in with text; fold larger drawings to size of text pages.

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

1.5 Contents - Each Volume

.1 Table of Contents: 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 clearly 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. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 – Testing and Quality Control.

1.6 As-Builts and Samples .1 Maintain at the site for Departmental Representative one record copy of:
- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Change Orders and other modifications to the Contract.
- .5 Reviewed shop drawings, product data, and samples.
- .6 Field test records.
- .7 Inspection certificates.
- .8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. 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. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents

for construction purposes.

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

1.7 Recording Actual Site Conditions

.1 Record information on set of opaque drawings, provided by Departmental Representative.

.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: legibly 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: legibly 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 specifications sections.

1.8 Final Survey

.1 Contractor is to submit final site survey certificate, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.9 Warranties and Bonds

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

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

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

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

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

.6 Co-execute submittals when required.

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

1.10 Materials and Finishes

.1 Building Products, Applied Materials, and Finishes: include produce data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

END OF SECTION

PART 1 - GENERAL

1.1 Related Requirements .1 Section 32 11 16.01 – Granular Sub-Base.

1.2 References .1 ASTM C136 Standard Test Method for Sieve Analysis for Fine and Coarse Aggregates.

.2 ASTM D698 Standard Test Methods for Laboratory Compaction.

.3 Government of Newfoundland and Labrador Specifications Book, Seventh Edition, March 2011 – Form 370

PART 2 - PRODUCTS

2.1 Equipment .1 Pulverization equipment, mounted on pneumatic wheels, is to have the capability to cut asphalt and aggregate base layer up to a thickness of 300 mm and create material with a maximum size of 40 mm.

.2 Use a grader with automatic slope controls capable of meeting an acceptable crown and super elevation.

PART 3 - EXECUTION

3.1 Preparation .1 Prior to beginning pulverization operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt pavement to be Pulverized.

.2 Protection: protect existing pavement not designated for pulverization, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative.

3.2 Pulverization .1 Work under this Item shall also include excavating and moving of pulverized material in the transitions to match into the existing conditions, as directed by the Engineer.

.2 All work shall be carried out to the full existing asphalt width.

.3 The Contractor shall carryout the Work such that the pulverizing extends to a maximum depth of 150 mm total into the asphalt and Aggregate Base/Subbase layer.

.4 The Contractor shall ensure that this pulverized region is in a completely mixed and loosened condition, with all material sized such that 100% of the material passes the 40 mm sieve and blended uniformly, when measured in accordance with ASTM C136.

.5 Over-sized pieces remaining after pulverization shall be removed immediately and shall become the property of the Contractor. Pieces are to be disposed of at an approved location outside of Park.

.6 Minimal 50 mm layer of Class "A" granular shall be blended into the pulverized layer by utilizing grader complete with scarifier. Contractor then shall regrade surface material to a minimum 95% of the maximum dry density as established by a test strip.

.7 The Contractor shall shape the road with a grader to meet an acceptable crown and super elevation.

.8 Grader shall be equipped with automatic slope control.

3.3 Finish Tolerance

1 Finished surface to be graded within +/-38 mm of grade specified but not uniformly high or low.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections

.1 Section 01 35 43 - Environmental Procedures.

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

1.2 Definitions

.1 Grubbing shall consist of the removal and disposal of all stumps, roots, surface boulders, embedded logs, debris, matted roots, and other vegetation from areas designed to be grubbed, and shall be performed by the Contractor on the sites of excavation and embankments together with other areas not affected by grading operations as directed by the Departmental Representative. However, grubbing will not normally be performed on areas selected as borrow pits and quarries unless otherwise directed by the Departmental Representative.

Where directed by the Departmental Representative, trees, stumps and brush shall be cut even with the ground in order not to disturb the natural matting and this "close cutting" will be paid for as grubbing.

1.3 Storage & Protection

.1 Prevent damage to fencing, trees, landscaping, natural features, bench marks, existing buildings, existing pavement, utility lines, site appurtenances, water courses, root systems of trees which are to remain.

.2 Repair any damaged items to approval of Departmental Representative. Replace any trees designated to remain, if damaged, as directed by Departmental Representative.

PART 2 – PRODUCTS

.1 Not Applicable

PART 3 - EXECUTION

3.1 Preparation

.1 Inspect site and verify with Departmental Representative, items designated to remain.

.2 Locate and protect above ground and

underground utility lines. Preserve in operating condition active utilities traversing site.

.3 Notify utility authorities before starting grubbing.

3.2 Grubbing

.1 Grub all trees and underbrush between 100 mm of original ground surface. Mechanical brushers are not permitted. Trees and underbrush as well as all other materials disturbed during this grubbing operation are to be removed from the site and disposed of outside the park boundaries in a manner and location approved by the Departmental Representative or it can be placed outside grubbing limit in a manner satisfactory to Departmental Representative. Mechanical brushers and harvesters may be used in areas of new highway intersection construction only.

.2 Areas in which grubbing is to be carried out will be staked on the ground beforehand by the Departmental Representative.

.3 Where grubbing is required near a watercourse or water body; the Contractor shall ensure that a minimum 15 m "no grub" zone is left between the watercourse or water body and adjacent work area. This "No Grub" buffer area shall be clearly marked in the field by the Departmental Representative prior to any grubbing so that the area is visible to heavy equipment operators. Where possible, ditch waters shall be directed to existing vegetation at least 30 m from watercourse crossing locations rather than directly discharging to the watercourse.

.4 Surface boulders, regardless of their size, shall be considered as part of grubbing debris. All surface boulders shall be removed and disposed of along with the other grubbing debris, except such boulders which in the opinion of the Departmental Representative can be incorporated in the project.

.5 Grubbing shall be disposed of in a manner approved by the Departmental Representative. The Contractor shall haul away and dispose of the grubbing debris in an approved waste disposal area. The approved waste disposal area shall be provided by the Contractor at his own expense. Grubbing debris shall be trimmed to slightly proportions.

.6 Grubbing operations as directed by the Departmental Representative shall be carried out for a distance of at least one kilometre in advance of grading operations, excepting where grubbing and excavation are permitted as a joint operation.

END OF SECTION

PART 1 GENERAL

1.1 Related Requirements .1 Section 31 23 33.01 Excavating, Trenching and Backfilling.

1.2 References .1 Government of Newfoundland and Labrador Specifications Book, Seventh Edition, March 2011 – Form 208.

PART 2 PRODUCTS

2.1 NOT USED

PART 3 EXCAVATION

3.1 Preparation .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.
- .2 Insert, repair and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

3.2 Construction .1 The Contractor shall carry out the Work as indicated in the Contract Documents and/or as specifically directed by the Departmental Representative.

.2 Ditching shall consist of removing vegetal matter and up to a maximum of 300 mm of soil from an existing ditch such that the width of the bottom of the ditch is not less than 1 m and the ditch has a continuous smooth grade providing positive gravity drainage, without ponding, in the specified flow direction.
- .1 The tendered Quantity includes cleaning ends of driveway culverts and cross culverts as directed by Departmental Representative.
- .2 The Contractor shall not excavate or undermine the Foreslope during the course of the Work.

.3 The Contractor shall shape ditches to a uniform cross section, with no gouges or ridges remaining in the finished Work.

.4 The Contractor shall repair any damage, at his/her own expense, to adjacent property resulting from the Work.

.5 The materials excavated from within the ditches shall become the property of the Contractor and shall be disposed of outside of the work site.

.6 A driveway crossing designated to be removed and not replaced shall be excavated so that the ditch and Slopes remaining after excavation match the adjacent ditch and Slopes.

.7 Driveways with a culvert designated for replacement shall be replaced in the same workday utilizing material excavated from the crossing wherever possible.

.1 Where excavation involves removal of driveway Culverts, the Contractor shall take care to ensure that any existing pipe is not damaged and is salvaged for re-use.

.1 The Contractor shall notify the Departmental Representative prior to exposing any existing pipe.

.2 Any pipe determined by the Departmental Representative to be salvageable shall remain the property of the Owner.

.3 Salvageable pipe shall be re-used in the Work Site or transported, by the Contractor, and stockpiled as directed by the Departmental Representative.

.4 Unsalvageable pipe and waste shall become the property of the Contractor and shall be disposed of outside of the Work Site.

.5 If the pipe is damaged as a result of the Contractors

actions, as determined by the Departmental Representative, the Contractor shall be responsible to replace the pipe.

.8 Ditches shall be stabilized against erosion with straw mulch at the end of each days ditching.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 35 43 - Environmental Procedures.

.2 Section 33 42 13 – Pipe Culverts.

1.2 References

.1 American Society for Testing and Materials (ASTM)
- .1 ASTM C117-04, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
- .2 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .3 ASTM D422-63(2007), Standard Test Method for Particle-Size Analysis of Soils.
- .4 ASTM D698-07, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbs/ft^3) (600 kNm/m^3).
- .5 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
- .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.3 Definitions

.1 Excavation classes:
- .1 Excavation class: two classes of excavation will be recognized; common excavation and rock excavation.
  - .1 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
  - .2 Rock excavation: solid material in excess of 1.00 m^3 and which cannot be removed by means of heavy duty mechanical excavation equipment with 0.95 m^3 - 1.15 m^3 bucket.
- .2 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.3 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.4 Unsuitable materials:

.1 Weak and compressible materials under excavated areas.

.2 Frost susceptible materials under excavated areas.

.3 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: Sieve sizes to CAN/CGSB-8.1.

.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.

.5 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.4 Quality Assurance

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

.2 For design of any temporary structures submit design and supporting data at least 2 weeks prior to installation or construction.

.3 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.

.4 Keep design and supporting data on site.

.5 Engage services of qualified professional Engineer who is registered or licensed in Province of Newfoundland and Labrador, Canada in which Work is to be carried out to design and inspect shoring, bracing and underpinning required for Work.

1.5 Shoring, Bracing, and Underpinning

.1 Shoring, Bracing or underpinning may be required to prevent undermining of adjacent structures, underground utilities and/or traffic areas.

.2 Comply with safety requirements and applicable local legislation to protect existing features.

.3 Engage services of qualified Professional Engineer who is registered in the Province of Newfoundland and Labrador to design and inspect cofferdams, shoring, bracing and underpinning required for work.

.4 At least 2 weeks prior to commencing work, submit design and supporting data.

.5 Design and supporting data submitted to bear the stamp and signature of qualified Professional Engineer licensed in the Province of Newfoundland and Labrador.

PART 2 – MATERIALS

2.1 Materials

.1 Rock Borrow: blasted or crushed rock consisting of durable crushed stones, having 100% by mass pass through a 150 mm x 150 mm screen, and a maximum 10% by mass pass through a maximum 100 mm x 100 mm screen. Rock to consist of angular fragments obtained by breaking and crushing solid or natural rock, reasonably free from thin, flat elongated or other objectionable pieces and fines or as otherwise approved by the Departmental Representative.

PART 3 - EXECUTION

3.1 Site Preparation

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Sawcut pavement neatly along limits of proposed removal in order that surface may break evenly and cleanly.

3.2 Dewatering

.1 Keep excavations free of water while Work is in progress.

.2 Protect open excavations against flooding and damage due to surface run-off.

.3 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved runoff areas and in manner not detrimental to public and private property, existing facilities, or portion of Work completed or under construction.

.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

.4 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.

3.3 Excavation

.1 Excavate to lines, grades, elevations and dimensions as indicated.

.2 Excavation must not interfere with bearing capacity of adjacent foundations.

.3 Dispose of surplus and unsuitable excavated material in approved location off site.

.4 Do not obstruct flow of surface drainage.

.5 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.6 Notify Departmental Representative when bottom of excavation is reached.

.7 Obtain Departmental Representative's approval of completed excavation.

.8 If encountered, remove unsuitable material from excavation bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.

3.4 Fill Types & Compaction

.1 Use types of fill as indicated, and compacted in accordance with the requirements stated elsewhere in this specification.

.2 Minimum roller size: 9t

3.5 Backfilling

.1 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.

.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 150 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 1.0 m.

3.6 Restoration

.1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.

.2 Clean and reinstate areas affected by Work as directed by Departmental Representative.

.3 Restore site to its normal state prior to excavation.

END OF SECTION

PART 1 GENERAL

1.1 Related Requirements None

1.2 References

.1 American Society for Testing and Materials International, (ASTM)
- .1 ASTM D 4491-99a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
- .2 ASTM D 4595-86(2001), Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
- .3 ASTM D 4751-99a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-4.2 No. 11.2-M89 (April 1997),Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
- .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
- .3 CAN/CGSB 2-4.2-M77, Colour Fastness and Dimensional Change in Domestic Laundering of Textiles
- .4 Government of Newfoundland and Labrador Specifications Book, Seventh Edition, March 2011 – Forms 904.02.09 and 909.03.07

1.3 Submittals

.1 Submit to Departmental Representative following samples at least 2 weeks prior to beginning Work.
- .1 Minimum length of 2 metres of roll width of geotextile.

1.4 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 Materials

.1 Physical properties: Medium Weight. Grab Tensile 700 N min, filtration opening size 50 um min – 250 um max, Permittivity 1.5 sec^{-1}.

.2 Geotextile: non-woven synthetic fibre fabric, supplied in rolls.

.3 All geotextile material properties to meet MARV (minimum average roll values).

PART 3 EXECUTION

3.1 Installation

.1 Place geotextile material, as indicated on drawings and as directed by 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 Departmental Representative.

.8 Place and compact soil layers in accordance with Section 31 23 33 – Excavating, Trenching and Backfilling.

3.2 Cleaning .1 Remove construction debris from project site and dispose of debris in an environmentally responsible and legal manner.

3.3 PROTECTION .1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections .1 Section 31 32 19.01 – Geotextiles

2.1 Rock .1 Hard, durable, angular quarry stone, free from seams, cracks or other structural defects, to meet the size distribution for use intended, as shown below in the table.

.2 Rip rap to be clean, inorganic, non ore-bearing, non-toxic material from a non-water course source. It shall be hard, resistant to weathering and angular in shape.

.3 Table: 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

NOTES: 1) Approximate Diameter (for information only)
2) Random riprap for abutment and slope protection
3) Measured perpendicular to the prepared surface

PART 3 - EXECUTION

3.1 Placing

.1 Where rip rap is to be placed on slopes, excavate trench at toe of slope.

.2 Fine grade area to be to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.

.3 Place rip rap to thickness and details as indicated.

.4 Place stones in manner approved by departmental representative to secure surface and create a stable mass. Place larger stones at bottom of slopes.

.5 Hand or Machine placing:
- .1 Use larger stones for lower courses and as headers for subsequent courses.
- .2 Stagger vertical joints and fill voids with rock spalls or cobbles.
- .3 Finish surface evenly, free of large openings and neat in appearance.

End of section

PARTPART 1 - GENERAL

1.1 Related Work .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 References .1 American Society for Testing and Materials (ASTM)
.1 ASTM C 117-13, Standard Test Methods for Material Finer Than 5-micro m (No.200) Sieve in Mineral Aggregates by Washing.
.2 ASTM D6928-10, Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.
.3 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.4 ASTM D 422-63 (2007), Standard Test Method for Particle-Size Analysis of Soils.
.5 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ftn) (600kN-m/mn).
.6 ASTM D 1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
.7 ASTM D 4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

PART 2 - PRODUCTS

2.1 Materials .1 Granular "B" Sub-Base Material
.1 Crushed blasted rock.
.2 Gradations to be within limits specified when tested To ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 AND CAN/CGSB-8.2.
.3 Table:

Sieve Designation	% Passing
50.8 mm	100
25.4 mm	50 – 100
4.76 mm	20 – 55
1.20 mm	10 – 35
0.300 mm	5 – 20
0.075 mm	2 – 6(Pit Source)
	2 – 8 (Rock Source)

.4 Other Properties as follows:
.1 Liquid Limit: to ASTM D 4318, Maximum 25.
.2 Plasticity Index: to ASTM D 4318 Maximum 0.
.3 Los Angeles degradation: to ASTM C131. Max % loss by mass: 35.
.4 Crushed Particles: at least 100% of particles by mass retained on the 4.75 mm sieve to have at least one fractured face.

.5 Particles smaller than 0.02 mm: to ASTM D 422, Maximum 3%.

.6 Flat and elongated particles: maximum percent by mass: 15.

PART 3 - EXECUTION

3.1 Inspection of Underlying Sub-Base

.1 Place granular sub-base after surface is inspected and approved by Departmental Representative.

.2 Underlying material to be compacted to 100% of Standard Proctor Density to ASTM D698.

3.2 Placing

.1 Place granular sub-base after subgrade is to the satisfaction of the Departmental Representative.

.2 Construct granular sub-base to depth and grade in areas indicated.

.3 Ensure no frozen material is placed.

.4 Place material only on clean, unfrozen surface, free from snow or ice.

.5 Place granular sub-base materials using methods which do not lead to segregation or degradation.

.6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.

.7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.8 Remove and replace portion of layer in which material has become segregated during spreading.

.9 Place and compact shouldering to 2% cross slope in reconstruction areas. In overlay sections, feather new shoulder material from top of new asphalt to rounding of shoulder slope.

.10 Compacted shouldering to be flush with asphalt concrete surface.

.11 Hand work will be required to form base for asphalt concrete gutters/offtakes.

.12 Place, hand rake and compact new shoulder material under and behind guiderail.

3.3 Compaction

.1 Compaction equipment to be vibratory-type and capable of obtaining required material densities.

.2 Compact to density of not less than 100% of Maximum Dry Density in accordance with ASTM D 698.

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.

.4 Apply water as necessary during compaction to obtain specified density.

.5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers to the satisfaction of the Departmental Representative.

.6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 Site Tolerances

.1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly

high or low.

3.5 Protection

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

.2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

.3 Shouldering to have 2% cross slope.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

None

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
- .1 ASTM C 117-[03], Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.
- .2 ASTM C 131-[03], Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .3 ASTM C 136-[01], Method for Sieve Analysis of Fine and Coarse Aggregates.
- .4 ASTM D 698-[00a], Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600kN-m/mü).
- .5 ASTM D 4318-[00], Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-8.1-[88], Sieves Testing, Woven Wire, Inch Series.
- .2 CAN/CGSB-8.2-[M88], Sieves Testing, Woven Wire, Metric.

.3 Government of Newfoundland and Labrador Specifications Book, Seventh Edition, March 2011 – Form 301.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Excess materials are to be diverted from landfill to site approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

None

PART 3 - EXECUTION

3.1 OPERATIONS .1 Scarifying and reshaping:

.1 Where directed by the Departmental Representative, the Contractor shall scarify and reshape a road surface prior to the application of Selected Granular Base Course or Asphaltic Pavement. The scarifying and reshaping shall be carried out within the lengths designated by the drawings, and within the width to be covered by the proposed pavement plus 0.3m on each side, or to such other width as the drawings may designate.

.2 Scarify roadbed to width as indicated unless directed otherwise by Departmental Representative and to minimum depth of 100 mm.

.3 Blade and trim pulverized material to elevation and cross section dimensions as indicated unless directed otherwise by Departmental Representative.

.4 Where deficiency of material exists, add and blend in new granular base material as directed by Departmental Representative. Ensure no frozen material is used.

.5 Unsuitable roadbed materials, as determined by the Departmental Representative, which are encountered during the scarifying operation shall be excavated to the lateral limits and depth directed by the Engineer and shall be disposed of as directed.

.6 No boulders greater than 150 mm in diameter shall be left within 300 mm of the top of subgrade composed of Other Material. Such boulders over 150 mm in diameter which cannot be removed by the scarifying operation shall be removed by hand excavation, blasting or any other suitable method. All excavated boulders shall be removed from the subgrade and ditches and then disposed of.

.7 Excavations resulting from the removal of boulders or Unsuitable Material shall be backfilled with approved material to the specified grades.

.8 Whenever the materials incorporated in the existing subgrade are insufficient to provide the required profile and cross section, the Contractor shall add additional approved material as directed by the Departmental Representative.

.2 Compaction equipment:

.1 Compaction equipment capable of obtaining required material densities.

.2 Provide Departmental Representative with proof of equipment efficiency for unspecified equipment.

.1 Efficiency of proposed equipment equal to specified equipment.

.2 Obtain approval from Departmental Representative before use.

.3 Equip with device that records hours of actual work, not motor running hours.

.3 Compacting:

.1 Road materials disturbed by the scarifying and reshaping shall be compacted.

.2 Where subgrade is scarified and reshaped, the disturbed materials shall be compacted to not less than 95% of the maximum Standard Proctor Dry Density (ASTM D698-78).

.3 Where select granular base course is scarified and reshaped, the disturbed materials shall be compacted to not less than 100% of the maximum Standard Proctor Dry Density.

.4 Shape and roll alternately to obtain smooth, even and uniformly compacted base.

.5 Apply water as necessary during compaction to obtain specified density.

.6 Use mechanical tampers, approved by Departmental Representative to compact areas not accessible to rolling equipment to specified density.

.4 Repair of soft areas:

.1 Correct soft areas by removing defective material to depth and extent directed by Departmental Representative. Replace with material acceptable to Departmental Representative and compact to specified density.

.2 Maintain reshaped surface in condition conforming to this section until succeeding material is applied or until acceptance by Departmental Representative.

3.2 SITE TOLERANCES

.1 The maximum variation from the specified profile and cross section of the compacted, scarified and reshaped road surface shall be 30 mm, except in those instances where paving is to take place directly on top of the scarified and reshaped material, in which case the finished surface shall not deviate at any place on a 3m straight edge by more than 10 mm.

.2 Where due to traffic use, or for whatever other reason, the scarified and reshaped road surface no longer lies within the required tolerance, then before placing the next materials, the Contractor shall scarify and reshape the affected area again, at his own expense.

END OF SECTION

PART 1 GENERAL

1.1 Related Requirements .1 Section 01 33 00 - Submittal Procedures.

1.2 References .1 American Society for Testing and Materials(ASTM)
- .1 ASTM C 117-13, Standard Test Methods for Materials Finer Than 75-mirco m Sieve in Mineral Aggregates by Washing.
- .2 ASTM D 6928-10, Standard Test Method for Resistance of coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.
- .3 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .4 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ftn)(600kN-m/mn).
- .5 ASTM D 1883-07e1, Standard Test Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils.
- .6 ASTM D 4318-10, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
- .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

PART 2 PRODUCTS

2.1 Materials. .1 Granular "A" base material in accordance with the following requirements:
- .1 Crushed blasted rock.
- .2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 and CAN/CGSB-8.2.
  - .1 Gradation to:

Sieve Designation	% Passing
19 mm	100
9.51 mm	50-80
4.76 mm	35-60
1.20 mm	15-35
0.300 mm	5-20

0.075 mm	2-6 (pit source) 2-8 (pit source)

.2 Liquid limit: to ASTM D 4318, maximum 25.

.3 Plasticity index: to ASTM D 4318, maximum.

.4 Los Angeles degradation: to ASTM C131. Maximum % loss by mass: 35.

.5 Crushed particles: at least 100% of particles by mass within each of following sieve designation ranges to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C136.

.6 Flat and elongated particles: maximum by mass: 15%.

PART 3 EXECUTION

3.1 Placing

.1 Place Aggregate Base Course after subgrade is inspected and approved by Departmental Representative.

.2 Construct Aggregate Base Course to depth and grade in areas indicated.

.3 Ensure no frozen material is placed.

.4 Place material only on clean unfrozen surface, free from snow or ice.

.5 Begin spreading Aggregate Base Course material on crown line or high side of one-way slope.

.6 Place Aggregate Base Course material 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.

.1 Departmental Representative may authorize thicker lifts if specified compaction can be achieved.

.8 Shape each layer to smooth contours 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 Aggregate Base Course 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.

.5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Engineer.

.6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 Site Tolerances

.1 Finished Aggregate Base Course surface to be within 10 mm of elevation as indicated but not uniformly high or low.

.2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.5 Protection

.1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by the Departmental Representative.

END OF SECTION

PART 1 – GENERAL

1.1 Related Sections
.1 Section 32 12 16 – Asphalt Paving

1.2 References
.1 American Society for Testing and Materials International, (ASTM)
  .1 ASTM D 140-2009, Standard Practice for Sampling Bituminous Materials.
  .2 ASTM D 244-09, Standard Test Methods and Practices for Emulsified Asphalts.
  .3 ASTM D 997-13, Standard Specification for Emulsified Asphalt.
.2 Government of Newfoundland and Labrador Specifications Book, Seventh Edition, March 2011 – Form 320

1.3 Environmental Provisions
.1 Tack coat spills larger than 70 L shall be immediately reported to the Newfoundland and Labrador Department of Environment & Conservation and the Departmental Representative.

.2 The Contractor shall take such steps as are necessary to abate the discharge, clean up the area affected, dispose of waste materials in an approved waste disposal site, and restore the environment to the satisfaction of the Newfoundland and Labrador Department of Environment & Conservation and the Departmental Representative, all at the Contractor's expense.

PART 2 – PRODUCTS

2.1 Materials
.1 Emulsified Asphalt: Type SS-1 or Type SS-1h emulsified asphalt, to ASTM D 997 as the tack coat material.
  .1 The Departmental Representative shall be notified in advance as to which type the Contractor intends to use and the tack coat shall meet the following standards.

.2 Water: Water for forming the solution shall be clean water free from impurities.

.3 Should the Contractor wish to use an alternate product, then prior written approval of the Engineer must first be obtained. A written request must be submitted to the Engineer a

minimum of 14 days prior to the intended use of the alternate product. The Contractor's request must include reasons for the use of the alternate product, manufacturer's product literature and required application rates as well as applicable Material Safety Data Sheets.

PART 3 – EXECUTION

3.1 Equipment

.1 Tack Coat shall be applied by means of an approved pressure distributor designed and equipped so that the emulsion may be applied uniformly at even heat on variable widths at easily determined and controlled application rates under uniform pressure. The distributor shall maintain a constant height of the spray bar as the tank is unloaded.

.2 The distributor shall be equipped with a suitable thermometer with a minimum range from 10° C to 150°C placed to accurately show the temperature of the contents. The approved pressure distributor shall be equipped with a tachometer measuring speeds in meters per minute that is visible to the truck driver so as to maintain constant application speeds at specified rates. The distributor's pump shall be equipped with a tachometer registering liters per minute that is visible to the truck driver. The distributor shall be equipped with a hose and nozzle attachment to be used for spraying by hand, areas inaccessible to the spray bar.

.3 All spray nozzles shall be in good condition and of the same type, orifice size and manufacturer and capable of producing a uniform fog-type spray without streaking. Clogged nozzles shall be removed and cleaned with solvent. The slot of each nozzle shall be set at 30 degrees to the axis of the spray bar and the spray bar shall be set at a height above the existing pavement that will permit the fan from each nozzle to overlap its neighbouring fan by exactly half. The spray bar shall be provided with a positive shut-off to prevent dribbling.

3.2 Application

.1 Obtain Departmental Representative's approval of existing surface before applying asphalt tack coat. Clean surface as required.

.2 Tack Coat shall only be placed on surfaces that are clean and dry, with no threat of precipitation or fog and then only when the atmospheric temperature is at least 10°C. The emulsion shall not be applied to a prepared surface when the surface temperature is less than 2°C.

.3 Should the surface to be treated be dirty, then the Contractor shall thoroughly clean the surface by means of a power broom, or equivalent.

.4 Tack Coat shall only be placed on surfaces that have been approved by the Departmental Representative.

.5 The Contractor shall plan his work so that no more tack coat than is necessary for the day's paving operation is applied at one time.

.6 Paint contact surfaces of existing abutting asphalt surface with thin, uniform coat of asphalt tack coat material.

.7 To avoid nuisance and possible property damage to the travelling public, the Contractor shall install portable traffic lights or other means of directing one-way traffic while working on the adjacent part of the road.

.8 The type SS-1 or SS-1h emulsions shall be diluted with an equal volume of water prior to the application. Both the mixing temperature and the application temperature shall be between 20°C and 55°C, or the temperature recommended by the manufacturer.

.9 On old pavement the diluted emulsion shall be applied at the rate of 0.2 to 0.5 l/m2 or the Department approved application rate as recommended from the manufacturer. However, on pavement which was placed during the previous construction season, the rate of application shall be as directed by the Engineer. This

rate will not exceed the rate for old pavement.

.10 Tack coat application shall be visually uniform. Areas of insufficient or non-uniform tack coat coverage shall be corrected by the contractor at no cost to Canada.

.11 Where traffic is to be maintained, treat no more than one half of width of surface in one application.

.12 Keep traffic off tacked areas until asphalt tack coat has set.

.13 Re-tack contaminated or disturbed areas as directed by Departmental Representative.

.14 Permit asphalt tack coat to set before placing asphalt pavement.\

.15 The Contractor shall plan his work so that no more tack coat than is necessary for the days paving operation is applied at one time.

.16 To avoid nuisance and possible property damage to the travelling public, the Contractor shall install portable traffic lights or other means of directing one-way traffic while the Contractor is working on the adjacent part of the road.

3.3 Curing

.1 No hot mix shall be placed upon the tack coat until it has dried to a proper condition of tackiness, as determined by the Departmental Representative. The Contractor is advised that the period required for such drying will depend upon weather conditions ; it will normally be 1 to 2 hours for types SS-1 and SS-1h emulsion tack coats.

END OF SECTION

PART 1 – GENERAL

1.1 Related Work

.1 Section 01 35 43 - Environmental Procedures.

.2 Section 32 11 23 – Aggregate Base Courses.

.3 Section 32 17 23 – Pavement Markings.

.4 Section 32 12 13.16 – Asphalt Tack Coats.

1.2 References

.1 ASTM International

.1 ASTM C 88-13, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.

.2 ASTM C 117-13, Standard Test Method for Material Finer Than 0.075mm (No.200) Sieve in Mineral Aggregates by Washing.

.3 ASTM C 123-12, Standard Test Method for Lightweight Particles in Aggregate.

.4 ASTM C 127-12, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.

.5 ASTM C 128-12, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.

.6 ASTM C 131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.7 ASTM C 136-06, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.

.8 ASTM C 207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes.

.9 ASTM D 995--95b(2002), Standard Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

.10 ASTM D 2419-09, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

.11 ASTM D 3203-11, Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.

.12 ASTM D 4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.13 ASTM D 6373-13, Standard Specification for Performance Graded Asphalt Binder
.14 ASTM D 6927-06, Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
.15 ASTM D 6928-10, Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus
.16 ASTM C 1252-06, Standard Test Methods for Uncompacted Void Content of Fine Aggregate (as Influenced by Particle Shape, Surface Texture, and Grading)
.17 ASTM D 4867, Standard Test for Effect of Moisture on Asphalt Concrete Paving Mixtures (Lottman Test)

.2 Government of Newfoundland and Labrador, Department of Transportation and works, Highway Design Division.
.1 The Department of Transportation and Works (DTW) specifications Book, latest edition.

1.3 Supply of Materials .1 Notify Departmental Representative of proposed date for use of materials; order and schedule shipments to coincide with construction schedule.

1.4 Source Sampling .1 At least 4 weeks prior to commencing work inform Departmental Representative of proposed source of aggregates and provide access for sampling.

.2 At least 4 weeks prior to commencing work submit samples of following materials proposed for use as requested by the Departmental Representative:
.1 One 5 L container of asphalt cement.

1.5 Material Certification .1 Submit manufacturer's test data and certification that asphalt cement meets requirements of this section.

1.6 Submission of Mix Design .1 Submit asphalt concrete mix designs and trial mix test results to Departmental Representative for review at least 4 weeks prior to commencing work.

.2 All asphalt concrete mix supplied for the work shall conform to the requirements of the 'surface course' and `base course' designation.

1.7 Delivery and Storage .1 Deliver and stockpile aggregates. Stockpile minimum 50% of total amount of aggregate required before commencing asphalt mixing operation.

.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 Furnish copies of freight and weigh bills for asphalt cement as shipments are received. Departmental Representative reserves right to check weights as material is received.

PART 2 – PRODUCTS

2.1 Materials .1 Asphalt cement: PG 58-28 in accordance with ASTM D6373.

.2 Aggregate material to following requirements:

.1 Crushed rock consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, and other deleterious materials.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117 and to have a smooth curve without sharp breaks when plotted on semi-log grading chart.

Sieve Designation	Surface Course % Passing
19.0 mm	100
12.5 mm	93 – 100
9.5 mm	75 – 92
4.75 mm	55 – 75
2.00 mm	32 – 55
0.425 mm	12 – 25
0.150 mm	5 – 12

0.075 mm	2 – 5

Sieve Designation	base Course % Passing
22 mm	100.0
19 mm	90 – 100
12.5 mm	75 – 90
9.5 mm	63 – 84
4.75 mm	35 – 55
2.00 mm	20 – 42
0.425 mm	10 – 25
0.150 mm	5 – 12
0.075 mm	2 – 6

.3 Coarse aggregate is aggregate retained on 4.75 mm sieve and fine aggregate is aggregate passing 4.75 mm when tested to ASTM C136.

.4 When dryer drum plant or plant without hot screening is used, process fine aggregate through 4.75 mm sieve and stockpile separately from coarse aggregate.

.5 Coarse aggregate stockpile shall contain no more than 10% passing 4.75 mm sieve.

.6 Fine aggregate stockpile shall contain no more than 20% retained on 4.75 mm sieve.

.7 Petrographic Number: CSA A23.2 – 15A, Max: 135.

.8 Do not use aggregates having known polishing characteristics in mixes for surface courses.

.9 Sand equivalent: ASTM D2419 Min: 50

.10 Magnesium Sulphate Soundness: ASTM C88. Max.% loss by mass: Coarse aggregate: 12. Fine aggregate, surface course: 16.

.11 Los Angeles abrasion; Gradation B. to ASTM C131. Max. % loss by mass: Coarse aggregate, surface/base course: 35

.12 Absorption: ASTM C127, max. % by mass: Coarse aggregate: 1.75

.13 Loss by washing: to ASTM C117. Max. % passing 0.075 mm sieve: Coarse aggregate, surface/base course: 2.0.

.14 Flat and elongated particles with length to thickness ratio greater than 4 ASTM D 4791: Max. % bymass: Coarse aggregate: 20

.15 Crushed fragments at least 100% of particles by mass within each of following sieve designation ranges to have at least 2 freshly fractured faces. Material to be divided into ranges using methods of ASTM C136. Passing Retained on 19.0 mm to 12.5 mm 12.5 mm to 4.75 mm

.16 Regardless of compliance with specified physical requirements, course and fine aggregates may be accepted or rejected on basis of past field performance.

.17 Micro – Deval abrasion, to ASTM D6928, Coarse aggregate: Max. 20%.

.18 Micro – Deval abrasion, to CSA A23.2 – 23A, Fine aggregate: Max 20%.

.19 Fine aggregate angularity, to ASTM C1252, Min. 45%.

.20 Plasticity Index, to ASTM D 4318: 0%.

.3 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. Mineral filler shall meet ASTM 242 Standard Specification.

.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.

2.2 Mix Design

.1 Design mix formulas to be provided by Contractor and designed and certified by a Professional Engineer licensed to practice in Newfoundland and Labrador. Design mix formula to be approved by Departmental Representative.

.2 Design of mix for base and surface courses shall conform to the requirements of this specification when tested in accordance with procedures provided in the latest edition of the Asphalt Institute Manual series 2 (MS-2.

.1 Compaction blows on each face of test specimens: 75.

.2 Mix physical requirements: Marshall

Stability at 60°C: 8000 N(minimum) Flow Value mm: 2 to 4.25 Air Voids in Mixture, %: 3-5 Voids in Mineral Aggregate, % min base course 14%, surface course 15%: 15 Index of Retained Stability % Minimum: 80.

.3 Measure physical requirements as follows:
  .1 Marshall load and flow value: to ASTM D6927.
  .2 Air voids: to ASTM D3203.

.4 Do not change design mix without prior approval of Departmental Representative. Should change in material source be proposed, new design-mix formula to be reviewed by Departmental Representative.

.5 Return plant dust collected during processing to mix in quantities acceptable to Departmental Representative.

.6 The dust/effective asphalt ratio shall be between 0.6 and 1.2. Dust is defined as material passing the 0.075 mm sieve.

.7 The quality of the final pavement mixture shall meet all requirements set forth in this specification.

.8 If required, anti-stripping additives are to adhere to the Newfoundland Department of Transportation Specifications Sections 330.02.01.05.

.9 Following acceptance of the Contractor's mix design, the department or it's representatives shall submit a Job Mix Formula (JMF) if the initial trial plant mix results deems adjustments are necessary. Copies of all JMFs will be provided to the Contractor. All JMFs shall meet the requirements outlined in this specification.

.10 Mixing tolerances:
  .1 During Mix production, the mix acceptance criteria for physical properties measured against the JMF are as follows:

4.75 mm sieve and larger	5.0
2.00 mm sieve	4.0
0.425 mm sieve	2.5

0.075 mm sieve 1.0

.2 Permissible variation of asphalt cement from design mix, 0.30%.

PART 3 – EXECUTION

3.1 Plant and Mixing Requirements

.1 Batch and continuous mixing plants:
.1 To ASTM D995.
.2 Heat asphalt cement and aggregate to mixing temperature directed by Departmental Representative. Do not heat asphalt cement above 165°C.
.3 Before mixing, dry aggregates to a moisture content not greater than 0.3% by mass or to a lesser moisture content if required to meet mix design requirements.
.4 Make available current asphalt cement viscosity data at plant. With information relative to viscosity of asphalt being used, Departmental Representative will direct temperature of completed mix at plant and at paver after considering hauling and placing conditions.
.5 Feed aggregates from individual stockpiles through separate bins to cold elevator feeders.
.6 Feed cold aggregates to plant in proportions that will ensure continuous operations.
.7 Immediately after drying, screen aggregates into hot storage bins in sizes to permit recombining into gradation meeting job-mix requirements.
.8 Store hot screened aggregates in a manner to minimize segregation and temperature loss.
.9 Calibrate bin gate openings and conveyor speeds to ensure mix proportions are achieved.
.10 Maintain temperature of materials within plus or minus 5°C of specified mix temperature during mixing.
.11 Mixing time:
.1 In batch plants, both dry and wet mixing times as directed by Departmental Representative. Continue wet mixing as long as necessary to obtain a thoroughly

blended mix but not less than 30 s or more than 75 s.

.2 In continuous mixing plants, mixing time as directed by Departmental Representative but not less than 45 s.

.3 Do not alter mixing time unless directed by Departmental Representative.

.2 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 entering mixer remain constant.

.3 Provide for easy calibration of weighing systems for aggregates without having material enter mixer.

.4 Calibrate individual feed bin conveyors to ensure mix proportions are achieved.

.5 Make provision for conveniently sampling the full flow of materials from the cold feed.

.6 Provide screens or other suitable devices to reject oversize particles or lumps of aggregate from cold feed prior to entering drum.

.7 Provide a system interlock which will stop all feed components if either asphalt or aggregate from any bin stops flowing.

.8 Accomplish heating and mixing of asphalt mix in an approved parallel flow dryer-mixer in which aggregate and asphalt 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. Equip system with automatic burner controls and provide for continuous temperature sensing of asphalt

mixture at discharge, with a printing recorder that can be monitored by plant operator. Submit printed record of mix temperatures at end of each day.

.9 Mixing period and temperature to produce a uniform mixture in which particles are thoroughly coated, and moisture content of material as it leaves mixer to be less than 0.3%.

.3 Temporary storage of hot mix:

.1 Provide mix storage of sufficient capacity to permit continuous operation and designed to prevent segregation and temperature loss.

.2 Do not store asphalt mix in storage bins in excess of 3 h.

.4 While producing asphalt mix for this project, do not produce mix for other users unless separate storage and pumping facilities are provided for materials supplied to this project.

3.2 Equipment

.1 Pavers: mechanical (grade controlled) self powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.

.2 Rollers, general: sufficient number of rollers of type and weight to obtain specified density of compacted mix.

.3 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 of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.

.3 In cool weather or for long hauls, insulate entire contact area of each truck box.

.4 Trucks which cannot be weighed in a single operation on scales supplied will not be accepted.

.4 Material Transfer Device: device to transfer all asphalt mixture from the haul trucks to the paver(s). The Material Transfer Device shall be utilized in conjunction with a hopper insert in the asphalt paver. The hopper insert on the asphalt paver shall be kept full at all times. Cycling the hopper wings of the asphalt paver shall be kept to a minimum. The Material Transfer Device shall be used at no extra cost.

.5 Hand tools:

.1 Lutes or rakes with covered teeth for spreading operations.

.2 Provide tamping irons having mass not less than 12 kg and a bearing area not exceeding 310 cm2 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, 4.5 m in length, to test finished surface.

3.3 Preparation

.1 Reshape granular roadbed to Departmental Representative's approval.

.2 Prior to laying mix, clean surfaces of loose and foreign material.

.3 Saw cut adjacent asphalt surfaces and prior to placing new asphaltic pavement.

.4 Tack coat existing asphalt surfaces and edges prior to placing new asphalt mix in accordance with Section 32 12 13.06 – Asphalt Tack Coat.

.5 Construct key joint at locations where the new top lift of asphalt will meet existing asphalt as indicated on the drawings.

3.4 Transportation of Mix

.1 Transport mix to job site in vehicles cleaned of foreign material in good mechanical working order, tight gates and with tarps.

.2 Paint or spray truck beds with limewater, soap

or detergent solution, or non-petroleum based commercial product at least once a day or as required. Elevate truck bed and thoroughly drain. No excess solution will be permitted.

.3 Schedule delivery of material for placing in daylight, unless Departmental Representative approves artificial light.

.4 Deposit mix from surge or storage silo into trucks in multiple drops and use methods necessary to prevent segregation.

.5 Deliver materials to paver at a uniform rate and in an amount within capacity of paving and compacting equipment.

.6 Deliver loads continuously in covered vehicles and immediately spread and compact. Deliver and place mixes at a temperature within range directed, but not less than 130°C.

3.5 Placing

.1 Obtain Departmental Representative's approval of base prior to placing asphalt.

.2 Place asphalt concrete to thicknesses, grades and lines indicated or directed by Departmental Representative.

.3 Placing conditions:
- .1 Place asphalt mixtures only when air temperature is above 5°C.
- .2 When temperature of surface on which material is to be placed falls below 10°C, provide extra rollers as necessary to obtain required compaction before cooling.
- .3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.
- .4 A material transfer device shall be used for the placement of all asphalt mix on the project. Prior to use, the material transfer device shall be approved by the Departmental Representative.

.4 Place asphalt concrete in compacted lifts of thickness as noted on the plans.

.5 Spread and strike off mixture with self propelled mechanical finisher:
- .1 Construct longitudinal joints and edges true to line markings. Lines for paver to follow will be established by Departmental Representative parallel to centerline of proposed pavement. Position and operate paver to follow established line closely.
- .2 When using pavers in echelon, have first paver follow marks or lines, and second paver follow edge of material placed by first paver. Work pavers as close together as possible and in no case permit them to be more than 30 m apart.
- .3 If segregation occurs, immediately suspend spreading operation until cause is determined and corrected.
- .4 Correct irregularities in alignment left by paver by trimming directly behind machine.
- .5 Correct irregularities in surface of pavement course directly behind paver. Remove by shovel or lute excess material forming high spots. Fill and smooth indented areas with hot mix. Do not broadcast material over such areas.
- .6 Do not throw surplus material on freshly screeded surfaces.

.6 When hand spreading is used:
- .1 Approved wood or steel forms, rigidly supported to assure 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 material by lutes or covered rakes. Reject material 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 material. Do not use tools at a higher temperature than temperature of mix being placed.

3.6 Compacting

.1 Roll asphalt continuously to a density not less than 93% of the mix maximum theoretical density.

.2 General:

.1 Provide minimum three (3) rollers and as many additional rollers as necessary to achieve specified pavement density. One roller must be pneumatic-tired type.

.2 Start rolling operations as soon as placed mix can bear weight of roller without undue displacement of material or cracking of surface.

.3 Operate rollers slowly initially to avoid displacement of material. For subsequent rolling do not exceed 5 km/h for static steel wheeled rollers and 8 km/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 metre 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 material but do not over-water.

.7 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism.

.8 Do to 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 When paving in echelon, leave unrolled 50 to 75 mm of edge which second paver is following and roll when joint between lanes is rolled.

.11 Where rolling causes displacement of

material, loosen affected areas at once with lutes or shovels and restore to original grade of loose material before re-rolling.

.3 Breakdown rolling:
- .1 Commence breakdown rolling immediately following rolling of transverse and longitudinal joint and edges.
- .2 Operate rollers as close to paver as necessary to obtain adequate 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.

.4 Second rolling:
- .1 Use pneumatic-tired, steel wheel or vibratory rollers and follow breakdown rolling as closely as possible and while paving mix temperature allows maximum density from this operation.
- .2 Rolling shall be continuous after initial rolling until mix placed has been thoroughly compacted.

.5 Finish rolling:
- .1 Accomplish finish rolling with two- axle or three-axle tandem steel wheel rollers while material is still warm enough for removal of roller marks. If necessary to obtain desired surface finish, Departmental Representative shall specify use of pneumatic-tired rollers.
- .2 Conduct rolling operations in close sequence.

3.7 Joints

.1 General:
- .1 Trim vertical face by saw cutting to provide true surface and cross section against which new pavement may be laid. Remove loose particles.
- .2 Paint joint face with thin coat of hot asphalt cement or cutback asphalt or preheat joint face with approved heater, prior to placing of fresh mix.

.3 Overlap previously laid strip with spreader by 100 mm.
.4 Remove surplus material from surface of previously laid strip. Do not dispose on surface of freshly laid strip.
.5 Construct joints between asphalt concrete pavement and portland cement concrete pavement as directed by Departmental Representative.
.6 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.

.2 Transverse joints:
.1 Construct and thoroughly compact transverse joints to provide a smooth riding surface.
.2 Stagger joint locations 2 m.
.3 Offset transverse joint in succeeding lifts by at least 600 mm.

.3 Longitudinal Joints:
.1 Before rolling, carefully remove and discard coarse aggregate in material overlapping joint with a lute or rake.
.2 Roll longitudinal joints directly behind paving operation.
.3 When rolling with static roller, shift roller over onto previously placed lane in order that 100 to 150 mm of drum width rides on newly laid lane, then operate roller to pinch and press fines gradually across joint. Continue rolling until thoroughly compacted neat joint is obtained.
.4 When rolling with static or 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 Offset longitudinal joints in succeeding lifts by at least 150 mm.
.6 Upon completion of each days' paving, the maximum length of exposed joint shall be 60 metres.

3.8 Finish Tolerances .1 Finished asphalt surface to be within 5 mm of

design elevation but not uniformly high or low.

.2 Finished asphalt surface not to have irregularities exceeding 5mm when checked with a 4.5 m straight edge place in any direction.

3.9 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 any areas showing defects. Defects shall include but not necessarily be limited to the following:

. .1 Segregated areas.
.2 Raveling.
.3 Roller marks.
.4 Cracking or tearing.
.5 improper matching of longitudinal and/or transverse joints.
.6 Tire marks.
.7 Sample locations not properly reinstated.
.8 Contaminant on the mat.
.9 Flushed areas.
.10 Pneumatic – tire roller pickup.

.3 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

3.10 Hours of Work

.1 Unless specifically authorized otherwise by the Departmental Representative, all spreading of asphalt mix shall stop at least 1/2 hour before sunset and the paver shall be off the road by sunset.

3.11 Pollution Control/Site Clean-up

.1 Control emissions from equipment and plant to Site Clean-up Provincial emission requirements.

.2 Copies of the Contractor's current Provincial Asphalt Plant Approval Permit must be provided to PCA and the EPO.

.3 Excess asphaltic concrete material must be disposed of at approved locations. No material will be deposited outside the lines and grades indicated for asphalt paving, except as approved by the Departmental Representative.

.4 The EPO on behalf of Provincial Department of Environment and Conservation will be monitoring the Contractor's operation, including site cleanup.

PART 4 – QUALITY ASSURANCE / PAYMENT ADJUSTMENT

4.1 General

.1 Quality Assurance (QA) testing for payment adjustment to be performed by Departmental Representative.

4.2 Smoothness

.1 Rate adjustment for smoothness will be based on average IRI measured per 100m per lane on surface course of hot asphaltic concrete.

.2 Testing shall be performed by the Departmental Representative utilizing a Class 1 Inertial Laser Profiler.

.3 Payment adjustment shall be applied to each 100m section based on the rates noted below:

IRI (mm/m)	**Rate Adjustment ($/100m)**
0.00-0.30	$400
0.31-0.50	$350
0.51-0.60	$300
0.61-0.70	$250
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	Rejected

.4 Any 100m section with an average IRI greater than 1.25 mm/m shall be deemed as an optional repair. The Departmental Representative shall determine on the type of recourse required for such an occurrence.

.5 Any 100m section with an average IRI greater than 2.0 mm/m shall be considered rejected.

.6 Repairs shall consist of cold planning the unsuitable sections of asphalt surface (full depth) and replacing with new hot-mix asphaltic concrete. Such repairs shall be the sole responsibility of the Contractor and no compensation will be paid by the Department. All areas of repair shall be subjected to testing for quality assurance.

4.3 Mix Tolerance

.1 Loose mix samples will be collected for the first 300 tonnes of asphalt produced and for every 500 tonnes produced daily thereafter by the Departmental Representative, with a minimum of one (1) per day of production.

.2 Mix tolerances shall reflect that of Part 2.0 "Products" and Part 3 "Execution". If two (2) consecutive samples deviate from the tolerances set forth within these sections, the Departmental Representative may direct the Contractor to cease production until corrective action is taken to remedy production problems.

.3 Sampling locations shall be determined by the Departmental Representative.

4.4 Asphalt Compaction Density

.1 Compaction will be based on the average of three (3) cores from randomly selected locations each day 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 adjustment shall be applied based on the rates noted below:

Maximum Theoretical Density (%)	**Rate Adjustment ($/tonne)**
>98.5	Rejected
98.0-98.5	-$4.00
97.6-97.9	-$0.25
93.0-97.5	$0.50
92.5-92.9	$0.25
92.0-92.4	$0.00
91.5-91.9	-$0.25
91.0-91.4	-$1.00
90.5-90.9	-$2.00
90.0-90.4	-$4.00
89.5-89.9	-$6.00
89.0-89.4	-$16.00
<89.0	Rejected

.4 Any asphalt deemed rejected shall not be accepted by the Department. The Contractor shall repair asphalt course by cold planning (full depth) and replacing with new hot mix asphaltic concrete. Such repairs shall be the sole responsibility of the Contractor and no compensation will be paid by the Department. All areas of repair shall be subjected to testing for quality assurance.

END OF SECTION

PART 1 GENERAL

1.1 Related Requirements

.1 Section 31 23 13 Rough Grading

.2 Section 32 11 16.01 Granular Subbase

.3 Section 32 11 23 Aggregate Base Courses

1.2 REFERENCES

.1 CAN/CGSB-15.1-92 Calcium Chloride

PART 2 PRODUCTS

2.1 Materials

.1 Supply water and calcium chloride in quantities and at times as directed by Departmental Representative.

.1 Water: to Departmental Representative's approval.

.2 Calcium chloride: Type I to CAN/CGSB-15.1, 35% aqueous solution.

PART 3 EXECUTION

3.1 General

.1 The Contractor shall use dust control throughout the construction site.

.2 Contractor is to use water as the primary method of dust control.

.3 Contractor is responsible for having proper equipment necessary for applying water to the area at all times throughout the contract.

.4 If the contractor fails to provide dust control to the satisfaction of the

Departmental Representative, the Departmental Representative will provide such controls as necessary and costs for such measures will be deducted from the Contractor's final progress claim.

3.2 Application

.1 Provide dust control on an on-going basis, including weekends and holidays, with equipment approved by Departmental Representative, at an appropriate rate to reduce dust as directed by the Departmental Representative.

.2 Apply water and/or aqueous calcium chloride with distributors equipped with means of shut-off and with spray system to ensure uniform application.

END OF SECTION

PART 1 – GENERAL

1.1 Description

.1 Contractor responsible for permanent lines and pavement markings and for all temporary line markings. Contractor to perform survey of existing centerline painting and all other pavement paintings prior to pulverization of existing asphalt and replace all pavement markings upon new paving.

2 This standard applies to low temperature, waterborne, acrylic, fast drying traffic paints suitable for spray application with specialized equipment, to asphalt surfaces. Included are centre lines and parking lines as shown on the drawings.

.3 This specification includes a compound to be used as an additive in conjunction with water-borne traffic paint and glass spheres to provide a drying agent which accelerates the no-tack time of the water-borne traffic paint. No-tack time is to be increased by approximately 40% over the same paint without the compound.

.4 All pavement markings to be in accordance with the Manual of Uniform Traffic Devices for Canada, latest edition.

.5 Contractor is responsible to supply and perform all work necessary to paint temporary lines and pavement markings. The Province will supply and perform all work required to paint permanent lines and pavement markings.

1.2 References

.1 American Society for Testing and Materials (ASTM)
- .1 ASTM D 711, Test Method for No-Pick-Up Time of Traffic Paint
- .2 ASTM D 868, Test Method for Evaluating Degree of Bleeding of Traffic Pain
- .3 ASTM D 869, Test Method for Evaluating Degree of Settling of Paint
- .4 ASTM D 969, Test Method for Laboratory Determination of Degree of Bleeding of Traffic Paint
- .5 ASTM D 1155, Test Method for Roundness of Glass Spheres

.6 ASTM D 1210, Test Method for Fineness of Dispersion of Pigment-Vehicle Systems
.7 ASTM D 1214, Test Method for Sieve Analysis of Glass Spheres
.8 ASTM D 1309, Test Methods for Settling Properties of Traffic Paints During Accelerated Storage
.9 ASTM D 2205, Guide for Selection of Tests for Traffic Paints
.10 ASTM D 2243, Test Method for Freeze-Thaw Resistance of Water-Borne Coatings
.11 ASTM D 3960, Standard Practice for Determining Volatile Organic Compound (VOC)Content of Paints and Related Coatings
.12 ASTM E 97, Test Method for Directional Reflectance Factor of Opaque Specimens by Broad-Band Filter Reflectometry.

.13 Transportation Association of Canada (TAC), Manual of Uniform Traffic Control Devices For Canada.

1.3 Samples

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

.2 Mark samples with name of project, location, paint manufacturer's name and address, name of paint, CGSB specification number and formulation number and batch number.

.3 The Departmental Representative reserves the right to test samples of paint at the point of delivery, from any or all batches of paint to be used. The samples will be tested and all paint from any batch tested that does not meet specifications, will not be permitted to be used on this project.

1.4 Temporary Line Striping

.1 The Contractor shall ensure that the roadway is properly marked as the work progresses and all cold planed sections and/or newly surfaced road is pre-marked at the completion of the day's operation, as described herein. Temporary pavement marking shall be clearly visible both day and night.

.2 Should the pre-marking tape not adhere to the cold planed and/or newly treated surface, the

Contractor shall use other means to adequately mark the roadway, such as painting the markings on the road.

.3 The Contractor is responsible for the removal of the Temporary Overlay Markers between successive pavement courses as the work progresses and from the finish course of pavement after painting.

.4 Temporary Pavement Marking sign to be erected 250 m in advance of the beginning of a temporarily marked section of highway. End Temporary Pavement Marking is placed at the end of a temporarily marked section. These signs must be used to indicate a section of highway that has been recently resurfaced and that does not have permanent centreline markings. The signs must remain in place until the permanent centreline has been painted.

.5 Typical temporary pavement markings consist of temporary marking tape, raised pavement markers and standard traffic paint with glass beads. Yellow markings shall be used where two-way traffic occurs and to delineate opposing traffic. White markings should be used for shoulder edge lines or multiple lanes where traffic flows in the same direction.

PART 2 – PRODUCTS

2.1 Materials

.1 General Requirements:

.1 The low temperature, water-borne (acrylic), lead free, fast drying traffic paints shall be designed to be applied in environmental conditions such that operational temperatures shall be in the range of 2 degrees Celsius and rising.

.2 Paint shall be well ground to a uniform smooth consistency and shall be free from skin, dirt and other foreign particles. The paint shall be capable of being sprayed at the temperature intended for the paint. It shall flow evenly and smoothly and cover solidly when applied to pavement. The paint shall be supplied

ready-mixed for use without any addition of water.

.3 The paint mixture shall include the glass bead intermix system.

.4 The paint mixture is to be able to be applied under pneumatic pressure by a standard truck mounted dispensing machine moving at speeds of 8 to 24km/hr.

2.2 Paint .1 Paint to this standard shall comply with the following detail requirements when tested in accordance with the specified test methods:

Property	**Specification**		**Test Method (1)**
General:	**Min.**	**Max.**	
Density	-	-	Method 2.1
Consistency, KU (2)	85	95	Method 4.5
Skinning Properties (3)	0	0	Method 10.1
Contrast Ratio (5)	0.992		
VOC (6)	150g/L		ASTM D3960
Volatile Matter % (mass)(including water)	24		Method 17.1
Freeze-thaw resistance	Pass		ASTM D2243
Pigment Content, % (mass)	56	62	Method 21.2
Binder solid,% of mass (7)	16.75		Method 19.1
100% Acrylic Polymer, % (mass)	15	-	Method 57.1
No-pick-up time, min. (4)	1	5	ASTM D711
Non-tracking time, sec. (9)		60	
Fineness of grind, HU	3	-	ASTM D1210
Coarse Particles:			
#60 Sieve 250um	nil	nil	ASTM D185 & ASTM D2205
#100 Sieve – 150 mm	-	0.01	
Bleeding	4	-	ASTM D868 & ASTM D2205
Settling Rate	6	-	ASTM D1309
	8	-	ASTM D869
White Paint:			
Titanium Dioxide, g/L	150	-	Method 2.1, 21.1, 50.14
Titanium Dioxide Pigment (8)			
Reflectance	80	-	ASTM E97
Colour	-	-	1-GP-12C 513-301
Yellow Paint:			
Reflectance	60	-	ASTM E97
Colour	-	-	505-308 (approx)

(1) All tests to be performed by methods as per Canadian General Standards Board (CGSB), 1-GP-71 or American Society of Testing and Materials (ASTM) or as noted herein.
(2) Kreb units at 25°C
(3) Paint shall be non-skinning. (See General Requirements, 2.1.1.2).
(4) Perform field tests on a 15 mil wet film thickness of hot spray (maximum 50°C). Wait one minute, drive a passenger vehicle over the film and ensure no visible (from 15m) deposition of paint is deposited onto the adjacent pavement.
(5) Contrast Ratio: apply a wet film thickness of 381 microns on Laneta Penopac form (1B) Drying Time: Minimum 24 hours at 23°C. (plus or minus 2°C)
(6) Volatile organic compounds (VOC) (excluding water): max. 150g/L; method ASTM D3960.
(7) Binder shall be FASTRACK Resin XSR or equivalent.
(8) Titanium dioxide pigment shall be Rutile type and have a minimum Ti02 content of 93%.
(9) Non-tracking time based upon 375um (15 mils) wet film thickness applied when pavement temperature is greater than 10° C and humidity conditions of 80% or less on dry pavement.

2.3 Glass Bead Intermix System

.1 The compound shall be a mixture of glass beads and drying agent materials.

.2 The compound shall meet the following gradation when tested according to ASTM D1214:

Sieve Size	**% Passing**
1.180mm (#16)	100%
0.850mm (#20)	90 – 100%
0.600mm (#30)	65 – 95%
0.300mm (#50)	10 – 35%
0.150mm (#100)	0 – 5%

.3 The glass bead component of the compound shall be colourless, clean, transparent, and free from milkiness and excessive air bubbles. They shall be spherical in shape, containing no more than 30% irregularly shaped particles and be the equivalent of an AASHTO Type I glass bead. The silica content of the glass spheres shall not be less than 60% as per ASTM C169 testing. The component shall be manufactured of glass of

a composition designed to be highly resistant to traffic wear, decomposition, etching under atmospheric conditions, dilute acids, alkalis, paint film constitutes, and to the effect of weathering, and should be composed of recycled glass (to the maximum extent possible).

.4 The drying agent component shall be smooth and spherically shaped, amber to white in colour, and of a type that promotes accelerated coalescence of the latex polymer and as such reduces water-borne paint dry to touch time by approximately 40% (minimum).

.5 The compound shall show no tendency to absorb moisture in storage and shall remain free of clusters and hard lumps. It shall flow freely from dispensing equipment at any time when applying with pavement marking.

PART 3 – EXECUTION

3.1 Equipment Requirements

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

3.2 Condition of Surfaces

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

3.3 Traffic Control

.1 Traffic control to be in accordance with Section 01 55 26 – Traffic Regulation.

3.4 Application

.1 Unless otherwise approved by Departmental Representative, apply paint only when air Temperature is above 10°C, wind speed is less than 60km/h and no rain is forecast within next 4h.

.2 Apply traffic paint evenly at rate of 3m/L.

.3 Do not thin paint unless approved by Departmental Representative.

.4 Symbols and letters to conform to dimensions indicated.

.5 Paint lines to be of uniform colour and density with sharp edges.

.6 Thoroughly clean distributor tanks before refilling with paint of different colour.

3.5 Tolerance

.1 Paint markings to be within plus or minus 12mm of dimensions indicated.

.2 Remove incorrect markings to approval of Departmental Representative.

3.6 Protection of Completed Work

.1 Protect pavement markings until dry.

END OF SECTION

PART 1 - GENERAL

.1 Section 01 33 00 – Submittal Procedures

.2 Section 31 23 10 – Excavating, Trenching and Backfilling.

.3 Section 31 24 13 – Roadway Embankments.

.4 Section 31 37 00 – Rip-rap.

.5 Section 32 11 19 – Granular Sub-base.

.6 Section 32 11 23 – Granular Base

.7 Section 32 12 16 – Hot Mix Asphalt Paving

.8 Section 35 42 19 – Preservation of Watercourses and Wetlands.

1.2 References

.1 ASTM C 14M-99, Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe (Metric).
- .1 ASTM C 117-95, Standard Test Method for Material Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
- .2 ASTM C 136-01, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .3 ASTM D 698-00a, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).
- .4 ASTM D 1248-02, Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable.
- .5 ASTM F 667-97, Standard Specification for Large Diameter Corrugated Polyethylene Pipe and Fittings.

.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-A3000-98 (April 2001), Cementitious Materials Compendium (Consists of A5-98, A8-98, A23.5-98,

A362-98, A363-98, A456.1-98, A456.2-98, A456.3-98).

.1 CAN/CSA-B182.1, B182.2, B182.4, B182.8, Polyvinyl Chloride (PVC) and high density polyethylene (HDPE) pipe and fittings.

1.3 Samples

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

.2 Inform Departmental Representative at least 4 weeks prior to commencing work, of proposed source of bedding materials and provide access for sampling.

1.4 Material Certification

.1 Contractor to submit stamped shop drawings from the pipe manufacturer for review and acceptance by the Departmental Representative at least four (4) weeks prior to commencing work.

.2 Submit manufacturer's test data and certification at least four (4) weeks prior to commencing work.

.3 Certifications to be marked on pipe.

1.5 Delivery, Storage and Handling

.1 Contractor to deliver, store and handle materials in accordance with Product Requirements and manufacturer's instructions.

1.6 Waste Management and Disposal

.1 Separate and recycle waste materials as indicated by Departmental Representative.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

1.7 Environmental; Permits and Authorization

.1 The Contactor is required to follow the Canadian Environmental Protection Act, Canadian Environment Assessment Act, Species at Risk Act, Fisheries Act, and Migratory Birds Convention Act.

.2 The Contractor is held responsible to ensure that all necessary permits related to

Environmental Protection have been obtained and that necessary documentation is available on-site.

.3 Where shown on the drawings or as identified by the Departmental Representative, a downstream pool shall be provided at the culvert.

.4 Where unwatering is required, the Contractor shall carry out this work in accordance with all applicable environmental and DFO approvals and requirements.

PART 2 - PRODUCTS

2.1 Materials

.1 Profile High Density Polyethylene (HDPE) pipe and fittings shall meet the requirements and be certified to CAN/CSA B182.8, with a minimum pipe stiffness of 320 kPa and Type 2 (soil-tight)joints with integrated bells.

.2 Aluminized steel pipe to Government of Newfoundland & Labrador, Department of Transportation and Works Highway Design Division Form 421. 2.8 mm thickness, Aluminized Type II.

.3 Aluminum alloy pipe to ASTM B209.

.4 All Pipe materials shall be clearly identified with the manufacturers name and strength class or category shown.

2.2 End Treatments

.1 Rip rap: to Section 31 37 00 – Rip Rap, and as indicated on drawings.

2.3 Granular Bedding

.1 Placement of granular bedding shall be paid for as Granular Subbase and placement of backfill material shall be paid for as Rock Borrow to the following requirements:
.1 Section 31 23 10 – Excavating, Trenching and Backfilling.
.2 Section 32 11 19 – Granular Sub-base.

2.4 Intermediate Rocks for Fish Passage

.1 Sound, rounded rocks measuring 400 mm – 600 mm in longest dimension, or as otherwise requested by Departmental Representative.

PART 3 - EXECUTION

3.1 Traffic Access

.1 During replacement of culverts crossing the highway, maintain at least one (1) lane of alternating two-way traffic. One-lane closures are to be short term and limited to daytime periods only.

.2 Maintain two (2) lanes of uninterrupted flow during the following periods from July 1st to Labour Day, inclusive:
.1 From 4 PM TO 11 PM ON Fridays
.2 From 2 pm to 10 pm on Sundays.

3.2 Road Diversion

.1 Where the work requires a road diversion from the existing highway alignment in order to maintain traffic flow, the Contactor shall be responsible for the design, construction, maintenance removal of such diversion. In providing the diversion, the Contactor shall comply with the requirements of the traffic Control Manual for Roadway Work Operations. Diversions shall be approved prior to their installation. The specified minimum width of the top of one (1) lane diversion shall be 5.5 metres.

.2 Traffic lights shall be provided at all road diversions.

.3 Where the road diversion requires a stream crossing, Contractor shall be responsible for sizing, designing, supplying, and installing such crossing to the requirements of all regulatory agencies and the park. Proposed diversion arrangement to be provided to the Departmental Representative for approval, along with copies of all approvals received from regulatory authorities, prior to starting any work on the diversion.

.4 At the end of the working season, the roadway and roadside environment must be returned to suitable condition for uninterrupted two-way traffic flow and for safe public travel and snow plowing.

3.3 Trenching

.1 Do trenching work in accordance with Section 31 23 10 – Excavating, Trenching and Backfilling.

.2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe.

3.4 Bedding

.1 Dewater excavation, as necessary, to allow placement of culvert bedding in the dry.

.2 Place minimum thickness of 150 mm of approved granular sub-base material on bottom of excavation and compact to minimum 95% of standard maximum density to ASTM D 698.

.3 Shape bedding to fit lower segment of pipe exterior so that width of at least 25% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.

.4 Place bedding in unfrozen condition.

3.5 Laying Pipe Culverts

.1 Commence placing at downstream end.

.2 Ensure bottom of pipe is in contact with shaped bed or compacted fill.

.3 Lay pipe with joint facing upstream.

.4 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.

3.6 Backfilling Culverts

.1 Place backfill material, rock borrow approved by Departmental Representative, in 300 mm layers to full width, alternately on each side of culvert. So as not to displace it laterally or vertically.

.2 Compact each layer to 95% of standard maximum density to ASTM D 698 taking special care to obtain required density under haunches.

.3 Protect installed culvert with minimum 600 mm cover 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.

3.7 End Treatments

.1 Install rip-rap as indicated or as directed by Departmental Representative.

.2 Obtain approval of Departmental Representative of culvert installation prior to installation of any end treatments.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

1.2 References

.1 American Association of State Highway and Transportation Officials (AASHTO):
  .1 AASHTO M180-2000, Corrugated Sheet Steel Beams for Highway Guardrails.

.2 American Society for Testing and Materials (ASTM International):
  .1 ASTM A 307-00, Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

.3 Canadian General Standards Board (CGSB):
  .1 CAN/CGSB-1.28-98, Exterior, Alkyd, House Paint.
  .2 CAN/CGSB-1.40-M97, Anti-corrosive, Structural Steel Alkyd Primer.
  .3 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.
  .4 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
  .5 CGSB 31-GP-107Ma-90, Non-inhibited, Phosphoric Acid Base Metal Conditioner and Rust Remover.

.4 Canadian Standards Association (CSA International):
  .1 CAN/CSA-O80 Series-97(February 2000), Wood Preservation.

.5 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.

.6 Government of Newfoundland and Labrador Specifications Book, Seventh Edition, March 2011 – Forms 640, 1279, 1280, 1282.

1.3 Samples

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
  .1 Engineered stamped shop drawings for crash absorption system.
  .2 Engineered stamped shop drawings for gate system.

.2 Inform Departmental Representative Owner at least 4 weeks prior to beginning Work, of proposed sources of guide rail and components.

1.4 Waste Management and Disposal

.1 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.2 Place materials defined as hazardous or toxic in designated containers.

.3 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

.4 Unused paint or coating material must be disposed of at an official hazardous material collections site as approved by Departmental Representative.

.5 Fold up metal banding, flatten and place in designated area for recycling.

.7 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in any other location where it will pose a health or environmental hazard.

.8 Do not dispose of preservative treated wood through incineration.

.9 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.

.10 Dispose of treated wood, end pieces, wood scraps and sawdust at a sanitary landfill.

.11 Dispose of unused preservative material at an official hazardous material collections site. Do not dispose of unused preservative material into the sewer system, streams, lakes, on ground or in any other location where they will pose a health or environmental hazard.

PART 2 PRODUCTS

2.1 Materials .1 Steel W-beam guide rail as indicated and to following requirements:

.1 The rail elements shall consist of a corrugated steel W-beam with corrugations symmetrical about the horizontal axis and such that the edges and centre of the rail element may contact each post.

.2 The individual rail elements shall be of the Standard Type (W-beam) consisting of 3.5 mm thick (10 gauge) rail of length not less then 4 125 mm, having post bolt slots 3 810 mm apart centre to centre; unless indicated elsewhere on a drawing or supplementary general condition in which case one additional post bolt slot will be placed at mid-span.

.3 The rail metal shall be open hearth oxygen furnace or electric furnace steel having an elongation of not less then 12 per cent in 50 mm and shall withstand a cold bend, without cracking, of 180 degrees around a mandrel of a diameter equal to 2½ times the thickness of the plate.

.4 The rail elements shall be hot-dip galvanized before or after fabrication. In accordance with the specifications of ASTM Designation A-515 (Class 2½ oz) or A123. Rail element joints shall be capable of withstanding a tensile load of not less then 350 kN without failure. The rail element shall not deflect more than 140 mm when tested as a simple beam with the traffic face up and with an 8.9 kN load applied at the centre of a 3 650 mm span through a 76 mm wide flat bearing.

.5 Workmanship shall be equivalent to good commercial practice and all edges, bolt holes and surfaces shall be free of torn metal, burns, sharp edges and protrusions.

.6 Rail sections shall be supplied by the Contractor.

.7 Two certified copies of mill test reports of each batch from which the rail element is formed, shall be furnished to the

Departmental Representative, if so required.

.2 Bolts, Nuts, Washers and Spikes:
- .1 All bolts, nuts and washers shall conform to the specifications of ASTM Designation A-307 or A-325, except that rail splice bolts shall be button headed.
- .2 Post bolts and splice bolts shall have shoulders of such shape and size that they fit into the bolt slots in the rails and thus prevent the bolt from turning.
- .3 Post bolts shall be 16 mm diameter and 250 mm long for use with 200 mm x 200 mm posts.
- .4 Post bolt washers for the back of posts shall be 45 mm in diameter and 4 mm thick.
- .5 Bolts for anchors shall be 16 mm diameter and 450 mm long for use with 200 mm x 200 mm posts and anchors. Washers shall be 45 mm round and 4 mm thick.
- .6 Spikes for anchors shall be 125 mm galvanized spikes.
- .7 Bolts, nuts, washers and other fittings shall be hot-dip galvanized in accordance with the specification of ASTM Designation A-153.
- .8 The Contractor shall supply the bolts, nuts, washers and spikes

.3 Sawn timber posts and offset blocks:
- .1 Timber for posts and anchors shall be sound, well seasoned structural grade lumber. Birch wood or other approved species will be acceptable for 200 x 200 guide rail posts.
- .2 Posts shall have minimum dimensions of 200 mm x 200 mm x 2400 mm.
- .3 Anchors shall consist of either one piece of guide rail post cut 450 mm long, or two pieces of 38 mm x 140 mm x 450 mm lumber.
- .4 Posts and anchors shall be pressure treated with an acceptable wood preservative.
- .5 The minimum required depth of penetration of wood preservative shall be 13mm. To determine penetration, a borer core shall

be taken from 20 pieces in each charge. If 80% of the borings meet the penetration requirements, the charge shall be accepted.

.6 The minimum retention of preservative shall be as follows:

PRESERVATIVE	MINIMUM RETENTION	METHOD OF DETERMINATION
PENTACHLOROPHENOL	6.4 kg/m3	BY ASSAY
CHROMATED COPPER ARSENATE	6.4 kg/m3	BY ASSAY
OTHER	IN ACCORDANCE WITH CSA 080-M 89	

.7 Incising will normally be required. However, this requirement will be waived if specifications for both penetration and retention are satisfied.

.8 If requested by the Engineer, the Contractor shall provide penetration and retention test reports for the guide posts and guide rail posts supplied for the project.

.9 The Contractor shall supply all the required wood preservative treated posts and anchors.

.4 Wood Preservative:

.1 Wood preservative for use in treating field cut ends of posts shall be of the same type and chemical composition as that used in the original treatment.

.2 The Contractor shall supply the wood preservative.

PART 3 Execution

.1 Galvanized materials shall be loaded, hauled and handled in such manner that galvanizing will not be damaged. All bare, abraded, and damaged surfaces shall be cleaned, pre-treated as required and coated with cold galvanizing compound as outlined above.

.2 Guide rail shall be placed to the lengths, lines and grades set by the Departmental Representative. Except where directed otherwise by the Departmental Representative, the guide rail shall be installed in accordance with the requirement of the drawings: Form 1279 "Typical Guide Rail Installation Types", Form 1280 "Guide Rail

Standard Installation", or Form 1282 "Guide Rail with Additional Posts" from Government of Newfoundland and Labrador Specifications Book, Seventh Edition, March 2011, as the case may be.

.3 A buried end section shall be placed at each end of a run of guide rail unless directed otherwise by the Departmental Representative.

.4 The end post of a buried end section shall have an anchor secured to the bottom of the post.

.5 Where a 150 mm x 150 mm x 450 mm timber anchor is used, it shall be secured to the post by means of a galvanized nut and 16 mm diameter bolt 350 mm long together with two 45 mm round 4 mm thick galvanized washers.

.6 Where a double 38 mm x 140 mm x 450 mm lumber anchor is used, it shall be secured to the post by means of four 125 mm galvanized spikes.

.7 Field boring and cutting to length of anchors will be permitted, provided that the hole is treated with two coats of wood preservative before driving the bolts and provided that the cut end is treated with two coats of wood preservative before burying.

.8 The Contractor shall excavate holes for the posts such that when placed in the holes the bottom of the posts are at least 1200 mm below the ground surface.

.9 Posts shall be set plumb and to the established lines and grades and shall be placed at 3810 mm intervals, unless directed by the Departmental Representative.

.10 The posts shall be firmly backfilled with selected material, free of large rock, placed in layers of thickness not greater than 100 mm. Each layer shall be thoroughly compacted before the next layer is placed. Should the backfill be dry

then each layer shall be moistened before tamping.

.11 All backfill shall be compacted to 95% of Standard Proctor Density (ASTM D698-78).

.12 All surplus excavated material shall be disposed of along the sides of fill, or in other locations as directed by the Departmental Representative.

.13 The rails shall be secured to even lines such that the centre of the rail is 500 mm above the edge of pavement.

.14 The Contractor shall bore holes in the posts for the post bolts and treat the holes with two coats of wood preservative before driving the bolts.

.15 Rail elements and terminal sections shall be lapped so that the exposed ends will not face approaching traffic.

.16 The bolted connections of the rail element to the post shall be capable of withstanding a 22.5 kN pull at right angles to the lines of the railing.

.17 When the attachment of the rail elements to the posts has been completed, the tops of the posts shall be cut to a point 75 mm above the top of the rail as shown by Section 1279 "Typical Guide Rail Installation Types" and Section 1280 "Guide Rail Standard Installation" from Government of Newfoundland and Labrador Specifications Book, Seventh Edition, March 2011. The tops of the posts shall be treated with two coats of wood preservative after cutting.

.18 Signal reflectors shall be attached to posts at terminal sections, posts at the buried end sections, and to every fourth post in a length of guide rail. Silver reflectors shall be placed facing oncoming traffic and yellow reflectors shall be placed on the opposite side of the post except for divided highway. On divided highways, silver

reflectors shall be placed facing oncoming traffic on the outside shoulder and yellow reflectors shall be placed facing oncoming traffic on the median shoulder.

.19 The Contractor shall drill nail holes in the reflectors, bend the reflectors to the required shape and secure the reflectors with 30 mm galvanized flat head nails as shown as shown on drawing Section 1281 "Signal Reflectors on Guide Rail Post" from Government of Newfoundland and Labrador Specifications Book, Seventh Edition, March 2011.

END OF SECTION

Appendix A

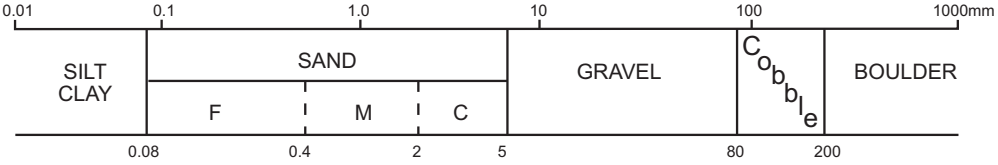
GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

FREDERICTON, MONCTON, BATHURST, GRAND FALLS, SAINT JOHN, NB

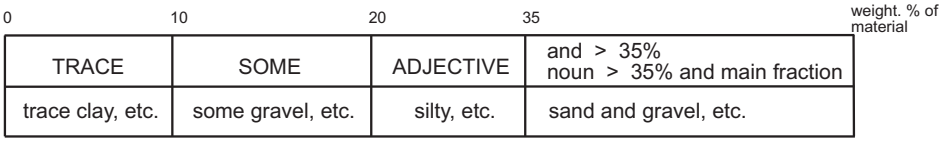
DESCRIPTIVE TERMS- BOREHOLE/TEST PIT LOG

SOILS

GRAIN SIZE



DESCRIPTIVE TERMINOLOGY



TRACE	SOME	ADJECTIVE	and > 35% noun > 35% and main fraction
trace clay, etc.	some gravel, etc.	silty, etc.	sand and gravel, etc.

COMPACTNESS gravels, sands, tills

N, RANGE	0 - 4	4 - 10	10 - 30	30 - 50	> 50
DENSITY	V. LOOSE	LOOSE	MEDIUM	DENSE	V. DENSE

CONSISTENCY silt, clay

S, KPa	< 12.5	12.5 - 25	25 - 50	50 - 100	100 - 200
CONSISTENCY	V. SOFT	SOFT	MEDIUM	STIFF	V. STIFF

ROCK

RQD	OVERALL QUALITY	FRACTURE SPACING
0 - 25	VERY POOR	VERY CLOSE 20 - 60 mm
25 - 50	POOR	CLOSE 60 - 200 mm
50 - 75	FAIR	MODERATE 200 - 600 mm
75 - 90	GOOD	WIDE 600 - 2000 mm
90 - 100	EXCELLENT	VERY WIDE 2 - 6 m

COMP. STR. MPa	1 - 5	5 - 25	25 - 50	50 - 100	100 - 250
DESCRIPTION	V. WEAK	WEAK	MODERATE	STRONG	V. STRONG

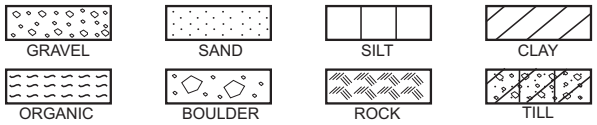
SAMPLE TYPES (location to scale on log)

S	SPLIT TUBE	G	SHOVEL
T	SHELBY TUBE	H	CARVED BLOCK
P	PISTON	K	SLOTTED
F	AUGER	V	IN SITU VANE
W	WASH	NR	NO RECOVERY

ROCK CORES

A(30mm); B(41mm); N(54mm)

LOG SYMBOLS



WELL SYMBOLS

N - standard penetration test; blows by 475 J drop hammer to advance Std. 50mm O.D. split tube sampler 0.3m

RQD - percent of core consisting of hard, sound pieces in excess of 100mm long (excluding machine breaks)

RECOVERY - sample recovery expressed as percent or length

S - shear strength , kPa; vane ⊕ ; penetrometer ■; unconfined ○ ; Uc unconfined compressive strength

Sr - shear strength, remoulded; vane ⊗ ; penetrometer □

Dd - dry density; t/m^3

W - natural moisture content, percent ✳

PL - plastic limit, percent ⊢

LL - liquid limit, percent ⊣

ND - non detect, total petroleum hydrocarbons (TPH) not detected in soil

Groundwater Level ▼ ; Seepage ▽

Revised Oct, 2009

BHDESCRM-2009.CDR

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH1
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/15	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 19.50	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits (w_P, w, w_L)
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0						0.03 Asphalt 19.47
	1	S	42	508		Dense, grey, well-graded GRAVEL with silt and sand (GW-GM); trace weather staining, dry: FILL
	2	S	23	584		0.91 18.59
1						Compact to very dense, brown to grey, well-graded SAND with silt and gravel (SW) to silty SAND with gravel (SM); trace weather staining, dry to damp
	3	S	21	559		
2	4	S	149/406	381		2.31 17.19
						End of Borehole - Borehole terminated at 2.31 m below ground surface due to refusal on probable bedrock or boulder. - Groundwater seepage not observed.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH2
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/15	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 30.00	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION	
0							
	1	S	93/381	203		0.04 Asphalt	29.96
						Compact to dense, grey, well-graded GRAVEL with silt and sand (GW-GM); dry. FILL	
						0.48	29.52

End of Borehole

- Borehole terminated at 0.48 m below ground surface due to auger refusal on probable bedrock. Bedrock outcrops visable adjacent to roadway.
- Groundwater seepage not observed.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH3
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/15	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 34.00	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0						0.05 Asphalt 33.95
	1	S	44	356		Dense, grey, well-graded GRAVEL with silt and sand (GW-GM); trace weather staining, dry: FILL
	2	S	24	356		
1						1.22 32.78
	3	S	14	279		Compact to very dense, brown and grey, well-graded SAND with silt and gravel (SW) to silty SAND with gravel (SM); layered, weathered, damp to dry
2	4	S	162	610		2.54 31.46
						End of Borehole - Borehole terminated at 2.54 m below ground surface at target depth. - Groundwater seepage not encountered.

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BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH4
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/15	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 33.40	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa (0, 25, 50, 75, 100)
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits (w_P, w, w_L)
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
(0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100)

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0						0.04 Asphalt 33.36
	1	S	59	533		Compact to very dense, grey, well-graded GRAVEL with silt and sand (GW-GM); trace weathering, dry: FILL
	2	S	25	457		1.02 32.38
1						Compact, brown, silty SAND with gravel (SM); damp to wet
	3	S	3	279		1.78 31.62
						ROOTMAT/PEAT - Inferred from 1.93 m depth, no recovery.
2	4	S	23	0		2.54 30.86
						End of Borehole - Borehole terminated at 2.54 m below ground surface at target depth. - Groundwater seepage observed at approximately 1.52 m below ground surface.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH5
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/15	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 31.10	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION	
0						0.05 Asphalt	31.05
	1	S	53	356		Dense, grey, well-graded GRAVEL with silt and sand (GW-GM); trace organics, trace weather staining, dry: FILL	
1	2	S	48	483			
	3	S	27	483			
2	4	S	16	279		2.51	28.59
						2.64 Compact, red brown, silty SAND with gravel (SM); dry to damp	28.46
						End of Borehole - Borehole terminated at 2.64 m below ground surface at target depth. - Groundwater seepage not observed.	

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH6
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/15	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 21.80	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0					0.05	Asphalt 21.75
	1	S	52	356		Dense, grey, well-graded SAND with silt and gravel (SW-SM); trace weather staining, dry: FILL
					0.71	21.09
	2	S	29	279		Loose to compact, brown, well-graded SAND with gravel (SW); trace silt, trace weather staining, dry
1	3	S	10	152		
					1.93	19.87
2	4	S	11	203		Loose, brown, silty SAND with gravel (SM); wet, orange in tip
					2.54	19.26

End of Borehole
- Borehole terminated at 2.54 m below ground surface at target depth.
- Groundwater seepage observed at approximately 1.93 m below ground surface.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH7
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/15	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 19.10	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0					0.05	Asphalt 19.05
	1	S	61	254		Compact to very dense, grey, poorly graded SAND with silt and gravel (SP-SM); trace orange weather staining: FILL
1	2	S	40	330		
	3	S	28	356		
2	4	S	51	508		
					2.54	16.56
						End of Borehole - Borehole terminated at 2.54 m below ground surface at target depth. - Groundwater seepage not observed.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH8
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/14	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 7.40	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa (0, 25, 50, 75, 100)

○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterberg Limits (w_P, w, w_L)
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0					0.04	Asphalt 7.36
	1	S	54	356		Compact to very dense, grey to brown layering, well-graded SAND with silt and gravel (SW-SM); trace orange weather staining, dry: FILL
1	2	S	23	305		
	3	S	24	381		
2	4	S	21	279		
	5	S	55	533		
3	6	S	24	76	3.76	3.64
	7	S	6	152		Loose, red brown, well-graded SAND with silt and gravel (SW-SM); organic odor, damp
4	8	S	9	203	4.98	2.42
	9	S	8	203		Loose, grey black, well-graded SAND with gravel (SW); trace silt, damp
5	10	S	9	254		
	11	S	18	178	6.81	0.59
6						End of Borehole - Borehole terminated at 6.81 m below ground surface at target depth. - Groundwater seepage not observed.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH8A
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/14	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 7.40	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa (0, 25, 50, 75, 100)
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits (w_P, w, w_L)
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
(0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100)

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0						0.06 Asphalt — 7.34
	1	S	26	330		Compact, dark grey, well-graded SAND with silt and gravel (SW-SM); trace orange weather staining, occasional cobbles: FILL
	2	S	24	356		
1	3	S	23	356		
	4	S	15	305		
2	5	S	11	305		2.84 — 4.56
						Loose, brown, silty SAND with gravel (SM); organic content throughout: FILL
3	6	S	7	254		
	7	S	8	203		
4	8	S	6	305		
	9	S	7	305		
5	10	S	16	203		
						6.10 — 1.30
6						6.20 ROOTMAT — 1.20
	11	S	84	254		Dense, grey, well-graded SAND with gravel (SW); trace silt, occasional cobbles — 0.85
						6.71 BEDROCK — 0.69
						End of Borehole - Borehole terminated at 6.71 m below ground surface due to refusal on bedrock. - Groundwater seepage not observed.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH9
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/13	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 5.50	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa (0, 25, 50, 75, 100)
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits (w_P, w, w_L)
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
(0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100)

DEPTH m	No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0						0.04 Asphalt
	1	S	34	254		Compact to dense, grey to brown, well-graded SAND with silt and gravel (SW-SM); trace orange weather staining, dry: FILL
1	2	S	30	254		
	3	S	11	279		
2	4	S	12	178		
						2.54 5.46
	5	S	16	406		Compact, black, well-graded SAND (SW); trace gravel, damp to wet
3	6	S		330		
	7	S	12	356		
4	8	S	11	330		
	9	S	18	356		
5	10	S	22	610		
						6.32 -0.82
6	11	S	50/127	178		End of Borehole - Borehole terminated at 6.32 m below ground surface due to refusal on probable bedrock. - Groundwater observed at approximately 5 m depth.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH9A
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/14	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 5.60	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa (0, 25, 50, 75, 100)

○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits (w_P, w, w_L)
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0						0.06 Asphalt
	1	S	25	356		Compact to dense, grey black, well-graded SAND with gravel (SW); trace silt, trace orange weather staining, dry: FILL
	2	S	35	305		
1	3	S	22	305		
	4	S	16	178		
2						2.44 (3.16)
	5	S	6	178		Loose to compact, brown, silty SAND with gravel (SM); organic odor, dry to damp
	6	S	13	203		
3						3.76 (1.84)
	7	S	13	229		Compact, black, poorly graded SAND with silt and gravel (SP-SM); trace gravel, damp to wet
	8	S	14	483		
4						
	9	S	14	406		
5						
	10	S	61	178		5.87 (-0.27)
	11	NQ	48%	93%		Strong, fair quality, fresh, grey: BEDROCK
6						
						7.47 (-1.87)
7						End of Borehole - Borehole terminated at 7.47 m below ground surface at target depth. - Groundwater seepage observed at approximately 5 m below ground surface.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH10
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/13	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 11.30	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits (w_P, w, w_L)
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0						0.05 Asphalt 11.25
	1	S	55	381		Very dense, grey, well-graded SAND with silt and gravel (SW-SM); dry: FILL
	2	S	40	356		1.27 10.03
1	3	S	21	305		Loose to compact, brown, well-graded SAND with gravel and organics (SW)
	4	S	11	406		2.03 9.27
2						Loose, dark grey, well-graded SAND with silt and gravel (SW-SM); damp
						2.54 8.76
						End of Borehole - Borehole terminated at 2.54 m below ground surface at target depth. - Groundwater seepage not observed.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH11
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/13	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 12.10	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION	
0						0.05 Asphalt	12.05
	1	S	55	356		Compact to very dense, grey to reddish brown, well-graded GRAVEL with silt and sand (GW-GM); trace organics, dry: FILL	
1	2	S	29	406			
	3	S	15	330			
2	4	S	5	305		2.23	9.87
						Very loose to loose, red brown, silty SAND with frequent organics: BOG/TOPSOIL	
						2.53	9.57
						End of Borehole - Borehole terminated at 2.53 m below ground surface at target depth. - Groundwater seepage not observed.	

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH12
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/13	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 7.00	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa (0, 25, 50, 75, 100)

○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits (w_P, w, w_L)
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m

(0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100)

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0						0.05 Asphalt — 6.95
	1	S	49	381		Dense, grey, well-graded GRAVEL with silt and sand (GW-GM); dry, trace cobbles: FILL
	2	S	20	330		0.79 — 6.21 Loose to compact, brown grey, well-graded SAND with gravel, trace silt (SW); dry to damp
1	3	S	4	356		1.58 — 5.42
						Very loose to loose, red brown, silty SAND with frequent organics: BOG/TOPSOIL — 2.01 — 4.99
2	4	S	18	254		Compact, grey, silty SAND with gravel (SM)
						2.59 — 4.41

End of Borehole
- Borehole terminated at 2.59 m below ground surface at target depth.
- Groundwater seepage not observed.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH13
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/13	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 2.30	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0						0.05 Asphalt 2.25
	1	S	27	406		Compact, dark grey, well-graded GRAVEL with silt and sand (GW-GM); dry, trace orange weather staining: FILL
	2	S	22	305		1.31 0.99
1	3	S	13	406		Compact to dense, black, silty SAND with gravel (SM) to poorly graded SAND with silt and trace gravel (SP); damp to wet, trace orange weather staining
	4	S	11	508		2.53 -0.23
2						End of Borehole - Borehole terminated at 2.53 m below ground surface at target depth. - Groundwater seepage observed at approximately 1.5 m below ground surface.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH14
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/13	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 2.10	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0					0.05	Asphalt 2.05
	1	S	18	229		Compact, dark grey, well-graded GRAVEL with silt and sand (GW-GM); dry to damp: FILL
	2	S	15	356		
1					1.52	0.58
	3	S	10	330		Compact to dense, black, silty SAND with gravel (SM); damp to wet, trace orange weather staining
2	4	S	41	254		
					2.44	-0.34

End of Borehole
- Borehole terminated at 2.44 m below ground surface at target depth.
- Groundwater seepage observed at approximately 1.5 m below ground surface.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH15
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/13	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 2.20	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0	1	S	7	152		Loose to compact, dark grey, well-graded GRAVEL with silt and sand (GW-GM); dry: FILL
	2	S	11	152		
1					1.22 / 0.98	
	3	S	15	305		Compact, black, poorly graded SAND with gravel (SP) to silty SAND with gravel (SM); dry to wet, trace orange weather staining
2	4	S	17	330		
					2.44 / -0.24	End of Borehole - Borehole terminated at 2.44 m below ground surface at target depth. - Groundwater seepage observed at approximately 1.8 m below ground surface.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH16
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/13	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 2.60	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0	1	S	14	152		Compact, grey black, well-graded GRAVEL with silt and sand (GW-GM); dry, trace orange weather staining: FILL
	2	S	15	305		
1	3	S	15	356		
2	4	S	57/203	127	2.03	0.57
						End of Borehole - Borehole terminated at 2.03 m below ground surface due to refusal on probable boulders or bedrock. - Groundwater seepage not observed.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH17
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/14	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 12.50	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0	1	S	45	559		Compact, dark grey brown, well-graded GRAVEL with silt and sand (GW-GM); wood debris at 1.2 m depth, damp: FILL
	2	S	9	178		
1						1.22 11.28
	3	S	5	356		Loose, brown, silty SAND with gravel (SM); organic odor, wet
2	4	S	7	152		2.44 10.06
						End of Borehole - Borehole terminated at 2.44 m below ground surface at target depth. - Groundwater seepage observed at approximately 1.22 m below ground surface.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH18
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/15	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 10.70	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0	1	S	16	508		Compact, brown, well-graded GRAVEL with silt and sand (GW-GM); some red weather staining, dry to damp: FILL
	2	S	3	152		0.91 9.79
1						PEAT/ROOTMAT
	3	S	8	305		1.52 9.18
						Loose to compact, grey, silty SAND with gravel (SM); wet to dry
2	4	S	30	305		2.41 8.29
						End of Borehole - Borehole terminated at 2.41 m depth due to refusal on probable boulder - Groundwater seepage not observed. Perched water observed below peat layer.

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH19
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/15	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 9.60	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0	1	S	31	305		Compact to dense, grey, well-graded GRAVEL with silt and sand (GW-GM); dry to wet: FILL
1	2	S	21	279		
	3	S	55	457		
2	4	S	31	305		
					2.44	End of Borehole - Borehole terminated at 2.44 m below ground surface at target depth. - Groundwater seepage observed at approximately 0.61 m below ground surface.
					7.16	

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH20
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/15	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 13.90	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION	
0	1	S	20	508		0.03 Grass/ROOTMAT	13.87
						Compact to dense, grey, well-graded GRAVEL with silt and sand (GW-GM); trace weather staining, dry: FILL	
	2	S	43	508			
1						1.22	12.68
	3	S	30	508		Compact, grey to brown, silty SAND with gravel (SM); trace weather staining, dry to wet	
						▼	
2	4	S	32	508		2.44	11.46
						End of Borehole - Borehole terminated at 2.44 m below ground surface at target depth. - Groundwater seepage observed at approximately 1.83 m below ground surface.	

BOREHOLE LOGS

Client	Parks Canada Agency	Proj No. 4088.24	BOREHOLE BH21
Project	Geotechnical Investigation - Pavement Rehabilitation Project	Date Drilled 2016/09/15	Page 1 of 1
Location	L'anse Aux Meadows National Historic Site		
Ground Level, m 18.20	Datum: Geodetic	Logged By LMS	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0						0.05 Asphalt 18.15
	1	S	29	533		Compact to dense, grey, poorly-graded GRAVEL with silt and sand (GP-GM); trace weather staining, dry: FILL
	2	S	39	508		
1	3	S	40	559		1.83 16.37
	4	S	45	457		Dense, grey brown, silty SAND with gravel (SM); damp to wet
2						2.54 15.66
						End of Borehole - Borehole relocated due to underground utilities. - Borehole terminated at 2.54 m below ground surface at target depth. - Groundwater seepage observed at approximately 1.93 m below ground surface.

GEMTEC
Consulting Engineers and Scientists

Client: Parks Canada Agency

Project: SOA #5P301-14-0001 - Engineering Services, Pavement Rehabilitation Project, L'Anse-aux Meadows N

Project #: 0408824

Moisture Content and Density

Borehole / Testpit	Depth	Sample	Description	Date/Time Sampled	Moisture Content, %	Sample Volume, mm^3	Wet Density, kg/m^3	Dry Density, kg/m^3
1	0.08-0.69m	1		16/10/18 1:27:00 PM	3.00			
11	0.71-1.32m	2		16/10/18 1:28:31 PM	8.31			
16	0.61-1.22m	2		16/10/18 1:28:31 PM	3.51			
18	0.0-0.61m	1		16/10/18 1:28:00 PM	14.06			
21	0.10-0.71m	1		16/10/18 1:28:31 PM	3.32			
4	0.10-0.71m	1		16/10/18 1:28:31 PM	2.49			
7	1.32-1.93m	3		16/10/18 1:28:31 PM	4.39			
8	5.59-6.20m	10		16/10/18 1:28:31 PM	12.96			
8A	0.71-1.32m	2		16/10/18 1:28:31 PM	10.13			
9	0.10-0.71m	1		16/10/18 1:28:31 PM	3.32			
9A	4.37-4.98m	8		16/10/18 1:28:31 PM	11.39			

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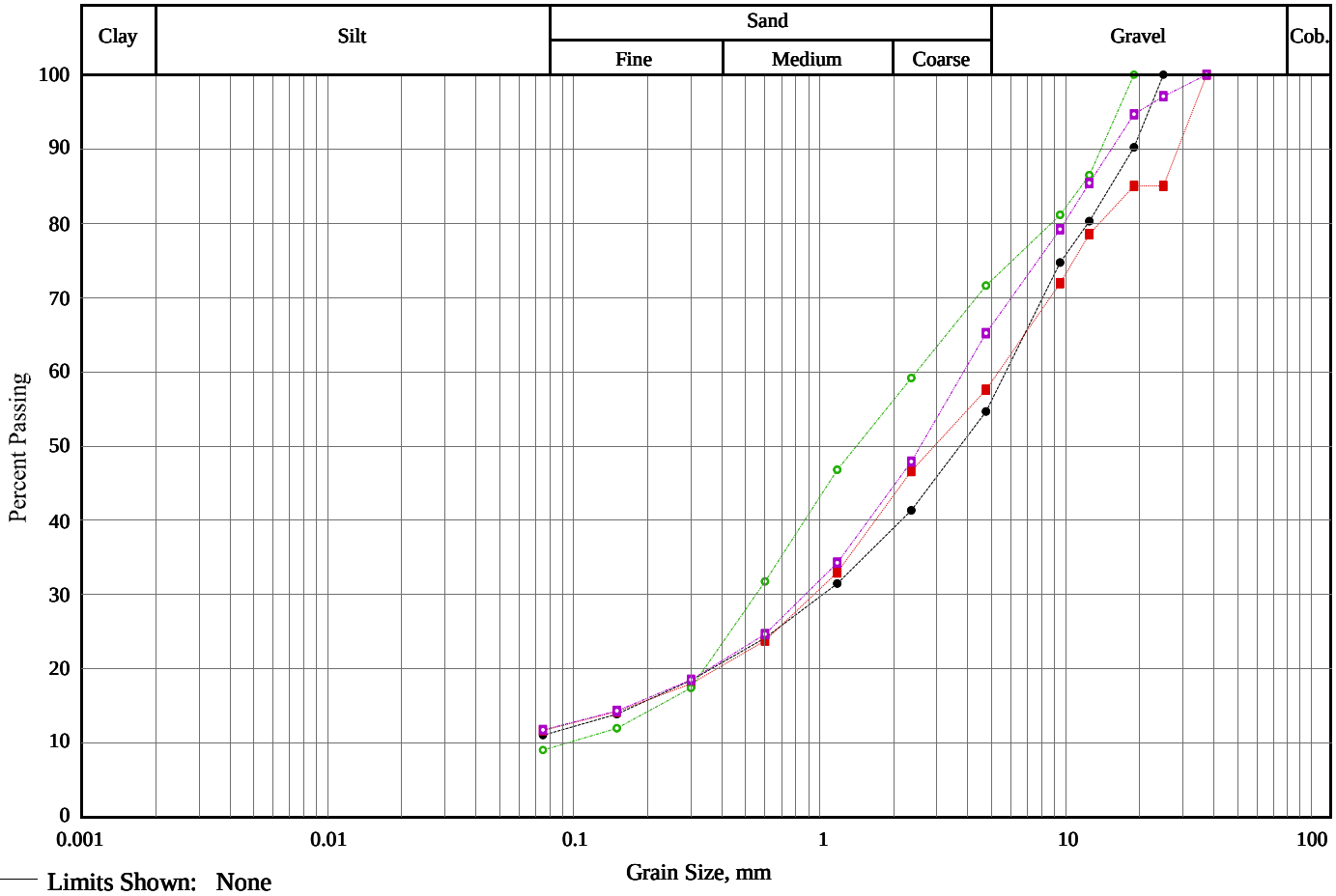
Consulting Engineers and Scientists

Client: Parks Canada Agency

Project: SOA #5P301-14-0001 - Engineering Services, Pavement

Project #: 0408824

Soils Grading Chart



Line Symbol	Description	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay	Date Sampled
		1	1	0.08-0.69m	45.4	43.6	11.0		16/10/18
		11	2	0.71-1.32m	42.4	45.9	11.7	0.0	16/10/18
		16	2	0.61-1.22m	28.4	62.6	9.0		16/10/18
		18	1	0.0-0.61m	34.8	53.5	11.7	0.0	16/10/18

Line Symbol	Sample Description	AASHTO	D_{10}	D_{15}	D_{50}	D_{85}	% 5-75µm
	Gravel and sand , some silt	A-1-a	---	0.18	3.73	15.26	---
	Sand and gravel , some silt	A-1-a	---	0.17	2.93	18.99	---
	Gravelly sand , trace silt	A-1-b	0.09	0.22	1.41	11.60	---
	Gravelly sand , some silt	A-1-a	---	0.17	2.57	12.28	---

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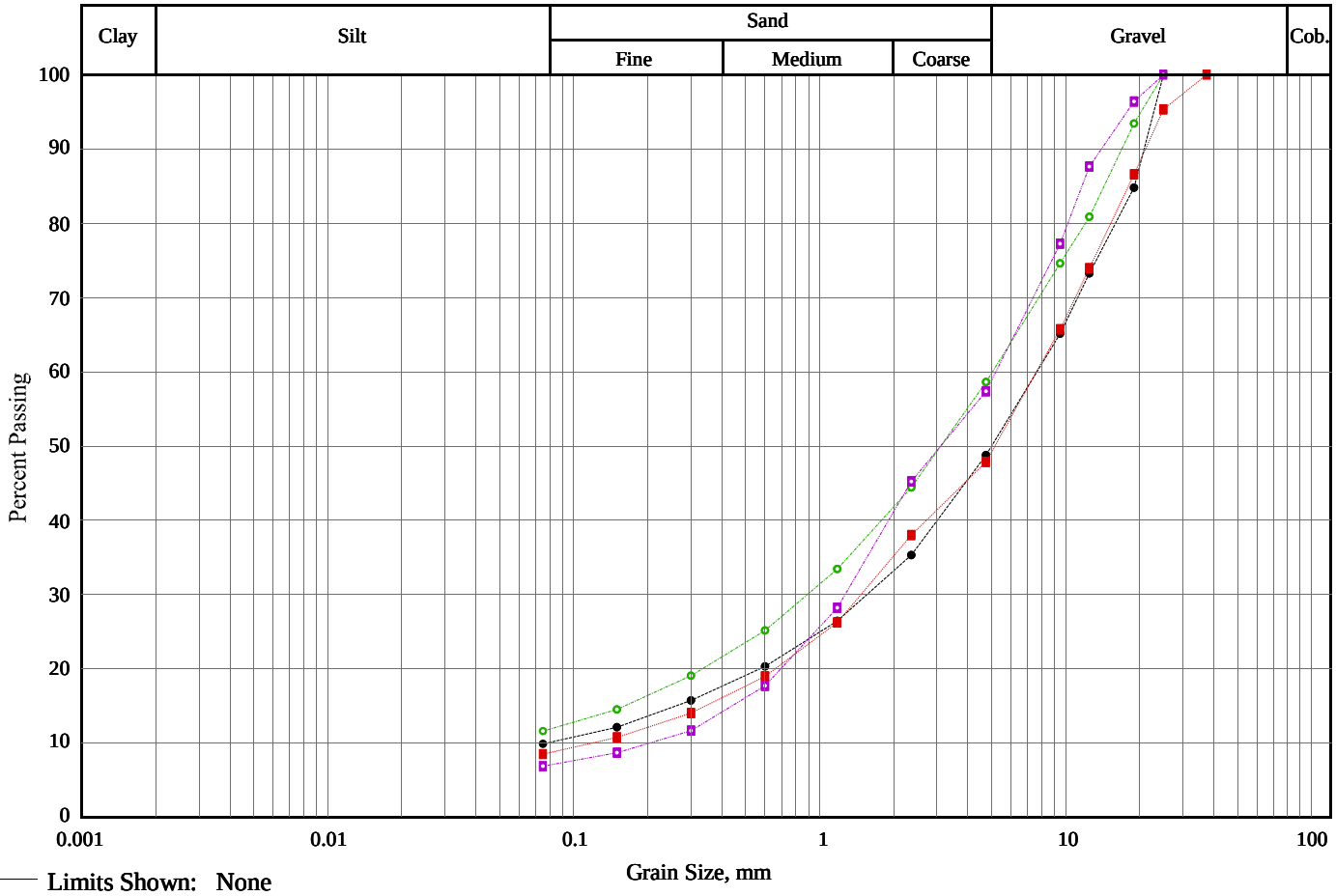
Client: Parks Canada Agency

Project: SOA #5P301-14-0001 - Engineering Services, Pavement

Project #: 0408824

Soils Grading Chart



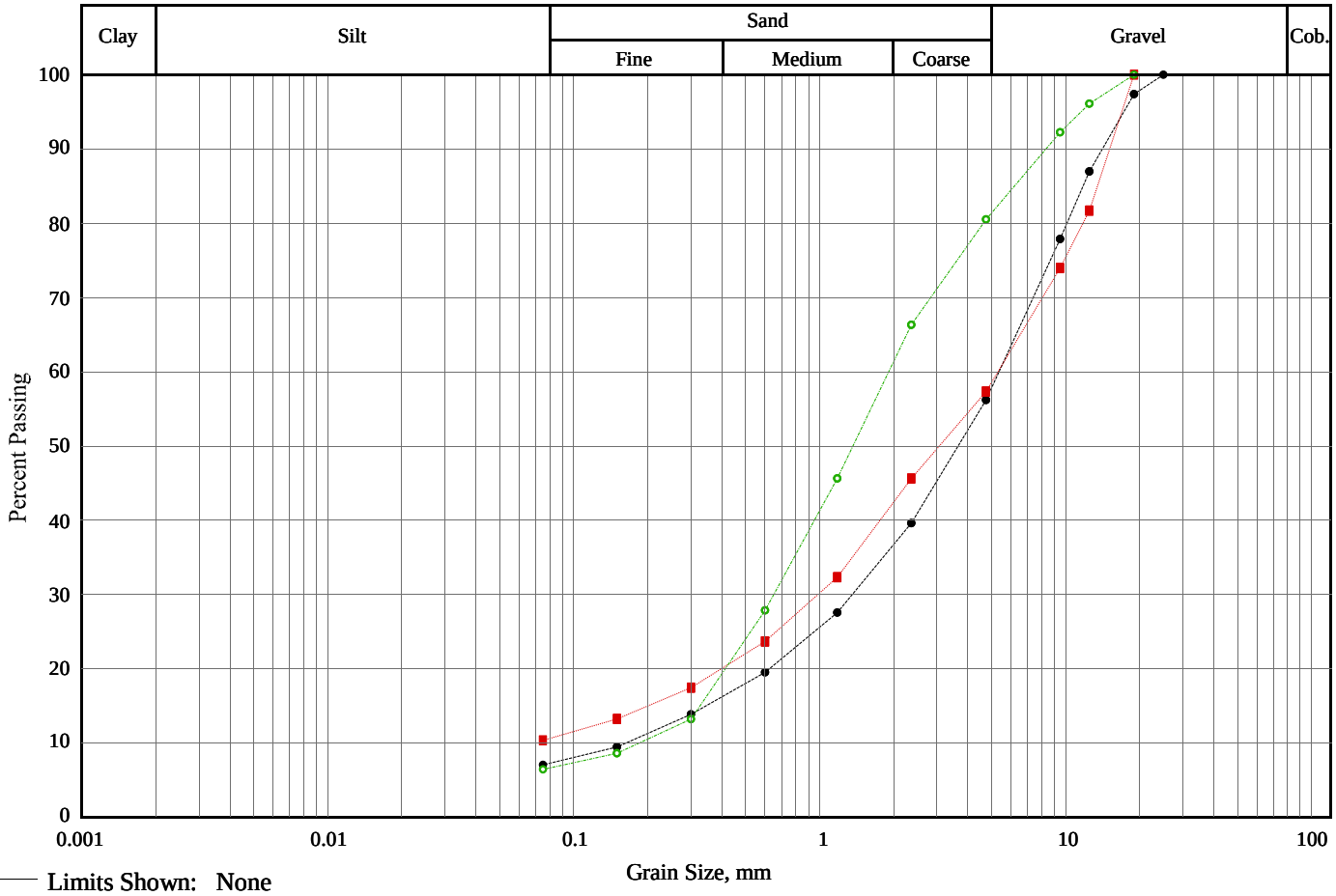
Line Symbol	Description	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay	Date Sampled
		21	1	0.10-0.71m	51.2	38.9	9.8	0.0	16/10/18
		4	1	0.10-0.71m	52.2	39.4	8.5	0.0	16/10/18
		7	3	1.32-1.93m	41.4	47.0	11.6	0.0	16/10/18
		8	10	5.59-6.20m	42.7	50.5	6.8		16/10/18

Line Symbol	Sample Description	AASHTO	D_{10}	D_{15}	D_{50}	D_{85}	% 5-75µm
	Gravel and sand , trace silt	A-1-a	0.08	0.26	5.01	19.08	---
	Gravel and sand , trace silt	A-1-a	0.12	0.35	5.17	18.04	---
	Sand and gravel , some silt	A-1-a	---	0.16	3.11	14.36	---
	Sand and gravel , trace silt	A-1-a	0.21	0.44	3.11	11.66	---

GEMTEC
Consulting Engineers and Scientists

Client:	Parks Canada Agency
Project:	SOA #5P301-14-0001 - Engineering Services, Pavement
Project #:	0408824

Soils Grading Chart



Line Symbol	Description	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay	Date Sampled
●----		8A	2	0.71-1.32m	43.8	49.2	7.0	0.0	16/10/18
■----		9	1	0.10-0.71m	42.7	47.0	10.3	0.0	16/10/18
○----		9A	8	4.37-4.98m	19.5	74.1	6.4		16/10/18

Line Symbol	Sample Description	AASHTO	D_{10}	D_{15}	D_{50}	D_{85}	% 5-75µm
●----	Sand and gravel , trace silt	A-1-a	0.16	0.35	3.66	11.78	---
■----	Sand and gravel , some silt	A-1-a	---	0.20	3.07	13.48	---
○----	Sand , some gravel , trace silt	A-1-b	0.19	0.33	1.37	6.19	---

APPENDIX B

Basic Impact Assessment
Parks Canada
Version IAA 2019

Basic Impact Assessment Instructions *for this form are available (see the Guidance and Tools section of the Parks Canada Impact Assessment intranet site or request from Parks Canada impact assessment staff).*

1. PROJECT TITLE & LOCATION

Highway 436 and Parking Lot Rehabilitation, L'Anse aux Meadows National Historic Site of Canada

2. PROPONENT INFORMATION

Highway Engineering Services (East)
Parks Canada, Gros Morne National
Rocky Harbour, NL

3. PROPOSED PROJECT DATES

Planned commencement: 2023-05-01

Planned completion: 2023-09-30

4. NOTICES ON REGISTRY

Title for Registry:

Project notice posted on Registry	2023-02-01
BIA or any permits approval cannot be taken before	2023-03-04

5. PROJECT FILE NUMBER (internal /Registry)

LAM_2023_001_Highway 436 and Parking Lot Rehabilitation

6. PROJECT DESCRIPTION

L'Anse aux Meadows National Historic Site (LAMNHS) was declared a national historic site in 1975, as it represents the only authenticated Norse archaeological site in the Americas and the earliest known European presence on the American continent. It was later inscribed on to the UNESCO World Heritage list in 1978 under criterion (vi), recognizing its Outstanding Universal Value in part for its global significance in the history of human migration and discovery. Specifically, L'Anse aux Meadows is the first and only known site established by Vikings in North America and the earliest evidence of European settlement in the New World. As such, it is a unique milestone in the history of human migration and discovery. The 80 km^2 property, 60 % marine, contains ecosystem features representative of the Strait of Belle Isle Ecoregion,

encompassing an area with provincially listed rare plants and habitat important for migratory seabirds.

LAMNHS is internationally renowned as a premier Norse destination drawing visitors from around the world. The proposed project looks to rehabilitate the portion of Highway 436 that is within the National Historic Site, along with the roads that provide access to the Site (Figure 1). In addition, a parking lot extension is proposed for the main parking area to better serve increasing numbers of visitors (i.e. an increase from 45 car parking spaces to 78; Figure 2). Activities for this work will include clearing of the right of ways, ditching, culvert replacements, asphalt milling, and resurfacing the road bed. Additionally, the bus loop will require culvert replacement, scarification and reshaping of the existing access/parking area, and resurfacing of the road bed with new asphalt. Lastly, the main parking lot will be extended on the northwest side and reshaped; work for this includes grubbing, excavation, rock fill, granular placements and asphalt paving.

Project staging will be at a location chosen by the selected contractor and in consultation with the project manager. The asphalt plant will not be permitted within the bounds of the National Historic Site and will be a location chosen by the selected contractor in conversation with the project manager. Work is intended to start spring of 2023 and be completed by fall of 2023.

Figure 1. Image of the L'Anse aux Meadows National Historic Site showing the location of the various road and parking lot work.

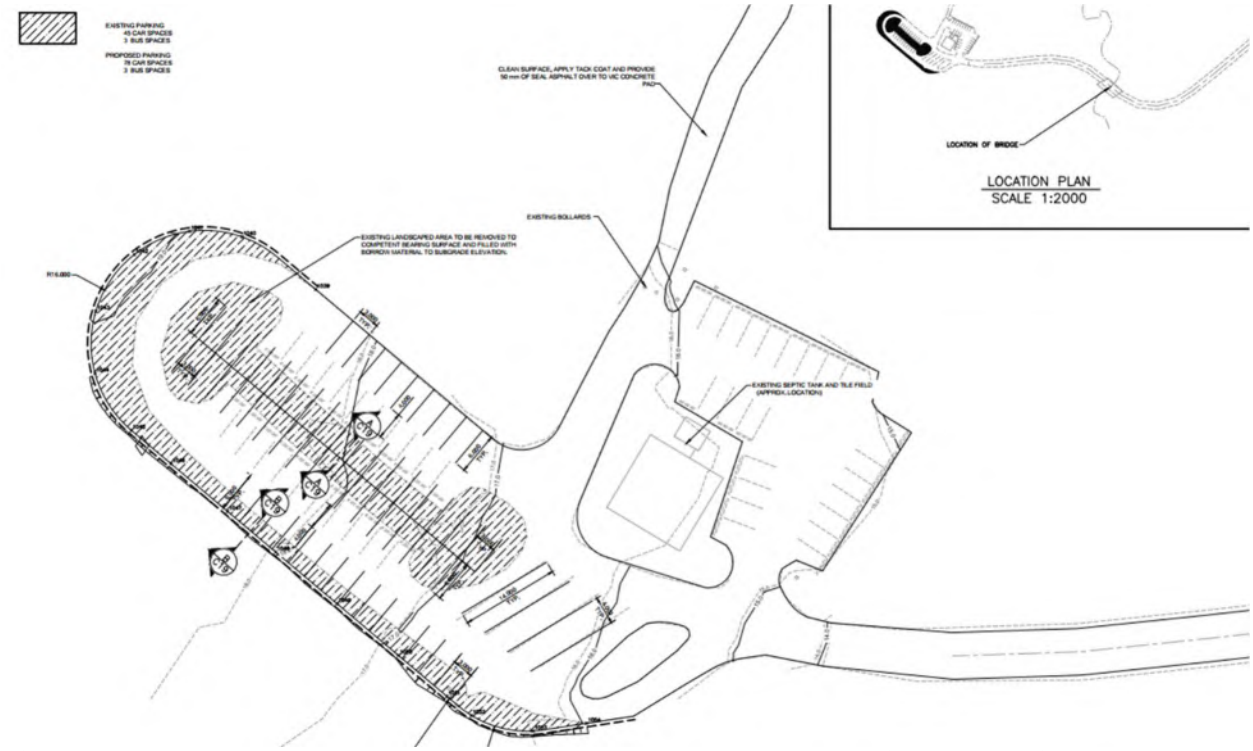


Figure 2. Visitor Center parking lot upgrades. Note shaded areas delineate parking expansion areas.

7. VALUED COMPONENTS LIKELY TO BE AFFECTED

Natural Resources

Air Quality and Noise: Ambient air quality and existing noise levels in the area of the proposed work includes wind, ocean waves, and highway traffic.

Soil and Landforms: The national historic site is located in a landscape that is representative of the Strait of Belle Isle Ecoregion. Features of this landscape include tidal salt marshes, discontinuous coniferous forest, tuckamore, bogs, barrens, wetlands, and freshwater ponds. Soils across much of this landscape are acidic and moist.

Water Quality and Riparian/Fish Habitat and Aquatic Fauna: Route 436 traverses through the National Historic site for about 3.3 km. A coastal highway, the road no more than 1.5 km from the ocean and at times as close as 20 m. Other surface water bodies include 79 permanent small ponds and lakes, some of which are as close as 50 meters from the highway. There are no major rivers in the National Historic Site, but there are many secondary streams and tributaries.

Little work has been done on the aquatic fauna of the National Historic Site. However, limited historical work (i.e. on Duck Pond, Black Duck Pond and Skin Pond) suggest three species of stickleback (3-spine, 4-spine, and 9-spine) are present at the Site and that common salmonid species (Atlantic salmon parr, Arctic char, brook trout, rainbow smelt) were also present in Black Duck Pond. Duck Pond and Skin Pond recorded less diversity with only brook trout and rainbow smelt found in Duck Pond, and only brook trout recorded in Skin Pond.

Other Fauna: Diversity is limited but is characteristic of the Strait of Belle Isle Ecoregion, with species such as snowshoe hare, and other small mammals (mink, weasel, otter, beaver, muskrat, and fox), as well as avifauna such as sparrow species (e.g., white-throated, white-crowned, and savannah), and warbler species (e.g., yellow, blackpoll, and yellow-rumped). The Site is important for various migratory seabirds, including eider ducks that use the offshore islands for nesting.

Flora: As described in the 1977 biophysical survey, the Site vegetation is a mixture of coastal forest, wetland, and heath/barrens. Coastal forests are comprised of three main groups, tamarack- balsam fir (*Larix – Abies balsamea*), fir tuckamore (tall tuck/fir tuck), and dwarf black spruce tuckamore (low tuck). There are a variety of wetland communities at the Site but most are classified as either flat bogs which are dominated by sphagnum moss, black crowberry, bake-apple, clubrush and cladonia lichens, or fens which are composed of aquatic sedges, club rush and sweet gale. There are three main barren communities, rock barren, soil barren, barren, each with their own unique plant communities including berries (black crowberry, partridge berry), lichens, dwarf shrubs (Labrador tea, green alder, white birch) and tall herbs (fireweed, Pruch's Golden rod). Anthropogenic plant communities (i.e. roadsides) were dominated by include buttercup, wild strawberry, clover, and yarrow during the 1977 biophysical survey, but have certainly seen the establishment of shrubs species since that time (e.g. mixed alder and willow).

Species at Risk: Although no species at risk critical habitat occurs within the boundaries of the historic site, the Site protects 38 vascular plants listed under the provincial government designation of S1 (extremely rare) or S2 (rare). Most of these plants are concentrated on the islands associated with the Site or along coastal portions of the Site. One species, Labrador willow (*Salix argyrocarpa*), listed as S1S2 has been identified on the mainland portion of the Site, particularly in areas near park facilities such as the old boardwalk from the visitor center to the Norse site. Further, short-eared owl (listed Special Concern) are seen frequently in the bogs and marshes within the Site's boundary and was confirmed to breed at the Site in 2013. Bats (likely little brown myotis and possibly northern myotis) are know in the general area; both species are listed as Endangered due to the impacts of white nose syndrome. Bank swallow (listed Threatened) are also know in the greater area, but have not been recorded at the Site. Historical fish surveys suggest American eel (listed Special Concern) may be found in some ponds at the Site (i.e. Black Duck Pond and Duck Pond).

Cultural Resources

Archaeological resources: L'Anse aux Meadows National Historic Site was designated as a National Historic site in 1975 because it represents the only authentic Norse archeology site in the Americas and is the earliest known European presence on the continent. Archeological excavations in the 1960s and 1970s uncovered early 11th-centruary dwellings and workshops. These structures were constructed of timber frames overlaid with sod and are similar to the architecture in Norse Greenland and Iceland of the same period. This set-up which could accommodate 90 people was occupied for a few years and served as a base for exploration into Vinland and the other areas mentioned in the Vinland Sagas. The site was previously inhabited by Indigenous peoples (Maritime Archaic, Groswater, Dorset, and Beothuk) at least 4000 years prior to the arrival of the Norse and represents the first known contact between North American Indigenous people and Europeans.

Cultural landscape: The Commemorative Integrity Statement (CIS) describes the heritage place as the land that "*comprises the terrace on which the Viking buildings were erected, the*

adjacent landscape whose features and resources led the Vikings to establish their base camp at this location, and the view planes over the Strait of Belle Isle, the offshore islands, and the Labrador coast. The situation of the site on the very northern edge of the Great Northern Peninsula close to the northern mouth of the Strait of Belle Isle and such landmarks as Belle Isle and other offshore islands made the site easy to find for Viking navigators lacking maps and instruments. Epaves Bay, bounded by cliffs to the south and Beak Point to the north, would also have been part of these landmarks." Furthermore, one of the vision statements in the 2019 Management Plan indicates "*L'Anse aux Meadows NHS continues to protect a historical landscape that has changed little over the past thousand years. As visitors explore the site, they are struck by the raw beauty of the surrounding landscape and are inspired by the same viewscapes that greeted Norse crews over one thousand years ago…*". The Site also boasts a contemporary cultural landscape with many traditional activities still permitted within the boundary of the Site including hay cutting, berry picking, vegetable gardening, trapping, snaring, domestic wood harvest, migratory bird hunting, snowmobiling, and recreational fishing.

Visitor Experience and Safety

Visitation at L'Anse aux Meadows National Historic Site has increased beyond 30,000 visitors in recent years. Highway 436 serves both visitors to the national historic site and other local attractions but also the over 200 year-round residents.

Outstanding Universal Values

L'Anse aux Meadows was inscribed on to the UNESCO World Heritage list in 1978 under Criterion (vi): L'Anse aux Meadows is the first and only known site established by Vikings in North America and the earliest evidence of European settlement in the New World. As such, it is a unique milestone in the history of human migration and discovery.

8. EFFECTS ANALYSIS

Natural Resources

Air Quality and Noise:

- Construction activities will lead to temporary increases in noise, dust, and vehicle emissions above baseline (i.e. daily highway traffic volume), and a decrease in ambient air quality.
- Construction activities may cause temporary increases in dust due to disturbance of exposed soils by machinery, vehicles, and wind, and excavation and transport of granular material.
- Construction activities may lead to temporary increases in levels of CO2 and other pollutants.
- Construction activities may lead to temporary increases in localized temperatures from paving and equipment operation.

Soil and Landforms:

- The majority of construction activities work will occur within existing footprint of Highway 436 so will have a limited effect on undisturbed soils and landforms.
- Removal of vegetation and top organic layer from adjacent ditches and side slopes, and soil disturbance due to construction activity may destabilise soils, increase the risk of erosion, lead to soil compaction, and alter soil permeability.
- Road embankments and ditches will be shaped and have a reduced slope.
- Construction activities may lead to unnatural ground surfaces contours (e.g. rutting, compaction).
- Accidental spills and leaks from construction equipment and construction can impact soils.

- Soil erosion, loss of topsoil and exposure of subsoil.

Water Quality and Riparian/Fish Habitat and Aquatic Fauna:

- Excavating and dewatering activities required for replacement of culverts increase the risk of erosion and runoff of sediments into the streams.
- Contamination of streams and adjacent ponds from toxic spills or leaks from machinery, equipment and construction materials (e.g. runoff sediment) could impact the health and survival of freshwater and marine fauna at or downstream from the construction site.
- Fuels and materials stored at temporary staging areas have the potential to leak and leach into ground and surface water.
- Reduced water quality due to transportation of debris and contamination (e.g. from leaks and accidental spills) and introduction of fine sediments directly from activity in the waterbody.
- Introduction of deleterious substances from structure maintenance (e.g. sediments, oils, de-icing chemicals, painted chips, treated wood debris, cement-based products, wood preservatives, epoxies, paints or sealants).
- Localized changes to surface water hydrology.
- Disruption of flow, habitat damage (including erosion), changes to stream channel or death of fish from maintenance and repairs.
- Disturbance of the stream bed and stream banks, as well as erosion from upland areas where soils are disturbed by construction activities, could lead to sedimentation and increased turbidity in streams. This could adversely affect water quality for aquatic fauna.
- Dewatering activities could cause harm to aquatic fauna.

Other Fauna:

- Vegetation clearing may result in loss of nests, eggs, food sources, and habitat for terrestrial fauna such as migratory birds.
- Construction noise and activities may cause temporary avoidance behaviours, and also disrupt feeding and breeding activity of wildlife in the area.
- Construction activities may cause injury or mortality.
- Improperly stored construction materials, garbage, and food, may act as wildlife attractants, increasing risk of human-wildlife conflict and roadway mortality.
- Accidental fuel or oil spills from construction equipment may negatively affect wildlife and habitat quality through contamination of vegetation or water sources used by wildlife.

Flora:

- Improper cleaning of construction equipment could result in the introduction of disease and invasive alien plant species.
- Soil disturbance in construction and staging areas may create habitat conducive to the establishment of invasive plant species that would displace or compete with native vegetation.
- Accidental fuel or oil spills from construction equipment could contaminate soils and groundwater, with adverse consequences for vegetation.

Species at Risk:

- Construction activities will not intersect species at risk critical habitat and it is unlikely that project activities will damage, or destroy habitat components or food sources considered necessary for species at risk (e.g., migratory birds, short-eared owl).
- Construction activities will not intersect any known records of rare plants.
- Construction activities are not expected to impact bats.

- Construction activities are not expected to impact bank swallow.
- Construction activities may impact a brook that may be used by American Eel
- The exact location of the Short-eared Owl nest was not documented but young were located in hiding in tuck alongside one of the trails. Therefore, it is assumed that construction activities will not intersect with the breeding area 2013.

Cultural Resources

Archeological resources:

- Through the Archeological Overview Assessment (Appendix 4) it was determined that an Archaeological Impact Assessment (AIA) and/or Archaeological Monitoring is not required for the construction activities, as long as the identified archaeological requirements are included within the mitigation measures for this project. That is, the potential impacts to archeological resources through these construction activities are low.

Cultural landscape:

- Highway work is unlikely to impact the historical landscape because while the highway was not in place during the Norse occupation, it has served the community for several decades. No new roads are being built, existing roads are being resurfaced.
- Highway work is unlikely to impact the contemporary cultural landscape (e.g. hay cutting and roadside gardens) because it appears these activities have not been undertaken in recent years (per. com. L. Decker 2023).
- Parking lot expansion work will not impact the historical landscape as viewed from the archeology site, as the parking lot was strategically located behind a ridge and cannot be viewed from the Site (Figure 3).

Figure 3. View looking from the archeology site back towards the Visitor Center and parking lot (i.e. parking lot is located behind the ridge).

Visitor Experience and Safety

- Construction activities will limit traffic on Highway 436 to one lane at times. Traffic will be temporarily stopped for movement of machinery and replacements of culverts.

- Construction activities will impact parking at the Site and alternate parking arrangements may be required when work is happening on the bus loop (i.e. during the placement of granular and one day of paving) and at the main parking area (i.e. about a week).
- Construction activities may cause temporary delays to visitor traffic and access to Site facilities, private residents, and commercial buildings outside the National Historic site.
- Construction activities may cause temporary adverse effects to visitor experience from changes in viewscapes, restricted access to areas, noise from work activities, and the presence of machinery and workers onsite.
- Construction activities will improve quality of access to the Site and provide additional parking for increasing number of visitors looking to visit a premier tourist destination on the Northern Peninsula.

Outstanding Universal Values (OUV)

- Construction activities primarily occurs in previously disturbed areas away from the archeology site. Consequently, there are no conceivable, anticipated threats to the key components related to the OUV of this site.
- Construction activities will improve quality of access to the Site and provide additional parking for increasing number of visitors looking to visit the World Heritage Site.

9. MITIGATION MEASURES

General Mitigations

Project Planning Start-up Preparation

1. The contractor will prepare an Environmental Protection Plan (EPP) in accordance with Parks Canada Environmental Procedures, a minimum of 5 business days before the start of construction. This EPP should address all mitigations listed here, and prior to the work beginning the EPP must be approved by Parks Canada. Note that though this Basic Impact Analysis (BIA) specifies that the contractor must prepare an Environmental Protection Plan, if these two documents are not consistent the most rigorous with regard to environmental stewardship shall be followed. The EPP will include, but not be limited to:
    a. A Work Area Plan showing proposed activity in each portion of area and including details on how the work limits will be marked and procedures to keep operations within the clearing boundaries to minimize damage to adjacent vegetation and soils.
    b. An overall site Erosion and Sedimentation Control Plan (ESCP) which outlines areas where erosion and sedimentation are likely to occur and the means by which the Contractor proposes to prevent or control these issues. It is likely that the final details of the plan will be provided later in the process or be modified depending on timing of work, site condition, and equipment used. However, typical requirements should be stated early. The ESCP will consider at a minimum:
        - Project design and spatial concept of environmental sensitivities (e.g. waterbodies, riparian, wetlands, steep slopes).
        - Erosion prevention (avoidance) procedures (e.g. project schedule, minimization of work area, site management, ground cover measures).
        - Sediment control (minimization) measures (e.g. sediment fences, check dams, sediment traps) including specifications and typical drawings of sediment control structures.
        - Detailed plans for in-water works including site isolation measures and project timelines.
        - Water management plans including site control, equipment necessary, and proposed dewatering locations.
        - Location of erosion and sediment control measures.

- Monitoring of prevention and control measures and corrective actions (e.g. repairs).
- Removal of non-biodegradable materials once site is stabilized.

In addition, a localised ESCP which directs specific mitigation for in-water work is required for culvert installations. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized or suspended sediment has resettled to the bed of the waterbody. The plan should include as necessary (DFO 2016):

- Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the water body.
- Work areas should be isolated using temporary cofferdams and in-stream work done in the dry as much as possible.
- Measures for containing and stabilizing material (e.g. stockpiled topsoil, stockpiled riprap) above the high water mark of nearby waterbodies to prevent re-entry.
- Regular inspection and maintenance of erosion and sediment control measures and structures during the course of construction.
- Repairs to erosion and sediment control measures and structures if damage occurs.
- Removal of non-biodegradable erosion and sediment control materials once site is stabilized.

c. A Hazardous Materials and Spill Contingency Plan (HMSCP) that details the containment and storage, handling, use, and disposal of empty containers, surplus fuels, or other hydrocarbon products in accordance with all applicable federal and provincial legislation. The HMSCP will include at a minimum:

- List of products and materials 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, sand blasting agents, paint, solvents and hydrocarbons. The Safety Data Sheets (SDS) for all chemicals used will be made available onsite.
- Appropriately sized and stocked spill kits will be on site and capable of handling 110% of the largest potential spill. Spill prevention procedures (i.e. containment and storage of materials, security, handling, use and disposal of empty containers, surplus products or waste generated in the application of these products in accordance with all applicable federal and provincial legislation).
- Fueling and fuel storage procedures.
- Spill response procedures (i.e., containment, clean-up, disposal of contaminated materials, etc.
- Spill reporting procedures.
- Up-to-date emergency response contact list including contact information for reporting spills.

d. A waste management plan (including industrial waste, domestic waste, and human waste), which among other things identifies methods and locations for solid waste disposal.

e. Waste Water Management Plan identifying methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as clean-up water, dewatering of ground water, disinfection water, and hydrostatic test water.

2. Prior to starting work all personnel working on site will be required to attend an environmental briefing led by Parks Canada's Resource Conservation Staff to review the mitigation measures required by Parks Canada and highlighted within this Basic Impact Analysis. Contacts for Parks Canada include:

   Holly Lightfoot, A/Ecologist, Parks Canada, Rocky Harbour, NL. Email: holly.lightfoot@pc.gc.ca, 709-458-8492

3. Schedule work to avoid restricted activity periods. Specifically, conduct any vegetation clearing outside applicable restricted activity periods, unless otherwise directed.

Environmental Timing Windows Table

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fish	AVOID INSTREAM WORK					Least risk window for work in and around freshwater, June 15 – Sept 15				AVOID INSTREAM WORK		

Birds	Reduced risk for harm to birds	AVOID VEGETATION REMOVAL Bird Nesting Period: 15 May – 15 Aug	Reduced risk for harm to birds	
Bats	Bat in Hibernacula	Bats Nursing Pups	Reduced risk for harm to bats	Bat in Hibernacula

4. Inform Parks Canada's Resource Conservation staff of any changes to the project plan and/or scheduling.
5. Keep disturbance footprint as small as possible (project limits to be approved by Parks Canada), and equipment staging areas shall be limited to existing hardened areas. Work will be conducted in a manner that minimizes impacts to existing landscaped and natural areas.
6. Clearing of vegetation requires a Restricted Activity Permit from Parks Canada. This shall be obtained prior to any clearing/cutting and can be obtained from Parks Canada Resource Conservation Staff.
7. This region has frequent extreme weather events with high winds and heavy precipitation. Certain operations such as excavation exposing soil, replacement of culverts, or the application of asphalt, may pose an environmental risk if carried out during extreme wind or rain events. Prior to such events, establish sediment and erosion control and a contingency planning for exposed soils or excavated material stockpiles will be required. Furthermore, Parks Canada Resource Conservation Staff have the authority to stop or delay the work activity during adverse weather.

<u>Fuel and other hazardous materials: Storage and spills</u>

8. Ensure drip trays are placed under equipment when not in use.
9. Retain spill kits sufficient to contain and clean up 110% of the site's largest possible fuel or chemical spill at each location of potential spills, including all sites where equipment is working.
10. Provide a briefing about the Spill Response Plan for all crew members on site and ensure they are aware of the location and use of spill kits and containment devices.
11. 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 waterbody or soils. The contractor must have all relevant and current Material Safety Data Sheets available onsite.
12. Take timely and effective action to stop, contain and clean-up all spills if the site is safe to enter. Immediately notify the designated Parks Canada staff of any spill. In the event of a major spill, stop all other work and devote all personnel to spill containment and clean-up. Remediate the site to pre-spill conditions.
13. Dispose of contaminants at an approved facility. A detailed receipt of delivery to an approved facility may be requested by the designated Parks Canada staff.
14. Storage of large amounts of fuel (more than 900 liters) is not permitted onsite.
15. Hazardous or toxic products (e.g. fuels, lubricants, paint, sealants, etc.) must be (i) securely stored, (ii) shall not be stored within 200 meters from any stream, wetland, or water body, and (iii) shall not be disposed of in the national historic site.
16. Fuels, gases, or other deleterious substances will be contained within the appropriate and approved containers, and tanks, hoses and connections will be inspected prior to use.
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.
18. Each piece of fuel-powered equipment must have a dedicated, easily accessible, well maintained spill kit. Each spill kit shall have an absorption capacity of no less than 23 liters.

<u>Equipment</u>

19. Prior to arrival on site equipment must be properly tuned, cleaned and free of contaminants, in good operating order, free of leaks (e.g. fuel, hydraulic fluid, coolant, oil, or grease), and fitted with standard air emission control devices, spill pans, and spark arrestors. Equipment must also be free of invasive species, plant seeds (e.g. noxious weeds), and soils.
20. Project staff must inspect equipment daily for fuel, hydraulic fluid, and other leaks, and for structural integrity, and inspections will be recorded. This documentation is requested to be kept open to site audit. Detected leaks will be addressed immediately.
21. Equipment maintenance (e.g. oil changes, etc.) is not permitted within the Site boundaries.

22. Fuelling heavy equipment shall not occur within 100 meters of open water, be carried out on a level impermeable roadside surface or at a staging area with spill catchment countermeasures in place. Fuelling sites should not drain towards water bodies or wetlands.
23. Fuelling of small engines (e.g. generators, chainsaws) will not be permitted within 30 meters of open water and portable containment pads must be used to prevent ground contact by accidental fuel spills.
24. Storage and movements of heavy equipment and workers' private vehicles shall be restricted to the 'footprint' of the construction and staging area only and at least 100 meters from the shoreline of water bodies.
25. To prevent materials (e.g. soil, rock, construction material, etc.) from escaping dump trucks, loads should not exceed the safe transport capacity specified by the Department of Transportation. Dump trucks should use appropriate covers when necessary.
26. Ensure careful machine operation to prevent damage to surrounding vegetation and soil disturbance. Equipment should remain on existing right of ways wherever possible and, where this is not possible make use of rig mats or swamp mats wherever warranted.
27. Operate machinery on land above the high water mark. No stream fording will be permitted.

Asphalt Production and Handling

28. An asphalt plant is not permitted to be set up in the Site.
29. Asphalt works should be undertaken during periods of dry weather whenever possible as this allows easier control of contaminated runoff and sediment.
30. If the work schedule requires working in the rain, install appropriate sediment and erosion controls 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. Stop paving if deleterious substances are running off (or are obviously going to run off).
31. Asphalt plant operation shall comply with all environmental pollution control regulations, including provincial regulations, and the plant operational plan.
32. Ensure asphalt plant emissions do not exceed the limits set by provincial emission regulation.
33. Make every effort to recycle waste asphalt, either as a base course, or by recycling waste asphalt product through the asphalt plant according to engineering specifications. Old cured ground asphalt material shall be removed and recycled, or stored for future recycling at an approved operational gravel pit or asphalt plant site.
34. Ensure trucks used for hauling asphalt mixture have tight, clean, smooth metal boxes. Acceptable lubrication to prevent asphalt product from adhering include a minimum amount of thin fuel oil or, where oil is prohibited, a non-petroleum lubricant. Oiling truck boxes should be completed only when absolutely necessary.
35. If gravel requires washing, wash water shall not be deposited directly into any waterbody.
36. Discharge water free from chemical contaminants onto the 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.
37. Contaminated water shall be treated to meet CCME guidelines or transported to an approved facility for disposal.
38. Ensure there are no vertical faces on gravel stockpiles, to prevent nesting by bank swallows or similar species.

Paving, Resurfacing, and Grading

39. Ensure gravel or road bed material is free of weeds and comes from an approved operational gravel source free of other contaminates.
40. Do not grade or allow material to spill outside of the delineated work area, within 1 m of the forest drip line, or in a stream, waterbody or wetland. Any material inadvertently falling outside the work limits will be removed promptly in a manner that does not damage vegetation or water quality.
41. Retain a 30 metre vegetated buffer around water bodies or install runoff management structures.
42. Paving should not be undertaken during steady rain to prevent entry of concrete, asphalt, or patching and sealing compounds directly or indirectly in water.

43. Minimize changes to the surface that could negatively affect infiltration and runoff characteristics, and maintain effective surface drainage to limit direct runoff into surface waters.
44. Follow manufacturer guidelines and methods for proper use in the handling and application of sealants or other compounds.
45. Minimize application of seal coats or tack in wet conditions:
    - Apply seal coats only to dry surfaces and not within 2 hr of rainfall
    - Apply tack coats only if no rain is expected prior to covering the tack-coated surface with asphalt. If unforeseen rain arrives ensure runoff from recently seal coated surfaces are prevented from entering surface waters.
46. If pressure treated wood is used, follow procedures in the Parks Canada Treated Wood Management Guidelines.
47. Undertake pavement marking pursuant to standard methods applied in the protected heritage place for control of paint products, both in transport and handling.
48. A plan for the transport and control of paint and hazardous products (e.g. application of paint, cleaning of equipment, containment and disposal of waste paint and cleaning products) must be approved by designated Parks Canada staff.

Site Clean Up/General Waste Management

49. Clean tools and equipment off Site to prevent the release of wash water that may contain deleterious substances, unless otherwise directed by designated Parks Canada staff.
50. Remove all salvageable, non-combustible and non-hazardous materials and reuse or recycle it to the greatest extent possible.
51. Contain and remove all waste in a timely and approved manner, and dispose of it at an approved disposal facility unless otherwise directed.
52. Empty construction waste storage containers when 90% full. Provide lids for waste containers, ensure they are wildlife proof if there are attractants, and cover waste loads during transport (including waste containers and truck loads).
53. Separate on site any hazardous material[1] and pollutants such as fuels and solvents. Dispose of contaminated materials at provincially or territorially certified disposal sites.
54. If present, service portable sanitary facilities on a regular basis and dispose of accumulated waste at a sanitary waste disposal facility. Provide adequately sized portable facilities and manage them to ensure waste is not discharged to the environment. Ensure facilities are situated/ anchored to prevent being upended by winds, preventing waste contaminating the environment.
55. Collect waste materials created during the application or removal of protective coatings (e.g. sandblasting abrasives, paint particles, rust and grease) and retain them for disposal at appropriate locations.

Site Reclamation

56. Long delays between vegetation removal and revegetation should be avoided. For some projects, revegetation in smaller phases should be considered to minimize soil exposure.
57. Avoid use of fertilizer to limit non-native vegetation growth and allow for local species to use available nutrients. Any use of compost, foreign soils, fertilizers, locally sourced mycorrhizae compost and soil amendments must be approved by designated Parks Canada staff.
58. Place and grade topsoil before winter.
59. Excavate, conserve, store and replace existing site topsoil unless otherwise directed by designated Parks Canada staff. Soil imports from other project sites or outside of the protected heritage place is not generally recommended. However, if required, it must be approved by designated Parks Canada staff.
60. Salvage site topsoil using a “two lift” method and store topsoil and subsoil separately for improved reclamation success.
61. Compact backfill or allow it to settle to prevent depressions.
62. Replace topsoil to all areas immediately following fine grading.

[1] E.g., asphalt shingles, creosote treated wood, asbestos, lead paint, molds, animal excrement, paints, automotive products, electrical equipment…

63. Do not compact topsoil by driving repeatedly over the site. Keep topsoil “rough and loose” or as directed by designated Parks Canada staff.
64. Where remaining soils are unstable due to steepness or soil characteristics, install erosion controls immediately or apply a hydraulic erosion control product to the target areas.
65. Schedule construction so that seeding or planting can coincide with seasonal planting windows (i.e., spring or fall).
66. Do not use seed that is coated (including “ultra-coating”) unless approved by the designated Parks Canada staff.
67. Ensure seed certificates are approved by the designated Parks Canada staff prior to seeding.
68. Ensure seed mix(es) and any species substitutions are approved by the designated Parks Canada staff.
69. Unless otherwise directed, seed certificates must include both the common and scientific name following the CANADENSYS nomenclature system; indicate if the seed is a cultivar, ecovar, or wild native species; geographic origin (seed source); date of collection; method of seed storage; germination, viability and vigour; and indicate all other species occurring including agronomic, weed, and native species; and date of the analysis. The contact information for the Seed Supplier shall be included.
70. If using Hydraulic Erosion Control Products (HECP or hydromulch) apply over top of native seed already in place, where possible. Avoid using native seeds in tank mixes unless specified by the designated Parks Canada staff.
71. For hydroseeding and hydromulching, thoroughly clean and rinse tanks to remove any unwanted species. All tank additions (e.g., hydro-mulch, tackifier, soil amendments) must be pre-approved by the designated Parks Canada staff.
72. For hydroseeding or hydromulching, ensure that full coverage and minimum depth are attained for erosion protection, and depth is consistent across site. Trees and established existing vegetation are not to be covered with mulch.
73. Seed and stabilize 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, unless otherwise directed.
74. Do not perform seeding under adverse field conditions such as frozen soils, excessively wet or dry soil, ice or standing water, heavy rain, or high winds.
75. In cases where mulching is necessary to assist with seed establishment, apply it immediately after seeding.
76. Apply seed at a rate appropriate to the seed mixture, seeding method and existing vegetation conditions or as directed by the designated Parks Canada staff.
77. Do not seed on hardened (compacted), crusted or mechanically rutted surfaces.
78. Protect seeded area against erosion or damage as appropriate for the specific site (e.g., erosion control blanket, hydro-mulching, mulching).

The mitigations listed above will address many potential impacts on valued components of the environment, visitor experience and cultural resources. The following additional mitigations are required to further protect specific elements of these resources.

Natural Resources

Air Quality and Noise

79. All equipment, vehicles, and stationary emission sources will be well maintained and used at optimal loads for minimal noise and air emissions.
80. Minimize idling of engines, contingent on operating instructions and temperature considerations.
81. For dust control from all project activities, use only water that is free of waste and organic matter. Chemical dust suppressants shall not be used unless directed otherwise by designated Parks Canada staff, in accordance with Parks Canada health and safety and environmental policies.
82. Maintain equipment and heavy machinery in good working order (e.g. adequate muffler, regular maintenance).

83. Use the noise attenuation devices provided with certain equipment or tools (e.g. compressor side panels).
84. Shut off motorized equipment if it is not used for an extended period of time.
85. Whenever possible, locate stationary equipment away from noise-sensitive areas or in such a way as to reduce the impact on the ambient noise level.

Soils and Landforms

86. Minimize changes to the ground surface that negatively affect infiltration and runoff characteristics and maintain or re-establish effective surface drainage on completion of the project.
87. Backfill and compact excavations as soon as possible.
88. Replace topsoil where necessary immediately following fine grading. Do not compact topsoil.
89. Where remaining soils are unstable due to steepness or soil characteristics, install erosion control.

Erosion and Sediment Control

90. Provide a briefing about the erosion and sediment control plan for all crew members on site and ensure they are aware of the mitigations.
91. Plan project activities to minimize soil handling and limit equipment movement over exposed soils and steep or unstable slopes prone to erosion.
92. Erosion and sedimentation controls must be installed prior to earthworks activities commencing. Regularly inspect and maintain erosion and sediment control structures during all phases of the project and modify or enhance measures as necessary.
93. If sediment ponds are required, ensure runoff that may reach streams meets CCME turbidity standards.
94. Avoid activities that contribute to soil compaction and use practices that roughen and decompact soils to promote infiltration.
95. Use erosion and sediment control products, including backing, that are made of 100% biodegradable materials (e.g. jute, sisal, or coir fiber).
96. Erosion and sediment control products should be selected to reduce potential for wildlife entanglement/attraction and prevent introduction of invasive alien species.
97. Avoid straw-based erosion control unless authorized by designated Parks Canada staff. The use of hay is not permitted due to risk of introducing invasive species.
98. All products must be approved by designated Parks Canada staff and installed prior to commencement of work.
99. Develop a response plan that is to be implemented immediately in the event of a sediment release.
100. Erosion and sediment control materials will be readily available on-site. Materials may include but are not limited to rock, gravel, mulch, biodegradable erosion control blankets, sediment fencing, staking, polyethylene sheeting, and hemp matting.
101. In the event of erosion and sediment control measure malfunction or of deleterious substance, including sediment, run off (current or impending), work shall stop until measures are adjusted to address the problem.
102. Minimize the length of time soils are exposed and complete work in one area before commencing work in another area.
103. Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation. As previously stated, in the event of extreme weather events Parks Canada Resource Conservation staff have the authority to postpone work activity.
104. If vegetation clearing is scheduled early due to restricted activity periods, maintain soil stability by delaying grubbing until just prior to construction activities.
105. Protect excavated material from entering a waterbody (e.g. cover with erosion blankets or tarps, seed, or plant with native vegetation).
106. All surplus excavated material (including vegetative debris) must be removed from the Site as soon as possible and disposed of at an approved location and in an approved manner.

Water Quality and Riparian/Fish Habitat and Aquatic Fauna:

General:

107. Determine if DFO measures to protect fish and fish habitat, a DFO Fish and Fish Habitat Protection Program letter of advice, or other water-related mitigations are needed.
108. To protect aquatic habitat, a 30 m buffer zone is generally required from a waterbody, in which no activities[2] can occur. However, the appropriate buffer zone will be determined based on site-specific conditions by qualified Parks Canada staff or upon the advice of DFO. Where appropriate, the buffer should also apply to storm drain inlets and outlets.
109. Plan in-water work to respect site-specific restricted activity periods to protect fish including their eggs, juveniles, spawning or migrating adults and/or the organisms upon which they feed or as directed by the designated Parks Canada staff (see Environmental Timing Table in Mitigation 3).
110. When appropriate, an in-stream work plan, or a specific section for work in and around water in an Environmental Protection Plan can be developed by a qualified professional and is subject to approval by the IA Practitioner.
111. Work shall comply with *Fisheries Act* and, if provided, mitigations in the letter of advice from the DFO Fish and Fish Habitat Protection Program.
112. Sediment control measures must be in place before starting work in the vicinity or rivers, water bodies, watercourses, and wetlands. This shall also apply during excavations at intermittent or active drainage channels.
113. Minimize duration of in-water work.
114. If aquatic invasive species are found during dewatering activities, note their presence and abundance and contact the designated Parks Canada staff to ensure compliance with the *Aquatic Invasive Species Regulations*.
115. Construction equipment is not permitted to operate in water.
116. Waterway beds are not to be used for borrow material.
117. All construction materials must be securely contained at the work site and kept from entering waterbodies.
118. If vegetation is required to be cut, regular chainsaw bar lubricant oils shall be replaced with BioLube or a similar non-toxic, vegetable-based chain oil where chainsaw use is required as a measure to protect water quality when cutting riparian vegetation.
119. Do not clean or drain equipment in waterways. All equipment cleaning and maintenance shall occur outside Site boundaries.
120. Ensure that all in-water activities, or associated in-water structures, do not interfere with fish passage, constrict channel width, reduce flows, or result in the stranding or death of fish.

Drainage Structures:

121. Consider installing the new culvert offset from the old one to allow the waterbody to continue flowing in its original path during construction, then shunt the stream to the new culvert upon completion.
122. Ensure compliance with current DFO standards and codes of practice (e.g. Interim code of practice: Culvert maintenance or Interim code of practice: Temporary cofferdams and diversion channels).
123. When removal of debris is required within culverts and around bridge piers and abutments, implement the following:
    a. Remove materials by hand when feasible.
    b. Limit removal of accumulated material (e.g. branches, stumps, woody materials, garbage) to the area within the culvert, immediately upstream of the culvert and to that which is necessary to retain culvert function and water flow.
124. Adequately protect the culvert, inlet(s) and outlets(s) with rip rap to prevent erosion and scour around the culvert during high runoff events. Such rock shall be installed at a similar slope to maintain a uniform bank and natural shoreline alignment.
125. Maintain natural streambed material through fish-bearing drainage structures to allow continuous substrate that matches the streambed below and above the crossing, unless otherwise directed.
126. A site specific dewatering plan is required to be provided before commencing a pump-out sump to dewater culvert installation sites with specific details on how and where the water will be discharged.
127. Work areas should be isolated using temporary cofferedam or a sealed check structure, and in-stream work to install culverts shall be completed in the dry.

[2] E.g., refueling; storage of hazardous products; long-term stockpiling of soil, aggregate or asphalt; establishment of concrete washout facilities; removal of vegetation.

128. Where dewatering of fish-bearing waters is necessary to isolate a work area for culvert installation the following conditions for the pump screen, as per Parks Canada Best Management Practices, shall be applied to prevent entrainment or impingement of fish:
    a. 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.
    b. Orient the screen face in the same direction as the flow of water.
    c. Ensure openings in the guides and seals are less than the opening criteria to make "fish tight".
    d. 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.
    e. 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.
    f. 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.
    g. Provision should be made for the removal, inspection, and cleaning of screens.
    h. Ensure regular maintenance and repair of cleaning apparatus, seals, and screens to prevent debris fouling and impingement of fish.
    i. Pumps must be shut down when fish screens are removed for inspection and cleaning.

Water withdrawal and dewatering:

129. Ensure any flows are temporarily diverted around the portion of the ditch or waterbodies where work is being undertaken.
130. Develop a site-specific dewatering plan before commencing a pump-out sump to dewater excavation sites, with specific details on how and where the water will be discharged and how turbidity will be managed.
131. Site-specific mitigations may be required depending on the conditions of the discharge area (including erodibility of soils), freezing conditions operations, overflow avoidance, decanting and settlement pond reclamation.
132. Capture and relocate any fish trapped within an isolated/enclosed work area and safely relocate them to an appropriate location in the same water body.
133. Dewater gradually to reduce the potential for stranding fish.
134. Monitor discharge water quality on a regular basis. Should there be any observable turbidity at the discharge point, work should halt until the source is determined and additional mitigation measures are applied.
135. Establish soil and vegetation erosion protection when water is pumped onto land.
136. Remove any excess sediment sources and cap with clean rock or gravel as appropriate.
137. Remove sediment control measures and exclusion fencing in a way that prevents the escape or re-suspension of sediments.

Fish Salvage:

138. A qualified environmental professional is required to do the salvage. The salvage protocol must be submitted and approved by Parks Canada.
139. Consider time of year for salvaging activities such as cold weather and ice which can make it very hard on animals, salvagers, labourers, and equipment.
140. Capture and relocate any fish trapped within an isolated/enclosed work area and safely relocate them to an appropriate location in the same water body/environment.
141. Relocate any fish as per applicable permits for capturing and relocating fish.
142. Complete salvage before work starts and, if appropriate, repeat if flooding occurs or if isolation is lost.

143. If temporary exclusion fencing is installed to prevent salvaged individuals from returning to the work area during construction, remove it upon completion of the work.

Other Fauna

144. If unexpected nests, species at risk, or other wildlife are found, cease work in the immediate area and contact designated Parks Canada staff for further direction.
145. Control materials that might attract wildlife (e.g. petroleum products, human food and garbage) as part of the waste management plan.
146. Never approach or harass wildlife (e.g. feeding, baiting, luring). If wildlife is observed at or near the work site, allow the animal(s) the opportunity to leave the work area.
147. Immediately alert designated Parks Canada staff or emergency dispatch of any potential wildlife conflict (e.g. aggressive behaviour, persistent intrusion, etc.), encounters, distress or mortality.
148. Conduct activities during daylight hours and avoid critical foraging times (i.e. dusk and dawn) unless otherwise approved by designated Parks Canada staff.
149. Minimize the time excavations remain open. Slope the sides to no greater than 1:1 and ensure that wildlife and humans can safely exit it. Cover or fence smaller excavations when left unattended to reduce the potential for wildlife injury.

Flora

(Note that many mitigations listed elsewhere will also mitigate impacts on vegetation, especially those for erosion and sediment control)

150. Flag clearing/grubbing areas. Clearing/grubbing plans shall be approved by designated Parks Canada staff and shall occur within the delineated work area.
151. Identify and preserve trees with obvious wildlife use (e.g. snags with cavity nests, large trees with stick nests) unless assessed as hazard trees. If felling is unavoidable, designated Parks Canada staff consultation and approval is required.
152. Clear the minimum of area necessary; trees should be removed only if necessary for project completion or visitor/staff safety.
153. Vegetation clearing should be conducted using methods that minimize ground disturbance, promote effective reclamation and minimize the potential for the establishment and spread of non-native vegetation (e.g. roots shall be left in the ground during vegetation clearing in order to protect soils and prevent erosion and sedimentation.) Minimize full removal and retain vegetation when possible to reduce erosion.
154. Stabilize and revegetate disturbed areas as soon as possible. If there is insufficient time remaining in the growing season, stabilize the site to prevent erosion and vegetate the following spring.
155. Ensure grubbing and stripping do not damage trees and roots beyond clearing limits.
156. During grubbing, shake stumps, roots, imbedded logs and other non-soil debris free of loose soil and rocks before transport.
157. Protect roots of trees to drip line to prevent disturbance or damage. Avoid traffic, dumping and storage of materials over the root zone.
158. If removal of riparian vegetation is unavoidable, use manual methods and directionally fall trees as far as possible from watercourses. Designated Parks Canada staff consultation and approval is required.
159. When removing individual branches, employ pruning techniques to minimize risk of tearing the bark and harming the tree; ensure that only branch tissue is removed and stem or trunk tissue is left undamaged.
160. Wash all construction equipment from outside the Parks Canada protected heritage place prior to arrival to minimize risk of introducing Invasive Alien Species (IAS), noxious weeds and soils from off-site. Proof that equipment was washed outside the protected heritage place may be requested before equipment is permitted into the protected heritage place.
161. Control IAS in parking or staging areas as needed to reduce the spread of invasive plants or seeds.
162. Work in uninfested sites before moving to infested sites.
163. Ensure machinery already in the protected heritage place is in a clean condition and maintained free of IAS before moving to new sites, within or beyond the protected heritage place.

164. Use caution during loading of trucks and transport of any IAS and plant materials to minimize loss of materials (e.g., cover materials during transport).
165. Soil, gravel, erosion and sediment control products or other applicable materials shall not be imported from outside the protected heritage place without approval from the designated Parks Canada staff.
166. Minimize ground disturbance, vegetation removal and bare soil exposure (e.g., cover stockpiled material with tarps, plant seeds or plants, cover with natural mulch/ground coverings).
167. Brush and tree limbs shall be chipped and discarded along designated sections of the highway as directed by Parks Canada. Chip depth is to be a maximum of 5 centimeters (2 inches), spread over an area no greater than 5 meters x 5 meters 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 exceed these parameters with permission from Parks Canada.
168. Consider placing limited amounts of vegetation debris in the forest to mimic natural tree fall, using it as a natural erosion control method along stream banks or large side slopes, or including it in site restoration. Such uses must be approved by designated Parks Canada staff.
169. Debris shall not be disposed of in waterbodies.

Species at Risk:

170. Mitigations listed in above sections will avoid or lessen potential adverse effects to species at risk.
171. Should bats be observed in the project area, stop work immediately and contact Park Staff.

Cultural Resources

Archeological Resources:

172. An Archaeological Impact Assessment (AIA) and/or Archaeological Monitoring is not required for a) Highway 436 and main parking access, b) Bus Loop and c) Main Parking Extension, as long as the archaeological requirements outlined below are followed.
    a. Project activities are restricted to the areas presented in the April 2017 *PCA 1348 Drawings* and outlined in the Archeological Overview Assessment (AOA; Attachment 4) is document. If landscaping or excavation are required beyond the proposed limits, please consult with Parks Canada Terrestrial Archaeology section to determine if an additional or amended AOA is required for these activities. Based on the AOA, an AIA and/or additional mitigation measures may be required prior to the continuation of excavation activities.
    b. Staging for the excavation and related equipment should take place on previously disturbed areas, such as road sides or parking lots to minimize impact on undisturbed area.
    c. There could be a chance, however low, that cultural resources, such as features or artifact concentrations may be encountered during construction and excavation activities. This may include nails, ceramics, stone tools, etc. If cultural resource features, are encountered, work should cease in the immediate area. The work area in relation to the findings must be photo documented and geo-referenced, and the Parks Canada project manager (lead) must be informed. The project manager (lead) should then contact Parks Canada's Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine what actions will be required to mitigate the chance find.

Cultural Landscape:

173. There are no anticipated adverse effects to the cultural landscape.

Visitor Experience and Safety

174. Maintain the project area in as tidy a condition as is practical for the duration of work.
175. Appropriate signage warning the public of work in the area should be in place on Highway 436 when needed.
176. All such signage and associated materials (e.g. sandbags used to ballast signs) must be removed from the park after the completion of work.

177. Highway traffic must be controlled when work trucks, heavy machinery, and other potentially hazardous vehicles are turning onto or off of the public highway.
178. Traffic disruption must be kept to a minimum.
179. Onsite stockpiling area for construction materials must be barricaded from public access.
180. Maintain a safe working distance between work activities and visitors. If traffic control is required, use flaggers or other standardized traffic management approaches to direct traffic through the construction/hazard area.
181. Keep visitor access trails and roads outside the construction area free of construction materials, waste, machinery and equipment.
182. Coordinate communication of project start and impacts to visitors, with Parks Canada Project Manager, National Historic Site Staff, and Field Unit External Relations Staff.

Outstanding Universal Values (OUV)

183. There are no anticipated adverse effects to outstanding universal values.

10. OTHER Considerations

☒ Comments received from the public /stakeholder engagement

No comments were received from the public during the 30 day posting on the IAA registry (1 February 2023 to 2 March 2023).

☐ Indigenous peoples engagement or consultation

☒ Surveillance

Regular site surveillance by Parks Canada Staff will not be possible given the location of the Site from the office of Parks Canada Resource conservation staff (i.e. 8.5 hr round trip). Instead, regular check-ins with staff on site will be required. Particular vigilance is required during the replacement of the culverts due to possible impacts to water resources and during the excavation and grubbing of the parking lot due to the potential of uncovering cultural resources in a previously undisturbed area. Follow-up monitoring will be required with respect to erosion of embankments, as it was decided not to apply the standard erosion and sediment control treatments. However, most embankments are considered to be gentle so pose limited concern with respect to erosion. Increased use of rock check dams may be required.

☐ Follow-up monitoring

Follow-up monitoring will be required to ensure these erosion and sediment controls are working effectively until embankments revegetate naturally

☐ SARA Follow-up monitoring

11. SIGNIFICANCE OF RESIDUAL ADVERSE EFFECTS

Natural Resources: Given the magnitude of effects, the limited extent of the work area around the existing highway footprint, limited expansion of the parking lot, and application of mitigation measures, the project is unlikely to result in significant residual adverse effects to natural resources.

Visitor Experience: Given the magnitude of effects and application of mitigation measures, the project is unlikely to result in significant residual adverse effects to visitor experience. Highway paving and parking lot extension should improve the overall travel conditions for highway traffic and improve the parking lot safety.

Cultural Resources: Given the magnitude of effects, the low potential for archaeological resources, and application of the mitigation measures the project is unlikely to result in significant residual adverse effects to cultural resources.

Outstanding Universal Values: Given the magnitude of effects, and application of the mitigation measures the project is unlikely to result in significant residual adverse effects to cultural resources.

Indigenous Rights: No Indigenous Peoples or groups have recognized or asserted land / resource rights in L'Anse aux Meadows National Historic Site, and highway work will not affect access, use, health, or socio-economic conditions for Indigenous people living in the region.

12. EXPERTS CONSULTED

Include Parks Canada experts. Add as many entries as necessary for the project.

Department/Agency/Institution: Parks Canada	Date of Request: 2023-02-10
Expert's Name & Contact Information: Loretta Decker, loretta.decker@pc.gc.ca	Title: A/National Historic Sites Manager
Expertise Requested: Impacts to contemporary cultural landscapes (i.e. hay cutting, and roadside gardens)	
Response: I think those areas are all not in use now. There was one garden near the road but even that has not been planted since the owner died. I don't think we'll need to add anything there.	

Department/Agency/Institution: Parks Canada	Date of Request: 2023-01-24
Expert's Name & Contact Information: Loretta Decker, loretta.decker@pc.gc.ca Darren Fitzgerald, darren.fitzgerald@pc.gc.ca	Title: A/National Historic Sites Manager
Expertise Requested: Impacts to parking lot reconfiguration	
Response: There will be impacts to visitors during highway work (minimal with the use of flag people) and the parking lot extension (a week) and the bus loop (1 or 2 days).	

Department/Agency/Institution:	Date of Request: 2023-02-16

Parks Canada	
Expert's Name & Contact Information: Mark Cullihall, mark.cullihall@pc.gc.ca	Title: A/WNLFU Assets Manager
Expertise Requested: Should Parks Canada retain grubbed materials? Is there any volume of wood to be cut for this work and should Parks Canada retain it?	
Response*: There are not a lot of space to stock pile material at the Site and there is no immediate need for grubbed material There will not be any substantial wood to be removed in the project area. *in conversation at work on the 16 February 2023	

13. DECISION

Taking into account implementation of mitigation measures outlined in the analysis, the project is:

☒ not likely to cause significant adverse environmental effects.

☐ likely to cause significant adverse environmental effects.

NOTE: If the project is identified as likely to cause significant adverse effects, IAA prohibits approval of the project unless the Governor in Council (Cabinet) determines that the effects are justified in the circumstances. A finding of significant effects therefore means the project CANNOT go ahead as proposed.

FOR SARA REQUIREMENTS:

☒ Residual adverse effects to species at risk are not likely, and therefore, the SARA-Permit Decision Tool was not required

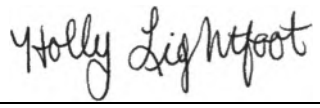
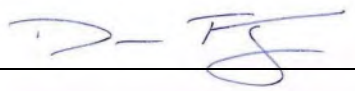
OR, the SARA-Permit Decision Tool (Appendix 2) was used and determined:

☐ This activity does not require a SARA permit

☐ This activity requires a SARA permit and one can be issued

☐ This activity requires a SARA permit but one cannot be issued

14. RECOMMENDATION AND APPROVAL

Prepared by: **Holly Lightfoot** A/Park Ecologist	Date: XX March 2023 
Recommended by: **Darren Fitzgerald** Project Manager	Date: March 15, 2023 

Approval Signature: **Trevor Rendell** A/Field Unit Superintendent	Date:

15. ATTACHMENTS

Appendix 1: Effects Identification Matrix
Appendix 2: Expert Consultation Cultural Landscapes
Appendix 3: Expert Consultation Impacts to Visitors
Appendix 4: Archeological Overview Assessment

Appendix 1: Effects Identification Matrix

Table A: Direct effects

Revise the associated activities and the valued components for the specific project being reviewed	**Valued components potentially directly affected by the proposed project phases (Preparation (P) / Construction (C) / Operation (O) / Decommissioning (D)**						
	Natural Resources					Cultural Resources	Outstanding Universal Values
	Air	Soil & landforms	Water (surface, ground, crossings, etc.)	Flora (specify, including SAR)	Fauna (specify, including SAR, migratory birds, fish)		
Associated Activities							
Supply and storage of materials	P						
Vegetation clearing		C O		C O		C	
Waste disposal							
Drainage		C	C O				
Excavation		C	C	C		C	
Grading		C	C				
Backfilling		C	C				
Use of machinery/ generators	C O D	C	C	C	C		
Transport of materials/ equipment	P C O D						
Use of Chemicals/ hazardous material/ Pesticides		C	C	C O	C O		
Set up/Use/ Removal of temporary facilities		P C D		P C D	C	C	
Water Pumping/ Dewatering		C	C	C			
Paving	C						
Use of treated wood		C O	C O	C O	C O		
Painting/Paint stripping/Sand-blasting	C		C	C	C		
Use of cofferdams		C O	C O		C O		
Planting/Seeding		D	D	C O	C O		
Vehicle Traffic	P C O D				P C O D		

Table B: Indirect effects

Revise the associated activities and the valued components for the specific project being reviewed	**Valued components potentially directly affected by the proposed project phases (Preparation (P) / Construction (C) / Operation (O) / Decommissioning (D)**								
	With respect to non-Indigenous peoples:	With respect to Indigenous peoples:				With respect to visitor experience			
	Health, social and economic conditions	Health & socio-economic conditions	Physical & Cultural heritage	Current use of lands & resources for traditional purposes	Any structure, site or thing that is of historical, archaeological, paleontological or architectural significance	Access & services	Recreation & accommodation opportunities	Safety	Viewscapes and essence of place
Natural resource components affected by the project									
Could impacts to <u>air</u> lead to adverse effects on…									P C D
Could impacts to <u>soils and landforms</u> lead to adverse effects on…						P C			P C D
Could impacts to <u>water</u> (e.g. surface, ground water and water crossings) lead to adverse effects on…									
Could impacts to <u>flora</u> (including SAR) lead to adverse effects on…									C
Could impacts to <u>fauna</u> (including SAR) lead to adverse effects on…									
Could impacts to <u>cultural resources</u> lead to adverse effects on…									
Could impacts to <u>outstanding universal values</u> lead to adverse effects on…									

Appendix 2: Expert Consultation Cultural Landscapes – L. Decker

Reply Reply All Forward IM

Fri 2023-02-10 11:50 AM

Loretta Decker

RE: Cultural Resources at LAM

To Holly Lightfoot

Cc Dale Wells

You replied to this message on 2023-02-10 2:02 PM.

Good Morning,

I think those areas are all not in use now. There was one garden near the road but even that has not been planted since the owner died. I don't think we'll need to add anything there.

L

From: Holly Lightfoot <holly.lightfoot@pc.gc.ca>
Sent: February 10, 2023 11:05 AM
To: Loretta Decker <loretta.decker@pc.gc.ca>
Cc: Dale Wells <dale.wells@pc.gc.ca>
Subject: Cultural Resources at LAM

Hi Loretta,

I wanted to touch base with you; I'm working on the BIA for the L'Anse aux Meadows highway work and am wondering about possible impact to contemporary cultural resources such as hay cutting or roadside gardens. On the map in the management plan it looks like there is some hay cutting happening adjacent to the highway and the appendix mentions gardens maybe permitted within the highway corridor. Are these activities still active? Are there many roadside gardens? Should I be adding mitigations within the BIA for these areas? Ultimately the diches will need to be cleared back etc. but I'm thinking we may want to make note about access being maintained (i.e. if there are established driveways etc.). I can't imagine that they would remove them, but I could highlight these if you think that would be important.

Cheers,
Holly

Holly Lightfoot

Pronouns: She/Her
Pronom: Elle

A/Park Ecologist, Gros Morne National Park
Parks Canada / Government of Canada

Appendix 3: Expert Consultation Impacts to Visitors – L. Decker

Reply Reply All Forward IM

Tue 2023-01-24 12:19 PM

Loretta Decker

RE: IA Pathway for LAM highway work and parking lot

To Holly Lightfoot

You forwarded this message on 2023-01-24 1:15 PM.

Hello,

My only concern is the impact on the visitor season. Of course there will be a need for flag people but I know most people will be more than use to having delays related to summer road work. The challenge I am most concerned about is the impact on the tour buses and large RVs. Many use the bus turn and having that worked on may impact on their ability to get out of the VRC parking lot.

Loretta

From: Holly Lightfoot <holly.lightfoot@pc.gc.ca>
Sent: January 24, 2023 12:13 PM
To: Loretta Decker <loretta.decker@pc.gc.ca>
Subject: IA Pathway for LAM highway work and parking lot

Hi Loretta,

I've gone through the IA pathway process for the work up at LAM this summer and am wondering if you would like to review and/or if you have any comments, questions, or concerns. I am recommending that we put this through a BIA given that there is some work in undisturbed areas (i.e. the parking lot extension), but do not think this work will have any impacts on the OUVs of the site. One thing I wasn't sure about, is how this will be impacting Visitor Experience. Ultimately, it will have a positive impact but have you and Darren discussed the plan for having this work to happen during the busy visitor season?

Once this paperwork is signed off I will post it on the registry and start working on the BIA for the project.

Thanks!
Holly

Holly Lightfoot

Pronouns: She/Her
Pronom: Elle

A/Park Ecologist, Gros Morne National Park
Parks Canada / Government of Canada

Tue 2023-01-24 1:52 PM

Darren Fitzgerald

RE: IA Pathway for LAM highway work and parking lot

To Holly Lightfoot

Cc Loretta Decker

You replied to this message on 2023-01-24 2:08 PM.

Hi Holly,

Although I cannot speak for the successful bidder, we should anticipate a week of disturbance for all visitors within the main parking area (RVs and cars) unless, the contractor so chooses to complete the work prior to the opening of the visitor centre. Unfortunately, we can't determine their intentions as the successful bidder may have work elsewhere.

The geographical area of LAM will restrict the paving window where I feel work can only be planned during the daily operations of the VC.

There may be a possibility to utilize the bus loop for RVs during the widening of the main parking lot as this area will have little interruption except for periodical slowdowns. Bus loop will only see the placement of granulars and a day of paving.

Darren

From: Holly Lightfoot <holly.lightfoot@pc.gc.ca>
Sent: January 24, 2023 1:16 PM
To: Darren Fitzgerald <darren.fitzgerald@pc.gc.ca>
Cc: Loretta Decker <loretta.decker@pc.gc.ca>
Subject: FW: IA Pathway for LAM highway work and parking lot

Hi Darren,

I'm working on the IADF for the LAM work so I can get a project description posted, and had a question about visitor access while this work is being completed. I reached out to Loretta and she highlighted the impacts of tour buses and large RVs. Are you able to provide brief comment on the plans to minimize those impacts?

Thanks!
Holly

Holly Lightfoot

THE PURPOSE OF THIS AMENDMENT IS TO GIVE EFFECT TO THE FOLLOWING:
Revisions to the drawings and specification documents:

**** AMENDMENT #1 - REVISED DRAWINGS AND SPECIFICATION – 2023/03/13 ****

Revision to Title and Project Number – Drawings and Specifications:

Remove: Pavement Rehabilitation Project
Parks Canada
L'Anse aux Meadows National Historic Site, NL.

Replace: **Highway 436 Renovations**
L'Anse aux Meadows National Historic Site, NL.

Remove: PCA Project Number: 1348

Replace: PCA Project Number: **2287**

Revisions to the Specifications:

1. **Section 01 11 00 – General Instructions**

Remove:

1.1.2.1 Supply and install all environmental protection measures required such as site check dams, silt fencing, straw bales, vegetative stabilization, and other measures to be maintained for the duration of the project and removed following completion.

Replace:

1.1.2.1 Supply and install all environmental protection measures as per the Basic Impact Analysis (BIA) and PCA Best Management Practices (Appendix B). Such mitigative measures shall include but are not limited to: check dams, silt fencing and/or vegetative stabilization. The use of straw/hay bales are strictly prohibited.

Mitigative measures are to be maintained for the duration of the project and are intended to be removed following project completion. Mitigative measures may be required to remain as installed and shall be addressed during the construction process. If such measures are to remain beyond project completion, the contractor shall not be held responsible to maintain or remove.

2. **Section 00 01 11 – List of Contents**

Add:

Division 01 – General Requirements

Section 01 20 00 – Mobilization and Demobilization

Section 01 20 00 – Mobilization and Demobilization

PART 1 – GENERAL

1.1 Related Sections

.1 Section 01 11 00 – General Instructions

1.2 Description

.1 Mobilization and Demobilization consists of all initial work and operations required to prepare for the scope of work. Items required for such include but are not limited to: transportation of movement of personnel, equipment, offices, supplies and incidentals to and from project sites;

.2 For the purpose of mobilization and demobilization, "project site" refers to all areas depicted within the drawing set.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

Add:

Section 01 20 00

Section 32 12 16 – Asphalt Paving

Remove:

2.1.1. Asphalt cement: PG 58-28 in accordance with ASTM D373.

Replace:

2.1.1. Asphalt cement: PG 58-28 complete with 0.5% anti-stripping additive in accordance with ASTM D373.

Remove:

2.2.8. If required, anti-stripping additives are to adhere to the Newfoundland Department of Transportation Specifications Sections 330.02.01.05.

Replace:

2.2.8. Anti-stripping additives shall adhere to the Newfoundland and Labrador's Department of Transportation and Infrastructure's Specifications Book - Section 330.02.01.05.

ALL OTHER TERMS AND CONDITIONS REMAIN UNCHANGED