

**SPECIFICATIONS**

**FOR**

**CAPE SPEAR SEPTIC SYSTEM UPGRADES  
PARKS CANADA  
CAPE SPEAR NATIONAL HISTORIC SITE, ST. JOHN'S, NL**

**ISSUED FOR TENDER**

**PCA Project No.:**  
**Date: June 25, 2020**

Cape Spear Septic  
System Upgrades  
Parks Canada  
Cape Spear National Historic Site  
St. John's, NL

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Section 00 00 02

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June 25, 2020

Specifications  
Issued for Tender

**PARKS CANADA**  
**CAPE SPEAR SEPTIC SYSTEM UPGRADES**  
**CAPE SPEAR NATIONAL HISTORIC SITE**

Standing Offer Agreement: 5P301-14-0001/004  
PCA Project No.: 1900387-03



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Director Municipal Engineering  
Crandall, A Division of Englobe Corp.

Cape Spear Septic  
System Upgrades  
Parks Canada  
Cape Spear National Historic Site  
St. John's, NL

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June 25, 2020

**PARKS CANADA  
CAPE SPEAR SEPTIC SYSTEM UPGRADES  
CAPE SPEAR NATIONAL HISTORIC SITE  
ST. JOHN'S, NL**

Crandall, A Division of Englobe						
Issued for Tender - Technical Specifications						
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PART 1 - GENERAL

- 1.1 Description of Work .1 The work will be carried out within the Cape Spear National Historic Site in St. John's, NL. It will include the removal and disposal of an existing septic system disposal field and replacement with a new raised bed disposal field complete with a new effluent pump system.
- .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, vegetative stabilization and other measures, to be maintained for the duration of the project and removed following completion unless otherwise noted on the drawings.
  - .2 Supply and operation of traffic control and signage for the duration of the project where required.
  - .4 Removal of existing septic system as shown on drawings, including decommissioning of existing septic systems including excavation of dosing chambers and removal of mechanical components and disposal fields in accordance with Provincial and Federal guidelines.
  - .5 Supply and install effluent pump including duplex pumping system, and all controls.
  - .6 Supply of all labour, material and equipment to construct new raised bed disposal field including, but not limited to excavation, bedding, compacting, disposal pipe, distribution box, wall seals as per the drawings.
  - .7 Hauling, placement and compaction of borrow aggregates and granular
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materials for bedding and to build up raised bed disposal field as shown on drawings.

.8 All other labour, materials and work necessary as shown on the drawings and to complete the project to the Departmental Representative's full satisfaction.

.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, Canadian Environmental Protection Act, Canada Labour Code and the NL Occupational Health and Safety Act and Regulations.

1.2 Work Restrictions

.1 The Contractor is limited to working within the contract limits and lay down areas shown on the drawings. Work beyond these limits is prohibited unless otherwise directed by the Departmental Representative.

.2 The Contractor shall not carry out any work within 30m of any water course, reservoir or wetland without all necessary permits.

1.3 Familiarization  
With Site

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

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

.3 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.

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- 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 arrange for the initial layout to be provided.
- 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 site and roads are continuously kept in a condition satisfactory to the 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
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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 located within a National Historic Site and it is essential that lands remain as undisturbed as possible. The Contractor will be expected to use standards and methods beyond those for normal construction in order to protect the environment and ensure the aesthetics of the work. Contract limits shall be strictly adhered to and every precaution shall be taken to minimize environmental damage and disruption to vegetation, wildlife habitat, and structures or existing services, both on construction and storage sites.
  - .1 If any damage occurs during construction, the Contractor is responsible to bear the expense to immediately restore such damaged areas to the satisfaction of the Departmental Representative.
  - .2 If Contractor fails to repair damage to the satisfaction of the Departmental Representative, the Departmental Representative may have repairs completed by others at the Contractor's expense.
  - .3 The Contractor shall ensure that contracted work meets the standards outlined in the contract specification and drawings.
  - .4 The Contractor shall ensure that no damage will be done to any existing underground telephone cables or other buried utilities.
  - .5 All sources of aggregate must be submitted to the Departmental Representative for approval at least two weeks prior to the start of any work. Aggregate sources must be free of invasive species and capable of

producing clean material to the satisfaction of the Departmental Representative.

- .6 The Contractor is responsible to follow the Provincial requirements regarding the following:
  - .1 Pit and Quarry Guidelines
  - .2 Environmental Construction Practice specifications
- .7 The Contractor will make arrangements with authorities or owners of private properties for quarrying and transporting materials and machinery over their properties and be responsible for obtaining and paying of fees.

1.11 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 Approved Permits.
  - .9 Field test reports.
  - .10 Manufacturer's installation and application instructions.
  - .11 Site specific Health and Safety Plan and other safety related documents.
  - .12 Other documents as stipulated elsewhere in the Contract Documents.

1.12 Site Conditions

- .1 The Contractor will be responsible to visit the existing facilities and planned route to review existing site conditions.
- .2 Existing geotechnical conditions can be found in the attached report in Appendix B. Should contractors require additional geotechnical investigation this can be done by obtaining all the proper permits and approvals from Parks Canada and carrying out the work at their own expense.

1.13 Departmental

- .1 Departmental Representative will be

Representative

assigned after contract award.

1.14 Work Schedule

- .1 Provide to the Departmental Representative in writing and within five (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 the provided 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 Departmental Representative will arrange project meetings that are to occur, at minimum, 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, lay down areas 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 pre-construction 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 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 pedestrian and other traffic is not unduly impeded, interrupted or endangered by execution or presence of work.
- .7 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.

- .8 Verify locations of any underground utilities.

1.19 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.

1.20 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.

1.21 National Park Act

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

1.22 Measurement of Quantities

- .1 Linear: Items which are measured by metre are to be measured along centre line of installation. Lengths shall be in agreement with the Departmental Representative.
- .2 Volume: Longitudinal and transverse measurements to be measured both horizontally and vertically to calculate

a volume which shall be in agreement with the Departmental Representative.

.3 Weight:

- .1 Where contract unit prices are for weight measure of material, the Contractor shall provide, install and maintain approved scales for the measurement of such materials. The scales shall be of sufficient capacity and dimension to fully contain the loaded vehicle. The scale platform and mechanism shall be kept clean and in good working order at all times. The approach roadway shall be on a flat grade, level with the scale platform for at least one truck length.
- .2 The scale shall be tested at the beginning of each construction season in accordance with the requirements of the Government of Canada prior to being used. The Certificate issued by the testing authority shall be displayed at the scales at all times.
- .3 If the scales are moved, repaired or altered in any way, they shall again be tested and certified in accordance with Government of Canada requirements before additional use. Only original weight certificates from the quarry or pit of material origin will be accepted and used as basis for payment. Copies of weight certificates will not be accepted. Weight certificates are to be original digitally printed vouchers. Hand-written weight certificates and certificates other than those approved will not be accepted.

1.23 Permits/  
Authorities

- .1 The Contractor shall obtain, and pay for, permits from authorities as required for all operations and construction. He 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.

1.24 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.

1.25 Existing Survey

- .1 Topographic survey used in the preparation of these Contract Documents was provided by Crandall Engineering Ltd. (a Division of Englobe Corp.)

1.26 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 shall 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

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                      **The awarded Contractor shall begin as soon as directed by the Departmental Representative and be completed all works including demobilization and clean-up by within four (4) weeks of starting the work.**

- .1      This project shall be completed in one (1) phase and shall begin within at least two (2) weeks following the award and be completed within four (4) weeks after start up.
  - .2      Upon acceptance of bid the Contractor shall submit:
    - .1      Preliminary work schedule within five (5) calendar days of contract award.
  - .3      Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.
  - .4      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:
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- .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.
  - .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 subtrades 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
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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 Departmental Representative will schedule and administer project meetings every two (2) weeks for entire duration of work.
- .2 Departmental Representative will prepare agenda for meetings.
- .3 Meetings will be held at project site or as directed by Departmental Representative.

END

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PART 1 - GENERAL

- 1.1 General Requirements .1 The Form of Tender includes both lump sum priced items and several unit priced items.
- .2 The total tendered price shall be the sum of the lump sum items plus 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 understands 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 the Contractor.
- .6 All measurement shall be along a horizontal plane unless otherwise indicated.
- 1.2 Lump Sum Items .1 There shall be no separate measurement or payment made for these lump sum items.
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- .2 General Contract Requirements:
    - .1 Method of Measurement: Percentage Complete as agreed by Departmental Representative and the Contractor.
    - .2 This item includes but is not limited to site maintenance, dust control, miscellaneous landscaping, where required, any and all ditching and environmental protection required and as shown on the drawings as well as any excavation and backfill not mentioned below.
  
  - .3 Removals and Holding Tank Modifications:
    - .1 Method of Measurement: Percentage complete as agreed by the Departmental Representative and the Contractor.
    - .2 This item shall include all of the items necessary to complete the work as shown on the Removals Drawing C02. This includes, excavation, removal and disposal of existing septic field, distribution box, decommissioning, removal and disposal of the existing dosing chamber, dosing valve and appurtenances, excavation and all work required to seal existing holding tank overflow and outlet to ensure a water tight seal.
  
  - .4 .  
Effluent Pumping System
    - .1 Method of Measurement: Percentage complete as agreed by Departmental Representative and the Contractor.
    - .2 This item shall include all items necessary to complete the work to install the effluent pumping system as shown on the drawings and detailed in the specification Section 32 32 13.13 "Effluent Pumping System". This includes but is not limited to delivery of pump and appurtenance to designated site, equipment and material,
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- excavation, installation, pumps, wet well, piping, valve system, control panel, electrical cables and connections, frame and cover, riser sections, connections, gaskets, dewatering, excavation, bedding, backfilling, compaction, restoration and maintenance, commissioning, training and site inspection.
- .3 The force main supply and installation will be paid in separate item under the lump sum unit price for Utility Drainage Field.
- .4 Utility Drainage Field:
- .1 Method of Measurement: Percentage Complete as agreed by Departmental Representative and the Contractor.
- .2 This item includes the supply of all labour and material, excavation, dewatering, bedding, compaction, the installation of force main piping from the new effluent pump to the distribution box, the supply and installation of treatment sand, delivery and installation of pre-cast concrete distribution box and all related components, supply and installation of disposal pipe, infiltrators, wall seals, backfilling, restoration, and maintenance. This item includes all labour and material for the installation of sanitary force main from the existing holding tank to the new distribution box, including insulation as noted on the drawing and in the specification.
- .3 This item does not include the supply of all labour and material, for imported borrow material. This lump sum item does not include the decommissioning or removal of the existing septic field. This item
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also does not include ditching or swales or topsoil and hydroseed. These items will be paid for under their particular unit prices and/or lump sum prices.

- .5 Septic Tank Cleaning and Inspection:
  - .1 Method of Measurement: Percentage Complete as agreed by Departmental Representative and the Contractor.
  - .2 This item includes the supply of all labour and material, and vacuum truck services, to properly clean the existing septic tank and holding tank and all related components. This item also includes the inspection of the tank by an approved septic tank installer complete with a written report assessing the condition of the septic tank and holding tank.

1.3 Unit Price Items

- .1 Imported Borrow/Fill
  - .1 Unit of Measurement: Cubic Meters (m<sup>3</sup>)
  - .2 Method of Measurement: This item shall be measured volume placed of Imported Borrow delivered and installed to build up new raised bed field as shown on drawings. Volume shall be measured in field and agreed upon with the Departmental Representative.
  - .3 This item includes: supply, placement, hauling and compaction of imported backfill for the new raised bed disposal field to the thickness shown on the drawings or as required by the Departmental Representative.
- .2 Rock Excavation:
  - .1 Unit of Measurement: cubic meters (m<sup>3</sup>), in place measurement, as agreed by Department Representative and the Contractor.

- .2 Method of Measurement: Rock will be measured in its original position, by the average elevation above 300mm below the pipe for a total width of 0.30m on each side of the pipe plus the pipe diameter), calculated by the length that it presents itself. Additional rock removed within the trench outside of the above cross section is considered incidental to the work and will not be measured for payment.
  - .3 This item includes: The supply of all material, equipment, and work required for rock removal excavation, shattering rock to a depth of 300 mm below the bottom of the new pipe elevation indicated on the drawings, measured as mentioned above, including loading and disposal of rock material off-site.
  - .3 Rip-Rap:
    - .1 Unit of Measurement: Tonnes (t)
    - .2 Method of Measurement: This item shall be measured by weight in tonnes of Rip-Rap delivered and installed on site. Truck slips indicating material weight will be collected for each load.
    - .3 This item includes: hauling, supply and placement of Rip-Rap to the size and dimensions shown on the drawings or as required in the field as directed by the Departmental Representative. There shall be no additional payment for extra thickness of materials or material placed outside of limits.
  - .4 Ditching
    - .1 Unit of Measurement: linear meters (m)
    - .2 Method of Measurement: Based on field measurements for linear meters of ditching completed.
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- .3 This item includes: supply and transportation of all labour, equipment, and materials, preparation, excavation, as directed and as shown on the drawings, minimum 600mm wide, clean-up and all work incidental thereto.
  
  - .5 Imported Topsoil
    - .1 Unit of Measurement: square metres
    - .2 Method of Measurement: Based on field measurements for square metres of imported topsoil acceptably placed.
    - .3 This item includes: supply and transportation of all labour, equipment, and materials, preparation, soil amendments, mixing, grading, imported topsoil, distributing, fertilizer, rolling, clean-up and all work incidental thereto, all as specified or as shown on the drawings or as laid out by the Departmental Representative.
  
  - .6 Hydroseeding
    - .1 Unit of Measurement: square metres
    - .2 Method of Measurement: Based on field measurements for square metres of hydroseed acceptably placed.
    - .3 This item includes: supply and transportation of all labour, equipment, and materials, preparation, soil amendments, mixing, distributing, rolling, maintenance, re-hydraulic seeding as directed, clean-up and all work incidental thereto.
  
  - .7 Sod
    - .1 Unit of Measurement: square metres
    - .2 Method of Measurement: Based on field measurements for square metres of Sod acceptably placed.
    - .3 This item includes: supply and transportation of all labour,
-



equipment, and materials,  
preparation, soil amendments,  
mixing, distributing, rolling,  
maintenance, Sod as directed,  
clean-up and all work incidental  
thereto.

- .8 Storm Sewer Manholes:
  - .1 Method of Measurement: Number of units of each type and size installed as agreed by Departmental Representative and the Contractor.
  - .2 Measurement for this item shall include supply and transportation of all labour, equipment and material, excavation, installation, manhole structure, flat-top section, frame and cover, cutting of pipes, gaskets, couplings, fittings including plugs and caps, grout, connections, dewatering, bedding, compaction, backfilling, leakage testing, adjustments, benching, inside drop concrete benching, supports, adjustments, trench restoration and maintenance, clean-up and all work incidental thereto, all as specified or as shown on the drawings, or as laid out by the Department Representative.
  
- .9 Drain Tile and Surface Water Diversion Swale:
  - .1 Unit of Measurement: Linear Meters (m). Based on field measurements for the length of each size of drain tile acceptably laid and surface ditch properly excavated ensuring positive drainage away from the field.
  - .2 This item includes all supply and transportation of materials, labour, stripping and re-use of top-soil, excavation, installation of pipe including connections, , compaction, couplings, ends and fittings, de-watering, bedding, backfill, granular materials,

including geotextile filter fabric and equipment required to remove all common excavation and stockpiling and disposal of surplus material at approved locations. This item includes ditching required to prepare a surface water diversion swale as noted on the drawings.

- .3 This item does not include topsoil and hydroseed. It will be paid for under the contract unit price for those respective items.
- .4 Where ditching is explicitly noted on the drawings and does not include a drain tile, it will be paid for under the contract unit price for ditching.

All and any items not specifically included in the unit price items are considered incidental to the work and are to be included in the lump sum portions or the unit price items of the work.

END

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PART 1 - GENERAL

1.1 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 and mock-ups in SI Metric units.
  - .4 Where items or information is not produced in SI Metric units converted values are acceptable.
  - .5 Review submittals prior to submission to 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
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Departmental Representative's review.

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

1.2 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 five (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. Accompany submissions with transmittal letter, in duplicate, containing:

- .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
  
  - .7 Submissions include:
    - .1 Date and revision dates.
    - .2 Project title and number.
    - .3 Name and address of:
      - .1 Subcontractor.
      - .2 Supplier.
      - .3 Manufacturer.
    - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
    - .5 Details of appropriate portions of Work as applicable:
      - .1 Fabrication.
      - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
      - .3 Setting or erection details.
      - .4 Capacities.
      - .5 Performance characteristics.
      - .6 Standards.
      - .7 Operating weight.
      - .8 Wiring diagrams.
      - .9 Single line and schematic diagrams.
      - .10 Relationship to adjacent work.
  
  - .8 After Departmental Representative's review, distribute copies.
  
  - .9 Submit four (4) prints and one (1) electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
  
  - .10 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental
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Representative where shop drawings will not be prepared due to standardized manufacture of product.

- .11 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
    - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accordance with specified requirements.
    - .2 Testing must have been within three (3) years of date of contract award for project.
  
  - .12 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
    - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
    - .2 Certificates must be dated after award of project contract complete with project name.
  
  - .13 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
    - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
  
  - .14 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
    - .1 Documentation of the testing and
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verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

- .15 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
  - .16 Delete information not applicable to project.
  - .17 Supplement standard information to provide details applicable to project.
  - .18 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, transparency copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
  - .19 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
    - .1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
    - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for
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information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 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.

1.4 Certificates  
and Transcripts

- .1 Immediately after award of Contract, submit Workplace NL status.
  - .2 Submit transcription of insurance immediately after award of Contract.
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Cape Spear Septic  
System Upgrades  
Parks Canada  
Cape Spear National Historic Site,  
St. John's, NL

SUBMITTAL PROCEDURES

Section 01 33 00

Page 7 of 7  
June 25, 2020

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END

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PART 1 - GENERAL

1.1 Definitions

- .1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
- .2 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.
- .3 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.
- .3 PPE: personal protective equipment
  - .1 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) and the Canada Occupational Health and Safety Regulations (COSHS) 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/](http://laws.justice.gc.ca/en/L-2/)

.2 COSHS can be viewed at:  
[www.http://laws.justice.gc.ca/eng/SOR-86-304/n\\_e.html](http://laws.justice.gc.ca/eng/SOR-86-304/n_e.html)

.3 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 2104.

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 provincial health and safety 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.
    - .4 Work around raw wastewater.
  - .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

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- .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.
  - .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

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.

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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.
- 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.
- 1.5 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.
- 1.6 Site Clearing and Plant Protection .1 No vegetation clearing will be permitted between May 1<sup>st</sup> and August 15<sup>th</sup> due to annual
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songbird nesting season.

- .2 Protect trees and plants on site and adjacent properties where indicated.
- .3 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.
- .4 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.
- .5 Minimize stripping of topsoil and vegetation.
- .6 Restrict vegetation removal to areas indicated or designated by Departmental Representative.
- .7 Vegetation and topsoil should not be removed to obtain fill for road construction purposes.
- .8 Whenever possible, organic debris removed during grading operations should be stored for re-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.

1.7 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.

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- .5 Do not skid logs or construction materials across waterways.
  - .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
  - .7 Temporary diversion ditches, approved by the Departmental Representative, are to be plastic lined.
  - .8 Temporary storage sites for debris generated from clearing operations should be deposited away from watercourses and should be surrounded by a natural vegetative buffer.
  - .9 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.
- 1.8 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 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.
- 1.9 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
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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).
  - .3 The Contractor shall meet all requirements as detailed in Appendix C - Basic Impact Analysis (BIA) Cape Spear Septic System Upgrades, Cape Spear National Historic Site. This document is not all-inclusive, and site adjustment of the mitigation methods for the work may be required. The Departmental Representative will advise the Contractor of any additional requirements as they arise.
  - .4 The Contractor to ensure that all equipment entering the site be cleaned to prevent potentially invasive species of plants from being transported into the National Park from previous projects.
- 1.10 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-a-round facilities for contractor-related equipment and vehicles will be limited to those areas agreed to
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and designated by the Departmental Representative.

1.11 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 the installation of pipes and culverts, cleaning equipment prior to entering the site. 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.

1.12 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.

1.13 Vehicular Movements

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

1.14 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.
- 1.15 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
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plan shall incorporate all necessary silt fences, silt traps, plastic lined trenches and ditches as approved by the Departmental Representative. **Hay or any other type of seed contaminant shall not be used in any type of erosion control method.**

- .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 curtailed 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.
-

1.16 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 saw-dust 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 removed from the site along with the timber. No burning of any vegetation or debris will be permitted in the park boundaries.
- .5 No vegetation clearing will be permitted during the annual songbird nesting period between May 1<sup>st</sup> and August 15<sup>th</sup>.

END

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PART 1 - GENERAL

1.1 Refueling

- .1 Refueling of equipment to be performed in locations as directed by Departmental Representative.
- .2 Do not refuel equipment within 100 meters 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.
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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

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PART 1 - GENERAL

- 1.1 Related Sections .1 Section 01 33 00 - Submittal Procedures.
- 1.2 Inspection .1 Give minimum 48 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
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- 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

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 Scaffolding .1 Provide and maintain scaffolding, ladders and temporary stairs.
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- 1.7 Hoisting
- .1 Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
  - .2 Hoists cranes shall be operated by qualified operator.
- 1.8 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.
- 1.9 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.
- 1.10 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, seven (7) days per week).
-

- 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.

END

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 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.
- 1.2 Related Sections
- .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.
- 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.
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The Contractor must formally request a road closure with the Departmental Representative if they feel it is necessary. 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 Roads that cannot be closed include:
  - .1 Emergency Exit
  - .2 Access Road to Treatment Plant.
- .5 Keep travelled way well graded, free of pot holes and of sufficient width that required number of lanes of traffic may pass.
- .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 A Traffic Control Plan must be approved by the Departmental Representative prior to commencing any work.
- .6 Continually maintain traffic control devices in use by:
  - .1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
  - .2 Removing or covering signs which do not apply to conditions existing from day to day.

1.6 Control of  
Public Traffic

- .1 Provide traffic control personnel at each entrance to Cape Spear National Historic Site 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 Flag persons are to be equipped with portable radios only, not cellular devices. Any flag person 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.
- 1.8 Operational Requirements
- .1 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.

PART 1 - GENERAL

- |                                       |    |   |
|---------------------------------------|----|---|
| <u>1.1 Precedence</u>                 | .1 | For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual. |
| <u>1.2 Related Sections</u>           | .1 | Section 01 52 00 - Construction Facilities.   |
|                                       | .2 | Section 01 55 26 - Traffic Regulation.  |
| <u>1.3 References</u>                 | .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-0121-M1978, Douglas Fir Plywood.  |
|                                       | .3 | Government of Newfoundland and Labrador, Department of Transportation and works, Highway Design Division.   |
| <u>1.4 Installation and Removal</u>   | .1 | Provide temporary controls in order to execute Work expeditiously.  |
|                                       | .2 | Remove from site all such work after use.   |
| <u>1.5 Guard Rails and Barricades</u> | .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

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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 re-installation 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

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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    Parks Canada'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

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 Parks Canada 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

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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 re-manufactured 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 re-modelling 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 non-structural 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 two (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.

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- .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 non-salvageable 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

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.
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- .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

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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 Copy will be returned after final inspection, with Departmental Representative's comments.  
.2 Revise content of documents as required prior to final submittal.  
.3 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of shop drawing and materials testing manuals in English.  
.4 If requested, furnish evidence as to type, source and quality of products provided.  
.5 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.  
.6 Pay costs of transportation/delivery.
- 1.4 Format .1 Binders: vinyl, hard covered, three (3) 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.  
.2 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
-

- .3 Arrange content by systems, under Section numbers and sequence of Table of Contents.
  - .4 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
  - .5 Text: Manufacturer's printed data, or typewritten data.
  - .6 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
  - .7 Provide 1:1 scaled CAD files in dxf or dwg format on USB storage device 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 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 drawings, provided by Departmental Representative.
- .2 Provide felt tip marking pens, maintaining separate colors 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 Field changes of dimension and detail.
  - .3 Changes made by change orders.
  - .4 Details not on original Contract Drawings.
  - .5 References to related shop drawings and modifications.
- .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.

END

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PART 1 - GENERAL

- 1.1 Related Sections .1 Section 33 36 33 - Utility Drainage Field
- .2 Section 33 31 13 - Site Sanitary Utility Sewerage Piping
- 1.2 Related Requirements .1 Refer to detailed drawings for specific requirements for removals.
- 1.3 References .1 Reference Standards:
- .1 Canadian Council of Ministers of the Environment (CCME)
- .1 PN1326, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).
- .3 Transport Canada (TC)
- .1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.
- 1.4 Site Conditions .1 Site Environmental Requirements.
- .1 Perform work in accordance with Section 01 35 43 - Environmental Procedures.
- 2 Ensure that removals work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
- .1 Ensure proper disposal procedures are maintained throughout the project.
-

- .4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.
- .6 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .2 Existing Conditions.
  - .1 Remove contaminated or hazardous materials from site as directed by Department Representative, prior to start of demolition Work, and dispose of at designated disposal facilities in safe manner in accordance with applicable regulatory requirements.

PART 2 - PRODUCTS

(NOT APPLICABLE)

PART 3 - EXECUTION

3.1 Preparation

- .1 Inspect site with Department Representative and verify extent and location of items designated for removal, disposal, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Contact proper utility companies in order to coordinate the demolition of the building.

3.2 Removal of  
Hazardous Waste

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

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- 3.3 Removal Operations
- .1 Remove items as indicated in their corresponding Sections.
  - .2 Do not disturb items designated to remain in place.
  - .3 Removal of pipes:
    - .1 Remove sections of piping as indicated.
    - .2 Piping to be abandoned shall be capped.
    - .3 Caps shall also be provided where required to block off and seal ends of pipes that are being abandoned or otherwise isolated, incidental to the work.
  - .4 Removal of dosing chamber and mechanical equipment and distribution boxes:
    - .1 Abandon/remove in accordance with Provincial and Federal Guidelines and as indicated on the Drawings.
    - .2 Pump out contents, remove mechanical equipment and electrical wiring and dispose of at an approved receiving facility.
    - .3 Remove tanks, chambers, distribution boxes, and covers where indicated.
  - .5 Removal of existing septic fields:
    - .1 Septic fields to be excavated and removed contents removed from site in accordance with Provincial and Federal Guidelines unless indicated otherwise on the Drawings.
    - .2 Where the new septic field is to be constructed in same location as existing, existing septic field materials including granular material, pipes, etc., shall be removed to the depth indicated on the Drawings, and disposed of at an appropriate facility.
-

- .6 Once the items have been removed the site is to be properly shaped and graded to match existing ground.
- .7 Disposal of Material:
  - .1 Dispose of materials not designated for salvage or reuse on site.
- .8 Backfill:
  - .1 Backfill in areas as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- 3.4 Restoration
  - .1 Restore areas and existing works outside areas of demolition match condition of adjacent, undisturbed areas.
  - .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
- 3.5 Cleaning
  - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Leave Work area clean at end of each day.
    - .2 Remove debris, trim surfaces and leave work site clean, upon completion of Work
    - .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
  - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- 3.6 Protection
  - .1 Repair damage to adjacent materials or property caused by selective site demolition.

END

PART 1 - GENERAL

- 1.1 Related Sections .1 Section 31 23 10 - Excavating, Trenching and Backfilling.
- .2 Section 32 11 23 - Aggregate Base Courses
- 1.2 References .1 American Society for Testing and Materials (ASTM)
- .1 ASTM D 4791-10, Standard Test Method for Flat Particles, Elongated Particles or Flat and Elongated Particles in Coarse Aggregate.
- 1.3 Source Approval .1 Inform Departmental Representative of proposed source of aggregates and imported borrow/fill and provide access for sampling two (2) weeks minimum before starting production. The Contractor or his representative is to be present during sampling.
- .2 Aggregate sources must be free of invasive species and capable of producing clean material to the satisfaction of the Departmental Representative.
- .3 If, in opinion of Departmental Representative, aggregate from the proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that aggregate from source in question can be processed to meet specified requirements.
- .4 Should a change of aggregate source be proposed during work, advise Departmental Representative one (1) week in advance of proposed change to allow sampling and testing.
- .5 Acceptance of an aggregate at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is
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found to be unsatisfactory.

1.4 Sampling

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Allow continual sampling by Departmental Representative during production.
- .3 Provide Departmental Representative with access to source and processed material for sampling.
- .4 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

PART 2 - PRODUCTS

2.1 Materials

- .1 Aggregate quality: sound, hard, durable aggregate free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in a deleterious manner for the use intended.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
  - .1 Greatest dimension to exceed three times least dimension.
- .3 Fine aggregate satisfying requirements of applicable section to be one, or a blend of following:
  - .1 Natural sand.
  - .2 Manufactured sand.
  - .3 Screenings produced in crushing of quarried rock, boulders, gravel
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
  - .1 Crushed rock.
  - .2 Gravel and crushed gravel composed of naturally formed particles of stone.

PART 3 - EXECUTION

- 3.1 Equipment .1 All equipment brought on site by the contractor or any subcontractor must be thoroughly washed clean of any soil and debris prior to arrival on site. Equipment containing debris or soil from a previous job site will not be permitted to enter the project site.
- 3.2 Stripping of Topsoil .1 Commence topsoil stripping of areas as indicated by the Guidelines and as directed by the Departmental Representative.
- .2 Avoid mixing topsoil with subsoil.
- .3 Stockpile in locations as indicated by the Guidelines. Stockpile height not to exceed 2m.
- .4 Refer also to Section 31 14 13 - Soil Stripping and Stockpiling.
- 3.3 Handling .1 Handle and transport aggregates to avoid segregation, contamination and degradation.
- 3.4 Stockpiling .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative.
- .2 Stockpile aggregates in sufficient quantities to meet project schedules.
- .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
- .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into work.
-



- .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
  - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.
  - .7 Stockpile materials in uniform layers of thickness as follows:
    - .1 Maximum 1.5 m for coarse aggregate and base coarse aggregate.
    - .2 Maximum 1.5 m for fine aggregate and sub-base aggregate.
    - .3 Maximum 1.5 m for other aggregate.
  - .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
  - .9 Do not cone piles or spill material over edges of piles.
  - .10 Do not use conveying stackers.
  - .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.
- 3.5 Aggregate Stockpile Cleanup
- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
  - .2 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.
- 3.6 Source Abandonment
- .1 For temporary or permanent abandonment of aggregate source, rehabilitate source to condition meeting requirements of the Guidelines.

END

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 33 31 13 - Public Sanitary Utility Sewerage Pipe
  - .2 Section 33 34 00 - Sanitary Utility Sewerage Force Mains
  - .3 Section 33 36 33 - Utility Drainage Field
- 1.2 References
- .1 American Society for Testing and Materials International (ASTM)
    - .1 ASTM C 117-13, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
    - .2 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
    - .3 ASTM D 422-63(2007), Standard Test Method for Particle-Size Analysis of Soils.
    - .4 ASTM D 698-10, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup>) (600 kN-m/m<sup>3</sup>).
    - .5 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-8.2-M88, Sieves, Testing, Woven Wire, Metric.
  - .3 Department of Justice Canada (Jus)
    - .1 Canadian Environmental Protection
-

- 
- Act (CEPA), 1999, c.33.
- .2 Transportation of Dangerous Goods Act(TDGA), 1992, c.34.
- .4 Newfoundland and Labrador Department of Transportation and Works
- .1 Specifications Book (latest edition).
- 1.3 Definitions
- .1 Topsoil:
- .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.
- .2 Excavation classes: two classes of excavation will be recognized; common excavation and rock removal.
- .1 Rock: the removal of material from solid masses of igneous, sedimentary or metamorphic rock which prior to removal was integral with the parent mass and the removal of boulders and rock fragments larger than 1.0 cubic metre in volume.
- .2 Common: all other excavation.
- .3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .4 Imported material: material obtained from locations outside area to be graded and required for construction of fill areas or for other portions of Work.
- .5 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
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- .6 Unsuitable materials:
- .1 Weak, chemically unstable, wet and compressible materials.
  - .2 Frost susceptible materials:
    - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318-10, and gradation within limits specified when tested to ASTM D 422-63(2007) and ASTM C 136-06: Sieve sizes to CAN/CGSB-8.2-M88.
    - .2 Table:

<u>Sieve Designation</u>	<u>% Passing</u>
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 0.075mm sieve.
- .7 Contaminated Soil: Soil containing hydro-carbons as identified by sampling performed by an approved testing facility.

- 1.4 Submittals
- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Quality control: in accordance with Section 01 45 00 - Quality Control:
    - .1 Submit to Departmental Representative testing results and reports as described in Part 3 of this section.
  - .3 Preconstruction Submittals:
    - .1 Submit construction equipment list for major equipment to be used in this section prior to start of work.
  - .4 Samples:
    - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
    - .2 Inform Departmental Representative at least four (4) weeks prior to beginning Work, of proposed source(s) of Imported Fill materials and provide access for sampling.
- 1.5 Quality Assurance
- .1 For design of any temporary structures submit design and supporting data at least 2 weeks prior to installation or construction.
  - .2 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.
  - .3 Keep design and supporting data on site.
  - .4 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.
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- 1.6 Existing Conditions .1 Examine Geotechnical Report prepared by  
Englobe attached in Appendix B.
- .2 Existing buried utilities and structures:
- .1 Before commencing work obtain all  
required digging permits from local  
utilities and/or authorities and  
verify and establish location of  
buried services on and adjacent to  
site.
  - .2 Size, depth and location of existing  
utilities and structures as  
indicated are for guidance only.  
Completeness and accuracy are not  
guaranteed.
  - .3 Prior to beginning excavation Work,  
notify applicable owner or  
authorities to clearly mark such  
locations to prevent disturbance  
during Work.
  - .4 Confirm locations of buried  
utilities by hand digging or careful  
test excavations in presence of  
Departmental Representative. Hand  
dig all cables one metre either side  
of cable prior to machine  
excavation.
  - .5 Maintain and protect from damage,  
water, sewer, gas, electric,  
telephone and other utilities and  
structures encountered.
  - .6 Where unidentified utility lines or  
structures exist in area of  
excavation, obtain direction of  
Departmental Representative before  
removing or otherwise disturbing  
utilities or structures.
  - .7 Record location of maintained, re-  
routed and abandoned underground  
lines.
- .3 Existing surface features:
- .1 Conduct, with Departmental  
Representative, condition survey of  
existing fencing, trees and other  
plants, service poles, wires,  
lighting fixtures, pavement, survey  
benchmarks and monuments, and all  
other surface features which may be
-

- affected by Work.
- .2 Protect existing surface features from damage while Work is in progress unless otherwise directed in the drawings. In event of damage, immediately make repair as directed by Departmental Representative.
  - .3 Protect existing asphalt and concrete pavements which may be affected by Work from damage while work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.
  - .4 Where required for excavation, cut roots or branches as directed by Departmental Representative.
- 1.7 Cofferdams, Shoring, Bracing, and Underpinning .1 Shoring will be required to safely install new piping where depth exceeds 2.5 metres. This is deemed incidental to the work.
- .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 shoring and bracing 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 - PRODUCTS

- 2.1 Materials
- .1 Borrow: Blasted or crushed rock or gravel in accordance with Section 322.02 of the City of St. John's - Department of Engineering - Specifications book Section 322.02, approved by Departmental Representative for use intended, dry, unfrozen, free of cinders, ashes, sods, refuse or other deleterious or unsuitable material.
  - .2 Treatment Sand in accordance with Section 33 36 33 - Utility Drainage Field.
  - .3 Bedding Material in accordance with Section 32 11 25 - Bedding Material.
  - .4 Topsoil in accordance with Section 32 91 19 - Topsoil Placement and Grading

PART 3 - EXECUTION

- 3.1 Equipment
- .1 All equipment brought on site by the contractor or any subcontractor must be thoroughly washed clean of any soil and debris prior to arrival on site. Equipment containing debris or soil from a previous job site will not be permitted to enter the project site.
- 3.2 Site Preparation
- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
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- 3.3 Stockpiling
- .1 Stockpile fill materials in areas approved by Departmental Representative and as shown on the drawings.
    - .1 Stockpile granular materials in manner to prevent segregation.
  - .2 Protect fill materials from contamination.
  - .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies. Note that no hay mulch or possible seed contaminants are to be used on this project site.
- 3.4 Cofferdams and Shoring
- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29.06 - Health and Safety Requirements and Health and Safety Act for Workplace NL.
  - .2 Obtain permit from authority having jurisdiction for any temporary diversion or pumping of water course.
  - .3 During backfill operation:
    - .1 Unless otherwise indicated or directed by Departmental Representative, remove sheeting and shoring from excavations.
    - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
  - .4 Upon completion of substructure construction:
    - .1 Remove shoring and bracing.
    - .2 Remove excess materials from site and restore watercourses as directed by Departmental Representative.
- 3.5 Dewatering
- .1 Keep excavations free of water while Work is in progress.
  - .2 Submit for Departmental Representative's review details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.
-

- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
  - .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved 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.
- .6 Provide settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

### 3.6 Excavation

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
- .2 Excavation must not interfere with normal 1:1 (H:V) splay of bearing capacity of adjacent foundations and traffic areas. If interference will occur, excavation must be shored, braced or underpinned as described elsewhere in this specification.
- .3 Do not disturb soil within branch spread of trees or shrubs that are to remain.
  - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .4 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation

operations and do not leave open more than 15 m at end of day's operation.

- .5 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
  - .6 Restrict vehicle operations directly adjacent to open trenches.
  - .7 Dispose of surplus and unsuitable excavated materials off-site in accordance with applicable provincial and municipal regulations.
  - .8 Do not obstruct flow of surface drainage or natural watercourses. Diversions of flow are to be submitted in detailed plan and approved by Departmental Representative and other authorities before proceeding.
  - .9 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
  - .10 Notify Departmental Representative when bottom of excavation is reached and/or appears unsuitable and proceed as directed by Departmental Representative.
  - .11 Obtain Departmental Representative's approval of completed excavation.
  - .12 If encountered, remove unsuitable material from excavation bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
    - .1 In areas occupied by foundations or structures, replace excavated material with Fill Against Structure compacted to not less than 100% Standard Proctor maximum dry density.
  - .13 Correct unauthorized over-excavation as follows:
-

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- .1 In areas not occupied by foundations or structures, replace excavated material with Select Backfill Material compacted to not less than 98% of Standard Proctor Maximum Dry Density.
  
  - .14 Hand trim, make firm and remove loose material and debris from excavations.
    - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
    - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.
  
  - 3.8 Backfilling
    - .1 Do not proceed with backfilling operations until completion of following:
      - .1 Departmental Representative has inspected and approved installations.
      - .2 Removal of shoring and bracing;
      - .3 Backfilling of voids with satisfactory soil material.
  
    - .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
  
    - .3 Do not use backfill material which is frozen or contains ice, snow or debris.
  
    - .4 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.
      - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
        - .1 Permit concrete to cure for
-

minimum 3 days or until it has sufficient strength to withstand earth and compaction pressure and obtain approval from Departmental Representative.

.5 Place unshrinkable fill in areas as indicated or directed by Departmental Representative. Consolidate and level unshrinkable fill with internal vibrators.

.5 Backfilling at surface:

.1 Shall be re-used existing stockpiled topsoil, where excavation is outside of paved or granular surfaces.

3.9 Restoration

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

.2 Replace topsoil.

.3 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.

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

.5 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END

PART 1 - GENERAL

- 1.1 Related Sections .1 Section 31 37 00 - Excavating,  
Trenching, and Backfilling

PART 2 - PRODUCTS

- 2.1 Rock .1 Hard, with relative density (formally  
specific gravity) not less than 2.5,  
durable quarry stone, free from seams,  
cracks or other structural defects, to  
meet following size distribution for use  
intended:
- .2 To meet following size distribution per  
sizes shown on drawings and graded as  
follows:
- .1 Nominal 300mm diameter or 40 kg  
mass:  
100% smaller than 450mm or 130 kg  
At least 20% larger than 350 mm or  
70 kg  
At least 50% larger than 300mm or  
40 kg  
At least 80% larger than 200mm or  
10 kg
- .3 Rip rap to be clean, inorganic, non ore-  
bearing, non-toxic material from a non-  
watercourse source. It shall be hard,  
resistant to weathering and angular in  
shape.
- 2.2 Geotextile Filter .1 Geotextile: non-woven type meeting the  
following minimum requirements (Minimum  
Average Roll (MAR) Values):

PROPERTY	UNIT	ASTM TEST	NON-WOVEN
Mullen Burst Strength	KPa	D3786	1110
Tearing Strength (Trapezoid Method)	N	D4533	160 (N1)
Grab Tensile Strength (Both Directions)	N	D4632	400 (N1)
Elongation at Break	%	D4632	50
Apparent Opening Size	Um	D4751	50-250
UV Degradation	% Ret	D4355	
Permittivity	Sec - 1	D4491	1.75 - 3.50

PART 3 - EXECUTION

3.1 Equipment

- .1 All equipment brought on site by the contractor or any subcontractor must be thoroughly washed clean of any soil and debris prior to arrival on site. Equipment containing debris or soil from a previous job site will not be permitted to enter the project site.

3.2 Placing

- .1 Place Rip-Rap in the locations and to the grade, dimensions, and details as shown on the drawings or as laid out by the Department Representative.
  - .2 Where Rip-Rap is to be placed on slopes, excavate trench at toe of slope to dimensions as indicated.
  - .3 Dewater the site as required to permit the work to be carried out.
  - .4 Fine grade area to be rip-rapped to uniform, even surface. Fill depressions with suitable material and compact to provide a firm bed.
  - .5 Place geotextile on prepared surface. Avoid puncturing geotextile. Vehicular traffic over geotextile not permitted.
  - .6 Place stones using appropriate equipment in manner approved by Department Representative to secure surface and create a stable mass. Place larger stones at bottom of slopes.
  - .7 Place stones without damaging adjacent structures or geotextile material.
  - .8 Place rip-rap to thickness and details as indicated.
  - .9 Hand placing:
    - .1 Use larger stones for lower courses and as headers for subsequent courses.
    - .2 Stagger vertical joints and fill
-

- .3 voids with rock spalls or cobbles.  
Finish surface evenly, free of  
large openings and neat in  
appearance.

END

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PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 31 05 16 - Aggregate Materials.
  - .2 Section 33 31 13 - Public Sanitary Utility Sewerage and Piping
  - .3 Section 33 34 00 - Sanitary Utility Force Mains
- 1.2 References
- .1 American Society for Testing and Materials (ASTM)
    - .1 ASTM C 117-95, Standard Test Methods for material finer than 0.075 mm Sieve in Mineral aggregates by washing.
    - .2 ASTM C 131-96, Standard Test Method for Resistance to degradation of small-size coarse aggregate by abrasion and impact in the Los Angeles machine.
    - .3 ASTM C 136-96a, Standard Test Method for Sieve analysis of fine and coarse aggregates.
    - .4 ASTM D 698-00a, Standard Test Methods for laboratory compaction characteristics of soil using standard effort (12,400ft-lbf/ft<sup>3</sup>) (600kN-m/m<sup>3</sup>).
    - .5 ASTM D 1557-00, Test Method for laboratory compaction characteristics of soil using modified effort (56,000ft-lbf/ft<sup>3</sup>) (2,700kN-m/m<sup>3</sup>).
    - .6 ASTM D 1883-99, Standard Test Method for CBR (California Bearing Ratio) of laboratory compacted soils.
    - .7 ASTM D 4318-00, Standard Test Methods for liquid limit, plastic limit and plasticity index of soils.
  - .2 Canadian General Standards Board (CGSB)
    - .1 CAN/CGSB-8.2-M88, sieves, testing, woven wire, metric.
-

1.3 Delivery, Storage and Handling .1 Deliver and stockpile aggregates in accordance with Section 31 05 16 - Aggregate Materials. Stockpile minimum 50% of total bedding material/aggregate required prior to beginning operation.

1.4 Waste Management And Disposal .1 Remove un-used bedding material from site.

PART 2 - PRODUCTS

2.1 Materials .1 Pipe Bedding Material: Bedding material shall consist of well graded sand or granular material free of clay, frozen lumps, organic or deleterious matter and meet the gradation limits specified below:

Sieve Designation (mm)	Percent Passing
25	100
19	75-100
12.5	-
9.5	50-100
4.75	30-70
2	20-45
0.425	10-25
0.18	-
0.075	3-8

.2 Stone Bedding Material: Stone bedding shall be used only as deemed necessary by the Departmental Representative where dewatering is not possible. Stone bedding shall consist of approved, well graded material free of clay, frozen lumps, organic or deleterious matter; and meet the gradation limits as specified below.

Sieve Designation (mm)	Percent Passing
25.4	100
19	75-100
9.5	0-75
4.75	0-15
2.36	0-5

**When using stone bedding, the entire pipe bedding zone must be completely enveloped with geotextile fabric to prevent the migration of fine from the surrounding soil.**

PART 3 - EXECUTION

3.1 Sequence of Operation.1

Placement

- .1 Place pipe bedding material and compact as necessary to meet the grades shown on the drawings.
- .2 Ensure no frozen material is placed.
- .3 Place material only on properly shaped, clean unfrozen surface, free from snow and ice.
- .4 Place material using methods which do not lead to segregation or degradation of aggregate.
- .5 Place bedding material to a thickness of 150mm below the underside of pipe when the trench is not in solid rock. If the trench is in solid rock, the bedding material shall be placed 300mm thick below the underside of pipe.
- .6 Bedding material shall be placed to a width of 300mm beyond the outside of the pipe, on both sides as well as 300mm thick on top of the pipe.
- .7 Bedding shall be placed in uniform layers not exceeding 150mm compacted thickness. Departmental Representative may authorize thicker layers if specified compaction can be achieved.

.2 Compaction Equipment

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

.3 Compacting

- .1 Compact to density not less than 95% corrected maximum dry density in accordance with ASTM D698, latest edition.
- .2 Shape and roll alternately to obtain

- smooth, even and uniformly compacted base.
- .3 Apply water as necessary during compacting to obtain specified density.
  - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative

END

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PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 32 92 21 - Hydroseeding
  - .2 Section 31 23 33 - Excavating, Trenching and Backfilling.
- 1.2 References
- .1 Agriculture and Agri-Food Canada
    - .1 The Canadian System of Soil Classification, Third Edition, 1998.
    - .2 Canadian Council of Ministers of the Environment
      - .1 PN1340-2005, Guidelines for Compost Quality.
- 1.3 Action and Informational Submittals
- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Quality control submittals:
    - .1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.
- 1.4 Quality Assurance
- .1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 14 10 - Scheduling and Management of Work.

PART 2 - PRODUCTS

- 2.1 Topsoil
- .1 Topsoil to come from material salvaged on site previously stockpiled on-site or from imported topsoil.
    - 1. Inform Departmental Representative of the proposed source of topsoil and provide access for sampling two (2) weeks minimum before starting production. The Contractor or his representative is to be present during sampling.
    - .2 Topsoil sources must be free of invasive species and capable of producing
-

- 
- clean material to the satisfaction of the Department Representative.
- .3 If, in the opinion of Departmental Representative, topsoil from the proposed source does not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that aggregate from a source in question can be processed to meet specified requirements.
  - .4 Should a change of topsoil source be proposed during work, advise Departmental Representative one (1) week in advance of the proposed change to allow sampling and testing.
  - .5 Acceptance of the topsoil at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory.
- 2.2 Source Quality Control
- .1 Contractor is responsible for amendments to supply topsoil as required.
  - .2 Provide for soil testing by recognized testing facility for PH, P and K, and organic matter.
    - .1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

PART 3 - EXECUTION

- 3.1 Temporary Erosion and Sedimentation Control
- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and sediment and erosion control drawings.
  - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
  - .3 Remove erosion and sedimentation
-

controls and restore and stabilize areas  
disturbed during removal.

- .4 No hay mulch or possible seed  
contaminants are to be used on this  
project as a part of erosion control or  
any other activity.

3.2 Preparation of  
Existing Grade

- .1 Verify that grades are correct.
- .2 If discrepancies occur, notify  
Departmental Representative and do not  
commence work until instructed by  
Departmental Representative.
- .3 Grade soil, eliminating uneven areas and  
low spots, ensuring positive drainage.
- .4 Remove debris, roots, branches, stones  
in excess of 50 mm diameter and other  
deleterious materials.
  - .1 Remove soil contaminated with  
calcium chloride, toxic materials  
and petroleum products.
  - .2 Remove debris which protrudes more  
than 75 mm above surface.
  - .3 Dispose of removed material off  
site.

3.3 Placing and Spreading  
of Topsoil/Planting Soil

- .1 Screen previously stripped material  
prior to use using 50mm square screen.  
Material retained on screen shall be  
disposed of incidental to the work.
- .2 Place topsoil after Departmental  
Representative has accepted subgrade.
- .3 Spread topsoil in uniform layers not  
exceeding 100 mm.
- .4 Spread topsoil as indicated to following  
minimum depths after settlement.
  - .1 50 mm for all areas.
- .5 Manually spread topsoil/planting soil  
around trees, shrubs and obstacles.

- 
- 3.4 Finish Grading .1 Grade to eliminate rough spots and low areas and ensure positive drainage.  
.1 Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.  
.1 Leave surfaces smooth, uniform and firm against deep footprinting.
- 3.5 Acceptance .1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.
- 3.6 Surplus Material .1 Dispose of materials not required where directed by Departmental Representative off site.
- 3.7 Cleaning .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END

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PART 1 - GENERAL

- 1.1 Related Sections .1 Section 32 91 19 - Top Soil and Grading.
- 1.2 Submittals .1 Product Data.
- .1 Submit product data in accordance with 01 33 00 - Submittal Procedures.
  - .2 Provide product data for:
    - .1 Seed.
    - .2 Mulch.
    - .3 Tackifier.
    - .4 Fertilizer.
    - .5 Fibre Reinforced Matrix
  - .3 Submit in writing to Departmental Representative fourteen (14) days prior to commencing work:
    - .1 Volume capacity of hydraulic seeder in litres.
    - .2 Amount of material to be used per tank based on volume.
    - .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.
- 1.3 Quality Assurance .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- 1.4 Scheduling .1 Schedule hydraulic seeding to coincide with preparation of soil surface.
- .2 Hydroseeding shall be carried out as soon as possible after completion of the surface preparation in order to prevent erosion by wind and water. Hydroseeding shall take place no more than two (2) weeks after excavation and embankment
-

construction is complete.

PART 2 - PRODUCTS

2.1 Materials

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
  - .1 Grass mixture: "Certified", "Canada No.1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
  - .2 Mixture composition:
    - .1 60% Certified Annual Rye Grass.
    - .2 40% Creeping Red Fescue
- .2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, with an environmentally acceptable dye, free of germination and growth inhibiting factors with following properties:
  - .1 Type I mulch:
    - .1 Made from wood cellulose fibre.
    - .2 Organic matter content: 95% plus or minus 0.5%.
    - .3 Value of pH: 6.0.
    - .4 Potential water absorption: 900%.
- .3 Tackifier: water dilutable, liquid dispersion water soluble vegetable carbohydrate powder.
- .4 Water: free of impurities that would inhibit germination and growth.
- .5 Fertilizer:
  - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
  - .2 The fertilizer is to have a plant food ratio of 10 nitrogen, 20 phosphorus, and 20 potash plus 2% Fritted Trace Elements.
  - .3 The fertilizer to be spread the following spring during the

maintenance period shall have a  
plant food ratio of 19 nitrogen,  
19 phosphorus, and 19 potash.

- .6 Inoculants: inoculant containers to be tagged with expiry date.
- .7 Fibre Reinforced Matrix (FRM)
  - .1 FRM shall consist of thermally refined wood fibers and 10% by weight cross-linked hydro-colloidal tackifiers, and 5% by weight crimped man-made fibers. FRM shall be 100% biodegradable. FRM shall not have a curing period.
  - .2 FRM shall be hydraulically applied and after application be capable of adhering to the soil. In a dry state, FRM shall be comprised of not less than 70% by weight of long stranded wood fibres held together by organic or mineral bonding agents or both. The hydrated FRM shall form a viscous mat. The bonding agent shall not dissolve or disperse upon re-wetting. FRM shall not inhibit the germination or growth of plant material.

PART 3 - EXECUTION

3.1 Workmanship

- .1 Do not spray onto structures, signs, guide rails, fences, plant material, utilities, and other than surfaces intended.
- .2 Clean-up immediately, any material sprayed where not intended, to satisfaction of Departmental Representative.
- .3 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, immediately prior to heavy rain events, frozen ground or ground covered with snow, ice or standing water.
- .4 Protect seeded areas from trespass until

plants are established.

3.2 Preparation of  
Surfaces

- .1 Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.
- .2 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
- .3 In areas of hard earth, spread suitable excavated material at a minimum depth of 150mm to promote growth.
- .4 Obtain Departmental Representative's approval of grade before starting to seed.

3.3 Preparation of  
Slurry

- .1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to Departmental Representative. Supply equipment required for this work.
- .2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
- .3 After all materials are in the seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

3.4 Slurry Application

- .1 Hydraulic seeding equipment:
  - .1 Slurry tank.
  - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
  - .3 Capable of seeding by 50m hand operated hoses and appropriate nozzles.
- .2 Slurry mixture applied per hectare.

- 
- .1 Seed: Grass mixture 175kg.
  - .2 Mulch: Type I 1350kg.
  - .3 Tackifier: 300kg.
  - .4 Water: Minimum 30,000L.
  - .5 Fertilizer: 400kg.
- 
- .3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
    - .1 Using correct nozzle for application.
    - .2 Using hoses for surfaces difficult to reach and to control application.
  - .4 Blend application 300mm into adjacent grass areas or sodded areas and previous applications to form uniform surfaces.
  - .5 Re-apply where application is not uniform.
  - .6 Remove slurry from items and areas not designated to be sprayed.
  - .7 Protect seeded areas from trespass satisfactory to Departmental Representative.
  - .8 Remove protection devices as directed by Departmental Representative.
- 
- 3.5 Application of Fibre Reinforced Matrix
- .1 FRM slurry shall be applied at locations as identified on the Drawings or as directed by the Departmental Representative.
  - .2 FRM shall be thoroughly mixed with water in a hydraulic.1 FRM shall be applied at a minimum rate of 3,700kg of dry product per hectare. FRM shall be thoroughly mixed with water in a hydraulic seeder and mulcher at a rate of 20-30 kg of dry product to 500-600 litres of water to form a homogeneous slurry.
  - .3 The FRM slurry may be applied in a 1-step application with seed or a two-step application on already seeded earth. FRM shall be applied by nozzle sprayer or extension hose. The FRM slurry shall be evenly dispersed in successive
-

applications from different directions to form a uniform, cohesive mat. The spray shall not dislodge soil or cause erosion.

- .4 FRM shall be installed by personnel certified and trained by the manufacturer in the proper mixing and installation of the product.

3.6 Maintenance During Establishment Period

- .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
- .2 The Contractor shall be responsible for maintaining hydroseeded areas to ensure proper and adequate growth of the vegetation during the warranty period. The Contractor shall also be responsible for an additional application of fertilizer the following spring after initial application. This application shall be by a method approved by the Department. The fertilizer shall be 5-10-30 and shall be applied at a rate of 300 kg/ha. No additional payment will be made for maintenance or the extra application of fertilizer.

3.7 Acceptance

- .1 Seeded areas will be accepted by the Departmental Representative provided evidence of growth and that plants are uniformly established.

3.8 Warranty Period

- .1 All areas hydroseeded under this contract shall have a warranty period of one (1) year starting from the date of initial acceptance. This warranty shall cover any defects in materials and workmanship, and damages caused by the elements of weather. During this period, any defect brought to the attention of the Contractor by the Departmental Representative shall be fixed, repaired or made good to the satisfaction of the Departmental Representative and at no additional cost to the Department.

3.9 Cleaning

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END

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PART 1 - GENERAL

- 1.1 Related Sections .1 Section 32 91 19 - Topsoil Placement and Grading.
- 1.2 References .1 Canadian Food Inspection Agency (CFIA); Plant Production Division, Fertilizer Section:  
.1 Canadian Fertilizer Act and Regulations  
.2 Canadian Fertilizer Quality Assurance Program  
.3 Canadian Fertilizer Act and Regulations  
.2 Canadian Nursery Landscape Association (CNLA):  
.1 Canadian Standards for Nursery Stock, Nursery Sod
- 1.3 Submittals .1 Product Data.  
.1 Submit manufacturer's instructions, printed product literature and data sheets for sod, geotextile and fertilizer and include product characteristics, performance criteria, physical size, finish and limitations.  
.2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 11 10 - General Requirements: Health and Safety Requirements.  
.3 Samples:  
.1 Submit:  
.1 Sod for each type specified. Install approved samples in 1 m<sup>2</sup> mock-ups and maintain in accordance with maintenance requirements during establishment period.  
.2 Bio-degradable geotextile fabric.  
.3 0.5 kg container of each type of fertilizer used.  
.2 Obtain approval of samples by Departmental Representative.  
.4 Test Reports: Submit certified test reports of seed analyses showing compliance with specified performance characteristics and physical properties.  
.5 Certificates: Submit product certificates signed by manufacturer certifying that
-



materials supplied to the project comply with specified performance characteristics and criteria and physical requirements.

1.4 Quality Assurance

- .1 Regulatory Requirements: Use only fertilizers, pesticides, micro-nutrients and supplements that are registered by the Canadian Food Inspection Agency and that meet requirements of referenced acts and regulations.

1.5 Scheduling

- .1 Schedule sod laying to coincide with preparation of soil surface.
- .2 Schedule sod installation when frost is not present in ground.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.6 Delivery,  
Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 11 10 - General Requirements: Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
  - .1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.
- .3 Storage and Handling Requirements
  - .1 Store fertilizer off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 Materials

- .1 Number One Grade Turf Grass: Provide sod that is sown and cultivated in local nursery fields as turf grass crop from certified seed as approved by the Departmental Representative, and that has matured under environmental conditions similar to that of the project and as follows:

.1 Turf Grade Sod: Mow sod to a height of 50 mm within 36 hours prior to lifting with clippings removed.

.2 Turf Grass Nursery Sod quality:

.1 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm

.2 Mowing height limit: 35 to 65 mm.

.3 Soil portion of sod: 6 to 15 mm in thickness.

## 2.2 Accessories

.1 Sod Establishment Support: Provide biodegradable geotextile fabric and pegs as required to prevent washouts and to establish strong root growth.

.2 Water: Provide water from local source or from trucked source as required during maintenance period and until vigorous growth has been established.

.3 Fertilizer: Provide slow release fertilizer that contains a minimum of 65% water insoluble nitrogen, and other nutrients required to establish vigorous growth in proportions necessary to amend topsoil as determined by analysis.

## 2.3 Source Quality Control

.1 Obtain written approval from Departmental Representative of sod at source.

.2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

.3 Obtain sod only from CNLA listed grower that can provide certification of seed source with growing location in close proximity to project site; provincial associations belonging to CNLA are acceptable for this requirement.

.4 Provide a nutrient analysis of topsoil and provide test data and recommended fertilizer application constituents and rates to Departmental Representative before delivering materials to the project site.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that grades are correct and prepared ready for placement of sodding materials
  - .1 Do not perform work under adverse conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
  - .2 Starting work of this Section indicates acceptance of conditions.

3.2 Preparation

- .1 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated to tolerance of  $\pm 8$  mm and to allow surface to drain naturally.
- .2 Remove and dispose of weeds, debris, stones larger than 50 mm diameter, soil contaminated by oil, gasoline and other deleterious materials off site and in accordance with requirements of local authority having jurisdiction.

3.3 Installation

- .1 Sod Placement:
  - .1 Lay sod within 24-hours of being lifted if air temperature exceeds 20°C.
  - .2 Lay sod sections in rows with joints staggered and ends butted closely without overlapping or leaving gaps between sections; cut out irregular or thin sections with sharp implements.
  - .3 Roll sod as required to obtain close contact between sod and soil using light rolling; use of heavy rolling to correct irregularities in grade is not permitted.
- .2 Sod Placement on Slopes:
  - .1 Install and secure geotextile fabric in areas having a slope greater than 3:1 to prevent soil erosion in accordance with manufacturer's instructions.
  - .2 Lay sod starting from bottom of slopes.
  - .3 Peg sod on slopes steeper than 3:1, within 1 metre of catch basins and within 1 metre of drainage channels and ditches to following pattern:

- .1 First sod sections along contours of slopes: 100 mm below top edge at 200 mm on centre.
    - .2 Areas above first sod sections: Not less than 3 to 6 pegs/m<sup>2</sup>.
    - .3 Areas at drainage structures Not less than 6 to 9 pegs/m<sup>2</sup>.
    - .4 Adjust pattern as required to obtain firm contact with topsoil and to prevent movement.
  - .2 Drive pegs to 20 mm above soil surface of sod sections.
  - .3 Fertilizing Program: Fertilize during establishment and warranty periods at a rate and frequency established by source quality control testing and until vigorous growth is established.
  - .4 Maintenance during Establishment Period: Perform following operations from time of installation until vigorous growth is established:
    - .1 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
    - .2 Cut grass to 50 mm when or prior to it reaching height of 75 mm; remove clippings that have potential to smother grassed areas.
    - .3 Fertilize areas in accordance with fertilizing program listed above; spread half of required amount of fertilizer in one direction and remainder at right angles and water in well where rainfall is not expected within 2 to 3 hours of fertilizing.
  - .5 Acceptance: Departmental Representative will accept installation provided that:
    - .1 Sodded areas are properly established and free of bare and dead spots with no surface soil from a height of 1500 mm when grass has been cut to height of 50 mm; when sodded areas are cut a minimum of 2 times prior to acceptance; and that fertilizing in accordance with fertilizer program has been carried out at least
-

once.

- .6 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.4 Maintenance  
During Warranty  
Period

- .1 Maintenance during Warranty Period: Perform following operations from time of acceptance until end of warranty period:
  - .1 Water Turf Grade Sod at weekly intervals to obtain optimum soil moisture conditions listed above.
  - .2 Repair and reapply sod to dead or bare spots before expiration of warranty period.
  - .3 Cut grass and remove clippings that have potential to smother grass to heights listed above.
  - .4 Cut grass at 2-week intervals or as otherwise required to maintain grass at correct growing height at intervals so that approximately one third of growth is removed in single cut.
  - .5 Eliminate weeds by mechanical means to extent acceptable listed above.

3.5 Acceptance

- .1 Sodded areas will be accepted by the Departmental Representative provided evidence of growth and that plants are uniformly established.

3.6 Warranty Period

- .1 For seeding, 12 months' warranty period is extended to 1 full growing season.
- .2 End-of-warranty inspection will be conducted by Departmental Representative.

3.7 Cleaning

- .1 Remove surplus materials, rubbish, tools and equipment barriers after completion of work of this Section.

END

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 03 10 00 Concrete Forming and Accessories.
  - .2 Section 03 20 00 Concrete Reinforcing.
  - .3 Section 03 30 00 Cast-in-Place Concrete.
  - .4 Section 31 23 33.01 - Excavating Trenching and Backfilling.
  - .5 Section 33 31 13 Public Sanitary Utility Sewerage Piping.
  - .6 Section 33 34 00 Sanitary Utility Sewerage Forcemains.
- 1.2 References
- .1 ASTM International
    - .1 ASTM A48/A48M-03(2012), Standard Specification for Gray Iron Castings.
    - .2 ASTM A123/A123M-2012, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    - .3 ASTM B148-14 Standard Specification for Aluminum-Bronze Sand Castings.
    - .4 ASTM C117-13, Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.
    - .5 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
    - .6 ASTM C139-11, Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
    - .7 ASTM C478M-13, Standard Specification for Precast Reinforced Concrete Manhole Sections (Metric).
    - .8 ASTM D698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup>(600 kN-m/m<sup>3</sup>)).
-

- .9 ASTM D1248-12 Standard  
Specification for Polyethylene Plastics  
Extrusion Materials for Wire and Cable.
- .10 ASTM F593 -13a Standard  
Specification for Stainless Steel Bolts,  
Hex Cap Screws, and Studs.
- .11 ASTM F594 -09e1 Standard  
Specification for Stainless Steel Nuts.
- .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 CSA Group
  - .1 CSA A23.1/A23.2-09, Concrete  
Materials and Methods of Concrete  
Construction/Test Methods and Standard  
Practices for Concrete.
  - .2 CAN/CSA-A165 Series-04 (R2009),  
CSA Standards on Concrete Masonry Units  
(Consists of A165.1, A165.2 and A165.3).
  - .3 CSA A257, Standards for concrete  
pipe and manhole sections.
  - .4 CAN/CSA-A3000-08, Cementitious  
Materials Compendium (Consists of A3001,  
A3002, A3003, A3004 and A3005).
  - .5 CSA G30.18-09, Carbon Steel Bars  
for Concrete Reinforcement.

1.3 Action and  
Informational Submittals

- .1 Submit in accordance with Section 01 33  
00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's  
instructions, printed product  
literature and data sheets for  
manholes, catch basins, and  
include product characteristics,  
performance criteria, physical  
size, finish and limitations.
- .3 Shop Drawings:
  - .1 It is the Contractor's  
responsibility to approve all Shop

- Drawings and verify their correctness.
- .2 Review of the Contractor's drawings by the Department Representative shall not relieve the Contractor of the responsibility for the correctness thereof, nor from the results arising from any error or omission in details of design.
  - .3 Prior to the production of fill concrete for use in this contract, provide to the Department Representative a certificate from a certified testing company stating that the concrete to be supplied conforms to the requirements of this Section.
- 1.4 Quality Assurance
- .1 Submit in accordance with Section 01 45 00 - Quality Control.
  - .2 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work. Include manufacturer's drawings, information and shop drawings where pertinent.
- 1.5 Delivery, Storage and Handling
- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
  - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .3 Storage and Handling Requirements:
    - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
    - .2 Store and protect manholes from nicks, scratches, and blemishes.
-



- .3 Replace defective or damaged materials with new.

- 1.6 Scheduling of Work
  - .1 Schedule work to minimize interruptions to existing services and to maintain existing flow during construction.
  - .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.

PART 2 - PRODUCTS

- 2.1 Materials
  - .1 Cast-in-place concrete:
    - .1 In accordance with Section 03 30 00 - Cast-in-Place Concrete.
    - .2 Benching requirements:
      - .1 Benching shall be concrete with a 28 day compressive strength of 25 MPa.
    - .3 Concrete reinforcement: in accordance with Section 03 20 00 - Concrete Reinforcing.
  - .2 Concrete Formwork: in accordance with Section 03 10 00 Concrete Forming and Accessories.
  - .3 Precast manhole units: to ASTM C478M, circular or oval.
    - .1 Top sections eccentric cone or flat slab top type with opening offset for vertical ladder installation.
    - .2 Precast base sections with reinforced concrete slab within:
      - .1 Rubber gaskets to suit the inlet and outlet pipes and factory installed benching.
      - .2 Install benching to minimize hydraulic losses through chamber.
      - .3 Channels and benching: smooth and uniform and not less than 75% of the diameter of the largest pipe.

- .4 Approved product: Capital Precast Ltd. or approved equivalent.
  - .4 Joints between sections: rubber gasket and Ram-Nek gasket as indicated on the detail drawings and meeting the requirements of the latest CSA A257.3.
    - .1 Waterproofing membrane as indicated on the detail drawings
      - .1 Acceptable product: Bakor Blueskin WP 200 complete with Aquatac Primer, Colphene 3000 by Soprema complete with Elastocol Stick Primer or approved equivalent.
      - .2 Protect membrane with an appropriate "blanket" before being backfilled against.
  - .5 Adjusting rings: 150 and 300 mm concrete riser sections to ASTM C478M.
  - .6 Adjusting rings: to ASTM C478M.
  - .7 Use drop manholes when the difference between the invert elevation of the inlet and the outlet pipe is greater than 600 mm.
    - .1 Internal drop: pre-cast concrete or RELINER, by RELINER - Duran Inc., complete with drop bowl assembly, PVC DR35 pipe, PVC band and S.S. clamp with maximum spacing of 0.5 m.
    - .2 Manhole diameter: minimum 1200 mm.
    - .3 Anchoring systems: in accordance with the drawings.
  - .8 Drop manhole pipe: same as sewer pipe.
  - .9 Galvanized iron sheet: approximately 2 mm thick.
  - .10 Steel gratings, I-beams and fasteners: as indicated.
-

- .11 Frames, covers to dimensions as indicated and following requirements:
  - .1 Standard manhole frames and covers: 411W cast iron meeting the requirements of the latest ASTM Standard A48, Class 30. Covers: snug fit and rattle free.
    - .1 Manhole 411W frame outside flange to be 870mm dia., with a 580mm cover opening, and a min. weight of 95.3 kg.
    - .2 Manhole 411W solid cover to be 575mm dia., with a min. of four ribs, two - 25mm lift holes, and a min. weight of 43.1 kg.
  - .2 Adjustable manhole frames and covers: Laperle C50 M1 or approved equivalent, meeting the requirements of the latest ASTM Standard A536 for Ductile Iron and ASTM A48, Class 30 for cast iron.
    - .1 Adjustable manhole frames and covers to have machined seats, anti-rocking bumps, and outside flange dia. of 860mm, a 572mm dia. x 24mm thick cover, with a min. weight set of 153 kg.
  - .3 Standard off-road manhole frames and covers: lock-down type, R12S as manufactured by IMP Group Ltd. or approved equivalent, meeting the requirements of the latest ASTM Standard A-48.
    - .1 Off-road frame outside flange dia. to be 838mm, secured with 4 - 12mm dia. stainless steel anchors, grouted a min. of 50mm into a 685mm dia. conc. riser.
    - .2 Off-road cover to be 610 mm dia., secured to frame with 2 pentagon-shaped (5-sided), stainless steel fasteners.
- .12 Granular bedding and backfill: in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

- .13 Unshrinkable fill: in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .18 Backfill material: in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .19 Fill Concrete:
  - .1 Portland cement: to CSA CAN3-A5-M, Type 10 or Type 30 (High Early Strength for winter construction).
  - .2 Supplementary cementing materials, when permitted: to CSA CAN3-A23.5-M.
  - .3 Fine and coarse aggregate: to CSA CAN3-A23.1-M. Gradation to conform to Table 1 of the CSA Standard for 10 mm minus.
  - .4 Mixing water: to CAN3-A23.1-M.
  - .5 Air-entraining admixtures: to CSA CAN3-A266.1-M.
  - .6 Mix Design:
    - .1 Maximum cement content: 25 kg/m<sup>3</sup>.
    - .2 Maximum strength at 28 days: 0.40 MPa (measured in accordance with CAN3-A23.2-9C).
    - .3 Slump: 150-200 mm (measured in accordance with CAN3-A23.2-5C).
    - .4 Air content: 4% - 6% (measured in accordance with CAN3-A23.2).
- .20 Backfill material: in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

PART 3 - EXECUTION

3.1 Examination

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for manhole

installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of the Department Representative.
- .2 Inform the Department Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Department Representative.

3.2 Excavation and Backfill

- .1 Excavate and backfill in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling and as indicated.

3.3 Concrete Work

- .1 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Place concrete reinforcement in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 Position metal inserts in accordance with dimensions and details as indicated.

3.4 Installation

- .1 Construct manholes of pre-cast concrete sections according to drawing details.
- .2 Construct units in accordance with details indicated, plumb and true to alignment and grade.
- .3 Complete units as pipe laying progresses.
  - .1 Maximum of 3 units behind point of pipe laying will be allowed.

- .4 Install manholes at the locations indicated on the drawings, at all changes in grade, pipe size or alignment, at all intersections, at the end of each line and at distances not greater than 120 m for sewer 600 mm nominal diameter and smaller and 150 m for sewers 600 mm nominal diameter and larger. Where possible, manholes in roadways will be located so as to avoid principal wheel travel areas.
  - .5 Dewater excavation to approval of the Department Representative and remove soft and foreign material before placing concrete base.
  - .6 Set precast concrete base on 150 mm minimum of granular bedding compacted to 100% corrected maximum dry density maximum density to ASTM D698.
  - .7 Make each successive joint watertight.
  - .8 Plug lifting holes with precast concrete plugs set in cement mortar or mastic compound.
  - .9 For sewers:
    - .1 Place stub outlets and bulkheads at elevations and in positions indicated.
    - .2 Bench to provide smooth U-shaped channel.
      - .1 Side height of channel to be 0.75 times full diameter of sewer.
      - .2 Slope adjacent floor at 1 in 20.
      - .3 Curve channels smoothly.
      - .4 Slope invert to establish sewer grade.
  - .10 Compact granular backfill to 95% corrected maximum dry density maximum density to ASTM D698.
-

- .11 Place unshrinkable backfill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
  
  - .12 Installing units in existing systems:
    - .1 Where new unit is installed in existing run of pipe, ensure full support of existing pipe during installation, and carefully remove that portion of existing pipe to dimensions required and install new unit as specified.
    - .2 Make joints watertight between new unit and existing pipe.
    - .3 Where deemed expedient to maintain service around existing pipes and when systems constructed under this project are ready for operation, complete installation with appropriate break-outs, removals, redirection of flows, blocking unused pipes or other necessary work.
  
  - .14 Installing units on new lines where connections are to be made to existing sewer lines:
    - .1 Install when the downstream systems are ready to receive wastewater.
    - .2 By-pass flows in the existing sewer around the connection area during construction and testing.
      - .1 A plug may also be required at the downstream manhole to which wastewater is being pumped, to prevent backflow to the work area.
    - .3 Test these manholes as they are constructed, before flows are permitted to pass through the new connection.
    - .4 Whenever bypassing of sewer flow is being carried out, the Contractor shall have personnel on site continuously and back-up system components must be kept on site in the event of a failure of the first system.
-

- .5 Provide plugs or caps where required to block off and seal ends of pipes that are being abandoned or otherwise isolated, incidental to the work.
- .15 Set frame and cover on top section to elevation as indicated.
  - .1 Paved roadways: 10 mm below finished grade and conforming to crown of road.
  - .2 Gravel roadways: 25 mm below finished grade.
  - .3 Off traveled roadways: 50 to 100 mm above finished grade.
    - .1 Include lock-down frame and cover.
      - .1 Approved product: R12S or approved equivalent.
  - .4 If adjustment required use concrete ring.
- .16 Clean units of debris and foreign materials.
  - .1 Remove fins and sharp projections.
  - .2 Prevent debris from entering system.

3.5 Abandonment or  
Removal of Manholes

- .1 Abandon or remove manholes as indicated on the drawings or as laid out by the Department Representative.
- .2 Manholes shall not be abandoned until the remainder of the system is ready to receive wastewater and all required sanitary sewer pipe connections have been completed and accepted.
- .3 Remove and dispose of top section(s) above the manhole base unless manhole is to be removed completely to accommodate new piping or connections.
- .4 Fill the remainder of the manhole structure with approved granular material.



- .5 Backfill the excavation in accordance with Section 31 23 33.01 Excavating, Trenching and Backfilling.
  - .1 Match top surface of the fill to surrounding ground and restore surface to match conditions specified for the adjacent areas.
- .6 Remove and dispose of surplus materials.

3.6 Field Quality Control

- .1 Test all sanitary sewer manholes for leakage.
- .2 Notify the Department Representative at least forty-eight (48) hours in advance of performing sanitary manhole ex-filtration tests.
- .3 Should the sanitary sewer main ex-filtration tests prove unsatisfactory, the Contractor shall excavate to determine the cause, make repairs, backfill and retest at his own expense.

3.7 Sanitary Manhole  
Vacuum Test (Air)

- .1 To latest version of ASTM C1244M.
- .2 Conduct testing one manhole at a time:
  - .1 Plug all lift holes. Plug all pipe inlets discharging into the test manhole and all pipe outlets discharging from the test manhole. Install a bulkhead on the test manhole.
  - .2 Use a vacuum pump to increase the negative pressure to 27.6 KPa (4.0 psi). Close the vacuum source. Begin recording of the test time. Allow the negative pressure to increase to 24.1 KPa (3.5 psi).
  - .3 Department Representative will calculate the allowable leakage and notify the Contractor. If the actual leakage time is greater than

the allowable leakage time, the test section is acceptable.

- 3.8 Cleaning
  - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Leave Work area clean at end of each day.
  - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  
- 3.9 Protection
  - .1 Protect installed products and components from damage during construction.
  - .2 Repair Damage to adjacent materials

END

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PART 1 - GENERAL

- 1.1 Work Included .1 This section includes the supply of all labour, materials and equipment and incidentals necessary for the complete installation of all gravity septic system/ sanitary sewer piping and insulation as shown on the drawings and herein specified. Refer to Section 33 36 33 - Utility Drainage Field for piping requirements within the septic field.
- 1.2 Related Sections .1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Section 33 36 33 - Utility Drainage Field.
- 1.3 References .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
- .1 ANSI/AWWA C111/A21.11-07, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .2 ASTM International
- .1 ASTM C12-09, Standard Practice for Installing Vitrified Clay Pipe Lines.
- .2 ASTM C14M-07, Standard Specification for Nonreinforced Concrete Sewer, Storm Drain and Culvert Pipe (Metric).
- .3 ASTM C76M-10a, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).
- .4 ASTM C117-04, Standard Test Method for Material Finer Than 75 MU m (No. 200) Sieve in Mineral Aggregates by Washing.
- .5 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
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- .6 ASTM C425-09, Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings.
  - .7 ASTM C428-05(2006), Standard Specification for Asbestos-Cement Nonpressure Sewer Pipe.
  - .8 ASTM C443M-07, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
  - .9 ASTM C663-98(2008), Standard Specification for Asbestos Cement Storm Drain Pipe.
  - .10 ASTM C700-09, Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
  - .11 ASTM C828-06, Standard Test Method for Low-pressure Air Test of Vitrified Clay Pipe Lines.
  - .12 ASTM D698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft<sup>4</sup>-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - .13 ASTM D1869-95(2005)e1, Standard Specification for Rubber Rings for Asbestos Cement Pipe.
  - .14 ASTM D2680-01(2009), Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
  - .15 ASTM D3034-08, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
  - .16 ASTM D3350-10, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
  - .3 CSA International
    - .1 CSA A3000-08, Cementitious Materials Compendium.
    - .2 CSA A257 Series-09, Standards for Concrete Pipe and Manhole Sections.
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.3      CAN/CSA-B70-06, Cast Iron Soil  
Pipe, Fittings, and Means of  
Joining.

- .4      CSA B1800-11, Thermoplastic  
Non-pressure Pipe Compendium.
- .1      CSA B182.1-11, Plastic Drain and  
Sewer Pipe and Pipe Fittings.
- .2      CSA B182.2-11, PSM Type  
Polyvinylchloride PVC Sewer Pipe  
and Fittings.
- .3      CSA B182.6-11, Profile  
Polyethylene (PE) Sewer Pipe and  
Fittings for Leak-Proof Sewer  
Applications.
- .4      CSA B182.11-11, Standard Practice  
for the Installation of  
Thermoplastic Drain, Storm, and  
Sewer Pipe and Fittings.

1.4 Administrative  
Requirements

- .1      Scheduling:
- .1      Schedule Work to minimize  
interruptions to existing services  
and maintain existing sewage flows  
during construction.
- .2      Submit schedule of expected  
interruptions for approval and  
adhere to approved schedule.
- .3      Notify the Department  
Representative 24 hours minimum in  
advance of any interruption in  
service.

1.5 Action and  
Informational Submittals

- .1      Submit in accordance with Section 01 33  
00 - Submittal Procedures.
- .2      Product Data:
- .1      Submit manufacturer's  
instructions, printed product  
literature and data sheets for  
pipes and include product  
characteristics, performance  
criteria, physical size, finish  
and limitations.
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- .3 Certificates:
  - .1 Certification to be marked on pipe.
- .4 Test and Evaluation Reports:
  - .1 Submit manufacturer's test data and certification 2 weeks minimum before beginning Work.

1.6 Delivery, Storage  
and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Load and unload pipe and accessories by lifting with hoists and slings, on pallets, or careful skidding so as to prevent shock and damage.
- .3 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .4 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations.
  - .2 Store and protect pipes and coatings from damage.
  - .3 Replace defective or damaged materials with new.
  - .4 Do not drop or drag pipe.
  - .5 Avoid severe impact blows, abrasion damage, and gouging or cutting of PVC pipe by metal surfaces or rocks.
  - .6 For pipe handled on skidways, do not skid or roll pipe against pipe already on the ground.
  - .7 Avoid stressing bell joints and damage of bevel ends.

PART 2 - PRODUCTS

2.1 General

- .1 Sanitary sewer pipe and gaskets will be supplied by the Contractor. Sewer pipe gaskets to be supplied to the Contractor by the pipe manufacturer.
- .2 Sanitary service lateral pipes, bored pipes, tees, wyes, bends, couplings, rings, fittings, elbows, caps and saddles will be provided by the Contractor.
- .3 Joints to be push-on type and must be watertight.

2.2 Plastic Pipe

- .1 Type PSM Polyvinyl Chloride (PVC): to CSA B182.2.
  - .1 Standard Dimensional Ratio (SDR): 35.
  - .2 Gasket to ASTM D3212 and integral bell system with no reduction in the wall thickness.
  - .3 Nominal lengths: 6 m.
  - .4 Color coded "green".
  - .5 Piping shall be either solid walled or perforated type as noted on drawings.

2.3 Fittings

- .1 Type PSM Poly (Vinyl) Chloride: to CSA B182.2.
- .2 Plastic pipe and fittings: to ASTM 3034 and CSA B182.1, with push-on joints.
  - .1 PVC DR35, colour coded green.
  - .2 Minimum 100 mm diameter.
  - .3 Joints: bell and spigot type with locked in rubber gasket.
- .3 Bends: long radius type only.
- .4 Caps for ends: PVC.

2.4 Cement Mortar

- .1 Portland cement: to CSA A3000, normal type 10.

- .2 Mix mortar 1 part by volume of cement to two parts of clean, sharp sand mixed dry.
    - .1 Add only sufficient water after mixing to give optimum consistency for placement.
    - .2 Do not use additives.
  
  - 2.5 Pipe Penetration Seal .1 As shown on the Contract Drawings, where cast in rubber gaskets cannot be installed and core drilling is required, suitable pipe penetrations seal is to be installed to ensure that the hole is watertight. All core drilling pipe perforations shall be sealed with Proco Pen-Seal or Link-Seal for a watertight seal. Size of the core drilling holes shall be in accordance with the manufacturer's recommendations.
  
  - 2.6 Pipe Bedding and Surrounding Material .1 Granular material to Section 31 23 33.01 - Excavating, Trenching and Backfilling.
  
  - 2.7 Backfill Material .1 In accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
  
  - 2.8 Insulation .1 Insulation: extruded, expanded closed-cell polystyrene insulation with the following minimum characteristics:
    - .1 Compressive strength - 210 kPa;
    - .2 Water absorption (% by volume) - Max. 0.7%;
    - .3 Capillarity (none);
    - .4 Shear strength - 275kPa.
  
  - .2 Acceptable Products:
    - .1 Styrofoam HI-40, Celfort 300 as manufactured by Owens Corning, or approved equivalent.
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PART 3 - EXECUTION

- 3.1 Examination .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sewer pipe installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of the Department Representative.
  - .2 Inform the Department Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.
- 3.2 Preparation .1 Clean pipes and fittings of debris and water before installation, and remove defective materials from site to approval of the Department Representative.
- .2 Clean and dry pipes and fittings before installation.
  - .3 Obtain **Department Representative's** approval of pipes and fittings prior to installation.
- 3.3 Trenching .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Protect trench from contents of sewer or sewer connection.
  - .3 Trench alignment and depth require approval of the Department Representative prior to placing bedding material and pipe.

3.4 Granular Bedding

- .1 Place bedding in unfrozen condition.
- .2 Place granular bedding materials in uniform layers not exceeding 300 mm compacted thickness to depth as indicated.
- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
  - .1 Do not use blocks when bedding pipe.
- .4 Shape transverse depressions as required to suit joints.
- .5 Compact each layer full width of bed to at least 95% maximum density to ASTM D698.
- .6 Fill excavation below bottom of specified bedding adjacent to manholes or structures with compacted bedding material or lean mix concrete mud slab, as indicated on drawings.

3.5 Installation

- .1 Install sanitary sewer mains according to the sizes and locations indicated on the drawings.
  - .2 Provide and use proper implements, tools and facilities for safe and efficient execution of the work.
  - .3 Lay and join pipes to: ASTM C12.
  - .4 Lay and join pipes in accordance with manufacturer's recommendations, in accordance with recognized good practice and to approval of the Department Representative.
  - .5 Handle pipe using methods approved by the Department Representative.
    - .1 Do not use chains or cables passed through rigid pipe bore so that
-

- weight of pipe bears upon pipe ends.
- .2 Carefully lower pipe and fittings into trench in such a manner as to prevent damage to them. Do not drop pipe or fittings into trench.
  
  - .6 Lay pipes on prepared bed, true to line and grade, with pipe invert smooth and free of sags or high points.
    - .1 Minimum grade, unless otherwise indicated:
      - .1 Pipe diameter 200 mm to 300 mm: 0.4%
      - .2 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
      - .3 Remove and re-lay any pipe which is not in true alignment or shows undue settlement after laying.
  
  - .7 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
  
  - .8 Do not lay pipe on a foundation into which frost has penetrated, or at any time when the Department Representative may deem that there is a danger of the formation of ice or the penetration of frost at the bottom of the excavation.
  
  - .9 Inspect pipe thoroughly before and after laying. Remove defective or damaged pipe from the site and replace with new sound material.
  
  - .10 Trenches where pipe laying is in progress are to be kept dry. Pipes are not to be laid in water or upon wet bedding. Dewater excavations as required.
  
  - .11 Thoroughly clean pipes as they are laid and protect pipes from dirt and water.
  
  - .12 No length of pipe shall be laid until the preceding length has been thoroughly bedded and secured in place
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so as to prevent movement or disturbance of the pipe.

- .13 Do not walk on or work over pipes until there is a minimum of 300 mm of cover over them, except as necessary in refilling trench and compacting the bedding material.
  - .14 Joint deflection permitted within limits recommended by pipe manufacturer.
  - .15 Water to flow through pipe during construction, only as permitted by the Department Representative.
  - .16 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
  - .17 Install plastic pipe and fittings in accordance with CSA B182.11.
  - .18 Pipe jointing:
    - .1 Install gaskets in accordance with manufacturer's written recommendations.
    - .2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
    - .3 Align pipes before joining.
    - .4 Maintain pipe joints free from mud, silt, gravel and foreign material. Wipe clean ends of pipe, rubber gaskets, fittings, etc. immediately before jointing.
    - .5 Avoid displacing gasket or contaminating with dirt or foreign material. Gaskets so disturbed to be removed, cleaned and lubricated and replaced before joining is attempted.
    - .6 Apply lubricant as approved by the pipe manufacturer to the spigot up to the reference mark and to the
-

- face of the gasket (mechanical joint gaskets included).
- .7 Complete each joint before laying next length of pipe.
  - .8 Minimize joint deflection after joint has been made to avoid joint damage.
    - .1 Joint deflection permitted within limits recommended by pipe manufacturer.
  - .9 At rigid structures, install pipe joints not more than 1.2 m from side of structure.
  - .10 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
  - .11 Pipes may be pushed together by means of a crow-bar solidly wedged into the ground, by using a suitable pipe puller at the joint, or in some instances by very carefully pushing with the backhoe, or by any other method approved by the Department Representative.
    - .1 Use a block of wood when pushing against the pipe to prevent damage,
  - .12 Ensure pipe gaskets are not rolled, pinched, dislodged, or torn during jointing.
  - .19 When stoppage of Work occurs, block pipes as directed by the Department Representative to prevent creep during down time.
  - .20 Plug lifting holes with pre-fabricated plugs approved by the Department Representative, set in shrinkage compensating grout.
  - .21 Cut pipes as required for special inserts, fittings or closure pieces as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
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- .22 Make watertight connections to concrete structures.
  - .1 Use shrinkage compensating grout when suitable gaskets are not available.

### 3.6 Pipe Surround

- .1 Place surround material in unfrozen condition.
- .2 Upon completion of pipe laying, and after the Department Representative has inspected pipe joints, surround and cover pipes as indicated.
  - .1 Leave joints and fittings exposed until field testing is completed.
- .3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.
  - .1 Do not dump material within 1 m of pipe.
- .4 Place layers uniformly and simultaneously on each side of pipe.
- .5 Compact each layer from pipe invert to mid height of pipe to at least 95% maximum density to ASTM D698.
- .6 Compact each layer from mid height of pipe to underside of backfill to at least 90% maximum density to ASTM D698.
- .7 When field test results are acceptable to the Department Representative, place surround material at pipe joints.

### 3.7 Insulation

- .1 Install insulation in the locations shown on the drawings and as directed by the Department Representative.
- .2 Install insulation 50 mm thick at 300 mm above the pipe for a width of 1200 mm.
- .3 Level and prepare the surface on which the insulation is to be placed so the

insulation is not cracked or broken when backfilled.

.4    Secure joints between sheets of insulation with an appropriate sheeting tape. Acceptable product: duct tape, or approved equivalent.

.5    Cover insulation with a minimum of 150 mm of bedding before backfilling.

3.8 Backfill

.1    Place backfill material in unfrozen condition.

.2    Place backfill material, above pipe surround in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.

.3    Under paving and walks, compact backfill to at least 95% maximum density to ASTM D698.

.1    In other areas, compact to at least 90% maximum density to ASTM D698.

.4    Place unshrinkable fill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.9 Pipe Penetration Seal

.1    As shown on the Contract Drawings, where cast in rubber gaskets cannot be installed and core drilling is required, suitable pipe penetrations seal is to be installed to ensure that the hole is watertight. All core drilling pipe perforations shall be sealed with Proco Pen-Seal or Link-Seal for a watertight seal. Size of the core drilling holes shall be in accordance with the manufacturer's recommendations.

3.10 Cleaning

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

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

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

END

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- .1 CSA B137 Series-09, Thermoplastic Pressure Piping Compendium.

1.4 Administrative Requirements

- .1 Scheduling:
  - .1 Schedule Work to minimize interruptions to existing services.
  - .2 Submit schedule of expected interruptions and adhere to schedule approved by the Department Representative.
  - .3 Notify the Department Representative a minimum of 24 hours in advance of interruption in service.

1.5 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Product Data:
    - .1 Submit manufacturer's instructions, printed product literature and data sheets for pipes and backfill and include product characteristics, performance criteria, physical size, finish and limitations.
  - .3 Samples:
    - .1 Submit 4 weeks minimum before beginning Work, with proposed source of bedding materials and provide access for sampling.
  - .4 Certification to be marked on pipe.
  - .5 Test and Evaluation Reports: submit manufacturer's test data and certification at least 2 weeks prior to beginning Work.
  - .6 Manufacturer's Instructions: submit to the Department Representative 1 copy of manufacturer's installation instructions.
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1.6 Delivery, Storage  
and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations.
  - .2 Store and protect pipes from damage.
  - .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 Materials

- .1 Polyvinyl chloride (PVC) pipe: to CSA B137 and ANSI/AWWA C900.
    - .1 Series 160 SDR: 26, white.
    - .2 Pressure Class: 160
    - .3 Gasket bell end.
    - .4 Pipe joints: bell and spigot with rubber gaskets, solvent welded joints or mechanical joints to ANSI/AWWA C111/A21.11, with transition gaskets to pipe manufacturer's specifications. This is a push-on joint and must be watertight. The bell will be an integral and homogeneous part of the pipe barrel with no reduction in the wall thickness.
    - .5 Rubber gaskets: to CSA B137.3 and ASTM D2241 ANSI/AWWA C111/A21.11. Gaskets for mechanical joints to be duck-tipped transition gaskets for PVC.
  - .2 Polyethylene pressure pipes: to CSA B137:
    - .1 Type: DR26.
    - .2 Joints:
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- .1 Thermal butt fusion
  - .2 Flanged with steel backing flanges.
  - .3 Flanged with stainless steel backing flanges in marine/submerged areas
  - .3 Polyethylene fittings: to CSA B137, for pipe sizes 4" and less.
  - .4 Pressure class 350 with cast iron outside diameter and integral bell gasketed joints, to ASTM D2992. Material: to ASTM D2310
  - .3 Fittings:
    - .1 Ductile Iron to AWWA C153, 2415 kPa Class.
    - .2 PVC pressure fittings to AWWA C907 and CSA B137.3.
      - .1 Class 160 (DR26) .
      - .2 Push-on bell and spigot type.
  - .4 Joints:
    - .1 Joints for iron fittings: mechanical type, complete with component parts, to latest AWWA Standard C111 for rubber-gasket joints ductile-iron fittings.
    - .2 PVC pressure fittings: push-on bell and spigot type, unless otherwise indicated.
  - .5 Joint Restraints:
    - .1 Iron fittings, joint restraint system components and couplings: ductile-iron with high strength low alloy steel tee bolts and nuts tightened using a torque wrench to the manufacturer's specifications, completely wrapped with 8-mil poly to AWWA C105.
    - .2 Mechanical joint restraint for ductile iron fitting: PVC Star Grip 4000 by Star Pipe Products, 2000 PV by EBAA Iron, 1300 S by Uniflange or approved equal.
    - .3 Mechanical joint restraint for PVC pressure fittings: 1360 S by Uniflange or approved equal.
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- .4 No extra payment will be made for the supply and installation of joints and fittings restrainers, this shall be considered incidental to the work.
  - .5 Joint restraint for PVC < 100mm shall be solvent welded joint with Schedule 80 PVC fittings.
  - .6 Pipe Penetration Seal
    - .1 Where cast in rubber gaskets cannot be installed and core drilling is required, suitable pipe penetrations seal is to be installed to ensure that the hole is watertight. All core drilling pipe perforations shall be sealed with Proco Pen-Seal or Link-Seal for a watertight seal. Size of the core drilling holes shall be in accordance with the manufacturer's recommendations.
  - .7 Insulation
    - .1 Extruded, expanded polystyrene insulation following the minimum characteristics.
      - .1 Compressive strength - 210kPa;
      - .2 Water absorption (% by volume) - max 0.7%;
      - .3 Capillarity (none);
      - .4 Shear strength - 275kPa.
    - .2 Acceptable products: Styrofoam HI-40, Celfort 300 or approved equivalent.
- 2.2 Equipment
- .1 In laying out the sewer pressure pipes, the Department Representative will establish only the locations and elevations of discharge locations. The Contractor shall be responsible for all other field layout in accordance with Section 01 00 01 General Requirements.
  - .2 Utilize laser beam instrumentation and techniques to determine intermediate line and grade for all pipes except where
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and when the Department Representative may allow other methods to be used.

- .3 Approved laser alignment equipment must be used to control line and grade during all laying of pipe. An approved laser sighting triangle or template must be used by the Contractor in setting each pipe.

2.3 Pipe Bedding and Surrounding Material

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

2.4 Backfill Material

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

PART 3 - EXECUTION

3.1 Examination

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

3.2 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 to adjacent properties and walkways, according to drawings. Inspect, repair, and maintain erosion and sedimentation
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control measures during  
construction until permanent  
vegetation has been established.  
.2 Remove erosion and sedimentation  
controls and restore and stabilize  
areas disturbed during removal.

- .2 Pipes and fittings to be clean and dry.
- .3 Prior to installation, obtain the  
Department Representative's approval of  
pipes and fittings.

### 3.3 Trenching

- .1 Do trenching Work, in accordance with  
Section 31 23 33.01 - Excavating,  
Trenching and Backfilling.
- .2 Trench alignment and depth require  
approval from the Department  
Representative prior to placing bedding  
material or pipe.

### 3.4 Granular Bedding

- .1 Place granular bedding in unfrozen  
condition.
- .2 Place granular bedding material in  
uniform layers not exceeding 150 mm  
compacted thickness to depth as  
indicated.
- .3 Shape bed true to grade and to provide  
continuous, uniform bearing surface for  
pipe.
- .4 Shape transverse depressions as required  
to suit joints.
- .5 Compact each layer full width of bed to  
at least 95% maximum density to ASTM  
D698.
- .6 Fill excavation below design elevation  
of bottom of specified bedding with  
common backfill.

3.5 Installation

- .1 Load and unload pipe and accessories by lifting with hoists or skidding so as to prevent shock and damage.
  - .2 Pipe handled on skid-ways will not be skidded or rolled against pipe already on the ground. Pipe will not be dragged along the ground at any time. All material will be handled and stored in accordance with the manufacturer's requirements.
  - .3 Pipe will be so handled so that any coating will not be damaged. When handling PVC pipe, avoid severe impact blows, abrasion damage and gouging or cutting by metal surfaces or rocks. Avoid stressing bell joints and damage of bevel ends. If, however, any part of the pipe is damaged, the repair will be made by the Contractor in a manner satisfactory to the Department Representative.
  - .4 Thoroughly inspect pipe in the field before and after placement. Immediately remove any defective or damaged pipe from the site and replace with new sound material at the Contractor's expense.
  - .5 Lay pipes according to the sizes, types and in the locations as indicated on the drawings in accordance with manufacturer's recommendations and recognized good practice.
  - .6 Lay pipe with a minimum 2.10 metres cover. The Contractor is responsible for locating this line at the connection points.
  - .7 Lay pipe in prepared trenches commencing at lowest point with bell of pipe pointing upgrade.
  - .8 Use proper implements, tools and facilities for safe and efficient execution of the work.
  - .9 Join pipes in accordance with manufacturer's recommendations. Pipes
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may be pushed together by means of a crow-bar solidly wedged into the ground, or by using a suitable pipe puller at the joint, or in some instances by very carefully pushing with a backhoe, or by any other method that may be approved by the Department Representative. When pushing against the pipe, a block of wood must be used to prevent any damage to the pipe.

- .10 Avoid damage to machined ends of pipes in handling and moving pipe. Do not drop pipe or fittings into trench.
  - .11 Maintain grade and alignment of pipes.
  - .12 Align pipes carefully before jointing.
  - .13 Joint deflection permitted within limits in accordance with pipe manufacturer's written recommendations.
  - .14 Support pipe firmly over entire length, except for clearance necessary at couplings.
    - .1 Suitable excavation shall be made to receive the bell, which shall not bear upon the sub-grade or bedding.
    - .2 Do not use blocks to support pipe.
  - .15 Lay pipe on dry bedding and keep trench dry during pipe laying.
  - .16 Keep pipe and pipe joints free from foreign material.
  - .17 Avoid bumping gasket and knocking it out of position, or contaminating with dirt or other foreign material. Remove disturbed gaskets clean, lubricate and replace before jointing is attempted.
  - .18 Support pipes using hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
-

- .19 The ends of the pipe, rubber gaskets, fittings, etc., will be wiped clean immediately before joining the pipes to remove foreign matter from the joints. Apply lubricant to the spigot up to the reference mark and to the face of the gasket (MJ gaskets included).
  - .20 Apply sufficient pressure in making joint to ensure that joint is complete to manufacturer's recommendations.
  - .21 Apply restraint to pipe to ensure that joints when completed are held in place, by tamping fill material under and alongside pipe, or otherwise as approved by the Department Representative.
  - .22 Remove and re-lay any pipe which is not in alignment or shows undue settlement after laying.
  - .23 No length of pipe shall be laid until the preceding length has been thoroughly embedded and secured in place so as to prevent any movement or disturbance of the pipe.
  - .24 When stoppage of Work occurs, block pipe using a watertight plug as directed by the Department Representative to prevent creep during downtime.
  - .25 No pipe will be laid on a foundation into which frost has penetrated, or at any time when the Department Representative may deem that there is a danger of the formation of ice or the penetration of frost at the bottom of the excavation.
  - .26 No walking on or working over the pipes after they have been laid will be allowed until there is at least 300 mm of cover over them, except as may be necessary in refilling the trench and compacting the bedding material.
  - .27 Mechanical joint connections and tightening and torqueing of bolts shall be in accordance with the manufacturer's
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instructions and recognized good practice.

- .28 Laser beam equipment shall be installed in the pipe, just above the pipe, or in the bottom of the manhole. Installation of the laser beam contrary to the aforementioned shall require approval of the Department Representative.
- .29 Install 50 mm wide metal marker tape 600 mm above the top of the pipe, carrying the message "CAUTION - FORCE MAIN BURIED".

### 3.6 Pipe Surround

- .1 Place surround material in unfrozen condition.
- .2 Upon completion of pipe laying, and after the Department Representative has inspected pipe joints, surround and cover pipes as indicated. Leave joints and fittings exposed until field testing is completed.
- .3 Hand place surround material in uniform layers simultaneously on each side of pipe not exceeding 150 mm compacted thickness as indicated.
  - .1 Do not dump material within 1 m of pipe.
- .4 Compact each layer from pipe invert to mid height of pipe to at least 95% maximum density to ASTM D698.
- .5 When field test results are acceptable to the Department Representative, place surround material at pipe joints.

### 3.7 Backfill

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround in uniform layers not exceeding

150 mm compacted thickness up to grades as indicated.

.3 Compact backfill to at least 95% maximum density to ASTM D698.

.4 Place unshrinkable fill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.8 Pipe Penetration Seal .1 As shown on the Contract Drawings, where cast in rubber gaskets cannot be installed and core drilling is required, suitable pipe penetrations seal is to be installed to ensure that the hole is watertight. All core drilling pipe perforations shall be sealed with Proco Pen-Seal or Link-Seal for a watertight seal. Size of the core drilling holes shall be in accordance with the manufacturer's recommendations.

3.9 Cleaning .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.  
.1 Leave Work area clean at end of each day.  
.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END

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PART 1 - GENERAL

1.1 Related Sections

- .1 Section 33 31 13 - Public Sanitary  
Utility Sewerage Piping.
- .2 Section 31 23 33 - Excavating, Trenching,  
and Backfilling
- .3 Section 32 11 23 - Aggregate Base Courses
- .4 Section 33 36 33 - Utility Septic Fields

1.2 References

- .1 ASTM International
  - .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 Method for  
Sieve Analysis of Fine and Coarse  
Aggregates.
  - .3 ASTM D698-07e1, Standard Test  
Method for Laboratory Compaction  
Characteristics of Soil Using  
Standard Effort (12,400  
ft-lbf/ft<sup>3</sup>(600 kN-m/m<sup>3</sup>)).
- .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 CSA International
  - .1 CSA A23.1/A23.2-09, Concrete  
Materials and Methods of Concrete  
Construction/Test Methods and Standard  
Practices for Concrete.
  - .2 CSA A23.4-09, Precast  
Concrete-Materials and Construction.
  - .3 CSA B66-10, Design, Material and  
Manufacturing Requirements for  
Prefabricated Septic Tanks and Sewage  
Holding Tanks.

- 1.3 Action and  
Informational Submittals .1 Submit in accordance with Section 01 33  
00 - Submittal Procedures.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

- 3.1 Cleaning .1 The Contractor shall be responsible to have  
the septic tank and holding tank cleaned  
with a vacuum truck.
- 3.2 Inspection .1 The Contractor shall be responsible to acquire  
the services of a septic tank installer  
to inspect the condition of the septic  
tank and holding tank. A report shall  
be submitted to the Departmental  
Representative outlining the condition  
of the septic tank and holding tank and  
providing recommendations.
- .2

END



1.5 Delivery, Storage  
and Handling

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 EFFLUENT PUMP SYSTEM

- .1 A new duplex effluent pump system shall be installed within the existing holding tank to transport septic tank effluent to the new distribution box as shown on drawings. The system is to be time-dosed capable to meet the performance criteria noted in Section 2.1.2.3. The pump system shall incorporate Orenco System Inc's (OSI) Universal Biotube Filtered Pump Vault equipment as noted below or an approved alternative.
- .2 High Head Effluent Pumps:
  - .1 Shall be high head effluent pumps compatible with the pump vault and include a minimum 6.1m (20 ft) power cable.
  - .2 Shall be UL and CSA listed as an effluent pump and shall be provided with a non-prorated, five-year warranty.
  - .3 Performance:
    - .1 Design Flow Rate: 3.2 L/s (50 USgpm)
    - .2 Geodetic Head: 3.7m (12 ft)
    - .2 Dynamic Head: 9.6m (31.4 ft)
    - .3 Electrical Characteristics:  
½ HP, 240V, 1PH



- .4 6 doses per day at 1200L per dose, or as manufacturer's recommendations to pump design flow of 7200 L/day.
  - .4 Shall supply two (2) pumps for duplex system.
  - .5 Model shall be OSI Model PF5005 or approved alternative.
- .3 Pump Vault:
- .1 Shall consist of a 300mm (12 inch) diameter HDPE vault with eight (8) 50 mm (2") holes evenly spaced around the perimeter to allow for pump flow.
  - .2 Shall include a duplex flow inducer tube to accept two high head effluent pumps.
  - .3 Shall include two rigid PVC support bracket arms that rest on the lip or flange of the tank to ensure the vault is in the proper position.
  - .4 Base of the vault shall be suspended into the pump compartment.
  - .5 Height of vault shall be 2.4m (8 ft) to suit the existing holding tank height.
  - .5 Model shall be OSI Model PVU95-1819 Duplex Universal Biotube Pump Vault or approved alternative.
- .3 Filter:
- .1 A filter assembly shall be housed inside the Pump Vault consisting of 3.175mm (1/8") mesh polypropylene tubes.
  - .2 Shall have a minimum effective screen area of no less than 1.9 square meters (20.6 square feet) and shall include a handle with an integrated float stem bracket to connect the pump control float tree.
  - .3 A handle shall be easily extended by the contractor in the field to the top of the riser for easy maintenance access.
  - .4 Model shall be OSI Biotube Filter Assembly or approved alternative.
- .4 Preassembled Pump Discharge Assemblies:
- .1 Shall be factory assembled with PVC flex hose, 1034kPA (150 psi) PVC ball valve, and 1034kPA (150 psi) PVC check

valve with a minimum working pressure rating of 441 kPa (64 psi), and Schedule 40 PVC pipe construction.

.2 Model shall be OSI Model HV200BCX-DB drain back style complete with Cold Weather Kit or approved alternative.

.5 External Flex Hose:

.1 Flex connection for transport piping on the outside of the riser.

.2 Model shall be OSI HVX200 External Flex Connection or approved alternative.

.6 Discharge Control Float Assembly:

.1 Shall contain four (4) floats clipped to a PVC float stem. The stem shall attach to a bracket at the exterior of the pump vault.

.2 Four (4) floats shall have the following functions:

.1 High Level Alarm/Lag Pump Enable;

.2 Override Timer Settings On/Off

.3 Timer On/Off

.4 Redundant Off/ Low Level alarm

.3 Floats must adjustable and easily installed and capable of being removed without removing the pump vault.

.4 Cable length shall be 6.1m (20')

.5 Float positions shall be set on the float stem at start up, according to the drawings and/or in accordance with the equipment manufacturer's representative, with adjustable cable clips to accommodate the depth of the pump vault.

.6 Each float lead shall also be secured with a nylon strain relief bushing at the splice box.

.7 Floats shall be UL and CSA listed and shall be rated for a minimum of 5.0A @ 120 VAC.

.8 Model shall be OSI Model MF4P-63FS-20 Float Assembly or approved equal.

.7 Splice Boxes:

.1 Shall be supplied at the riser for float connections to simplify

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- installation, inspection and replacement of floats as required.
- .2 External splice box with four (4) cord grips and outlet fitting will be provided for control float connections in the pump tank riser area.
  - .3 Splice Box shall be UL listed.
  - .4 Model shall be OSI Model SBEX1-4 or approved alternative.
- .8 Grommets:
- .1 Rubber grommets shall be installed in the riser as required to provide a watertight seal for any pipe penetrating the riser sidewall.
- .9 Acceptable pump suppliers must have a Newfoundland service representative fully capable and experienced in the operation and maintenance of their product. This representative must be capable of troubleshooting and repairing mechanical and pump controller problems. This requirement will be considered in the evaluation of alternative products. Suppliers shall demonstrate this ability in requesting for the equipment approval.
- .10 The pump/motor assembly shall have CSA approval as one unit, per CSA Standard C22.2-145, rated for submersible pumping for sewage applications. Proof of this approval shall be submitted by the pump manufacturer with approval drawings. An approval of the motor unit only will not be acceptable. The pump/motor unit is to be approved by CSA for service in Class I, Zone 1, Groups C or D hazardous locations.
- .11 It will be the responsibility of the Manufacturer / Supplier to confirm that the proposed selection is the most suitable for the application and will be verified during the shop drawing review.
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2.2 PUMP ACCESS AND

LID

- .1 The existing tank access riser over the planned pump system will need to be removed and replaced with a new 0.762m (30") diameter to facilitate installation, inspection and maintenance of the pump system.
- .2 Riser:
  - .1 Shall be PVC with nominal size 0.762m (30") diameter x 0.610m (24") length and manufactured to meet ASTM standard F794 and certified to CSA B182.4.
  - .2 Shall be constructed of non-corrosive material and designed to be buried in soil. The pipe manufactured from virgin PVC compound meeting the cell classifications requirements as defined in ASTM Standard D1784. Pipe markings are as specified in CSA B182.4 and ASTM F794.
  - .3 Shall have a minimum pipe stiffness value of 320kPA (46psi) when tested in accordance with ASTM D2412.
  - .4 Shall be constructed watertight by attaching and sealing directly to bolt down tank to riser adapter with an epoxy adhesive that ensures appropriate bond and watertight seal are provided.
  - .4 Shall extend a minimum 50mm (2 inches) above original grade to allow for settlement and ensure positive drainage away from the access.
  - .5 The riser shall be capable of being cut in one piece, to any required depth, without introducing seams that could compromise water tightness or strength characteristics.
  - .6 The riser, lid and attached components (epoxy adhesive/sealant) shall all provided by a single manufacturer.
  - .7 Riser installation shall include wrapping of the riser ribs with 30 mil liner material to provide a slip face to prevent any frost action. The wrapping material shall be provided by the riser manufacturer.
  - .8 Model shall be Orenco Kor Flo Model RR3024 or approved alternative.

- .3 Lid:
  - .1 Shall be one green, non-skid, bolt down, fiberglass access lid with gasket shall be furnished with the access riser.
  - .2 Shall be flat, with no noticeable upward dome and shall be waterproof, corrosion resistant and UV resistant.
  - .3 Shall be capable of withstanding a truck wheel load of 2500 pounds (54 square inches) for 60 minutes with a maximum vertical deflection of  $\frac{3}{4}$  of an inch.
  - .4 Shall incorporate an integral poured and formed gasket that forms a watertight seal with the top of the access riser.
  - .5 Shall be tamper-resistant, stainless steel, bolts and wrench shall be included with the lids.
  - .6 Fasteners shall not extend above the surface of the lid.
  - .7 Model shall be OSI Model FLD30G
- .4 Riser to Tank Attachment Adapter:
  - .1 The new riser shall be attached to the existing tank surface with a tank adapter bolted to the tank and sealed with methacrylate structural adhesive.
  - .2 All attachment components shall be constructed of waterproof, non-corrosive materials, such as PVC, ABS, fiberglass or stainless steel.
  - .3 Adhesives and sealants shall be waterproof, corrosion resistant and approved for the intended applications.
  - .4 Riser to tank connection shall be a capable of handling a vertical uplift of 2268kg (5000 pounds) to prevent riser separation due to tank settlement, frost heave, or accidental vehicle traffic over the tank.
  - .5 Model shall be OSI Model PRTA30 Tank Adapter using a PRTA30RBDKIT bolt down kit.

2.3 PUMP SYSTEM CONTROL  
PANEL

- .1 A duplex control panel shall be provided for control and monitoring of the

effluent pump system by activating appropriate pumps and alarms in response to timer and level control float inputs. To ensure effective integration of the pump system and controls, they shall be provided by the same manufacturer. The manufacturer shall have demonstrated history in the design and manufacturing of the control systems for pumping systems related to water or wastewater processes.

- .2 The equipment and controls manufacturer must demonstrate the ability to provide remote support for both the control panel and pump system. The manufacturer must maintain engineering and controls technical support staff and local distributors that are capable of assisting the owner with assessment of any situation that arises.
  - .3 Control Panel:
    - .1 The discharge pumps will operate in an alternating duplex fashion on a timer with redundant off, timer, timer on/off, and high-level alarm control floats. Pump cycle counters and elapsed time meters shall be included and located internal to the PLC.
    - .2 The system will monitor any high, and low, level alarm floats of the pump tank to provide advance notice of any potential high level or low level condition. The alarm condition will be noted on the panel indicator lights and remote alarm contacts are available to activate a remote light or signal.
    - .3 Each pump or motor on the system shall be connected to a current sensor to continuously validate motor current and amps. Should a motor fail to operate when called upon, the current sensor shall trigger an alarm notification.
    - .4 Key features shall include:
      - .1 Programmable for timed- or demand-dosing applications.
      - .2 Built-in elapsed time meter and counters.
-

- .3 Digital timed-dose function accurate within 1%.
  - .4 Adjustable timer settings for optimum dosing during normal and peak flow conditions,
  - .5 Pump alternation continues during override conditions.
  - .6 Built-in programming keys for field-adjustable timer settings without a portable computer.
  - .7 High- and low-level alarm conditions differentiated by steady or blinking LED light.
  - .8 Silenced alarms automatically reactivated after 12 hours if condition is not corrected.
  - .9 Standard 120V output for remote alarm activation.
  - .10 Timed delays on float inputs to prevent chattering.
  - .11 Ability to use one model of float for all functions.
  - .12 Redundant-off function as standard UL 508 listing in US and Canada.
- .5 Standard components to include the following:
- .1 Programmable logic Unit 120V built-in LCD screen and programming keys. Provides control functions and timing for panel operation.
  - .2 Motor-Start Contactors: 120V:16 FLA, 1HP, 60Hz; 2.5 million cycles at FLA (10 million at 50% of FLA)
  - .3 Toggle Switches Single-pole, double throw HOA switch. 20A,1HP.
  - .4 Controls Circuit Breaker 10A, off/on switch. Single-pole 120V\*. DIN mounting with thermal magnetic tripping characteristics.
  - .5 Pump Circuit Breakers 20A, off/on switch. Single-pole 120V or double-pole 240V. DIN rail mounting with thermal magnetic tripping characteristics.
  - .6 Audible alarm 95 dB, warble-tone sound.
-

- .7 Visual alarm 22mm (7/8") diameter red lens. UL Type 4X rated, 1 W LED light 120V.
- .8 Panel Enclosure UL Type 4X rated.
- .9 Constructed of UV-resistant fiberglass.
- .10 Intrinsically Safe 120V. Listed UL 698A, for Class 1 Div.1 hazardous locations.
- .11 Surge Arrestor 120V. Status light on unit. Protects incoming power supply from surges.
- .12 Dead-Front. HMI screen, HOA switches and indicator lights etc. mounted on the dead-front door inside the outer door, to avoid having to open and expose the panel's interior circuitry for day to day operational functions.
- .13 Panel Insulation.
- .6 Model shall be OSI MVP-DAX2 IR DM CS HT SA RA.

PART 3 - EXECUTION

3.1 Installation

- .1 Follow manufacturer's instructions for base preparation to install units.
- .2 Ensure existing outlets from the holding tank are sealed and water tight. Prior to installation of new pump.
- .3 Remove existing inspection/ cleanout way and modify the existing concrete access hole to suit the new pump requirements.
- .4 Install new cleanout/ inspection way to manufacturer's recommendations.
- .5 Install pump, pump controls and discharge piping. Make all connections water tight through the pump vault and through the concrete holding tank (discharge hole).



- .6 Qualified electrician to connect electrical power to effluent pump as per manufacturer's instructions.
- .7 Provide a minimum of two (2) hours on site for equipment representatives for each piece of equipment installed. Representative to report to the Departmental Representative before leaving site with equipment fully functional.
- .8 Provide a written report from the pump manufacturer or an approved local installer/ system maintainer (approved by the manufacturer) that the equipment is installed and operating to their satisfaction.

3.2 Demonstration

- .1 Provide on-site training by qualified personnel for designated operating personnel prior to final commissioning.
  - .1 Schedule and deliver training in accordance with training plan approved in writing by Department Representative.
  - .2 Include safety precaution procedures for system.

3.3 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

PART 1 - GENERAL

1.1 Related Sections

- .1 Section 31 23 33 - Excavating, Trenching, and Backfilling
- .2 Section 32 11 25 - Bedding Material
- .3 Section 33 31 13 - Public Sanitary Utility Sewerage Piping.

1.2 References

- .1 ASTM International
  - .1 ASTM C117-04, Standard Test Method for Material Finer Than 75 µm (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 D4318-10, Standard 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 CSA International
    - .1 CAN/CSA-B137 Series-09, Thermoplastic Pressure Piping Compendium. (Consists of B137.0, B137.1, B137.2, B137.3, B137.4, B137.4.1, B137.5, B137.6, B137.8, B137.9, B137.10, B137.11 and B137.12).
      - .1 CAN/CSA-B137.1-09, Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services.
    - .2 CAN/CSA-B1800-11, Thermoplastic Non-Pressure Piping Compendium. (Consists

of B181.1, B181.2, B181.3,  
B181.5, B182.1, B182.2,  
B182.4, B182.6, B182.7,  
B182.8 and B182.11).  
.1 CAN/CSA-B182.2-11, PVC  
Sewer Pipe and Fittings  
(PSM Type).

1.3 Action and  
Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for drainage field materials and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
  - .1 Submit 20 kg sample of each granular materials 4 weeks minimum before beginning Work.
- .4 Certificates:
  - .1 Submit copy of certification or licence of approved installers.
- .5 Test Reports:
  - .1 Submit 2 certified copies of factory tests of pipe material.

1.4 Quality Assurance

- .1 Use certified and licensed installers who comply with local authority having jurisdiction.

1.5 Delivery, Storage  
and Handling

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect drainage field materials from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 Granular Materials

- .1 Granular material in accordance with Section 31 05 16 - Aggregate Materials and to requirements as follows:
  - .1 Pit run crushed or screened stone, gravel or sand.
  - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
  - .3 Table

Sieve Designation	% Passing	
	Treatment Sand	Septic Field Backfill Material
25 mm	-	95-100
19 mm	-	90-100
12.5 mm	-	-
9.5 mm	100	60-100
4.75 mm		35-80
2.36 mm	80-100	15-60
1.18 mm	30-100	-
0.600 mm	15-95	-
0.300 mm	4-15	0-30
0.150 mm	2-8	-
0.075 mm	0-3	0-10

2.2 Imported Filter Material

- .1 Sand conforming to requirements of local authority having jurisdiction.
- .2 If no such requirements exist, follow sand gradation limits indicated in Section 2.1.1.3

- .3 Treatment sand shall meet the following requirements:
  - .1  $D_{10}$  (effective size): 0.15mm-0.50mm
  - .2 Cu (uniformity): 1.0 to 6.0
  - .3  $K_{FS}$  (field saturated hydraulic conductivity): 5E-5 to 6E-4 m/sec

### 2.3 Borrow Materials

- .1 Refer to Section 31 23 33 - Excavating Trenching and Backfill for borrow material requirements.
- .2 Borrow material shall be used as fill material for to bring the septic field up to design grade as per the drawings.

### 2.4 Concrete Mixes and Materials

- .1 Concrete mixes and materials: to CSA A23.1/A23.2.
- .2 Use type 1 cement.
- .3 Concrete exposure classification: A-3.

### 2.5 Pipe for Disposal Fields

- .1 Effluent piping from septic tanks to distribution boxes: shall be in accordance to Section 33 34 00 Public Sanitary Utility Sewerage Force Mains.
- .2 Effluent piping within infiltrator chambers: Straight PVC pipe and fittings to CAN/CSA-B182.2, perforated. Perforation pattern to comply with CSA and Nova Scotia Onsite Sewage Disposal Systems Standard.
- .3 Vertical piping for infiltrator chamber inspection and ventilation: Straight PVC pipe and fittings to CAN/CSA-B182.2, unperforated, complete with gooseneck fitting to prevent water and debris from entering infiltrator chambers. Piping to be primed with PVC primer and painted white for UV resistance.

### 2.6 Infiltration Chambers

- .1 Infiltration chambers shall be selected as follows:

- .1 Infiltrator Systems Quick4 Standard chambers, or approved equal, for burial depths of 900mm or less.
- .2 No disposal field installations to exceed burial depth of 900mm.
- .3 All infiltration chambers to be fitted with internal 100mm diameter perforated drainage pipe as indicated in section 2.4.2.
- .4 All infiltration chambers to be fitted with inspection/ventilation piping as indicated in section 2.4.3 and as per manufacturer's recommendations at both end caps of each trench.

#### 2.7 Distribution Box

- .1 Distribution boxes shall be pre-cast concrete or as per Section 2.3 above.
- .2 All penetrations for connected piping shall be watertight rubber gasket(s) installed by the manufacturer.
- .3 Distribution "boxes" can be square, rectangular, or circular as approved by the Departmental Representative.
- .4 All pipe penetrations to the distribution box shown on the Drawings shall be at the same elevation and fitted with speed levellers to allow even flow of sewage to each pipe.
- .5 Distribution boxes shall have a minimum sump depth of 100mm.

### Part 3 - EXECUTION

#### 3.1 Examination

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for drainage

field installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of the Department Representative.
- .2 Inform the Department Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Department Representative.

3.2 Area Type Disposal  
Field and Installation

- .1 Excavate and remove existing disposal field, including but not limited to perforated piping, imported granular bedding, and distribution box.
- .2 Backfill, in accordance with 31 23 33 - Excavating, Trenching, and Backfilling with imported backfill to elevation and grades noted on drawings.
- .3 Place 300mm minimum thickness layer of sand material or as noted on the drawings as per Section 2.2 for disposal bed under disposal field area.
- .3 Place sand material in unfrozen condition as indicated.
- .4 Disposal bed fill material (imported filter material) to have characteristics as specified in section 2.2.3 and be pre-approved in writing by Departmental Representative before delivering to site.
- .5 After placement of disposal bed fill, Departmental Representative will conduct 3 on site percolation tests in sand mound before bed construction.
- .6 Operate construction equipment across disposal bed only after receipt of

written approval from Departmental  
Representatives

- .7 Install distribution box between effluent pump and disposal field. Installation to be water-tight construction.
  - .8 Set distribution box level as indicated.
    - .1 Provide access with removable cover for inspection of distribution box.
  - .9 Connect lengths and place effluent pipe on suitable bedding material as indicated and cover with 150mm minimum of suitable backfill material.
  - .10 Connect each effluent pipe individually to distribution box. The first length of each effluent pipe connected to the distribution box shall be set to same grade to ensure even flow. Piping beyond the first length may be graded as required to reach individual absorption trench elevations.
  - .11 Connect effluent pipes to lower infiltration chamber end caps as indicated.
  - .12 Cap free ends of perforated pipe in dosed systems.
  - .13 Grade of perforated pipe inside infiltration chamber shall not exceed 0.5%.
  - .14 Do not backfill disposal field until pipe grade and alignment have been approved by Departmental Representative.
  - .15 Install vertical piping at each end of infiltrator chamber trench at cutout locations as recommended by manufacturer. Vertical piping to be primed with PVC primer and painted white to protect from UV damage.
-



- .16 Cover disposal field as indicated.
  - .1 Use only material approved in writing by the Department Representative to backfill.
  - .2 Do not compact.
  - .3 Overfill to allow for settlement.
  
- .17 Grade areas surrounding disposal field bed as indicated, to provide for diversion of surface run off waters.
  
- .18 Follow all manufacturer's installation instructions.
  
- 3.1 Cleaning
  - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Leave Work area clean at end of each day.
  
  - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END

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PART 1 - GENERAL

- 1.1 Work Included .1 This section includes the supply of all labour, materials and equipment and incidentals necessary for the complete installation of all storm utility drainage piping, including drain tile as noted on the drawings.
- 1.2 Related Sections .1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Section 33 05 16 - Manholes and Catch basin Structures.
- 1.3 References .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
- .1 ANSI/AWWA C111/A21.11-07, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .2 ASTM International
- .1 ASTM C12-09, Standard Practice for Installing Vitrified Clay Pipe Lines.
- .2 ASTM C14M-07, Standard Specification for Nonreinforced Concrete Sewer, Storm Drain and Culvert Pipe (Metric).
- .3 ASTM C76M-10a, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).
- .4 ASTM C117-04, Standard Test Method for Material Finer Than 75  $\mu\text{m}$  (No. 200) Sieve in Mineral Aggregates by Washing.
- .5 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .6 ASTM C425-09, Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings.

- .7 ASTM C428-05(2006), Standard Specification for Asbestos-Cement Nonpressure Sewer Pipe.
  - .8 ASTM C443M-07, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
  - .9 ASTM C663-98(2008), Standard Specification for Asbestos Cement Storm Drain Pipe.
  - .10 ASTM C700-09, Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
  - .11 ASTM C828-06, Standard Test Method for Low-pressure Air Test of Vitrified Clay Pipe Lines.
  - .12 ASTM D698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft<sup>4</sup>-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - .13 ASTM D1869-95(2005)e1, Standard Specification for Rubber Rings for Asbestos Cement Pipe.
  - .14 ASTM D2680-01(2009), Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
  - .15 ASTM D3034-08, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
  - .16 ASTM D3350-10, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
  - .3 CSA International
    - .1 CSA A3000-08, Cementitious Materials Compendium.
    - .2 CSA A257 Series-09, Standards for Concrete Pipe and Manhole Sections.
    - .3 CAN/CSA-B70-06, Cast Iron Soil Pipe, Fittings, and Means of Joining.
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- .4 CSA B1800-11, Thermoplastic Non-pressure Pipe Compendium.
  - .1 CSA B182.1-11, Plastic Drain and Sewer Pipe and Pipe Fittings.
  - .2 CSA B182.2-11, PSM Type Polyvinylchloride PVC Sewer Pipe and Fittings.
  - .3 CSA B182.6-11, Profile Polyethylene (PE) Sewer Pipe and Fittings for Leak-Proof Sewer Applications.
  - .4 CSA B182.11-11, Standard Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.

1.4 Administrative Requirements

- .1 Scheduling:
  - .1 Schedule Work to minimize interruptions to existing services and maintain existing sewage flows during construction.
  - .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.
  - .3 Notify the Department Representative 24 hours minimum in advance of any interruption in service.

1.5 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for pipes and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Certificates:
  - .1 Certification to be marked on pipe.
- .4 Test and Evaluation Reports:

- .1 Submit manufacturer's test data and certification 2 weeks minimum before beginning Work.

1.6 Delivery, Storage  
and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Load and unload pipe and accessories by lifting with hoists and slings, on pallets, or careful skidding so as to prevent shock and damage.
- .3 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .4 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations.
  - .2 Store and protect pipes and coatings from damage.
  - .3 Replace defective or damaged materials with new.
  - .4 Do not drop or drag pipe.
  - .5 Avoid severe impact blows, abrasion damage, and gouging or cutting of PVC pipe by metal surfaces or rocks.
  - .6 For pipe handled on skidways, do not skid or roll pipe against pipe already on the ground.
  - .7 Avoid stressing bell joints and damage of bevel ends.

PART 2 - PRODUCTS

2.1 General

- .1 Storm sewer pipe and gaskets will be supplied by the Contractor. Sewer pipe

gaskets to be supplied to the Contractor by the pipe manufacturer.

- .2 Storm sewer pipes, tees, wyes, bends, couplings, rings, fittings, elbows, caps and saddles will be provided by the Contractor.
- .3 Joints to be push-on type and must be watertight.

## 2.2 Plastic Pipe

- .1 Type PSM Polyvinyl Chloride (PVC): to CSA B182.2.
  - .1 Standard Dimensional Ratio (SDR): 35.
  - .2 Gasket to ASTM D3212 and integral bell system with no reduction in the wall thickness.
  - .3 Piping shall be perforated where noted on drawings.
- .2 Plastic pipe and fittings: to ASTM 3034 and CSA B182.1, with push-on joints.
  - .1 PVC DR35
  - .2 Minimum 100 mm diameter.
  - .3 Joints: bell and spigot type with locked in rubber gasket.
- .3 Bends: long radius type only.
- .4 Caps for ends of laterals: PVC.

## 2.3 Cement Mortar

- .1 Portland cement: to CSA A3000, normal type 10.
- .2 Mix mortar 1 part by volume of cement to two parts of clean, sharp sand mixed dry.
  - .1 Add only sufficient water after mixing to give optimum consistency for placement.
  - .2 Do not use additives.

## 2.4 Pipe Penetration Seal

- .1 As shown on the Contract Drawings, where cast in rubber gaskets cannot be

installed and core drilling is required, suitable pipe penetrations seal is to be installed to ensure that the hole is watertight. All core drilling pipe perforations shall be sealed with Proco Pen-Seal or Link-Seal for a watertight seal. Size of the core drilling holes shall be in accordance with the manufacturer's recommendations.

2.5 Pipe Bedding and Surrounding Material And Backfill

- .1 As noted on the drawings, material shall be 20mm washed stone wrapped in a non-woven geotextile filter fabric. Refer to 2.6 for details on fabric.

2.6 Geotextile and Filter Fabric

- .1 Non-woven geotextile filter fabric
- .2 Overlap all edges with 600mm minimum of fabric.
- .2 Acceptable Products:
  - .1 Armtec 200 or approved equal.

2.7 Layout Equipment

- .1 In laying out the sewer lines, the Department Representative will establish only the locations and elevations of manholes.
- .2 Use approved laser beam instrumentation and techniques to determine intermediate line and grade for all pipes except where and when the Department Representative may allow other methods to be used.
  - .1 Install laser beam in the pipe, just above the pipe, or in the bottom of the manhole, unless otherwise approved by the Department Representative.
- .3 Use an approved laser sighting triangle or template to set each pipe.

PART 3 - EXECUTION

- 3.1 Examination .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sewer pipe installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of the Department Representative.
  - .2 Inform the Department Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.
- 3.2 Preparation .1 Clean pipes and fittings of debris and water before installation, and remove defective materials from site to approval of the Department Representative.
- .2 Clean and dry pipes and fittings before installation.
  - .3 Obtain **Department Representative's** approval of pipes and fittings prior to installation.
- 3.3 Trenching .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Protect trench from contents of sewer or sewer connection.
  - .3 Trench alignment and depth require approval of the Department Representative prior to placing bedding material and pipe.
- 3.4 Granular Bedding .1 Place bedding in unfrozen condition.
-



- .2 Place granular bedding materials in uniform layers not exceeding 300 mm compacted thickness to depth as indicated.
- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
  - .1 Do not use blocks when bedding pipe.
- .4 Shape transverse depressions as required to suit joints.
- .5 Compact each layer full width of bed to at least 95% maximum density to ASTM D698.
- .6 Fill excavation below bottom of specified bedding adjacent to manholes or structures with compacted bedding material or lean mix concrete mud slab, as indicated on drawings.

### 3.5 Installation

- .1 Install drain tile according to the sizes and locations indicated on the drawings.
- .2 Provide and use proper implements, tools and facilities for safe and efficient execution of the work.
- .3 Lay and join pipes to: ASTM C12.
- .4 Lay and join pipes in accordance with manufacturer's recommendations, in accordance with recognized good practice and to approval of the Department Representative.
- .5 Handle pipe using methods approved by the Department Representative.
  - .1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
  - .2 Carefully lower pipe and fittings into trench in such a manner as to

prevent damage to them. Do not drop pipe or fittings into trench.

- .6 Lay pipes on prepared bed, wrapped in geotextile filter fabric, true to line and grade, with pipe invert smooth and free of sags or high points.
    - .1 Minimum grade, unless otherwise indicated:
      - .1 0.5%
      - .2 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
      - .3 Remove and re-lay any pipe which is not in true alignment or shows undue settlement after laying.
  - .7 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
  - .8 Do not lay pipe on a foundation into which frost has penetrated, or at any time when the Department Representative may deem that there is a danger of the formation of ice or the penetration of frost at the bottom of the excavation.
  - .9 Inspect pipe thoroughly before and after laying. Remove defective or damaged pipe from the site and replace with new sound material.
  - .10 Trenches where pipe laying is in progress are to be kept dry. Pipes are not to be laid in water or upon wet bedding. Dewater excavations as required.
  - .11 Thoroughly clean pipes as they are laid and protect pipes from dirt and water.
  - .12 No length of pipe shall be laid until the preceeding length has been thoroughly bedded and secured in place so as to prevent movement or disturbance of the pipe.
  - .13 Do not walk on or work over pipes until there is a minimum of 300 mm of cover
-

over them, except as necessary in refilling trench and compacting the bedding material.

- .14 Joint deflection permitted within limits recommended by pipe manufacturer.
- .15 Water to flow through pipe during construction, only as permitted by the Department Representative.
- .16 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .17 Install plastic pipe and fittings in accordance with CSA B182.11.
- .19 When stoppage of Work occurs, block pipes as directed by the Department Representative to prevent creep during down time.
- .20 Plug lifting holes with pre-fabricated plugs approved by the Department Representative, set in shrinkage compensating grout.
- .22 Make watertight connections to manholes.
  - .1 Use shrinkage compensating grout when suitable gaskets are not available.

### 3.6 Pipe Surround

- .1 Place surround material in unfrozen condition.
- .2 Upon completion of pipe laying, and after the Department Representative has inspected pipe joints, surround and cover pipes as indicated.
  - .1 Leave joints and fittings exposed until field testing is completed.
- .3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.

.1 Do not dump material within 1 m of pipe.

.4 Place layers uniformly and simultaneously on each side of pipe.

.5 Compact each layer from pipe invert to mid height of pipe to at least 95% maximum density to ASTM D698.

.6 Compact each layer from mid height of pipe to underside of backfill to at least 90% maximum density to ASTM D698.

### 3.7 Backfill

.1 Place backfill material in unfrozen condition.

.2 Place backfill material, above pipe surround in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.

.3 Wrap backfill drainage stone in geotextile filter fabric as per the drawings. Ensure a minimum of 600mm overlap of geotextile filter fabric.

### 3.8 Pipe Penetration Seal

.1 As shown on the Contract Drawings, where cast in rubber gaskets cannot be installed and core drilling is required, suitable pipe penetrations seal is to be installed to ensure that the hole is watertight. All core drilling pipe perforations shall be sealed with Proco Pen-Seal or Link-Seal for a watertight seal. Size of the core drilling holes shall be in accordance with the manufacturer's recommendations

### 3.9 Cleaning

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

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

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and

equipment in accordance with Section 01  
74 11 - Cleaning.

END

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PART 2      PRODUCTS

- 2.1 PVC Ducts  
And Fittings      .1      Rigid PVC duct: to CSA C22.2 No. 211.1-06  
Rigid Type DB2/ES2, with moulded fittings,  
for direct burial expanded flange ends.  
    .1      Nominal length: 3 m plus or minus 12 mm.
- .2      Rigid PVC bends, couplings, reducers, bell  
end fittings, plugs, caps, adaptors same  
product material as duct, to make a complete  
installation.
- .3      Rigid PVC 90 degrees, 45 degree bends and 5  
degrees angle couplings as required.
- .4      Expansion joints every 50 m and as required.
- .5      Utilization of PVC split ducts is not  
permitted.
- 2.2 Solvent Weld  
Compound      .1      Solvent cement for PVC duct joints.
- 2.3 Cable  
Pulling Equipment      .1      6 mm stranded polypropylene pull rope tensile  
strength 5 kN.
- 2.4 Markers      .1      Concrete type cable markers: as indicated,  
with words: "Cable", "Joint" or "Conduit"  
impressed in top surface, with arrows to  
indicate change in direction of duct runs.
- 2.5 Warning Tape      .1      Standard 4-mil polyethylene 76 mm wide tape,  
yellow with black letters, imprinted with  
"CAUTION BURIED ELECTRIC CABLE BELOW ".

PART 3      EXECUTION

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

- 3.2 Installation
- .1 Install duct in accordance with manufacturer's instructions and at elevations as indicated.
  - .2 Clean inside of ducts before laying.
  - .3 Install plastic duct spacers and ensure full, even support every 1.5 m and smooth transition throughout duct length.
  - .4 Slope ducts with 1 to 400 minimum slope.
  - .5 Install plugs and cap both ends of ducts to prevent entrance of foreign materials during and after construction.
  - .6 Pull through each duct steel mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign material.
    - .1 Pull stiff bristle brush through each duct immediately before pulling-in cables.
  - .7 Install a pull rope continuous throughout each duct run with 3 m spare rope at each end.
  - .8 Place continuous strip of warning tape 300 mm above duct before backfilling trenches.
  - .9 Install markers as required.
  - .10 Notify the Departmental Representative for field review upon completion of direct buried ducts and obtain acceptance prior to backfill.
- 3.3 Cleaning
- .1 Clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
  - .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END



**SPECIFICATIONS**

**FOR**

**CAPE SPEAR SEPTIC SYSTEM UPGRADES  
PARKS CANADA  
CAPE SPEAR NATIONAL HISTORIC SITE, ST. JOHN'S, NL**

**ISSUED FOR TENDER**

**PCA Project No.: 1829**

**Date: June 25, 2020**

Cape Spear Septic  
System Upgrades  
Parks Canada  
Cape Spear National Historic Site  
St. John's, NL

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Section 00 00 02

Page 1 of 2  
June 25, 2020

Specifications  
Issued for Tender

**PARKS CANADA**  
**CAPE SPEAR SEPTIC SYSTEM UPGRADES**  
**CAPE SPEAR NATIONAL HISTORIC SITE**

Standing Offer Agreement: 5P301-14-0001/004  
PCA Project No.: 1900387-03



Julien Babin, P. Eng.

Director Municipal Engineering  
Crandall, A Division of Englobe Corp.

Cape Spear Septic  
System Upgrades  
Parks Canada  
Cape Spear National Historic Site  
St. John's, NL

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Section 00 00 02

Page 2 of 2  
June 25, 2020

**PARKS CANADA  
CAPE SPEAR SEPTIC SYSTEM UPGRADES  
CAPE SPEAR NATIONAL HISTORIC SITE  
ST. JOHN'S, NL**

Crandall, A Division of Englobe						
Issued for Tender - Technical Specifications						
	Prepared by	Init	Date	Checked by	Init	Date
Civil	Kyle McConnell	<i>KM</i>	25 June 2020	Julien Babin	<i>JBS</i>	25 June 2020
Project Manager	Andrew Melanson	<i>AcM</i>	25 June 2020			

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Basic Impact Assessment

List of Drawings

CS01 SANITARY SEWER OVERALL SITE PLAN, LEGEND & GENERAL NOTES  
CS02 SITE REMOVALS PLAN  
CS03 DISPOSAL FIELD SITE PLAN & PROFILE  
CS04 MISCELLANEOUS SECTIONS AND DETAILS (1 OF 2)  
CS05 MISCELLANEOUS SECTIONS AND DETAILS (2 OF 2)

PART 1 - GENERAL

- 1.1 Description of Work .1 The work will be carried out within the Cape Spear National Historic Site in St. John's, NL. It will include the removal and disposal of an existing septic system disposal field and replacement with a new raised bed disposal field complete with a new effluent pump system.
- .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, vegetative stabilization and other measures, to be maintained for the duration of the project and removed following completion unless otherwise noted on the drawings.
  - .2 Supply and operation of traffic control and signage for the duration of the project where required.
  - .4 Removal of existing septic system as shown on drawings, including decommissioning of existing septic systems including excavation of dosing chambers and removal of mechanical components and disposal fields in accordance with Provincial and Federal guidelines.
  - .5 Supply and install effluent pump including duplex pumping system, and all controls.
  - .6 Supply of all labour, material and equipment to construct new raised bed disposal field including, but not limited to excavation, bedding, compacting, disposal pipe, distribution box, wall seals as per the drawings.
  - .7 Hauling, placement and compaction of borrow aggregates and granular
-

materials for bedding and to build up raised bed disposal field as shown on drawings.

.8 All other labour, materials and work necessary as shown on the drawings and to complete the project to the Departmental Representative's full satisfaction.

.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, Canadian Environmental Protection Act, Canada Labour Code and the NL Occupational Health and Safety Act and Regulations.

1.2 Work Restrictions

.1 The Contractor is limited to working within the contract limits and lay down areas shown on the drawings. Work beyond these limits is prohibited unless otherwise directed by the Departmental Representative.

.2 The Contractor shall not carry out any work within 30m of any water course, reservoir or wetland without all necessary permits.

1.3 Familiarization  
With Site

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

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

.3 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 arrange for the initial layout to be provided.
- 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 site and roads are continuously kept in a condition satisfactory to the 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 located within a National Historic Site and it is essential that lands remain as undisturbed as possible. The Contractor will be expected to use standards and methods beyond those for normal construction in order to protect the environment and ensure the aesthetics of the work. Contract limits shall be strictly adhered to and every precaution shall be taken to minimize environmental damage and disruption to vegetation, wildlife habitat, and structures or existing services, both on construction and storage sites.
  - .1 If any damage occurs during construction, the Contractor is responsible to bear the expense to immediately restore such damaged areas to the satisfaction of the Departmental Representative.
  - .2 If Contractor fails to repair damage to the satisfaction of the Departmental Representative, the Departmental Representative may have repairs completed by others at the Contractor's expense.
  - .3 The Contractor shall ensure that contracted work meets the standards outlined in the contract specification and drawings.
  - .4 The Contractor shall ensure that no damage will be done to any existing underground telephone cables or other buried utilities.
  - .5 All sources of aggregate must be submitted to the Departmental Representative for approval at least two weeks prior to the start of any work. Aggregate sources must be free of invasive species and capable of

producing clean material to the satisfaction of the Departmental Representative.

- .6 The Contractor is responsible to follow the Provincial requirements regarding the following:
  - .1 Pit and Quarry Guidelines
  - .2 Environmental Construction Practice specifications
- .7 The Contractor will make arrangements with authorities or owners of private properties for quarrying and transporting materials and machinery over their properties and be responsible for obtaining and paying of fees.

1.11 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 Approved Permits.
  - .9 Field test reports.
  - .10 Manufacturer's installation and application instructions.
  - .11 Site specific Health and Safety Plan and other safety related documents.
  - .12 Other documents as stipulated elsewhere in the Contract Documents.

1.12 Site Conditions

- .1 The Contractor will be responsible to visit the existing facilities and planned route to review existing site conditions.
- .2 Existing geotechnical conditions can be found in the attached report in Appendix B. Should contractors require additional geotechnical investigation this can be done by obtaining all the proper permits and approvals from Parks Canada and carrying out the work at their own expense.

1.13 Departmental

- .1 Departmental Representative will be

Representative

assigned after contract award.

1.14 Work Schedule

- .1 Provide to the Departmental Representative in writing and within five (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 the provided 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 Departmental Representative will arrange project meetings that are to occur, at minimum, 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, lay down areas 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 pre-construction 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 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 pedestrian and other traffic is not unduly impeded, interrupted or endangered by execution or presence of work.
- .7 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.

- .8 Verify locations of any underground utilities.

1.19 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.

1.20 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.

1.21 National Park Act

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

1.22 Measurement of Quantities

- .1 Linear: Items which are measured by metre are to be measured along centre line of installation. Lengths shall be in agreement with the Departmental Representative.
- .2 Volume: Longitudinal and transverse measurements to be measured both horizontally and vertically to calculate

a volume which shall be in agreement with the Departmental Representative.

.3 Weight:

- .1 Where contract unit prices are for weight measure of material, the Contractor shall provide, install and maintain approved scales for the measurement of such materials. The scales shall be of sufficient capacity and dimension to fully contain the loaded vehicle. The scale platform and mechanism shall be kept clean and in good working order at all times. The approach roadway shall be on a flat grade, level with the scale platform for at least one truck length.
- .2 The scale shall be tested at the beginning of each construction season in accordance with the requirements of the Government of Canada prior to being used. The Certificate issued by the testing authority shall be displayed at the scales at all times.
- .3 If the scales are moved, repaired or altered in any way, they shall again be tested and certified in accordance with Government of Canada requirements before additional use. Only original weight certificates from the quarry or pit of material origin will be accepted and used as basis for payment. Copies of weight certificates will not be accepted. Weight certificates are to be original digitally printed vouchers. Hand-written weight certificates and certificates other than those approved will not be accepted.

1.23 Permits/  
Authorities

- .1 The Contractor shall obtain, and pay for, permits from authorities as required for all operations and construction. He 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.

1.24 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.

1.25 Existing Survey

- .1 Topographic survey used in the preparation of these Contract Documents was provided by Crandall Engineering Ltd. (a Division of Englobe Corp.)

1.26 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 shall 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

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                      **The awarded Contractor shall begin as soon as directed by the Departmental Representative and be completed all works including demobilization and clean-up by within four (4) weeks of starting the work.**

- .1      This project shall be completed in one (1) phase and shall begin within at least two (2) weeks following the award and be completed within four (4) weeks after start up.
  - .2      Upon acceptance of bid the Contractor shall submit:
    - .1      Preliminary work schedule within five (5) calendar days of contract award.
  - .3      Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.
  - .4      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.
  - .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 subtrades 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
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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 Departmental Representative will schedule and administer project meetings every two (2) weeks for entire duration of work.
- .2 Departmental Representative will prepare agenda for meetings.
- .3 Meetings will be held at project site or as directed by Departmental Representative.

END

---

PART 1 - GENERAL

- 1.1 General Requirements .1 The Form of Tender includes both lump sum priced items and several unit priced items.
- .2 The total tendered price shall be the sum of the lump sum items plus 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 understands 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 the Contractor.
- .6 All measurement shall be along a horizontal plane unless otherwise indicated.
- 1.2 Lump Sum Items .1 There shall be no separate measurement or payment made for these lump sum items.
-

- .2 General Contract Requirements:
    - .1 Method of Measurement: Percentage Complete as agreed by Departmental Representative and the Contractor.
    - .2 This item includes but is not limited to site maintenance, dust control, miscellaneous landscaping, where required, any and all ditching and environmental protection required and as shown on the drawings as well as any excavation and backfill not mentioned below.
  
  - .3 Removals and Holding Tank Modifications:
    - .1 Method of Measurement: Percentage complete as agreed by the Departmental Representative and the Contractor.
    - .2 This item shall include all of the items necessary to complete the work as shown on the Removals Drawing C02. This includes, excavation, removal and disposal of existing septic field, distribution box, decommissioning, removal and disposal of the existing dosing chamber, dosing valve and appurtenances, excavation and all work required to seal existing holding tank overflow and outlet to ensure a water tight seal.
  
  - .4 Effluent Pumping System
    - .1 Method of Measurement: Percentage complete as agreed by Departmental Representative and the Contractor.
    - .2 This item shall include all items necessary to complete the work to install the effluent pumping system as shown on the drawings and detailed in the specification Section 32 32 13.13 "Effluent Pumping System". This includes but is not limited to delivery of pump and appurtenance to designated site, equipment and material,
-

- excavation, installation, pumps, wet well, piping, valve system, control panel, electrical cables and connections, frame and cover, riser sections, connections, gaskets, dewatering, excavation, bedding, backfilling, compaction, restoration and maintenance, commissioning, training and site inspection.
- .3 The force main supply and installation will be paid in separate item under the lump sum unit price for Utility Drainage Field.
- .4 Utility Drainage Field:
- .1 Method of Measurement: Percentage Complete as agreed by Departmental Representative and the Contractor.
- .2 This item includes the supply of all labour and material, excavation, dewatering, bedding, compaction, the installation of force main piping from the new effluent pump to the distribution box, the supply and installation of treatment sand, delivery and installation of pre-cast concrete distribution box and all related components, supply and installation of disposal pipe, infiltrators, wall seals, backfilling, restoration, and maintenance. This item includes all labour and material for the installation of sanitary force main from the existing holding tank to the new distribution box, including insulation as noted on the drawing and in the specification.
- .3 This item does not include the supply of all labour and material, for imported borrow material. This lump sum item does not include the decommissioning or removal of the existing septic field. This item
-

also does not include ditching or swales or topsoil and hydroseed. These items will be paid for under their particular unit prices and/or lump sum prices.

- .5 Septic Tank Cleaning and Inspection:
  - .1 Method of Measurement: Percentage Complete as agreed by Departmental Representative and the Contractor.
  - .2 This item includes the supply of all labour and material, and vacuum truck services, to properly clean the existing septic tank and holding tank and all related components. This item also includes the inspection of the tank by an approved septic tank installer complete with a written report assessing the condition of the septic tank and holding tank.

1.3 Unit Price Items

- .1 Imported Borrow/Fill
  - .1 Unit of Measurement: Cubic Meters (m<sup>3</sup>)
  - .2 Method of Measurement: This item shall be measured volume placed of Imported Borrow delivered and installed to build up new raised bed field as shown on drawings. Volume shall be measured in field and agreed upon with the Departmental Representative.
  - .3 This item includes: supply, placement, hauling and compaction of imported backfill for the new raised bed disposal field to the thickness shown on the drawings or as required by the Departmental Representative.
- .2 Rock Excavation:
  - .1 Unit of Measurement: cubic meters (m<sup>3</sup>), in place measurement, as agreed by Department Representative and the Contractor.

- .2 Method of Measurement: Rock will be measured in its original position, by the average elevation above 300mm below the pipe for a total width of 0.30m on each side of the pipe plus the pipe diameter), calculated by the length that it presents itself. Additional rock removed within the trench outside of the above cross section is considered incidental to the work and will not be measured for payment.
  - .3 This item includes: The supply of all material, equipment, and work required for rock removal excavation, shattering rock to a depth of 300 mm below the bottom of the new pipe elevation indicated on the drawings, measured as mentioned above, including loading and disposal of rock material off-site.
  - .3 Rip-Rap:
    - .1 Unit of Measurement: Tonnes (t)
    - .2 Method of Measurement: This item shall be measured by weight in tonnes of Rip-Rap delivered and installed on site. Truck slips indicating material weight will be collected for each load.
    - .3 This item includes: hauling, supply and placement of Rip-Rap to the size and dimensions shown on the drawings or as required in the field as directed by the Departmental Representative. There shall be no additional payment for extra thickness of materials or material placed outside of limits.
  - .4 Ditching
    - .1 Unit of Measurement: linear meters (m)
    - .2 Method of Measurement: Based on field measurements for linear meters of ditching completed.
-

- .3 This item includes: supply and transportation of all labour, equipment, and materials, preparation, excavation, as directed and as shown on the drawings, minimum 600mm wide, clean-up and all work incidental thereto.
  
  - .5 Imported Topsoil
    - .1 Unit of Measurement: square metres
    - .2 Method of Measurement: Based on field measurements for square metres of imported topsoil acceptably placed.
    - .3 This item includes: supply and transportation of all labour, equipment, and materials, preparation, soil amendments, mixing, grading, imported topsoil, distributing, fertilizer, rolling, clean-up and all work incidental thereto, all as specified or as shown on the drawings or as laid out by the Departmental Representative.
  
  - .6 Hydroseeding
    - .1 Unit of Measurement: square metres
    - .2 Method of Measurement: Based on field measurements for square metres of hydroseed acceptably placed.
    - .3 This item includes: supply and transportation of all labour, equipment, and materials, preparation, soil amendments, mixing, distributing, rolling, maintenance, re-hydraulic seeding as directed, clean-up and all work incidental thereto.
  
  - .7 Sod
    - .1 Unit of Measurement: square metres
    - .2 Method of Measurement: Based on field measurements for square metres of Sod acceptably placed.
    - .3 This item includes: supply and transportation of all labour,
-



equipment, and materials,  
preparation, soil amendments,  
mixing, distributing, rolling,  
maintenance, Sod as directed,  
clean-up and all work incidental  
thereto.

- .8 Storm Sewer Manholes:
    - .1 Method of Measurement: Number of units of each type and size installed as agreed by Departmental Representative and the Contractor.
    - .2 Measurement for this item shall include supply and transportation of all labour, equipment and material, excavation, installation, manhole structure, flat-top section, frame and cover, cutting of pipes, gaskets, couplings, fittings including plugs and caps, grout, connections, dewatering, bedding, compaction, backfilling, leakage testing, adjustments, benching, inside drop concrete benching, supports, adjustments, trench restoration and maintenance, clean-up and all work incidental thereto, all as specified or as shown on the drawings, or as laid out by the Department Representative.
  
  - .9 Drain Tile and Surface Water Diversion Swale:
    - .1 Unit of Measurement: Linear Meters (m). Based on field measurements for the length of each size of drain tile acceptably laid and surface ditch properly excavated ensuring positive drainage away from the field.
    - .2 This item includes all supply and transportation of materials, labour, stripping and re-use of top-soil, excavation, installation of pipe including connections, , compaction, couplings, ends and fittings, de-watering, bedding, backfill, granular materials,
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including geotextile filter fabric and equipment required to remove all common excavation and stockpiling and disposal of surplus material at approved locations. This item includes ditching required to prepare a surface water diversion swale as noted on the drawings.

- .3 This item does not include topsoil and hydroseed. It will be paid for under the contract unit price for those respective items.
- .4 Where ditching is explicitly noted on the drawings and does not include a drain tile, it will be paid for under the contract unit price for ditching.

All and any items not specifically included in the unit price items are considered incidental to the work and are to be included in the lump sum portions or the unit price items of the work.

END

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PART 1 - GENERAL

1.1 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 and mock-ups in SI Metric units.
  - .4 Where items or information is not produced in SI Metric units converted values are acceptable.
  - .5 Review submittals prior to submission to 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.

1.2 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 five (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. Accompany submissions with transmittal letter, in duplicate, containing:

- .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
  
  - .7 Submissions include:
    - .1 Date and revision dates.
    - .2 Project title and number.
    - .3 Name and address of:
      - .1 Subcontractor.
      - .2 Supplier.
      - .3 Manufacturer.
    - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
    - .5 Details of appropriate portions of Work as applicable:
      - .1 Fabrication.
      - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
      - .3 Setting or erection details.
      - .4 Capacities.
      - .5 Performance characteristics.
      - .6 Standards.
      - .7 Operating weight.
      - .8 Wiring diagrams.
      - .9 Single line and schematic diagrams.
      - .10 Relationship to adjacent work.
  
  - .8 After Departmental Representative's review, distribute copies.
  
  - .9 Submit four (4) prints and one (1) electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
  
  - .10 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental
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Representative where shop drawings will not be prepared due to standardized manufacture of product.

- .11 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
    - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accordance with specified requirements.
    - .2 Testing must have been within three (3) years of date of contract award for project.
  
  - .12 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
    - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
    - .2 Certificates must be dated after award of project contract complete with project name.
  
  - .13 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
    - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
  
  - .14 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
    - .1 Documentation of the testing and
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verification actions taken by  
manufacturer's representative to  
confirm compliance with  
manufacturer's standards or  
instructions.

- .15 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Delete information not applicable to project.
- .17 Supplement standard information to provide details applicable to project.
- .18 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, transparency copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .19 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
  - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for

information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 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.

1.4 Certificates  
and Transcripts

- .1 Immediately after award of Contract, submit Workplace NL status.
- .2 Submit transcription of insurance immediately after award of Contract.



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Cape Spear Septic  
System Upgrades  
Parks Canada  
Cape Spear National Historic Site,  
St. John's, NL

SUBMITTAL PROCEDURES

Section 01 33 00

Page 7 of 7  
June 25, 2020

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END

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PART 1 - GENERAL

1.1 Definitions

- .1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
- .2 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.
- .3 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.
- .3 PPE: personal protective equipment
  - .1 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) and the Canada Occupational Health and Safety Regulations (COSHS) 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/](http://laws.justice.gc.ca/en/L-2/)

.2 COSHS can be viewed at:  
[www.http://laws.justice.gc.ca/eng/SOR-86-304/n\\_e.html](http://laws.justice.gc.ca/eng/SOR-86-304/n_e.html)

.3 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 2104.

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 provincial health and safety 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.
    - .4 Work around raw wastewater.
  - .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.
  - .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

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.

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.
- 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.
- 1.5 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.
- 1.6 Site Clearing and Plant Protection .1 No vegetation clearing will be permitted between May 1<sup>st</sup> and August 15<sup>th</sup> due to annual
-

songbird nesting season.

- .2 Protect trees and plants on site and adjacent properties where indicated.
- .3 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.
- .4 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.
- .5 Minimize stripping of topsoil and vegetation.
- .6 Restrict vegetation removal to areas indicated or designated by Departmental Representative.
- .7 Vegetation and topsoil should not be removed to obtain fill for road construction purposes.
- .8 Whenever possible, organic debris removed during grading operations should be stored for re-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.

1.7 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.

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- .5 Do not skid logs or construction materials across waterways.
  - .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
  - .7 Temporary diversion ditches, approved by the Departmental Representative, are to be plastic lined.
  - .8 Temporary storage sites for debris generated from clearing operations should be deposited away from watercourses and should be surrounded by a natural vegetative buffer.
  - .9 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.
- 1.8 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 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.
- 1.9 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).
  - .3 The Contractor shall meet all requirements as detailed in Appendix C - Basic Impact Analysis (BIA) Cape Spear Septic System Upgrades, Cape Spear National Historic Site. This document is not all-inclusive, and site adjustment of the mitigation methods for the work may be required. The Departmental Representative will advise the Contractor of any additional requirements as they arise.
  - .4 The Contractor to ensure that all equipment entering the site be cleaned to prevent potentially invasive species of plants from being transported into the National Park from previous projects.
- 1.10 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-a-round facilities for contractor-related equipment and vehicles will be limited to those areas agreed to
-



and designated by the Departmental Representative.

1.11 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 the installation of pipes and culverts, cleaning equipment prior to entering the site. 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.

1.12 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.

1.13 Vehicular  
Movements

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

1.14 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.
- 1.15 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
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plan shall incorporate all necessary silt fences, silt traps, plastic lined trenches and ditches as approved by the Departmental Representative. **Hay or any other type of seed contaminant shall not be used in any type of erosion control method.**

- .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 curtailed 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.
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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 saw-dust 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 removed from the site along with the timber. No burning of any vegetation or debris will be permitted in the park boundaries.
- .5 No vegetation clearing will be permitted during the annual songbird nesting period between May 1<sup>st</sup> and August 15<sup>th</sup>.

END

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PART 1 - GENERAL

1.1 Refueling

- .1 Refueling of equipment to be performed in locations as directed by Departmental Representative.
- .2 Do not refuel equipment within 100 meters 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



- 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

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 Scaffolding .1 Provide and maintain scaffolding, ladders  
and temporary stairs.
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- 1.7 Hoisting
- .1 Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
  - .2 Hoists cranes shall be operated by qualified operator.
- 1.8 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.
- 1.9 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.
- 1.10 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, seven (7) days per week).
-

- 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.

END

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 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.
- 1.2 Related Sections
- .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.
- 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.
-

The Contractor must formally request a road closure with the Departmental Representative if they feel it is necessary. 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 Roads that cannot be closed include:
  - .1 Emergency Exit
  - .2 Access Road to Treatment Plant.
- .5 Keep travelled way well graded, free of pot holes and of sufficient width that required number of lanes of traffic may pass.
- .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 A Traffic Control Plan must be approved by the Departmental Representative prior to commencing any work.
- .6 Continually maintain traffic control devices in use by:
  - .1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
  - .2 Removing or covering signs which do not apply to conditions existing from day to day.

1.6 Control of  
Public Traffic

- .1 Provide traffic control personnel at each entrance to Cape Spear National Historic Site 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 Flag persons are to be equipped with portable radios only, not cellular devices. Any flag person 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.
- 1.8 Operational Requirements
- .1 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.



- 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

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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
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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 re-installation 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

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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

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- .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

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 Parks Canada 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

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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 two (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.

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- .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 non-salvageable 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

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.
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- .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

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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 Copy will be returned after final inspection, with Departmental Representative's comments.  
.2 Revise content of documents as required prior to final submittal.  
.3 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of shop drawing and materials testing manuals in English.  
.4 If requested, furnish evidence as to type, source and quality of products provided.  
.5 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.  
.6 Pay costs of transportation/delivery.
- 1.4 Format .1 Binders: vinyl, hard covered, three (3) 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.  
.2 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
-

- .3 Arrange content by systems, under Section numbers and sequence of Table of Contents.
  - .4 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
  - .5 Text: Manufacturer's printed data, or typewritten data.
  - .6 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
  - .7 Provide 1:1 scaled CAD files in dxf or dwg format on USB storage device 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 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 drawings, provided by Departmental Representative.
- .2 Provide felt tip marking pens, maintaining separate colors 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 Field changes of dimension and detail.
  - .3 Changes made by change orders.
  - .4 Details not on original Contract Drawings.
  - .5 References to related shop drawings and modifications.
- .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.

END

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PART 1 - GENERAL

- 1.1 Related Sections .1 Section 33 36 33 - Utility Drainage Field
- .2 Section 33 31 13 - Site Sanitary Utility Sewerage Piping
- 1.2 Related Requirements .1 Refer to detailed drawings for specific requirements for removals.
- 1.3 References .1 Reference Standards:
- .1 Canadian Council of Ministers of the Environment (CCME)
- .1 PN1326, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).
- .3 Transport Canada (TC)
- .1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.
- 1.4 Site Conditions .1 Site Environmental Requirements.
- .1 Perform work in accordance with Section 01 35 43 - Environmental Procedures.
- 2 Ensure that removals work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
- .1 Ensure proper disposal procedures are maintained throughout the project.
-

- .4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.
- .6 Protect trees, plants and foliage on site and adjacent properties where indicated.
  
- .2 Existing Conditions.
  - .1 Remove contaminated or hazardous materials from site as directed by Department Representative, prior to start of demolition Work, and dispose of at designated disposal facilities in safe manner in accordance with applicable regulatory requirements.

PART 2 - PRODUCTS

(NOT APPLICABLE)

PART 3 - EXECUTION

3.1 Preparation

- .1 Inspect site with Department Representative and verify extent and location of items designated for removal, disposal, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Contact proper utility companies in order to coordinate the demolition of the building.

3.2 Removal of Hazardous Waste

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

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- 3.3 Removal Operations
- .1 Remove items as indicated in their corresponding Sections.
  - .2 Do not disturb items designated to remain in place.
  - .3 Removal of pipes:
    - .1 Remove sections of piping as indicated.
    - .2 Piping to be abandoned shall be capped.
    - .3 Caps shall also be provided where required to block off and seal ends of pipes that are being abandoned or otherwise isolated, incidental to the work.
  - .4 Removal of dosing chamber and mechanical equipment and distribution boxes:
    - .1 Abandon/remove in accordance with Provincial and Federal Guidelines and as indicated on the Drawings.
    - .2 Pump out contents, remove mechanical equipment and electrical wiring and dispose of at an approved receiving facility.
    - .3 Remove tanks, chambers, distribution boxes, and covers where indicated.
  - .5 Removal of existing septic fields:
    - .1 Septic fields to be excavated and removed contents removed from site in accordance with Provincial and Federal Guidelines unless indicated otherwise on the Drawings.
    - .2 Where the new septic field is to be constructed in same location as existing, existing septic field materials including granular material, pipes, etc., shall be removed to the depth indicated on the Drawings, and disposed of at an appropriate facility.
-

- .6 Once the items have been removed the site is to be properly shaped and graded to match existing ground.
- .7 Disposal of Material:
  - .1 Dispose of materials not designated for salvage or reuse on site.
- .8 Backfill:
  - .1 Backfill in areas as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- 3.4 Restoration
  - .1 Restore areas and existing works outside areas of demolition match condition of adjacent, undisturbed areas.
  - .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
- 3.5 Cleaning
  - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Leave Work area clean at end of each day.
    - .2 Remove debris, trim surfaces and leave work site clean, upon completion of Work
    - .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
  - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- 3.6 Protection
  - .1 Repair damage to adjacent materials or property caused by selective site demolition.

END

PART 1 - GENERAL

- 1.1 Related Sections .1 Section 31 23 10 - Excavating, Trenching and Backfilling.
- .2 Section 32 11 23 - Aggregate Base Courses
- 1.2 References .1 American Society for Testing and Materials (ASTM)
- .1 ASTM D 4791-10, Standard Test Method for Flat Particles, Elongated Particles or Flat and Elongated Particles in Coarse Aggregate.
- 1.3 Source Approval .1 Inform Departmental Representative of proposed source of aggregates and imported borrow/fill and provide access for sampling two (2) weeks minimum before starting production. The Contractor or his representative is to be present during sampling.
- .2 Aggregate sources must be free of invasive species and capable of producing clean material to the satisfaction of the Departmental Representative.
- .3 If, in opinion of Departmental Representative, aggregate from the proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that aggregate from source in question can be processed to meet specified requirements.
- .4 Should a change of aggregate source be proposed during work, advise Departmental Representative one (1) week in advance of proposed change to allow sampling and testing.
- .5 Acceptance of an aggregate at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is
-

found to be unsatisfactory.

1.4 Sampling

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Allow continual sampling by Departmental Representative during production.
- .3 Provide Departmental Representative with access to source and processed material for sampling.
- .4 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

PART 2 - PRODUCTS

2.1 Materials

- .1 Aggregate quality: sound, hard, durable aggregate free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in a deleterious manner for the use intended.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
  - .1 Greatest dimension to exceed three times least dimension.
- .3 Fine aggregate satisfying requirements of applicable section to be one, or a blend of following:
  - .1 Natural sand.
  - .2 Manufactured sand.
  - .3 Screenings produced in crushing of quarried rock, boulders, gravel
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
  - .1 Crushed rock.
  - .2 Gravel and crushed gravel composed of naturally formed particles of stone.

PART 3 - EXECUTION

- 3.1 Equipment .1 All equipment brought on site by the contractor or any subcontractor must be thoroughly washed clean of any soil and debris prior to arrival on site. Equipment containing debris or soil from a previous job site will not be permitted to enter the project site.
- 3.2 Stripping of Topsoil .1 Commence topsoil stripping of areas as indicated by the Guidelines and as directed by the Departmental Representative.
- .2 Avoid mixing topsoil with subsoil.
- .3 Stockpile in locations as indicated by the Guidelines. Stockpile height not to exceed 2m.
- .4 Refer also to Section 31 14 13 - Soil Stripping and Stockpiling.
- 3.3 Handling .1 Handle and transport aggregates to avoid segregation, contamination and degradation.
- 3.4 Stockpiling .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative.
- .2 Stockpile aggregates in sufficient quantities to meet project schedules.
- .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
- .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into work.
-



- .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
  - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.
  - .7 Stockpile materials in uniform layers of thickness as follows:
    - .1 Maximum 1.5 m for coarse aggregate and base coarse aggregate.
    - .2 Maximum 1.5 m for fine aggregate and sub-base aggregate.
    - .3 Maximum 1.5 m for other aggregate.
  - .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
  - .9 Do not cone piles or spill material over edges of piles.
  - .10 Do not use conveying stackers.
  - .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.
- 3.5 Aggregate Stockpile Cleanup
- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
  - .2 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.
- 3.6 Source Abandonment
- .1 For temporary or permanent abandonment of aggregate source, rehabilitate source to condition meeting requirements of the Guidelines.

END

PART 1 - GENERAL

1.1 Related Sections

- .1 Section 33 31 13 - Public Sanitary  
Utility Sewerage Pipe
- .2 Section 33 34 00 - Sanitary Utility  
Sewerage Force Mains
- .3 Section 33 36 33 - Utility Drainage  
Field

1.2 References

- .1 American Society for Testing and  
Materials International (ASTM)
    - .1 ASTM C 117-13, Standard Test  
Method for Material Finer than  
0.075 mm (No.200) Sieve in Mineral  
Aggregates by Washing.
    - .2 ASTM C 136-06, Standard Test  
Method for Sieve Analysis of Fine  
and Coarse Aggregates.
    - .3 ASTM D 422-63(2007), Standard Test  
Method for Particle-Size Analysis  
of Soils.
    - .4 ASTM D 698-10, Standard Test  
Methods for Laboratory Compaction  
Characteristics of Soil Using  
Standard Effort (12,400 ft-  
lbf/ft<sup>3</sup>) (600 kN-m/m<sup>3</sup>).
    - .5 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-8.2-M88, Sieves, Testing,  
Woven Wire, Metric.
  - .3 Department of Justice Canada (Jus)
    - .1 Canadian Environmental Protection
-

- 
- Act (CEPA), 1999, c.33.
  - .2 Transportation of Dangerous Goods Act (TDGA), 1992, c.34.
  - .4 Newfoundland and Labrador Department of Transportation and Works
    - .1 Specifications Book (latest edition).
- 1.3 Definitions
- .1 Topsoil:
    - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
    - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.
  - .2 Excavation classes: two classes of excavation will be recognized; common excavation and rock removal.
    - .1 Rock: the removal of material from solid masses of igneous, sedimentary or metamorphic rock which prior to removal was integral with the parent mass and the removal of boulders and rock fragments larger than 1.0 cubic metre in volume.
    - .2 Common: all other excavation.
  - .3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
  - .4 Imported material: material obtained from locations outside area to be graded and required for construction of fill areas or for other portions of Work.
  - .5 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
-

- .6 Unsuitable materials:
- .1 Weak, chemically unstable, wet and compressible materials.
  - .2 Frost susceptible materials:
    - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318-10, and gradation within limits specified when tested to ASTM D 422-63(2007) and ASTM C 136-06: Sieve sizes to CAN/CGSB-8.2-M88.
    - .2 Table:

<u>Sieve Designation</u>	<u>% Passing</u>
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 0.075mm sieve.
- .7 Contaminated Soil: Soil containing hydro-carbons as identified by sampling performed by an approved testing facility.

- 1.4 Submittals
- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Quality control: in accordance with Section 01 45 00 - Quality Control:
    - .1 Submit to Departmental Representative testing results and reports as described in Part 3 of this section.
  - .3 Preconstruction Submittals:
    - .1 Submit construction equipment list for major equipment to be used in this section prior to start of work.
  - .4 Samples:
    - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
    - .2 Inform Departmental Representative at least four (4) weeks prior to beginning Work, of proposed source(s) of Imported Fill materials and provide access for sampling.
- 1.5 Quality Assurance
- .1 For design of any temporary structures submit design and supporting data at least 2 weeks prior to installation or construction.
  - .2 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.
  - .3 Keep design and supporting data on site.
  - .4 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.
-

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- 1.6 Existing Conditions .1 Examine Geotechnical Report prepared by  
Englobe attached in Appendix B.
- .2 Existing buried utilities and structures:
- .1 Before commencing work obtain all required digging permits from local utilities and/or authorities and verify and establish location of buried services on and adjacent to site.
  - .2 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
  - .3 Prior to beginning excavation Work, notify applicable owner or authorities to clearly mark such locations to prevent disturbance during Work.
  - .4 Confirm locations of buried utilities by hand digging or careful test excavations in presence of Departmental Representative. Hand dig all cables one metre either side of cable prior to machine excavation.
  - .5 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
  - .6 Where unidentified utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or otherwise disturbing utilities or structures.
  - .7 Record location of maintained, re-routed and abandoned underground lines.
- .3 Existing surface features:
- .1 Conduct, with Departmental Representative, condition survey of existing fencing, trees and other plants, service poles, wires, lighting fixtures, pavement, survey benchmarks and monuments, and all other surface features which may be
-

- affected by Work.
- .2 Protect existing surface features from damage while Work is in progress unless otherwise directed in the drawings. In event of damage, immediately make repair as directed by Departmental Representative.
  - .3 Protect existing asphalt and concrete pavements which may be affected by Work from damage while work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.
  - .4 Where required for excavation, cut roots or branches as directed by Departmental Representative.
- 1.7 Cofferdams, Shoring, Bracing, and Underpinning .1 Shoring will be required to safely install new piping where depth exceeds 2.5 metres. This is deemed incidental to the work.
- .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 shoring and bracing 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 - PRODUCTS

- 2.1 Materials
- .1 Borrow: Blasted or crushed rock or gravel in accordance with Section 322.02 of the City of St. John's - Department of Engineering - Specifications book Section 322.02, approved by Departmental Representative for use intended, dry, unfrozen, free of cinders, ashes, sods, refuse or other deleterious or unsuitable material.
  - .2 Treatment Sand in accordance with Section 33 36 33 - Utility Drainage Field.
  - .3 Bedding Material in accordance with Section 32 11 25 - Bedding Material.
  - .4 Topsoil in accordance with Section 32 91 19 - Topsoil Placement and Grading

PART 3 - EXECUTION

- 3.1 Equipment
- .1 All equipment brought on site by the contractor or any subcontractor must be thoroughly washed clean of any soil and debris prior to arrival on site. Equipment containing debris or soil from a previous job site will not be permitted to enter the project site.
- 3.2 Site Preparation
- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
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- 
- 3.3 Stockpiling
- .1 Stockpile fill materials in areas approved by Departmental Representative and as shown on the drawings.
    - .1 Stockpile granular materials in manner to prevent segregation.
  - .2 Protect fill materials from contamination.
  - .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies. Note that no hay mulch or possible seed contaminants are to be used on this project site.
- 3.4 Cofferdams and Shoring
- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29.06 - Health and Safety Requirements and Health and Safety Act for Workplace NL.
  - .2 Obtain permit from authority having jurisdiction for any temporary diversion or pumping of water course.
  - .3 During backfill operation:
    - .1 Unless otherwise indicated or directed by Departmental Representative, remove sheeting and shoring from excavations.
    - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
  - .4 Upon completion of substructure construction:
    - .1 Remove shoring and bracing.
    - .2 Remove excess materials from site and restore watercourses as directed by Departmental Representative.
- 3.5 Dewatering
- .1 Keep excavations free of water while Work is in progress.
  - .2 Submit for Departmental Representative's review details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.
-

- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
  - .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved 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.
- .6 Provide settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

### 3.6 Excavation

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
- .2 Excavation must not interfere with normal 1:1 (H:V) splay of bearing capacity of adjacent foundations and traffic areas. If interference will occur, excavation must be shored, braced or underpinned as described elsewhere in this specification.
- .3 Do not disturb soil within branch spread of trees or shrubs that are to remain.
  - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .4 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation

operations and do not leave open more than 15 m at end of day's operation.

- .5 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
  - .6 Restrict vehicle operations directly adjacent to open trenches.
  - .7 Dispose of surplus and unsuitable excavated materials off-site in accordance with applicable provincial and municipal regulations.
  - .8 Do not obstruct flow of surface drainage or natural watercourses. Diversions of flow are to be submitted in detailed plan and approved by Departmental Representative and other authorities before proceeding.
  - .9 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
  - .10 Notify Departmental Representative when bottom of excavation is reached and/or appears unsuitable and proceed as directed by Departmental Representative.
  - .11 Obtain Departmental Representative's approval of completed excavation.
  - .12 If encountered, remove unsuitable material from excavation bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
    - .1 In areas occupied by foundations or structures, replace excavated material with Fill Against Structure compacted to not less than 100% Standard Proctor maximum dry density.
  - .13 Correct unauthorized over-excavation as follows:
-

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- .1 In areas not occupied by foundations or structures, replace excavated material with Select Backfill Material compacted to not less than 98% of Standard Proctor Maximum Dry Density.
  
  - .14 Hand trim, make firm and remove loose material and debris from excavations.
    - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
    - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.
  
  - 3.8 Backfilling
    - .1 Do not proceed with backfilling operations until completion of following:
      - .1 Departmental Representative has inspected and approved installations.
      - .2 Removal of shoring and bracing;
      - .3 Backfilling of voids with satisfactory soil material.
  
    - .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
  
    - .3 Do not use backfill material which is frozen or contains ice, snow or debris.
  
    - .4 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.
      - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
        - .1 Permit concrete to cure for
-

minimum 3 days or until it has sufficient strength to withstand earth and compaction pressure and obtain approval from Departmental Representative.

.5 Place unshrinkable fill in areas as indicated or directed by Departmental Representative. Consolidate and level unshrinkable fill with internal vibrators.

.5 Backfilling at surface:

.1 Shall be re-used existing stockpiled topsoil, where excavation is outside of paved or granular surfaces.

3.9 Restoration

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

.2 Replace topsoil.

.3 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.

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

.5 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END

PART 1 - GENERAL

- 1.1 Related Sections .1 Section 31 37 00 - Excavating,  
Trenching, and Backfilling

PART 2 - PRODUCTS

- 2.1 Rock .1 Hard, with relative density (formally  
specific gravity) not less than 2.5,  
durable quarry stone, free from seams,  
cracks or other structural defects, to  
meet following size distribution for use  
intended:
- .2 To meet following size distribution per  
sizes shown on drawings and graded as  
follows:
- .1 Nominal 300mm diameter or 40 kg  
mass:  
100% smaller than 450mm or 130 kg  
At least 20% larger than 350 mm or  
70 kg  
At least 50% larger than 300mm or  
40 kg  
At least 80% larger than 200mm or  
10 kg
- .3 Rip rap to be clean, inorganic, non ore-  
bearing, non-toxic material from a non-  
watercourse source. It shall be hard,  
resistant to weathering and angular in  
shape.
- 2.2 Geotextile Filter .1 Geotextile: non-woven type meeting the  
following minimum requirements (Minimum  
Average Roll (MAR) Values):

PROPERTY	UNIT	ASTM TEST	NON-WOVEN
Mullen Burst Strength	KPa	D3786	1110
Tearing Strength (Trapezoid Method)	N	D4533	160 (N1)
Grab Tensile Strength (Both Directions)	N	D4632	400 (N1)
Elongation at Break	%	D4632	50
Apparent Opening Size	Um	D4751	50-250
UV Degradation	% Ret	D4355	
Permittivity	Sec - 1	D4491	1.75 - 3.50

PART 3 - EXECUTION

3.1 Equipment

- .1 All equipment brought on site by the contractor or any subcontractor must be thoroughly washed clean of any soil and debris prior to arrival on site. Equipment containing debris or soil from a previous job site will not be permitted to enter the project site.

3.2 Placing

- .1 Place Rip-Rap in the locations and to the grade, dimensions, and details as shown on the drawings or as laid out by the Department Representative.
  - .2 Where Rip-Rap is to be placed on slopes, excavate trench at toe of slope to dimensions as indicated.
  - .3 Dewater the site as required to permit the work to be carried out.
  - .4 Fine grade area to be rip-rapped to uniform, even surface. Fill depressions with suitable material and compact to provide a firm bed.
  - .5 Place geotextile on prepared surface. Avoid puncturing geotextile. Vehicular traffic over geotextile not permitted.
  - .6 Place stones using appropriate equipment in manner approved by Department Representative to secure surface and create a stable mass. Place larger stones at bottom of slopes.
  - .7 Place stones without damaging adjacent structures or geotextile material.
  - .8 Place rip-rap to thickness and details as indicated.
  - .9 Hand placing:
    - .1 Use larger stones for lower courses and as headers for subsequent courses.
    - .2 Stagger vertical joints and fill
-

- .3 voids with rock spalls or cobbles.  
Finish surface evenly, free of  
large openings and neat in  
appearance.

END

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PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 31 05 16 - Aggregate Materials.
  - .2 Section 33 31 13 - Public Sanitary Utility Sewerage and Piping
  - .3 Section 33 34 00 - Sanitary Utility Force Mains
- 1.2 References
- .1 American Society for Testing and Materials (ASTM)
    - .1 ASTM C 117-95, Standard Test Methods for material finer than 0.075 mm Sieve in Mineral aggregates by washing.
    - .2 ASTM C 131-96, Standard Test Method for Resistance to degradation of small-size coarse aggregate by abrasion and impact in the Los Angeles machine.
    - .3 ASTM C 136-96a, Standard Test Method for Sieve analysis of fine and coarse aggregates.
    - .4 ASTM D 698-00a, Standard Test Methods for laboratory compaction characteristics of soil using standard effort (12,400ft-lbf/ft<sup>3</sup>) (600kN-m/m<sup>3</sup>).
    - .5 ASTM D 1557-00, Test Method for laboratory compaction characteristics of soil using modified effort (56,000ft-lbf/ft<sup>3</sup>) (2,700kN-m/m<sup>3</sup>).
    - .6 ASTM D 1883-99, Standard Test Method for CBR (California Bearing Ratio) of laboratory compacted soils.
    - .7 ASTM D 4318-00, Standard Test Methods for liquid limit, plastic limit and plasticity index of soils.
  - .2 Canadian General Standards Board (CGSB)
    - .1 CAN/CGSB-8.2-M88, sieves, testing, woven wire, metric.
-

1.3 Delivery, Storage and Handling .1 Deliver and stockpile aggregates in accordance with Section 31 05 16 - Aggregate Materials. Stockpile minimum 50% of total bedding material/aggregate required prior to beginning operation.

1.4 Waste Management And Disposal .1 Remove un-used bedding material from site.

PART 2 - PRODUCTS

2.1 Materials .1 Pipe Bedding Material: Bedding material shall consist of well graded sand or granular material free of clay, frozen lumps, organic or deleterious matter and meet the gradation limits specified below:

Sieve Designation (mm)	Percent Passing
25	100
19	75-100
12.5	-
9.5	50-100
4.75	30-70
2	20-45
0.425	10-25
0.18	-
0.075	3-8

.2 Stone Bedding Material: Stone bedding shall be used only as deemed necessary by the Departmental Representative where dewatering is not possible. Stone bedding shall consist of approved, well graded material free of clay, frozen lumps, organic or deleterious matter; and meet the gradation limits as specified below.

Sieve Designation (mm)	Percent Passing
25.4	100
19	75-100
9.5	0-75
4.75	0-15
2.36	0-5

**When using stone bedding, the entire pipe bedding zone must be completely enveloped with geotextile fabric to prevent the migration of fine from the surrounding soil.**

PART 3 - EXECUTION

3.1 Sequence of Operation.1

Placement

- .1 Place pipe bedding material and compact as necessary to meet the grades shown on the drawings.
  - .2 Ensure no frozen material is placed.
  - .3 Place material only on properly shaped, clean unfrozen surface, free from snow and ice.
  - .4 Place material using methods which do not lead to segregation or degradation of aggregate.
  - .5 Place bedding material to a thickness of 150mm below the underside of pipe when the trench is not in solid rock. If the trench is in solid rock, the bedding material shall be placed 300mm thick below the underside of pipe.
  - .6 Bedding material shall be placed to a width of 300mm beyond the outside of the pipe, on both sides as well as 300mm thick on top of the pipe.
  - .7 Bedding shall be placed in uniform layers not exceeding 150mm compacted thickness. Departmental Representative may authorize thicker layers if specified compaction can be achieved.
- .2 Compaction Equipment
- .1 Compaction equipment to be capable of obtaining required material densities.
- .3 Compacting
- .1 Compact to density not less than 95% corrected maximum dry density in accordance with ASTM D698, latest edition.
  - .2 Shape and roll alternately to obtain

- smooth, even and uniformly compacted base.
- .3 Apply water as necessary during compacting to obtain specified density.
  - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative

END

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PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 32 92 21 - Hydroseeding
  - .2 Section 31 23 33 - Excavating, Trenching and Backfilling.
- 1.2 References
- .1 Agriculture and Agri-Food Canada
    - .1 The Canadian System of Soil Classification, Third Edition, 1998.
    - .2 Canadian Council of Ministers of the Environment
      - .1 PN1340-2005, Guidelines for Compost Quality.
- 1.3 Action and Informational Submittals
- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Quality control submittals:
    - .1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.
- 1.4 Quality Assurance
- .1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 14 10 - Scheduling and Management of Work.

PART 2 - PRODUCTS

- 2.1 Topsoil
- .1 Topsoil to come from material salvaged on site previously stockpiled on-site or from imported topsoil.
    - 1. Inform Departmental Representative of the proposed source of topsoil and provide access for sampling two (2) weeks minimum before starting production. The Contractor or his representative is to be present during sampling.
    - .2 Topsoil sources must be free of invasive species and capable of producing
-

- 
- clean material to the satisfaction of the Department Representative.
- .3 If, in the opinion of Departmental Representative, topsoil from the proposed source does not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that aggregate from a source in question can be processed to meet specified requirements.
- .4 Should a change of topsoil source be proposed during work, advise Departmental Representative one (1) week in advance of the proposed change to allow sampling and testing.
- .5 Acceptance of the topsoil at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory.
- 2.2 Source Quality Control .1 Contractor is responsible for amendments to supply topsoil as required.
- .2 Provide for soil testing by recognized testing facility for PH, P and K, and organic matter.
- .1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

PART 3 - EXECUTION

- 3.1 Temporary Erosion and Sedimentation Control .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and sediment and erosion control drawings.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation
-

controls and restore and stabilize areas disturbed during removal.

- .4 No hay mulch or possible seed contaminants are to be used on this project as a part of erosion control or any other activity.

3.2 Preparation of Existing Grade

- .1 Verify that grades are correct.
- .2 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
- .3 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .4 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
  - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
  - .2 Remove debris which protrudes more than 75 mm above surface.
  - .3 Dispose of removed material off site.

3.3 Placing and Spreading of Topsoil/Planting Soil

- .1 Screen previously stripped material prior to use using 50mm square screen. Material retained on screen shall be disposed of incidental to the work.
- .2 Place topsoil after Departmental Representative has accepted subgrade.
- .3 Spread topsoil in uniform layers not exceeding 100 mm.
- .4 Spread topsoil as indicated to following minimum depths after settlement.
  - .1 50 mm for all areas.
- .5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

- 
- 3.4 Finish Grading .1 Grade to eliminate rough spots and low areas and ensure positive drainage.  
.1 Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.  
.1 Leave surfaces smooth, uniform and firm against deep footprinting.
- 3.5 Acceptance .1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.
- 3.6 Surplus Material .1 Dispose of materials not required where directed by Departmental Representative off site.
- 3.7 Cleaning .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END

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PART 1 - GENERAL

- 1.1 Related Sections .1 Section 32 91 19 - Top Soil and Grading.
- 1.2 Submittals .1 Product Data.
- .1 Submit product data in accordance with 01 33 00 - Submittal Procedures.
  - .2 Provide product data for:
    - .1 Seed.
    - .2 Mulch.
    - .3 Tackifier.
    - .4 Fertilizer.
    - .5 Fibre Reinforced Matrix
  - .3 Submit in writing to Departmental Representative fourteen (14) days prior to commencing work:
    - .1 Volume capacity of hydraulic seeder in litres.
    - .2 Amount of material to be used per tank based on volume.
    - .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.
- 1.3 Quality Assurance .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- 1.4 Scheduling .1 Schedule hydraulic seeding to coincide with preparation of soil surface.
- .2 Hydroseeding shall be carried out as soon as possible after completion of the surface preparation in order to prevent erosion by wind and water. Hydroseeding shall take place no more than two (2) weeks after excavation and embankment
-

construction is complete.

## PART 2 - PRODUCTS

### 2.1 Materials

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
  - .1 Grass mixture: "Certified", "Canada No.1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
  - .2 Mixture composition:
    - .1 60% Certified Annual Rye Grass.
    - .2 40% Creeping Red Fescue
- .2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, with an environmentally acceptable dye, free of germination and growth inhibiting factors with following properties:
  - .1 Type I mulch:
    - .1 Made from wood cellulose fibre.
    - .2 Organic matter content: 95% plus or minus 0.5%.
    - .3 Value of pH: 6.0.
    - .4 Potential water absorption: 900%.
- .3 Tackifier: water dilutable, liquid dispersion water soluble vegetable carbohydrate powder.
- .4 Water: free of impurities that would inhibit germination and growth.
- .5 Fertilizer:
  - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
  - .2 The fertilizer is to have a plant food ratio of 10 nitrogen, 20 phosphorus, and 20 potash plus 2% Fritted Trace Elements.
  - .3 The fertilizer to be spread the following spring during the

maintenance period shall have a  
plant food ratio of 19 nitrogen,  
19 phosphorus, and 19 potash.

- .6 Inoculants: inoculant containers to be tagged with expiry date.
- .7 Fibre Reinforced Matrix (FRM)
  - .1 FRM shall consist of thermally refined wood fibers and 10% by weight cross-linked hydro-colloidal tackifiers, and 5% by weight crimped man-made fibers. FRM shall be 100% biodegradable. FRM shall not have a curing period.
  - .2 FRM shall be hydraulically applied and after application be capable of adhering to the soil. In a dry state, FRM shall be comprised of not less than 70% by weight of long stranded wood fibres held together by organic or mineral bonding agents or both. The hydrated FRM shall form a viscous mat. The bonding agent shall not dissolve or disperse upon re-wetting. FRM shall not inhibit the germination or growth of plant material.

PART 3 - EXECUTION

3.1 Workmanship

- .1 Do not spray onto structures, signs, guide rails, fences, plant material, utilities, and other than surfaces intended.
- .2 Clean-up immediately, any material sprayed where not intended, to satisfaction of Departmental Representative.
- .3 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, immediately prior to heavy rain events, frozen ground or ground covered with snow, ice or standing water.
- .4 Protect seeded areas from trespass until

plants are established.

3.2 Preparation of  
Surfaces

- .1 Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.
- .2 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
- .3 In areas of hard earth, spread suitable excavated material at a minimum depth of 150mm to promote growth.
- .4 Obtain Departmental Representative's approval of grade before starting to seed.

3.3 Preparation of  
Slurry

- .1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to Departmental Representative. Supply equipment required for this work.
- .2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
- .3 After all materials are in the seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

3.4 Slurry Application

- .1 Hydraulic seeding equipment:
  - .1 Slurry tank.
  - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
  - .3 Capable of seeding by 50m hand operated hoses and appropriate nozzles.
- .2 Slurry mixture applied per hectare.

- 
- .1 Seed: Grass mixture 175kg.
  - .2 Mulch: Type I 1350kg.
  - .3 Tackifier: 300kg.
  - .4 Water: Minimum 30,000L.
  - .5 Fertilizer: 400kg.
- 
- .3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
    - .1 Using correct nozzle for application.
    - .2 Using hoses for surfaces difficult to reach and to control application.
  - .4 Blend application 300mm into adjacent grass areas or sodded areas and previous applications to form uniform surfaces.
  - .5 Re-apply where application is not uniform.
  - .6 Remove slurry from items and areas not designated to be sprayed.
  - .7 Protect seeded areas from trespass satisfactory to Departmental Representative.
  - .8 Remove protection devices as directed by Departmental Representative.
- 
- 3.5 Application of Fibre Reinforced Matrix
- .1 FRM slurry shall be applied at locations as identified on the Drawings or as directed by the Departmental Representative.
  - .2 FRM shall be thoroughly mixed with water in a hydraulic.1 FRM shall be applied at a minimum rate of 3,700kg of dry product per hectare. FRM shall be thoroughly mixed with water in a hydraulic seeder and mulcher at a rate of 20-30 kg of dry product to 500-600 litres of water to form a homogeneous slurry.
  - .3 The FRM slurry may be applied in a 1-step application with seed or a two-step application on already seeded earth. FRM shall be applied by nozzle sprayer or extension hose. The FRM slurry shall be evenly dispersed in successive
-

applications from different directions to form a uniform, cohesive mat. The spray shall not dislodge soil or cause erosion.

- .4 FRM shall be installed by personnel certified and trained by the manufacturer in the proper mixing and installation of the product.

3.6 Maintenance During Establishment Period

- .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
- .2 The Contractor shall be responsible for maintaining hydroseeded areas to ensure proper and adequate growth of the vegetation during the warranty period. The Contractor shall also be responsible for an additional application of fertilizer the following spring after initial application. This application shall be by a method approved by the Department. The fertilizer shall be 5-10-30 and shall be applied at a rate of 300 kg/ha. No additional payment will be made for maintenance or the extra application of fertilizer.

3.7 Acceptance

- .1 Seeded areas will be accepted by the Departmental Representative provided evidence of growth and that plants are uniformly established.

3.8 Warranty Period

- .1 All areas hydroseeded under this contract shall have a warranty period of one (1) year starting from the date of initial acceptance. This warranty shall cover any defects in materials and workmanship, and damages caused by the elements of weather. During this period, any defect brought to the attention of the Contractor by the Departmental Representative shall be fixed, repaired or made good to the satisfaction of the Departmental Representative and at no additional cost to the Department.

3.9 Cleaning

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END

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PART 1 - GENERAL

- 1.1 Related Sections .1 Section 32 91 19 - Topsoil Placement and Grading.
- 1.2 References .1 Canadian Food Inspection Agency (CFIA); Plant Production Division, Fertilizer Section:  
.1 Canadian Fertilizer Act and Regulations  
.2 Canadian Fertilizer Quality Assurance Program  
.3 Canadian Fertilizer Act and Regulations  
.2 Canadian Nursery Landscape Association (CNLA):  
.1 Canadian Standards for Nursery Stock, Nursery Sod
- 1.3 Submittals .1 Product Data.  
.1 Submit manufacturer's instructions, printed product literature and data sheets for sod, geotextile and fertilizer and include product characteristics, performance criteria, physical size, finish and limitations.  
.2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 11 10 - General Requirements: Health and Safety Requirements.  
.3 Samples:  
.1 Submit:  
.1 Sod for each type specified. Install approved samples in 1 m<sup>2</sup> mock-ups and maintain in accordance with maintenance requirements during establishment period.  
.2 Bio-degradable geotextile fabric.  
.3 0.5 kg container of each type of fertilizer used.  
.2 Obtain approval of samples by Departmental Representative.  
.4 Test Reports: Submit certified test reports of seed analyses showing compliance with specified performance characteristics and physical properties.  
.5 Certificates: Submit product certificates signed by manufacturer certifying that
-



materials supplied to the project comply with specified performance characteristics and criteria and physical requirements.

1.4 Quality Assurance

- .1 Regulatory Requirements: Use only fertilizers, pesticides, micro-nutrients and supplements that are registered by the Canadian Food Inspection Agency and that meet requirements of referenced acts and regulations.

1.5 Scheduling

- .1 Schedule sod laying to coincide with preparation of soil surface.
- .2 Schedule sod installation when frost is not present in ground.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.6 Delivery,  
Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 11 10 - General Requirements: Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
  - .1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.
- .3 Storage and Handling Requirements
  - .1 Store fertilizer off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 Materials

- .1 Number One Grade Turf Grass: Provide sod that is sown and cultivated in local nursery fields as turf grass crop from certified seed as approved by the Departmental Representative, and that has matured under environmental conditions similar to that of the project and as follows:

.1 Turf Grade Sod: Mow sod to a height of 50 mm within 36 hours prior to lifting with clippings removed.

.2 Turf Grass Nursery Sod quality:

.1 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm

.2 Mowing height limit: 35 to 65 mm.

.3 Soil portion of sod: 6 to 15 mm in thickness.

## 2.2 Accessories

.1 Sod Establishment Support: Provide biodegradable geotextile fabric and pegs as required to prevent washouts and to establish strong root growth.

.2 Water: Provide water from local source or from trucked source as required during maintenance period and until vigorous growth has been established.

.3 Fertilizer: Provide slow release fertilizer that contains a minimum of 65% water insoluble nitrogen, and other nutrients required to establish vigorous growth in proportions necessary to amend topsoil as determined by analysis.

## 2.3 Source Quality Control

.1 Obtain written approval from Departmental Representative of sod at source.

.2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

.3 Obtain sod only from CNLA listed grower that can provide certification of seed source with growing location in close proximity to project site; provincial associations belonging to CNLA are acceptable for this requirement.

.4 Provide a nutrient analysis of topsoil and provide test data and recommended fertilizer application constituents and rates to Departmental Representative before delivering materials to the project site.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that grades are correct and prepared ready for placement of sodding materials
  - .1 Do not perform work under adverse conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
  - .2 Starting work of this Section indicates acceptance of conditions.

3.2 Preparation

- .1 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated to tolerance of  $\pm 8$  mm and to allow surface to drain naturally.
- .2 Remove and dispose of weeds, debris, stones larger than 50 mm diameter, soil contaminated by oil, gasoline and other deleterious materials off site and in accordance with requirements of local authority having jurisdiction.

3.3 Installation

- .1 Sod Placement:
  - .1 Lay sod within 24-hours of being lifted if air temperature exceeds 20°C.
  - .2 Lay sod sections in rows with joints staggered and ends butted closely without overlapping or leaving gaps between sections; cut out irregular or thin sections with sharp implements.
  - .3 Roll sod as required to obtain close contact between sod and soil using light rolling; use of heavy rolling to correct irregularities in grade is not permitted.
- .2 Sod Placement on Slopes:
  - .1 Install and secure geotextile fabric in areas having a slope greater than 3:1 to prevent soil erosion in accordance with manufacturer's instructions.
  - .2 Lay sod starting from bottom of slopes.
  - .3 Peg sod on slopes steeper than 3:1, within 1 metre of catch basins and within 1 metre of drainage channels and ditches to following pattern:

- .1 First sod sections along contours of slopes: 100 mm below top edge at 200 mm on centre.
    - .2 Areas above first sod sections: Not less than 3 to 6 pegs/m<sup>2</sup>.
    - .3 Areas at drainage structures Not less than 6 to 9 pegs/m<sup>2</sup>.
    - .4 Adjust pattern as required to obtain firm contact with topsoil and to prevent movement.
  - .2 Drive pegs to 20 mm above soil surface of sod sections.
  - .3 Fertilizing Program: Fertilize during establishment and warranty periods at a rate and frequency established by source quality control testing and until vigorous growth is established.
  - .4 Maintenance during Establishment Period: Perform following operations from time of installation until vigorous growth is established:
    - .1 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
    - .2 Cut grass to 50 mm when or prior to it reaching height of 75 mm; remove clippings that have potential to smother grassed areas.
    - .3 Fertilize areas in accordance with fertilizing program listed above; spread half of required amount of fertilizer in one direction and remainder at right angles and water in well where rainfall is not expected within 2 to 3 hours of fertilizing.
  - .5 Acceptance: Departmental Representative will accept installation provided that:
    - .1 Sodded areas are properly established and free of bare and dead spots with no surface soil from a height of 1500 mm when grass has been cut to height of 50 mm; when sodded areas are cut a minimum of 2 times prior to acceptance; and that fertilizing in accordance with fertilizer program has been carried out at least
-

once.

- .6 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.4 Maintenance  
During Warranty  
Period

- .1 Maintenance during Warranty Period: Perform following operations from time of acceptance until end of warranty period:
  - .1 Water Turf Grade Sod at weekly intervals to obtain optimum soil moisture conditions listed above.
  - .2 Repair and reapply sod to dead or bare spots before expiration of warranty period.
  - .3 Cut grass and remove clippings that have potential to smother grass to heights listed above.
  - .4 Cut grass at 2-week intervals or as otherwise required to maintain grass at correct growing height at intervals so that approximately one third of growth is removed in single cut.
  - .5 Eliminate weeds by mechanical means to extent acceptable listed above.

3.5 Acceptance

- .1 Sodded areas will be accepted by the Departmental Representative provided evidence of growth and that plants are uniformly established.

3.6 Warranty Period

- .1 For seeding, 12 months' warranty period is extended to 1 full growing season.
- .2 End-of-warranty inspection will be conducted by Departmental Representative.

3.7 Cleaning

- .1 Remove surplus materials, rubbish, tools and equipment barriers after completion of work of this Section.

END

PART 1 - GENERAL

1.1 Related Sections

- .1 Section 03 10 00 Concrete Forming and Accessories.
- .2 Section 03 20 00 Concrete Reinforcing.
- .3 Section 03 30 00 Cast-in-Place Concrete.
- .4 Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .5 Section 33 31 13 Public Sanitary Utility Sewerage Piping.
- .6 Section 33 34 00 Sanitary Utility Sewerage Forcemains.

1.2 References

- .1 ASTM International
    - .1 ASTM A48/A48M-03(2012), Standard Specification for Gray Iron Castings.
    - .2 ASTM A123/A123M-2012, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    - .3 ASTM B148-14 Standard Specification for Aluminum-Bronze Sand Castings.
    - .4 ASTM C117-13, Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.
    - .5 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
    - .6 ASTM C139-11, Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
    - .7 ASTM C478M-13, Standard Specification for Precast Reinforced Concrete Manhole Sections (Metric).
    - .8 ASTM D698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup>(600 kN-m/m<sup>3</sup>)).
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- .9 ASTM D1248-12 Standard  
Specification for Polyethylene Plastics  
Extrusion Materials for Wire and Cable.
- .10 ASTM F593 -13a Standard  
Specification for Stainless Steel Bolts,  
Hex Cap Screws, and Studs.
- .11 ASTM F594 -09e1 Standard  
Specification for Stainless Steel Nuts.
- .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 CSA Group
  - .1 CSA A23.1/A23.2-09, Concrete  
Materials and Methods of Concrete  
Construction/Test Methods and Standard  
Practices for Concrete.
  - .2 CAN/CSA-A165 Series-04 (R2009),  
CSA Standards on Concrete Masonry Units  
(Consists of A165.1, A165.2 and A165.3).
  - .3 CSA A257, Standards for concrete  
pipe and manhole sections.
  - .4 CAN/CSA-A3000-08, Cementitious  
Materials Compendium (Consists of A3001,  
A3002, A3003, A3004 and A3005).
  - .5 CSA G30.18-09, Carbon Steel Bars  
for Concrete Reinforcement.

1.3 Action and  
Informational Submittals

- .1 Submit in accordance with Section 01 33  
00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's  
instructions, printed product  
literature and data sheets for  
manholes, catch basins, and  
include product characteristics,  
performance criteria, physical  
size, finish and limitations.
- .3 Shop Drawings:
  - .1 It is the Contractor's  
responsibility to approve all Shop

- Drawings and verify their correctness.
- .2 Review of the Contractor's drawings by the Department Representative shall not relieve the Contractor of the responsibility for the correctness thereof, nor from the results arising from any error or omission in details of design.
  - .3 Prior to the production of fill concrete for use in this contract, provide to the Department Representative a certificate from a certified testing company stating that the concrete to be supplied conforms to the requirements of this Section.
- 1.4 Quality Assurance
- .1 Submit in accordance with Section 01 45 00 - Quality Control.
  - .2 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work. Include manufacturer's drawings, information and shop drawings where pertinent.
- 1.5 Delivery, Storage and Handling
- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
  - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .3 Storage and Handling Requirements:
    - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
    - .2 Store and protect manholes from nicks, scratches, and blemishes.
-



- .3 Replace defective or damaged materials with new.

- 1.6 Scheduling of Work
  - .1 Schedule work to minimize interruptions to existing services and to maintain existing flow during construction.
  - .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.

PART 2 - PRODUCTS

- 2.1 Materials
  - .1 Cast-in-place concrete:
    - .1 In accordance with Section 03 30 00 - Cast-in-Place Concrete.
    - .2 Benching requirements:
      - .1 Benching shall be concrete with a 28 day compressive strength of 25 MPa.
    - .3 Concrete reinforcement: in accordance with Section 03 20 00 - Concrete Reinforcing.
  - .2 Concrete Formwork: in accordance with Section 03 10 00 Concrete Forming and Accessories.
  - .3 Precast manhole units: to ASTM C478M, circular or oval.
    - .1 Top sections eccentric cone or flat slab top type with opening offset for vertical ladder installation.
    - .2 Precast base sections with reinforced concrete slab within:
      - .1 Rubber gaskets to suit the inlet and outlet pipes and factory installed benching.
      - .2 Install benching to minimize hydraulic losses through chamber.
      - .3 Channels and benching: smooth and uniform and not less than 75% of the diameter of the largest pipe.

- .4 Approved product: Capital Precast Ltd. or approved equivalent.
  - .4 Joints between sections: rubber gasket and Ram-Nek gasket as indicated on the detail drawings and meeting the requirements of the latest CSA A257.3.
    - .1 Waterproofing membrane as indicated on the detail drawings
      - .1 Acceptable product: Bakor Blueskin WP 200 complete with Aquatac Primer, Colphene 3000 by Soprema complete with Elastocol Stick Primer or approved equivalent.
      - .2 Protect membrane with an appropriate "blanket" before being backfilled against.
  - .5 Adjusting rings: 150 and 300 mm concrete riser sections to ASTM C478M.
  - .6 Adjusting rings: to ASTM C478M.
  - .7 Use drop manholes when the difference between the invert elevation of the inlet and the outlet pipe is greater than 600 mm.
    - .1 Internal drop: pre-cast concrete or RELINER, by RELINER - Duran Inc., complete with drop bowl assembly, PVC DR35 pipe, PVC band and S.S. clamp with maximum spacing of 0.5 m.
    - .2 Manhole diameter: minimum 1200 mm.
    - .3 Anchoring systems: in accordance with the drawings.
  - .8 Drop manhole pipe: same as sewer pipe.
  - .9 Galvanized iron sheet: approximately 2 mm thick.
  - .10 Steel gratings, I-beams and fasteners: as indicated.
-

- .11 Frames, covers to dimensions as indicated and following requirements:
  - .1 Standard manhole frames and covers: 411W cast iron meeting the requirements of the latest ASTM Standard A48, Class 30. Covers: snug fit and rattle free.
    - .1 Manhole 411W frame outside flange to be 870mm dia., with a 580mm cover opening, and a min. weight of 95.3 kg.
    - .2 Manhole 411W solid cover to be 575mm dia., with a min. of four ribs, two - 25mm lift holes, and a min. weight of 43.1 kg.
  - .2 Adjustable manhole frames and covers: Laperle C50 M1 or approved equivalent, meeting the requirements of the latest ASTM Standard A536 for Ductile Iron and ASTM A48, Class 30 for cast iron.
    - .1 Adjustable manhole frames and covers to have machined seats, anti-rocking bumps, and outside flange dia. of 860mm, a 572mm dia. x 24mm thick cover, with a min. weight set of 153 kg.
  - .3 Standard off-road manhole frames and covers: lock-down type, R12S as manufactured by IMP Group Ltd. or approved equivalent, meeting the requirements of the latest ASTM Standard A-48.
    - .1 Off-road frame outside flange dia. to be 838mm, secured with 4 - 12mm dia. stainless steel anchors, grouted a min. of 50mm into a 685mm dia. conc. riser.
    - .2 Off-road cover to be 610 mm dia., secured to frame with 2 pentagon-shaped (5-sided), stainless steel fasteners.
- .12 Granular bedding and backfill: in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

- .13 Unshrinkable fill: in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .18 Backfill material: in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .19 Fill Concrete:
  - .1 Portland cement: to CSA CAN3-A5-M, Type 10 or Type 30 (High Early Strength for winter construction).
  - .2 Supplementary cementing materials, when permitted: to CSA CAN3-A23.5-M.
  - .3 Fine and coarse aggregate: to CSA CAN3-A23.1-M. Gradation to conform to Table 1 of the CSA Standard for 10 mm minus.
  - .4 Mixing water: to CAN3-A23.1-M.
  - .5 Air-entraining admixtures: to CSA CAN3-A266.1-M.
  - .6 Mix Design:
    - .1 Maximum cement content: 25 kg/m<sup>3</sup>.
    - .2 Maximum strength at 28 days: 0.40 MPa (measured in accordance with CAN3-A23.2-9C).
    - .3 Slump: 150-200 mm (measured in accordance with CAN3-A23.2-5C).
    - .4 Air content: 4% - 6% (measured in accordance with CAN3-A23.2).
- .20 Backfill material: in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

PART 3 - EXECUTION

3.1 Examination

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for manhole

installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of the Department Representative.
- .2 Inform the Department Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Department Representative.

3.2 Excavation and Backfill

- .1 Excavate and backfill in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling and as indicated.

3.3 Concrete Work

- .1 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Place concrete reinforcement in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 Position metal inserts in accordance with dimensions and details as indicated.

3.4 Installation

- .1 Construct manholes of pre-cast concrete sections according to drawing details.
- .2 Construct units in accordance with details indicated, plumb and true to alignment and grade.
- .3 Complete units as pipe laying progresses.
  - .1 Maximum of 3 units behind point of pipe laying will be allowed.

- .4 Install manholes at the locations indicated on the drawings, at all changes in grade, pipe size or alignment, at all intersections, at the end of each line and at distances not greater than 120 m for sewer 600 mm nominal diameter and smaller and 150 m for sewers 600 mm nominal diameter and larger. Where possible, manholes in roadways will be located so as to avoid principal wheel travel areas.
  - .5 Dewater excavation to approval of the Department Representative and remove soft and foreign material before placing concrete base.
  - .6 Set precast concrete base on 150 mm minimum of granular bedding compacted to 100% corrected maximum dry density maximum density to ASTM D698.
  - .7 Make each successive joint watertight.
  - .8 Plug lifting holes with precast concrete plugs set in cement mortar or mastic compound.
  - .9 For sewers:
    - .1 Place stub outlets and bulkheads at elevations and in positions indicated.
    - .2 Bench to provide smooth U-shaped channel.
      - .1 Side height of channel to be 0.75 times full diameter of sewer.
      - .2 Slope adjacent floor at 1 in 20.
      - .3 Curve channels smoothly.
      - .4 Slope invert to establish sewer grade.
  - .10 Compact granular backfill to 95% corrected maximum dry density maximum density to ASTM D698.
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- .11 Place unshrinkable backfill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .12 Installing units in existing systems:
  - .1 Where new unit is installed in existing run of pipe, ensure full support of existing pipe during installation, and carefully remove that portion of existing pipe to dimensions required and install new unit as specified.
  - .2 Make joints watertight between new unit and existing pipe.
  - .3 Where deemed expedient to maintain service around existing pipes and when systems constructed under this project are ready for operation, complete installation with appropriate break-outs, removals, redirection of flows, blocking unused pipes or other necessary work.
- .14 Installing units on new lines where connections are to be made to existing sewer lines:
  - .1 Install when the downstream systems are ready to receive wastewater.
  - .2 By-pass flows in the existing sewer around the connection area during construction and testing.
    - .1 A plug may also be required at the downstream manhole to which wastewater is being pumped, to prevent backflow to the work area.
  - .3 Test these manholes as they are constructed, before flows are permitted to pass through the new connection.
  - .4 Whenever bypassing of sewer flow is being carried out, the Contractor shall have personnel on site continuously and back-up system components must be kept on site in the event of a failure of the first system.

- .5 Provide plugs or caps where required to block off and seal ends of pipes that are being abandoned or otherwise isolated, incidental to the work.
- .15 Set frame and cover on top section to elevation as indicated.
  - .1 Paved roadways: 10 mm below finished grade and conforming to crown of road.
  - .2 Gravel roadways: 25 mm below finished grade.
  - .3 Off traveled roadways: 50 to 100 mm above finished grade.
    - .1 Include lock-down frame and cover.
      - .1 Approved product: R12S or approved equivalent.
  - .4 If adjustment required use concrete ring.
- .16 Clean units of debris and foreign materials.
  - .1 Remove fins and sharp projections.
  - .2 Prevent debris from entering system.

3.5 Abandonment or  
Removal of Manholes

- .1 Abandon or remove manholes as indicated on the drawings or as laid out by the Department Representative.
- .2 Manholes shall not be abandoned until the remainder of the system is ready to receive wastewater and all required sanitary sewer pipe connections have been completed and accepted.
- .3 Remove and dispose of top section(s) above the manhole base unless manhole is to be removed completely to accommodate new piping or connections.
- .4 Fill the remainder of the manhole structure with approved granular material.



- .5 Backfill the excavation in accordance with Section 31 23 33.01 Excavating, Trenching and Backfilling.
  - .1 Match top surface of the fill to surrounding ground and restore surface to match conditions specified for the adjacent areas.
- .6 Remove and dispose of surplus materials.

3.6 Field Quality Control

- .1 Test all sanitary sewer manholes for leakage.
- .2 Notify the Department Representative at least forty-eight (48) hours in advance of performing sanitary manhole ex-filtration tests.
- .3 Should the sanitary sewer main ex-filtration tests prove unsatisfactory, the Contractor shall excavate to determine the cause, make repairs, backfill and retest at his own expense.

3.7 Sanitary Manhole Vacuum Test (Air)

- .1 To latest version of ASTM C1244M.
- .2 Conduct testing one manhole at a time:
  - .1 Plug all lift holes. Plug all pipe inlets discharging into the test manhole and all pipe outlets discharging from the test manhole. Install a bulkhead on the test manhole.
  - .2 Use a vacuum pump to increase the negative pressure to 27.6 KPa (4.0 psi). Close the vacuum source. Begin recording of the test time. Allow the negative pressure to increase to 24.1 KPa (3.5 psi).
  - .3 Department Representative will calculate the allowable leakage and notify the Contractor. If the actual leakage time is greater than





- .6 ASTM C425-09, Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings.
  - .7 ASTM C428-05(2006), Standard Specification for Asbestos-Cement Nonpressure Sewer Pipe.
  - .8 ASTM C443M-07, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
  - .9 ASTM C663-98(2008), Standard Specification for Asbestos Cement Storm Drain Pipe.
  - .10 ASTM C700-09, Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
  - .11 ASTM C828-06, Standard Test Method for Low-pressure Air Test of Vitrified Clay Pipe Lines.
  - .12 ASTM D698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft<sup>4</sup>-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - .13 ASTM D1869-95(2005)e1, Standard Specification for Rubber Rings for Asbestos Cement Pipe.
  - .14 ASTM D2680-01(2009), Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
  - .15 ASTM D3034-08, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
  - .16 ASTM D3350-10, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
  - .3 CSA International
    - .1 CSA A3000-08, Cementitious Materials Compendium.
    - .2 CSA A257 Series-09, Standards for Concrete Pipe and Manhole Sections.
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.3      CAN/CSA-B70-06, Cast Iron Soil  
Pipe, Fittings, and Means of  
Joining.

- .4      CSA B1800-11, Thermoplastic  
Non-pressure Pipe Compendium.
- .1      CSA B182.1-11, Plastic Drain and  
Sewer Pipe and Pipe Fittings.
- .2      CSA B182.2-11, PSM Type  
Polyvinylchloride PVC Sewer Pipe  
and Fittings.
- .3      CSA B182.6-11, Profile  
Polyethylene (PE) Sewer Pipe and  
Fittings for Leak-Proof Sewer  
Applications.
- .4      CSA B182.11-11, Standard Practice  
for the Installation of  
Thermoplastic Drain, Storm, and  
Sewer Pipe and Fittings.

1.4 Administrative  
Requirements

- .1      Scheduling:
- .1      Schedule Work to minimize  
interruptions to existing services  
and maintain existing sewage flows  
during construction.
- .2      Submit schedule of expected  
interruptions for approval and  
adhere to approved schedule.
- .3      Notify the Department  
Representative 24 hours minimum in  
advance of any interruption in  
service.

1.5 Action and  
Informational Submittals

- .1      Submit in accordance with Section 01 33  
00 - Submittal Procedures.
- .2      Product Data:
- .1      Submit manufacturer's  
instructions, printed product  
literature and data sheets for  
pipes and include product  
characteristics, performance  
criteria, physical size, finish  
and limitations.
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- .3 Certificates:
  - .1 Certification to be marked on pipe.
- .4 Test and Evaluation Reports:
  - .1 Submit manufacturer's test data and certification 2 weeks minimum before beginning Work.

1.6 Delivery, Storage  
and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Load and unload pipe and accessories by lifting with hoists and slings, on pallets, or careful skidding so as to prevent shock and damage.
- .3 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .4 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations.
  - .2 Store and protect pipes and coatings from damage.
  - .3 Replace defective or damaged materials with new.
  - .4 Do not drop or drag pipe.
  - .5 Avoid severe impact blows, abrasion damage, and gouging or cutting of PVC pipe by metal surfaces or rocks.
  - .6 For pipe handled on skidways, do not skid or roll pipe against pipe already on the ground.
  - .7 Avoid stressing bell joints and damage of bevel ends.

PART 2 - PRODUCTS

2.1 General

- .1 Sanitary sewer pipe and gaskets will be supplied by the Contractor. Sewer pipe gaskets to be supplied to the Contractor by the pipe manufacturer.
- .2 Sanitary service lateral pipes, bored pipes, tees, wyes, bends, couplings, rings, fittings, elbows, caps and saddles will be provided by the Contractor.
- .3 Joints to be push-on type and must be watertight.

2.2 Plastic Pipe

- .1 Type PSM Polyvinyl Chloride (PVC): to CSA B182.2.
  - .1 Standard Dimensional Ratio (SDR): 35.
  - .2 Gasket to ASTM D3212 and integral bell system with no reduction in the wall thickness.
  - .3 Nominal lengths: 6 m.
  - .4 Color coded "green".
  - .5 Piping shall be either solid walled or perforated type as noted on drawings.

2.3 Fittings

- .1 Type PSM Poly (Vinyl) Chloride: to CSA B182.2.
- .2 Plastic pipe and fittings: to ASTM 3034 and CSA B182.1, with push-on joints.
  - .1 PVC DR35, colour coded green.
  - .2 Minimum 100 mm diameter.
  - .3 Joints: bell and spigot type with locked in rubber gasket.
- .3 Bends: long radius type only.
- .4 Caps for ends: PVC.

2.4 Cement Mortar

- .1 Portland cement: to CSA A3000, normal type 10.

- .2 Mix mortar 1 part by volume of cement to two parts of clean, sharp sand mixed dry.
    - .1 Add only sufficient water after mixing to give optimum consistency for placement.
    - .2 Do not use additives.
  
  - 2.5 Pipe Penetration Seal .1 As shown on the Contract Drawings, where cast in rubber gaskets cannot be installed and core drilling is required, suitable pipe penetrations seal is to be installed to ensure that the hole is watertight. All core drilling pipe perforations shall be sealed with Proco Pen-Seal or Link-Seal for a watertight seal. Size of the core drilling holes shall be in accordance with the manufacturer's recommendations.
  
  - 2.6 Pipe Bedding and Surrounding Material .1 Granular material to Section 31 23 33.01 - Excavating, Trenching and Backfilling.
  
  - 2.7 Backfill Material .1 In accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
  
  - 2.8 Insulation .1 Insulation: extruded, expanded closed-cell polystyrene insulation with the following minimum characteristics:
    - .1 Compressive strength - 210 kPa;
    - .2 Water absorption (% by volume) - Max. 0.7%;
    - .3 Capillarity (none);
    - .4 Shear strength - 275kPa.
  
  - .2 Acceptable Products:
    - .1 Styrofoam HI-40, Celfort 300 as manufactured by Owens Corning, or approved equivalent.
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PART 3 - EXECUTION

- 3.1 Examination .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sewer pipe installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of the Department Representative.
  - .2 Inform the Department Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.
- 3.2 Preparation .1 Clean pipes and fittings of debris and water before installation, and remove defective materials from site to approval of the Department Representative.
- .2 Clean and dry pipes and fittings before installation.
  - .3 Obtain **Department Representative's** approval of pipes and fittings prior to installation.
- 3.3 Trenching .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Protect trench from contents of sewer or sewer connection.
  - .3 Trench alignment and depth require approval of the Department Representative prior to placing bedding material and pipe.
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3.4 Granular Bedding

- .1 Place bedding in unfrozen condition.
- .2 Place granular bedding materials in uniform layers not exceeding 300 mm compacted thickness to depth as indicated.
- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
  - .1 Do not use blocks when bedding pipe.
- .4 Shape transverse depressions as required to suit joints.
- .5 Compact each layer full width of bed to at least 95% maximum density to ASTM D698.
- .6 Fill excavation below bottom of specified bedding adjacent to manholes or structures with compacted bedding material or lean mix concrete mud slab, as indicated on drawings.

3.5 Installation

- .1 Install sanitary sewer mains according to the sizes and locations indicated on the drawings.
  - .2 Provide and use proper implements, tools and facilities for safe and efficient execution of the work.
  - .3 Lay and join pipes to: ASTM C12.
  - .4 Lay and join pipes in accordance with manufacturer's recommendations, in accordance with recognized good practice and to approval of the Department Representative.
  - .5 Handle pipe using methods approved by the Department Representative.
    - .1 Do not use chains or cables passed through rigid pipe bore so that
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- weight of pipe bears upon pipe ends.
- .2 Carefully lower pipe and fittings into trench in such a manner as to prevent damage to them. Do not drop pipe or fittings into trench.
  
  - .6 Lay pipes on prepared bed, true to line and grade, with pipe invert smooth and free of sags or high points.
    - .1 Minimum grade, unless otherwise indicated:
      - .1 Pipe diameter 200 mm to 300 mm: 0.4%
      - .2 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
      - .3 Remove and re-lay any pipe which is not in true alignment or shows undue settlement after laying.
  
  - .7 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
  
  - .8 Do not lay pipe on a foundation into which frost has penetrated, or at any time when the Department Representative may deem that there is a danger of the formation of ice or the penetration of frost at the bottom of the excavation.
  
  - .9 Inspect pipe thoroughly before and after laying. Remove defective or damaged pipe from the site and replace with new sound material.
  
  - .10 Trenches where pipe laying is in progress are to be kept dry. Pipes are not to be laid in water or upon wet bedding. Dewater excavations as required.
  
  - .11 Thoroughly clean pipes as they are laid and protect pipes from dirt and water.
  
  - .12 No length of pipe shall be laid until the preceding length has been thoroughly bedded and secured in place
-

so as to prevent movement or disturbance of the pipe.

- .13 Do not walk on or work over pipes until there is a minimum of 300 mm of cover over them, except as necessary in refilling trench and compacting the bedding material.
  - .14 Joint deflection permitted within limits recommended by pipe manufacturer.
  - .15 Water to flow through pipe during construction, only as permitted by the Department Representative.
  - .16 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
  - .17 Install plastic pipe and fittings in accordance with CSA B182.11.
  - .18 Pipe jointing:
    - .1 Install gaskets in accordance with manufacturer's written recommendations.
    - .2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
    - .3 Align pipes before joining.
    - .4 Maintain pipe joints free from mud, silt, gravel and foreign material. Wipe clean ends of pipe, rubber gaskets, fittings, etc. immediately before jointing.
    - .5 Avoid displacing gasket or contaminating with dirt or foreign material. Gaskets so disturbed to be removed, cleaned and lubricated and replaced before joining is attempted.
    - .6 Apply lubricant as approved by the pipe manufacturer to the spigot up to the reference mark and to the
-

- face of the gasket (mechanical joint gaskets included).
- .7 Complete each joint before laying next length of pipe.
  - .8 Minimize joint deflection after joint has been made to avoid joint damage.
    - .1 Joint deflection permitted within limits recommended by pipe manufacturer.
  - .9 At rigid structures, install pipe joints not more than 1.2 m from side of structure.
  - .10 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
  - .11 Pipes may be pushed together by means of a crow-bar solidly wedged into the ground, by using a suitable pipe puller at the joint, or in some instances by very carefully pushing with the backhoe, or by any other method approved by the Department Representative.
    - .1 Use a block of wood when pushing against the pipe to prevent damage,
  - .12 Ensure pipe gaskets are not rolled, pinched, dislodged, or torn during jointing.
  
  - .19 When stoppage of Work occurs, block pipes as directed by the Department Representative to prevent creep during down time.
  
  - .20 Plug lifting holes with pre-fabricated plugs approved by the Department Representative, set in shrinkage compensating grout.
  
  - .21 Cut pipes as required for special inserts, fittings or closure pieces as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
-

- .22 Make watertight connections to concrete structures.
  - .1 Use shrinkage compensating grout when suitable gaskets are not available.

### 3.6 Pipe Surround

- .1 Place surround material in unfrozen condition.
- .2 Upon completion of pipe laying, and after the Department Representative has inspected pipe joints, surround and cover pipes as indicated.
  - .1 Leave joints and fittings exposed until field testing is completed.
- .3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.
  - .1 Do not dump material within 1 m of pipe.
- .4 Place layers uniformly and simultaneously on each side of pipe.
- .5 Compact each layer from pipe invert to mid height of pipe to at least 95% maximum density to ASTM D698.
- .6 Compact each layer from mid height of pipe to underside of backfill to at least 90% maximum density to ASTM D698.
- .7 When field test results are acceptable to the Department Representative, place surround material at pipe joints.

### 3.7 Insulation

- .1 Install insulation in the locations shown on the drawings and as directed by the Department Representative.
- .2 Install insulation 50 mm thick at 300 mm above the pipe for a width of 1200 mm.
- .3 Level and prepare the surface on which the insulation is to be placed so the

insulation is not cracked or broken when backfilled.

.4 Secure joints between sheets of insulation with an appropriate sheeting tape. Acceptable product: duct tape, or approved equivalent.

.5 Cover insulation with a minimum of 150 mm of bedding before backfilling.

3.8 Backfill

.1 Place backfill material in unfrozen condition.

.2 Place backfill material, above pipe surround in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.

.3 Under paving and walks, compact backfill to at least 95% maximum density to ASTM D698.

.1 In other areas, compact to at least 90% maximum density to ASTM D698.

.4 Place unshrinkable fill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.9 Pipe Penetration Seal

.1 As shown on the Contract Drawings, where cast in rubber gaskets cannot be installed and core drilling is required, suitable pipe penetrations seal is to be installed to ensure that the hole is watertight. All core drilling pipe perforations shall be sealed with Proco Pen-Seal or Link-Seal for a watertight seal. Size of the core drilling holes shall be in accordance with the manufacturer's recommendations.

3.10 Cleaning

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

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

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

END



PART 1 - GENERAL

- 1.1 Work Included .1 This section governs the supply of all labour, materials and equipment and incidentals necessary for the complete installation of all sanitary sewer pressure pipes, as shown on the drawings and herein specified that are a part of the sanitary pressure pipe system.
- 1.2 Related Sections .1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- 1.3 References .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
- .1 ANSI/AWWA C207-07, Standard for Steel Pipe Flanges for Waterworks Service, Sizes 4 Inch Through 144 Inch (100 mm Through 3,600 mm).
  - .2 ANSI/AWWA C900-07, Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 Inch Through-12 Inch (100 mm-300 mm), for Water Transmission and Distribution.
- .2 ASTM International
- .1 ASTM D698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort ((12,400 ft-lbf/ft<sup>3</sup>) (600kN-m/m<sup>3</sup>)).
  - .2 ASTM D2241-09, Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
  - .3 ASTM D3034-08, Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- .3 Canadian General Standards Board (CGSB)
- .1 CGSB 41-GP-25M-77, Pipe, Polyethylene, for the Transport of Liquids.
- .4 CSA International
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- .1 CSA B137 Series-09, Thermoplastic Pressure Piping Compendium.

1.4 Administrative Requirements

- .1 Scheduling:
  - .1 Schedule Work to minimize interruptions to existing services.
  - .2 Submit schedule of expected interruptions and adhere to schedule approved by the Department Representative.
  - .3 Notify the Department Representative a minimum of 24 hours in advance of interruption in service.

1.5 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Product Data:
    - .1 Submit manufacturer's instructions, printed product literature and data sheets for pipes and backfill and include product characteristics, performance criteria, physical size, finish and limitations.
  - .3 Samples:
    - .1 Submit 4 weeks minimum before beginning Work, with proposed source of bedding materials and provide access for sampling.
  - .4 Certification to be marked on pipe.
  - .5 Test and Evaluation Reports: submit manufacturer's test data and certification at least 2 weeks prior to beginning Work.
  - .6 Manufacturer's Instructions: submit to the Department Representative 1 copy of manufacturer's installation instructions.
-



- .1 Thermal butt fusion
  - .2 Flanged with steel backing flanges.
  - .3 Flanged with stainless steel backing flanges in marine/submerged areas
  - .3 Polyethylene fittings: to CSA B137, for pipe sizes 4" and less.
  - .4 Pressure class 350 with cast iron outside diameter and integral bell gasketed joints, to ASTM D2992. Material: to ASTM D2310
  - .3 Fittings:
    - .1 Ductile Iron to AWWA C153, 2415 kPa Class.
    - .2 PVC pressure fittings to AWWA C907 and CSA B137.3.
      - .1 Class 160 (DR26) .
      - .2 Push-on bell and spigot type.
  - .4 Joints:
    - .1 Joints for iron fittings: mechanical type, complete with component parts, to latest AWWA Standard C111 for rubber-gasket joints ductile-iron fittings.
    - .2 PVC pressure fittings: push-on bell and spigot type, unless otherwise indicated.
  - .5 Joint Restraints:
    - .1 Iron fittings, joint restraint system components and couplings: ductile-iron with high strength low alloy steel tee bolts and nuts tightened using a torque wrench to the manufacturer's specifications, completely wrapped with 8-mil poly to AWWA C105.
    - .2 Mechanical joint restraint for ductile iron fitting: PVC Star Grip 4000 by Star Pipe Products, 2000 PV by EBAA Iron, 1300 S by Uniflange or approved equal.
    - .3 Mechanical joint restraint for PVC pressure fittings: 1360 S by Uniflange or approved equal.
-

- .4 No extra payment will be made for the supply and installation of joints and fittings restrainers, this shall be considered incidental to the work.
  - .5 Joint restraint for PVC < 100mm shall be solvent welded joint with Schedule 80 PVC fittings.
  - .6 Pipe Penetration Seal
    - .1 Where cast in rubber gaskets cannot be installed and core drilling is required, suitable pipe penetrations seal is to be installed to ensure that the hole is watertight. All core drilling pipe perforations shall be sealed with Proco Pen-Seal or Link-Seal for a watertight seal. Size of the core drilling holes shall be in accordance with the manufacturer's recommendations.
  - .7 Insulation
    - .1 Extruded, expanded polystyrene insulation following the minimum characteristics.
      - .1 Compressive strength - 210kPa;
      - .2 Water absorption (% by volume) - max 0.7%;
      - .3 Capillarity (none);
      - .4 Shear strength - 275kPa.
    - .2 Acceptable products: Styrofoam HI-40, Celfort 300 or approved equivalent.
- 2.2 Equipment
- .1 In laying out the sewer pressure pipes, the Department Representative will establish only the locations and elevations of discharge locations. The Contractor shall be responsible for all other field layout in accordance with Section 01 00 01 General Requirements.
  - .2 Utilize laser beam instrumentation and techniques to determine intermediate line and grade for all pipes except where
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and when the Department Representative may allow other methods to be used.

- .3 Approved laser alignment equipment must be used to control line and grade during all laying of pipe. An approved laser sighting triangle or template must be used by the Contractor in setting each pipe.

2.3 Pipe Bedding and Surrounding Material

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

2.4 Backfill Material

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

PART 3 - EXECUTION

3.1 Examination

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

3.2 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 to adjacent properties and walkways, according to drawings. Inspect, repair, and maintain erosion and sedimentation
-

control measures during  
construction until permanent  
vegetation has been established.  
.2 Remove erosion and sedimentation  
controls and restore and stabilize  
areas disturbed during removal.

- .2 Pipes and fittings to be clean and dry.
- .3 Prior to installation, obtain the  
Department Representative's approval of  
pipes and fittings.

### 3.3 Trenching

- .1 Do trenching Work, in accordance with  
Section 31 23 33.01 - Excavating,  
Trenching and Backfilling.
- .2 Trench alignment and depth require  
approval from the Department  
Representative prior to placing bedding  
material or pipe.

### 3.4 Granular Bedding

- .1 Place granular bedding in unfrozen  
condition.
- .2 Place granular bedding material in  
uniform layers not exceeding 150 mm  
compacted thickness to depth as  
indicated.
- .3 Shape bed true to grade and to provide  
continuous, uniform bearing surface for  
pipe.
- .4 Shape transverse depressions as required  
to suit joints.
- .5 Compact each layer full width of bed to  
at least 95% maximum density to ASTM  
D698.
- .6 Fill excavation below design elevation  
of bottom of specified bedding with  
common backfill.

3.5 Installation

- .1 Load and unload pipe and accessories by lifting with hoists or skidding so as to prevent shock and damage.
  - .2 Pipe handled on skid-ways will not be skidded or rolled against pipe already on the ground. Pipe will not be dragged along the ground at any time. All material will be handled and stored in accordance with the manufacturer's requirements.
  - .3 Pipe will be so handled so that any coating will not be damaged. When handling PVC pipe, avoid severe impact blows, abrasion damage and gouging or cutting by metal surfaces or rocks. Avoid stressing bell joints and damage of bevel ends. If, however, any part of the pipe is damaged, the repair will be made by the Contractor in a manner satisfactory to the Department Representative.
  - .4 Thoroughly inspect pipe in the field before and after placement. Immediately remove any defective or damaged pipe from the site and replace with new sound material at the Contractor's expense.
  - .5 Lay pipes according to the sizes, types and in the locations as indicated on the drawings in accordance with manufacturer's recommendations and recognized good practice.
  - .6 Lay pipe with a minimum 2.10 metres cover. The Contractor is responsible for locating this line at the connection points.
  - .7 Lay pipe in prepared trenches commencing at lowest point with bell of pipe pointing upgrade.
  - .8 Use proper implements, tools and facilities for safe and efficient execution of the work.
  - .9 Join pipes in accordance with manufacturer's recommendations. Pipes
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may be pushed together by means of a crow-bar solidly wedged into the ground, or by using a suitable pipe puller at the joint, or in some instances by very carefully pushing with a backhoe, or by any other method that may be approved by the Department Representative. When pushing against the pipe, a block of wood must be used to prevent any damage to the pipe.

- .10 Avoid damage to machined ends of pipes in handling and moving pipe. Do not drop pipe or fittings into trench.
  - .11 Maintain grade and alignment of pipes.
  - .12 Align pipes carefully before jointing.
  - .13 Joint deflection permitted within limits in accordance with pipe manufacturer's written recommendations.
  - .14 Support pipe firmly over entire length, except for clearance necessary at couplings.
    - .1 Suitable excavation shall be made to receive the bell, which shall not bear upon the sub-grade or bedding.
    - .2 Do not use blocks to support pipe.
  - .15 Lay pipe on dry bedding and keep trench dry during pipe laying.
  - .16 Keep pipe and pipe joints free from foreign material.
  - .17 Avoid bumping gasket and knocking it out of position, or contaminating with dirt or other foreign material. Remove disturbed gaskets clean, lubricate and replace before jointing is attempted.
  - .18 Support pipes using hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
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- .19 The ends of the pipe, rubber gaskets, fittings, etc., will be wiped clean immediately before joining the pipes to remove foreign matter from the joints. Apply lubricant to the spigot up to the reference mark and to the face of the gasket (MJ gaskets included).
  - .20 Apply sufficient pressure in making joint to ensure that joint is complete to manufacturer's recommendations.
  - .21 Apply restraint to pipe to ensure that joints when completed are held in place, by tamping fill material under and alongside pipe, or otherwise as approved by the Department Representative.
  - .22 Remove and re-lay any pipe which is not in alignment or shows undue settlement after laying.
  - .23 No length of pipe shall be laid until the preceding length has been thoroughly embedded and secured in place so as to prevent any movement or disturbance of the pipe.
  - .24 When stoppage of Work occurs, block pipe using a watertight plug as directed by the Department Representative to prevent creep during downtime.
  - .25 No pipe will be laid on a foundation into which frost has penetrated, or at any time when the Department Representative may deem that there is a danger of the formation of ice or the penetration of frost at the bottom of the excavation.
  - .26 No walking on or working over the pipes after they have been laid will be allowed until there is at least 300 mm of cover over them, except as may be necessary in refilling the trench and compacting the bedding material.
  - .27 Mechanical joint connections and tightening and torqueing of bolts shall be in accordance with the manufacturer's
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instructions and recognized good practice.

- .28 Laser beam equipment shall be installed in the pipe, just above the pipe, or in the bottom of the manhole. Installation of the laser beam contrary to the aforementioned shall require approval of the Department Representative.
- .29 Install 50 mm wide metal marker tape 600 mm above the top of the pipe, carrying the message "CAUTION - FORCE MAIN BURIED".

### 3.6 Pipe Surround

- .1 Place surround material in unfrozen condition.
- .2 Upon completion of pipe laying, and after the Department Representative has inspected pipe joints, surround and cover pipes as indicated. Leave joints and fittings exposed until field testing is completed.
- .3 Hand place surround material in uniform layers simultaneously on each side of pipe not exceeding 150 mm compacted thickness as indicated.
  - .1 Do not dump material within 1 m of pipe.
- .4 Compact each layer from pipe invert to mid height of pipe to at least 95% maximum density to ASTM D698.
- .5 When field test results are acceptable to the Department Representative, place surround material at pipe joints.

### 3.7 Backfill

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround in uniform layers not exceeding



PART 1 - GENERAL

1.1 Related Sections

- .1 Section 33 31 13 - Public Sanitary  
Utility Sewerage Piping.
- .2 Section 31 23 33 - Excavating, Trenching,  
and Backfilling
- .3 Section 32 11 23 - Aggregate Base Courses
- .4 Section 33 36 33 - Utility Septic Fields

1.2 References

- .1 ASTM International
  - .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 Method for  
Sieve Analysis of Fine and Coarse  
Aggregates.
  - .3 ASTM D698-07e1, Standard Test  
Method for Laboratory Compaction  
Characteristics of Soil Using  
Standard Effort (12,400  
ft-lbf/ft<sup>3</sup>(600 kN-m/m<sup>3</sup>
- .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 CSA International
  - .1 CSA A23.1/A23.2-09, Concrete  
Materials and Methods of Concrete  
Construction/Test Methods and Standard  
Practices for Concrete.
  - .2 CSA A23.4-09, Precast  
Concrete-Materials and Construction.
  - .3 CSA B66-10, Design, Material and  
Manufacturing Requirements for  
Prefabricated Septic Tanks and Sewage  
Holding Tanks.

- 1.3 Action and  
Informational Submittals .1 Submit in accordance with Section 01 33  
00 - Submittal Procedures.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

- 3.1 Cleaning .1 The Contractor shall be responsible to have  
the septic tank and holding tank cleaned  
with a vacuum truck.
- 3.2 Inspection .1 The Contractor shall be responsible to acquire  
the services of a septic tank installer  
to inspect the condition of the septic  
tank and holding tank. A report shall  
be submitted to the Departmental  
Representative outlining the condition  
of the septic tank and holding tank and  
providing recommendations.
- .2

END



1.5 Delivery, Storage  
and Handling

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 EFFLUENT PUMP SYSTEM

- .1 A new duplex effluent pump system shall be installed within the existing holding tank to transport septic tank effluent to the new distribution box as shown on drawings. The system is to be time-dosed capable to meet the performance criteria noted in Section 2.1.2.3. The pump system shall incorporate Orenco System Inc's (OSI) Universal Biotube Filtered Pump Vault equipment as noted below or an approved alternative.
- .2 High Head Effluent Pumps:
  - .1 Shall be high head effluent pumps compatible with the pump vault and include a minimum 6.1m (20 ft) power cable.
  - .2 Shall be UL and CSA listed as an effluent pump and shall be provided with a non-prorated, five-year warranty.
  - .3 Performance:
    - .1 Design Flow Rate: 3.2 L/s (50 USgpm)
    - .2 Geodetic Head: 3.7m (12 ft)
    - .2 Dynamic Head: 9.6m (31.4 ft)
    - .3 Electrical Characteristics:  
½ HP, 240V, 1PH



- .4 6 doses per day at 1200L per dose, or as manufacturer's recommendations to pump design flow of 7200 L/day.
  - .4 Shall supply two (2) pumps for duplex system.
  - .5 Model shall be OSI Model PF5005 or approved alternative.
- .3 Pump Vault:
- .1 Shall consist of a 300mm (12 inch) diameter HDPE vault with eight (8) 50 mm (2") holes evenly spaced around the perimeter to allow for pump flow.
  - .2 Shall include a duplex flow inducer tube to accept two high head effluent pumps.
  - .3 Shall include two rigid PVC support bracket arms that rest on the lip or flange of the tank to ensure the vault is in the proper position.
  - .4 Base of the vault shall be suspended into the pump compartment.
  - .5 Height of vault shall be 2.4m (8 ft) to suit the existing holding tank height.
  - .5 Model shall be OSI Model PVU95-1819 Duplex Universal Biotube Pump Vault or approved alternative.
- .3 Filter:
- .1 A filter assembly shall be housed inside the Pump Vault consisting of 3.175mm (1/8") mesh polypropylene tubes.
  - .2 Shall have a minimum effective screen area of no less than 1.9 square meters (20.6 square feet) and shall include a handle with an integrated float stem bracket to connect the pump control float tree.
  - .3 A handle shall be easily extended by the contractor in the field to the top of the riser for easy maintenance access.
  - .4 Model shall be OSI Biotube Filter Assembly or approved alternative.
- .4 Preassembled Pump Discharge Assemblies:
- .1 Shall be factory assembled with PVC flex hose, 1034kPA (150 psi) PVC ball valve, and 1034kPA (150 psi) PVC check

valve with a minimum working pressure rating of 441 kPa (64 psi), and Schedule 40 PVC pipe construction.

.2 Model shall be OSI Model HV200BCX-DB drain back style complete with Cold Weather Kit or approved alternative.

.5 External Flex Hose:

.1 Flex connection for transport piping on the outside of the riser.

.2 Model shall be OSI HVX200 External Flex Connection or approved alternative.

.6 Discharge Control Float Assembly:

.1 Shall contain four (4) floats clipped to a PVC float stem. The stem shall attach to a bracket at the exterior of the pump vault.

.2 Four (4) floats shall have the following functions:

.1 High Level Alarm/Lag Pump Enable;

.2 Override Timer Settings On/Off

.3 Timer On/Off

.4 Redundant Off/ Low Level alarm

.3 Floats must adjustable and easily installed and capable of being removed without removing the pump vault.

.4 Cable length shall be 6.1m (20')

.5 Float positions shall be set on the float stem at start up, according to the drawings and/or in accordance with the equipment manufacturer's representative, with adjustable cable clips to accommodate the depth of the pump vault.

.6 Each float lead shall also be secured with a nylon strain relief bushing at the splice box.

.7 Floats shall be UL and CSA listed and shall be rated for a minimum of 5.0A @ 120 VAC.

.8 Model shall be OSI Model MF4P-63FS-20 Float Assembly or approved equal.

.7 Splice Boxes:

.1 Shall be supplied at the riser for float connections to simplify

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- installation, inspection and replacement of floats as required.
- .2 External splice box with four (4) cord grips and outlet fitting will be provided for control float connections in the pump tank riser area.
  - .3 Splice Box shall be UL listed.
  - .4 Model shall be OSI Model SBEX1-4 or approved alternative.
- .8 Grommets:
- .1 Rubber grommets shall be installed in the riser as required to provide a watertight seal for any pipe penetrating the riser sidewall.
- .9 Acceptable pump suppliers must have a Newfoundland service representative fully capable and experienced in the operation and maintenance of their product. This representative must be capable of troubleshooting and repairing mechanical and pump controller problems. This requirement will be considered in the evaluation of alternative products. Suppliers shall demonstrate this ability in requesting for the equipment approval.
- .10 The pump/motor assembly shall have CSA approval as one unit, per CSA Standard C22.2-145, rated for submersible pumping for sewage applications. Proof of this approval shall be submitted by the pump manufacturer with approval drawings. An approval of the motor unit only will not be acceptable. The pump/motor unit is to be approved by CSA for service in Class I, Zone 1, Groups C or D hazardous locations.
- .11 It will be the responsibility of the Manufacturer / Supplier to confirm that the proposed selection is the most suitable for the application and will be verified during the shop drawing review.
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2.2 PUMP ACCESS AND

LID

- .1 The existing tank access riser over the planned pump system will need to be removed and replaced with a new 0.762m (30") diameter to facilitate installation, inspection and maintenance of the pump system.
- .2 Riser:
  - .1 Shall be PVC with nominal size 0.762m (30") diameter x 0.610m (24") length and manufactured to meet ASTM standard F794 and certified to CSA B182.4.
  - .2 Shall be constructed of non-corrosive material and designed to be buried in soil. The pipe manufactured from virgin PVC compound meeting the cell classifications requirements as defined in ASTM Standard D1784. Pipe markings are as specified in CSA B182.4 and ASTM F794.
  - .3 Shall have a minimum pipe stiffness value of 320kPA (46psi) when tested in accordance with ASTM D2412.
  - .4 Shall be constructed watertight by attaching and sealing directly to bolt down tank to riser adapter with an epoxy adhesive that ensures appropriate bond and watertight seal are provided.
  - .4 Shall extend a minimum 50mm (2 inches) above original grade to allow for settlement and ensure positive drainage away from the access.
  - .5 The riser shall be capable of being cut in one piece, to any required depth, without introducing seams that could compromise water tightness or strength characteristics.
  - .6 The riser, lid and attached components (epoxy adhesive/sealant) shall all provided by a single manufacturer.
  - .7 Riser installation shall include wrapping of the riser ribs with 30 mil liner material to provide a slip face to prevent any frost action. The wrapping material shall be provided by the riser manufacturer.
  - .8 Model shall be Orenco Kor Flo Model RR3024 or approved alternative.

- .3 Lid:
  - .1 Shall be one green, non-skid, bolt down, fiberglass access lid with gasket shall be furnished with the access riser.
  - .2 Shall be flat, with no noticeable upward dome and shall be waterproof, corrosion resistant and UV resistant.
  - .3 Shall be capable of withstanding a truck wheel load of 2500 pounds (54 square inches) for 60 minutes with a maximum vertical deflection of  $\frac{3}{4}$  of an inch.
  - .4 Shall incorporate an integral poured and formed gasket that forms a watertight seal with the top of the access riser.
  - .5 Shall be tamper-resistant, stainless steel, bolts and wrench shall be included with the lids.
  - .6 Fasteners shall not extend above the surface of the lid.
  - .7 Model shall be OSI Model FLD30G
- .4 Riser to Tank Attachment Adapter:
  - .1 The new riser shall be attached to the existing tank surface with a tank adapter bolted to the tank and sealed with methacrylate structural adhesive.
  - .2 All attachment components shall be constructed of waterproof, non-corrosive materials, such as PVC, ABS, fiberglass or stainless steel.
  - .3 Adhesives and sealants shall be waterproof, corrosion resistant and approved for the intended applications.
  - .4 Riser to tank connection shall be a capable of handling a vertical uplift of 2268kg (5000 pounds) to prevent riser separation due to tank settlement, frost heave, or accidental vehicle traffic over the tank.
  - .5 Model shall be OSI Model PRTA30 Tank Adapter using a PRTA30RBDKIT bolt down kit.

2.3 PUMP SYSTEM CONTROL  
PANEL

- .1 A duplex control panel shall be provided for control and monitoring of the

effluent pump system by activating appropriate pumps and alarms in response to timer and level control float inputs. To ensure effective integration of the pump system and controls, they shall be provided by the same manufacturer. The manufacturer shall have demonstrated history in the design and manufacturing of the control systems for pumping systems related to water or wastewater processes.

- .2 The equipment and controls manufacturer must demonstrate the ability to provide remote support for both the control panel and pump system. The manufacturer must maintain engineering and controls technical support staff and local distributors that are capable of assisting the owner with assessment of any situation that arises.
  - .3 Control Panel:
    - .1 The discharge pumps will operate in an alternating duplex fashion on a timer with redundant off, timer, timer on/off, and high-level alarm control floats. Pump cycle counters and elapsed time meters shall be included and located internal to the PLC.
    - .2 The system will monitor any high, and low, level alarm floats of the pump tank to provide advance notice of any potential high level or low level condition. The alarm condition will be noted on the panel indicator lights and remote alarm contacts are available to activate a remote light or signal.
    - .3 Each pump or motor on the system shall be connected to a current sensor to continuously validate motor current and amps. Should a motor fail to operate when called upon, the current sensor shall trigger an alarm notification.
    - .4 Key features shall include:
      - .1 Programmable for timed- or demand-dosing applications.
      - .2 Built-in elapsed time meter and counters.
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- .3 Digital timed-dose function accurate within 1%.
  - .4 Adjustable timer settings for optimum dosing during normal and peak flow conditions,
  - .5 Pump alternation continues during override conditions.
  - .6 Built-in programming keys for field-adjustable timer settings without a portable computer.
  - .7 High- and low-level alarm conditions differentiated by steady or blinking LED light.
  - .8 Silenced alarms automatically reactivated after 12 hours if condition is not corrected.
  - .9 Standard 120V output for remote alarm activation.
  - .10 Timed delays on float inputs to prevent chattering.
  - .11 Ability to use one model of float for all functions.
  - .12 Redundant-off function as standard UL 508 listing in US and Canada.
- .5 Standard components to include the following:
- .1 Programmable logic Unit 120V built-in LCD screen and programming keys. Provides control functions and timing for panel operation.
  - .2 Motor-Start Contactors: 120V:16 FLA, 1HP, 60Hz; 2.5 million cycles at FLA (10 million at 50% of FLA)
  - .3 Toggle Switches Single-pole, double throw HOA switch. 20A,1HP.
  - .4 Controls Circuit Breaker 10A, off/on switch. Single-pole 120V\*. DIN mounting with thermal magnetic tripping characteristics.
  - .5 Pump Circuit Breakers 20A, off/on switch. Single-pole 120V or double-pole 240V. DIN rail mounting with thermal magnetic tripping characteristics.
  - .6 Audible alarm 95 dB, warble-tone sound.
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- .7 Visual alarm 22mm (7/8") diameter red lens. UL Type 4X rated, 1 W LED light 120V.
- .8 Panel Enclosure UL Type 4X rated.
- .9 Constructed of UV-resistant fiberglass.
- .10 Intrinsically Safe 120V. Listed UL 698A, for Class 1 Div.1 hazardous locations.
- .11 Surge Arrestor 120V. Status light on unit. Protects incoming power supply from surges.
- .12 Dead-Front. HMI screen, HOA switches and indicator lights etc. mounted on the dead-front door inside the outer door, to avoid having to open and expose the panel's interior circuitry for day to day operational functions.
- .13 Panel Insulation.
- .6 Model shall be OSI MVP-DAX2 IR DM CS HT SA RA.

PART 3 - EXECUTION

3.1 Installation

- .1 Follow manufacturer's instructions for base preparation to install units.
- .2 Ensure existing outlets from the holding tank are sealed and water tight. Prior to installation of new pump.
- .3 Remove existing inspection/ cleanout way and modify the existing concrete access hole to suit the new pump requirements.
- .4 Install new cleanout/ inspection way to manufacturer's recommendations.
- .5 Install pump, pump controls and discharge piping. Make all connections water tight through the pump vault and through the concrete holding tank (discharge hole).



- .6 Qualified electrician to connect electrical power to effluent pump as per manufacturer's instructions.
- .7 Provide a minimum of two (2) hours on site for equipment representatives for each piece of equipment installed. Representative to report to the Departmental Representative before leaving site with equipment fully functional.
- .8 Provide a written report from the pump manufacturer or an approved local installer/ system maintainer (approved by the manufacturer) that the equipment is installed and operating to their satisfaction.

3.2 Demonstration

- .1 Provide on-site training by qualified personnel for designated operating personnel prior to final commissioning.
  - .1 Schedule and deliver training in accordance with training plan approved in writing by Department Representative.
  - .2 Include safety precaution procedures for system.

3.3 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 31 23 33 - Excavating, Trenching, and Backfilling
  - .2 Section 32 11 25 - Bedding Material
  - .3 Section 33 31 13 - Public Sanitary Utility Sewerage Piping.
- 1.2 References
- .1 ASTM International
    - .1 ASTM C117-04, Standard Test Method for Material Finer Than 75 µm (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 D4318-10, Standard 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 CSA International
      - .1 CAN/CSA-B137 Series-09, Thermoplastic Pressure Piping Compendium. (Consists of B137.0, B137.1, B137.2, B137.3, B137.4, B137.4.1, B137.5, B137.6, B137.8, B137.9, B137.10, B137.11 and B137.12).
        - .1 CAN/CSA-B137.1-09, Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services.
      - .2 CAN/CSA-B1800-11, Thermoplastic Non-Pressure Piping Compendium. (Consists
-

of B181.1, B181.2, B181.3,  
B181.5, B182.1, B182.2,  
B182.4, B182.6, B182.7,  
B182.8 and B182.11).  
.1 CAN/CSA-B182.2-11, PVC  
Sewer Pipe and Fittings  
(PSM Type).

1.3 Action and  
Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for drainage field materials and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
  - .1 Submit 20 kg sample of each granular materials 4 weeks minimum before beginning Work.
- .4 Certificates:
  - .1 Submit copy of certification or licence of approved installers.
- .5 Test Reports:
  - .1 Submit 2 certified copies of factory tests of pipe material.

1.4 Quality Assurance

- .1 Use certified and licensed installers who comply with local authority having jurisdiction.

1.5 Delivery, Storage  
and Handling

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect drainage field materials from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 Granular Materials

- .1 Granular material in accordance with Section 31 05 16 - Aggregate Materials and to requirements as follows:
  - .1 Pit run crushed or screened stone, gravel or sand.
  - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
  - .3 Table

Sieve Designation	% Passing	
	Treatment Sand	Septic Field Backfill Material
25 mm	-	95-100
19 mm	-	90-100
12.5 mm	-	-
9.5 mm	100	60-100
4.75 mm		35-80
2.36 mm	80-100	15-60
1.18 mm	30-100	-
0.600 mm	15-95	-
0.300 mm	4-15	0-30
0.150 mm	2-8	-
0.075 mm	0-3	0-10

2.2 Imported Filter Material

- .1 Sand conforming to requirements of local authority having jurisdiction.
- .2 If no such requirements exist, follow sand gradation limits indicated in Section 2.1.1.3

- .3 Treatment sand shall meet the following requirements:
  - .1  $D_{10}$  (effective size): 0.15mm-0.50mm
  - .2 Cu (uniformity): 1.0 to 6.0
  - .3  $K_{FS}$  (field saturated hydraulic conductivity): 5E-5 to 6E-4 m/sec

### 2.3 Borrow Materials

- .1 Refer to Section 31 23 33 - Excavating Trenching and Backfill for borrow material requirements.
- .2 Borrow material shall be used as fill material for to bring the septic field up to design grade as per the drawings.

### 2.4 Concrete Mixes and Materials

- .1 Concrete mixes and materials: to CSA A23.1/A23.2.
- .2 Use type 1 cement.
- .3 Concrete exposure classification: A-3.

### 2.5 Pipe for Disposal Fields

- .1 Effluent piping from septic tanks to distribution boxes: shall be in accordance to Section 33 34 00 Public Sanitary Utility Sewerage Force Mains.
- .2 Effluent piping within infiltrator chambers: Straight PVC pipe and fittings to CAN/CSA-B182.2, perforated. Perforation pattern to comply with CSA and Nova Scotia Onsite Sewage Disposal Systems Standard.
- .3 Vertical piping for infiltrator chamber inspection and ventilation: Straight PVC pipe and fittings to CAN/CSA-B182.2, unperforated, complete with gooseneck fitting to prevent water and debris from entering infiltrator chambers. Piping to be primed with PVC primer and painted white for UV resistance.

### 2.6 Infiltration Chambers

- .1 Infiltration chambers shall be selected as follows:

- .1 Infiltrator Systems Quick4 Standard chambers, or approved equal, for burial depths of 900mm or less.
- .2 No disposal field installations to exceed burial depth of 900mm.
- .3 All infiltration chambers to be fitted with internal 100mm diameter perforated drainage pipe as indicated in section 2.4.2.
- .4 All infiltration chambers to be fitted with inspection/ventilation piping as indicated in section 2.4.3 and as per manufacturer's recommendations at both end caps of each trench.

#### 2.7 Distribution Box

- .1 Distribution boxes shall be pre-cast concrete or as per Section 2.3 above.
- .2 All penetrations for connected piping shall be watertight rubber gasket(s) installed by the manufacturer.
- .3 Distribution "boxes" can be square, rectangular, or circular as approved by the Departmental Representative.
- .4 All pipe penetrations to the distribution box shown on the Drawings shall be at the same elevation and fitted with speed levellers to allow even flow of sewage to each pipe.
- .5 Distribution boxes shall have a minimum sump depth of 100mm.

### Part 3 - EXECUTION

#### 3.1 Examination

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for drainage

field installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of the Department Representative.
- .2 Inform the Department Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Department Representative.

3.2 Area Type Disposal  
Field and Installation

- .1 Excavate and remove existing disposal field, including but not limited to perforated piping, imported granular bedding, and distribution box.
- .2 Backfill, in accordance with 31 23 33 - Excavating, Trenching, and Backfilling with imported backfill to elevation and grades noted on drawings.
- .3 Place 300mm minimum thickness layer of sand material or as noted on the drawings as per Section 2.2 for disposal bed under disposal field area.
- .3 Place sand material in unfrozen condition as indicated.
- .4 Disposal bed fill material (imported filter material) to have characteristics as specified in section 2.2.3 and be pre-approved in writing by Departmental Representative before delivering to site.
- .5 After placement of disposal bed fill, Departmental Representative will conduct 3 on site percolation tests in sand mound before bed construction.
- .6 Operate construction equipment across disposal bed only after receipt of

written approval from Departmental  
Representatives

- .7 Install distribution box between effluent pump and disposal field. Installation to be water-tight construction.
  - .8 Set distribution box level as indicated.
    - .1 Provide access with removable cover for inspection of distribution box.
  - .9 Connect lengths and place effluent pipe on suitable bedding material as indicated and cover with 150mm minimum of suitable backfill material.
  - .10 Connect each effluent pipe individually to distribution box. The first length of each effluent pipe connected to the distribution box shall be set to same grade to ensure even flow. Piping beyond the first length may be graded as required to reach individual absorption trench elevations.
  - .11 Connect effluent pipes to lower infiltration chamber end caps as indicated.
  - .12 Cap free ends of perforated pipe in dosed systems.
  - .13 Grade of perforated pipe inside infiltration chamber shall not exceed 0.5%.
  - .14 Do not backfill disposal field until pipe grade and alignment have been approved by Departmental Representative.
  - .15 Install vertical piping at each end of infiltrator chamber trench at cutout locations as recommended by manufacturer. Vertical piping to be primed with PVC primer and painted white to protect from UV damage.
-



- .16 Cover disposal field as indicated.
    - .1 Use only material approved in writing by the Department Representative to backfill.
    - .2 Do not compact.
    - .3 Overfill to allow for settlement.
  - .17 Grade areas surrounding disposal field bed as indicated, to provide for diversion of surface run off waters.
  - .18 Follow all manufacturer's installation instructions.
- 3.1 Cleaning
- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Leave Work area clean at end of each day.
  - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END

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PART 1 - GENERAL

- 1.1 Work Included .1 This section includes the supply of all labour, materials and equipment and incidentals necessary for the complete installation of all storm utility drainage piping, including drain tile as noted on the drawings.
- 1.2 Related Sections .1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Section 33 05 16 - Manholes and Catch basin Structures.
- 1.3 References .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
- .1 ANSI/AWWA C111/A21.11-07, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .2 ASTM International
- .1 ASTM C12-09, Standard Practice for Installing Vitrified Clay Pipe Lines.
- .2 ASTM C14M-07, Standard Specification for Nonreinforced Concrete Sewer, Storm Drain and Culvert Pipe (Metric).
- .3 ASTM C76M-10a, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).
- .4 ASTM C117-04, Standard Test Method for Material Finer Than 75  $\mu\text{m}$  (No. 200) Sieve in Mineral Aggregates by Washing.
- .5 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .6 ASTM C425-09, Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings.

- .7 ASTM C428-05(2006), Standard Specification for Asbestos-Cement Nonpressure Sewer Pipe.
  - .8 ASTM C443M-07, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
  - .9 ASTM C663-98(2008), Standard Specification for Asbestos Cement Storm Drain Pipe.
  - .10 ASTM C700-09, Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
  - .11 ASTM C828-06, Standard Test Method for Low-pressure Air Test of Vitrified Clay Pipe Lines.
  - .12 ASTM D698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft<sup>4</sup>-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - .13 ASTM D1869-95(2005)e1, Standard Specification for Rubber Rings for Asbestos Cement Pipe.
  - .14 ASTM D2680-01(2009), Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
  - .15 ASTM D3034-08, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
  - .16 ASTM D3350-10, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
  
  - .3 CSA International
    - .1 CSA A3000-08, Cementitious Materials Compendium.
    - .2 CSA A257 Series-09, Standards for Concrete Pipe and Manhole Sections.
    - .3 CAN/CSA-B70-06, Cast Iron Soil Pipe, Fittings, and Means of Joining.
-

- .4 CSA B1800-11, Thermoplastic Non-pressure Pipe Compendium.
  - .1 CSA B182.1-11, Plastic Drain and Sewer Pipe and Pipe Fittings.
  - .2 CSA B182.2-11, PSM Type Polyvinylchloride PVC Sewer Pipe and Fittings.
  - .3 CSA B182.6-11, Profile Polyethylene (PE) Sewer Pipe and Fittings for Leak-Proof Sewer Applications.
  - .4 CSA B182.11-11, Standard Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.

1.4 Administrative Requirements

- .1 Scheduling:
  - .1 Schedule Work to minimize interruptions to existing services and maintain existing sewage flows during construction.
  - .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.
  - .3 Notify the Department Representative 24 hours minimum in advance of any interruption in service.

1.5 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for pipes and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Certificates:
  - .1 Certification to be marked on pipe.
- .4 Test and Evaluation Reports:

- .1 Submit manufacturer's test data and certification 2 weeks minimum before beginning Work.

1.6 Delivery, Storage  
and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Load and unload pipe and accessories by lifting with hoists and slings, on pallets, or careful skidding so as to prevent shock and damage.
- .3 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .4 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations.
  - .2 Store and protect pipes and coatings from damage.
  - .3 Replace defective or damaged materials with new.
  - .4 Do not drop or drag pipe.
  - .5 Avoid severe impact blows, abrasion damage, and gouging or cutting of PVC pipe by metal surfaces or rocks.
  - .6 For pipe handled on skidways, do not skid or roll pipe against pipe already on the ground.
  - .7 Avoid stressing bell joints and damage of bevel ends.

PART 2 - PRODUCTS

2.1 General

- .1 Storm sewer pipe and gaskets will be supplied by the Contractor. Sewer pipe

gaskets to be supplied to the Contractor by the pipe manufacturer.

- .2 Storm sewer pipes, tees, wyes, bends, couplings, rings, fittings, elbows, caps and saddles will be provided by the Contractor.
- .3 Joints to be push-on type and must be watertight.

## 2.2 Plastic Pipe

- .1 Type PSM Polyvinyl Chloride (PVC): to CSA B182.2.
  - .1 Standard Dimensional Ratio (SDR): 35.
  - .2 Gasket to ASTM D3212 and integral bell system with no reduction in the wall thickness.
  - .3 Piping shall be perforated where noted on drawings.
- .2 Plastic pipe and fittings: to ASTM 3034 and CSA B182.1, with push-on joints.
  - .1 PVC DR35
  - .2 Minimum 100 mm diameter.
  - .3 Joints: bell and spigot type with locked in rubber gasket.
- .3 Bends: long radius type only.
- .4 Caps for ends of laterals: PVC.

## 2.3 Cement Mortar

- .1 Portland cement: to CSA A3000, normal type 10.
- .2 Mix mortar 1 part by volume of cement to two parts of clean, sharp sand mixed dry.
  - .1 Add only sufficient water after mixing to give optimum consistency for placement.
  - .2 Do not use additives.

## 2.4 Pipe Penetration Seal

- .1 As shown on the Contract Drawings, where cast in rubber gaskets cannot be

installed and core drilling is required, suitable pipe penetrations seal is to be installed to ensure that the hole is watertight. All core drilling pipe perforations shall be sealed with Proco Pen-Seal or Link-Seal for a watertight seal. Size of the core drilling holes shall be in accordance with the manufacturer's recommendations.

2.5 Pipe Bedding and Surrounding Material And Backfill

- .1 As noted on the drawings, material shall be 20mm washed stone wrapped in a non-woven geotextile filter fabric. Refer to 2.6 for details on fabric.

2.6 Geotextile and Filter Fabric

- .1 Non-woven geotextile filter fabric
- .2 Overlap all edges with 600mm minimum of fabric.
- .2 Acceptable Products:
  - .1 Armtec 200 or approved equal.

2.7 Layout Equipment

- .1 In laying out the sewer lines, the Department Representative will establish only the locations and elevations of manholes.
- .2 Use approved laser beam instrumentation and techniques to determine intermediate line and grade for all pipes except where and when the Department Representative may allow other methods to be used.
  - .1 Install laser beam in the pipe, just above the pipe, or in the bottom of the manhole, unless otherwise approved by the Department Representative.
- .3 Use an approved laser sighting triangle or template to set each pipe.

PART 3 - EXECUTION

- 3.1 Examination .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sewer pipe installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of the Department Representative.
  - .2 Inform the Department Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.
- 3.2 Preparation .1 Clean pipes and fittings of debris and water before installation, and remove defective materials from site to approval of the Department Representative.
- .2 Clean and dry pipes and fittings before installation.
  - .3 Obtain **Department Representative's** approval of pipes and fittings prior to installation.
- 3.3 Trenching .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Protect trench from contents of sewer or sewer connection.
  - .3 Trench alignment and depth require approval of the Department Representative prior to placing bedding material and pipe.
- 3.4 Granular Bedding .1 Place bedding in unfrozen condition.
-



- .2 Place granular bedding materials in uniform layers not exceeding 300 mm compacted thickness to depth as indicated.
- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
  - .1 Do not use blocks when bedding pipe.
- .4 Shape transverse depressions as required to suit joints.
- .5 Compact each layer full width of bed to at least 95% maximum density to ASTM D698.
- .6 Fill excavation below bottom of specified bedding adjacent to manholes or structures with compacted bedding material or lean mix concrete mud slab, as indicated on drawings.

### 3.5 Installation

- .1 Install drain tile according to the sizes and locations indicated on the drawings.
- .2 Provide and use proper implements, tools and facilities for safe and efficient execution of the work.
- .3 Lay and join pipes to: ASTM C12.
- .4 Lay and join pipes in accordance with manufacturer's recommendations, in accordance with recognized good practice and to approval of the Department Representative.
- .5 Handle pipe using methods approved by the Department Representative.
  - .1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
  - .2 Carefully lower pipe and fittings into trench in such a manner as to

prevent damage to them. Do not drop pipe or fittings into trench.

- .6 Lay pipes on prepared bed, wrapped in geotextile filter fabric, true to line and grade, with pipe invert smooth and free of sags or high points.
    - .1 Minimum grade, unless otherwise indicated:
      - .1 0.5%
      - .2 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
      - .3 Remove and re-lay any pipe which is not in true alignment or shows undue settlement after laying.
  - .7 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
  - .8 Do not lay pipe on a foundation into which frost has penetrated, or at any time when the Department Representative may deem that there is a danger of the formation of ice or the penetration of frost at the bottom of the excavation.
  - .9 Inspect pipe thoroughly before and after laying. Remove defective or damaged pipe from the site and replace with new sound material.
  - .10 Trenches where pipe laying is in progress are to be kept dry. Pipes are not to be laid in water or upon wet bedding. Dewater excavations as required.
  - .11 Thoroughly clean pipes as they are laid and protect pipes from dirt and water.
  - .12 No length of pipe shall be laid until the preceeding length has been thoroughly bedded and secured in place so as to prevent movement or disturbance of the pipe.
  - .13 Do not walk on or work over pipes until there is a minimum of 300 mm of cover
-

over them, except as necessary in refilling trench and compacting the bedding material.

- .14 Joint deflection permitted within limits recommended by pipe manufacturer.
- .15 Water to flow through pipe during construction, only as permitted by the Department Representative.
- .16 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .17 Install plastic pipe and fittings in accordance with CSA B182.11.
- .19 When stoppage of Work occurs, block pipes as directed by the Department Representative to prevent creep during down time.
- .20 Plug lifting holes with pre-fabricated plugs approved by the Department Representative, set in shrinkage compensating grout.
- .22 Make watertight connections to manholes.
  - .1 Use shrinkage compensating grout when suitable gaskets are not available.

### 3.6 Pipe Surround

- .1 Place surround material in unfrozen condition.
- .2 Upon completion of pipe laying, and after the Department Representative has inspected pipe joints, surround and cover pipes as indicated.
  - .1 Leave joints and fittings exposed until field testing is completed.
- .3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.

.1 Do not dump material within 1 m of pipe.

.4 Place layers uniformly and simultaneously on each side of pipe.

.5 Compact each layer from pipe invert to mid height of pipe to at least 95% maximum density to ASTM D698.

.6 Compact each layer from mid height of pipe to underside of backfill to at least 90% maximum density to ASTM D698.

### 3.7 Backfill

.1 Place backfill material in unfrozen condition.

.2 Place backfill material, above pipe surround in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.

.3 Wrap backfill drainage stone in geotextile filter fabric as per the drawings. Ensure a minimum of 600mm overlap of geotextile filter fabric.

### 3.8 Pipe Penetration Seal

.1 As shown on the Contract Drawings, where cast in rubber gaskets cannot be installed and core drilling is required, suitable pipe penetrations seal is to be installed to ensure that the hole is watertight. All core drilling pipe perforations shall be sealed with Proco Pen-Seal or Link-Seal for a watertight seal. Size of the core drilling holes shall be in accordance with the manufacturer's recommendations

### 3.9 Cleaning

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

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

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and

equipment in accordance with Section 01  
74 11 - Cleaning.

END

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PART 1      GENERAL

- |            |  |    |   |
|------------|--|----|---|
| <u>1.1</u> | <u>References</u>                          | .1 | Canadian Standards Association (CSA)  |
|            |  | .1 | CSA C22.2 No. 211.1-06 Rigid Types EB1 and DB2/ES2 PVC Conduit.   |
| <u>1.2</u> | <u>Action And Informational Submittals</u> | .1 | Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.  |
|            |  | .2 | Provide product data in accordance with Section 01 33 00 - Submittal Procedures.  |
|            |  | .1 | Provide manufacturer's printed product literature, specifications, data sheet and include product characteristics, performance criteria, physical size, finish and limitations. |
|            |  | .3 | Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.   |
|            |  | .1 | Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.                     |
| <u>1.3</u> | <u>Closeout Submittals</u>                 | .1 | Submit in accordance with Section 01 78 00 - Closeout Submittals.   |
|            |  | .2 | Operation and Maintenance Data: submit operation and maintenance data into manual.  |
| <u>1.4</u> | <u>Delivery, Storage And Handling</u>      | .1 | Deliver, store and handle materials in accordance with manufacturer's written instructions.   |
|            |  | .2 | Waste Management and Disposal:  |
|            |  | .1 | Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.   |
-

PART 2      PRODUCTS

- 2.1 PVC Ducts  
And Fittings      .1      Rigid PVC duct: to CSA C22.2 No. 211.1-06  
Rigid Type DB2/ES2, with moulded fittings,  
for direct burial expanded flange ends.  
    .1      Nominal length: 3 m plus or minus 12 mm.
- .2      Rigid PVC bends, couplings, reducers, bell  
end fittings, plugs, caps, adaptors same  
product material as duct, to make a complete  
installation.
- .3      Rigid PVC 90 degrees, 45 degree bends and 5  
degrees angle couplings as required.
- .4      Expansion joints every 50 m and as required.
- .5      Utilization of PVC split ducts is not  
permitted.
- 2.2 Solvent Weld  
Compound      .1      Solvent cement for PVC duct joints.
- 2.3 Cable  
Pulling Equipment      .1      6 mm stranded polypropylene pull rope tensile  
strength 5 kN.
- 2.4 Markers      .1      Concrete type cable markers: as indicated,  
with words: "Cable", "Joint" or "Conduit"  
impressed in top surface, with arrows to  
indicate change in direction of duct runs.
- 2.5 Warning Tape      .1      Standard 4-mil polyethylene 76 mm wide tape,  
yellow with black letters, imprinted with  
"CAUTION BURIED ELECTRIC CABLE BELOW ".

PART 3      EXECUTION

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

- 3.2 Installation
- .1 Install duct in accordance with manufacturer's instructions and at elevations as indicated.
  - .2 Clean inside of ducts before laying.
  - .3 Install plastic duct spacers and ensure full, even support every 1.5 m and smooth transition throughout duct length.
  - .4 Slope ducts with 1 to 400 minimum slope.
  - .5 Install plugs and cap both ends of ducts to prevent entrance of foreign materials during and after construction.
  - .6 Pull through each duct steel mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign material.
    - .1 Pull stiff bristle brush through each duct immediately before pulling-in cables.
  - .7 Install a pull rope continuous throughout each duct run with 3 m spare rope at each end.
  - .8 Place continuous strip of warning tape 300 mm above duct before backfilling trenches.
  - .9 Install markers as required.
  - .10 Notify the Departmental Representative for field review upon completion of direct buried ducts and obtain acceptance prior to backfill.
- 3.3 Cleaning
- .1 Clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
  - .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END



## APPENDIX A - COMBINED PRICE FORM

PCA Project No.: 1829  
Cape Spear Septic System Upgrades  
Cape Spear National Historic Site, St. John's, NL

**APPENDIX A - COMBINED PRICE FORM**

- 1) The prices per unit shall govern in establishing the Total Extended Amount. Any arithmetical errors in this Appendix will be corrected by Canada.
- 2) Canada may reject the bid if any of the prices submitted do not reasonably reflect the cost of performing the part of the work to which that price applies.

**LUMP SUM**

The Lump Sum Amount designates Work to which a Lump Sum Arrangement applies.

- (a) Work included in the Lump Sum Amount represents all work not included in the unit price table.

Item	Specification Reference	Class of Labour, Plant or Material	Unit of Measurement	Lump Sum Price GST/HST Extra
1	01 29 00	General Contract Requirements	Lump Sum	
2	02 41 15	Removals and Holding Tank Modifications	Lump Sum	
3	33 36 16	Effluent Pumping System	Lump Sum	
4	32 32 13.13	Utility Drainage Fields	Lump Sum	
5	33 36 00	Septic Tank Cleaning and Inspection	Lump Sum	
<b>TOTAL LUMP SUM AMOUNT (LSA)</b> Excluding GST / HST				

**UNIT PRICE TABLE**

- 1) The unit price table designates the Work to which a Unit Price Arrangement applies
  - (a) The Price per Unit and the Price must be entered for each Item Listed
  - (b) Work included in each item is as described in the referenced specification section

Item	Specification Reference	Class of Labour, Plant or Material	Unit of Measurement	Estimated Quantity	Price per Unit GST/HST Extra	Estimated Total Price GST/HST Extra
1	31 23 16	Imported Borrow/Fill	T	2000		
2	31 23 16	Rock Excavation	m <sup>3</sup>	50		
3	31 37 00	R-5 Rip-Rap	T	30		
4	31 23 16	Ditching	m	40		
5	32 91 19	Imported Topsoil	m <sup>2</sup>	1000		
6	32 92 19	Hydroseeding	m <sup>2</sup>	1000		
7	32 92 23	Sod	m <sup>2</sup>	1000		
8	33 05 16	1050mm dia. Storm Sewer Manhole	unit	1		

PCA Project No.: 1829  
 Cape Spear Septic System Upgrades  
 Cape Spear National Historic Site, St. John's, NL

9	33 41 00	Drain Tile and Surface Water Diversion Swale	m	25		
<b>TOTAL EXTENDED AMOUNT (TEA)</b>						
Excluding GST/HST						

**TOTAL BID AMOUNT**

	<b>TOTAL BID AMOUNT (LSA + TEA)</b>	
Excluding GST/HST		

Please note: All fixed price items of the specification NOT designated in the unit price table above, are subject to a lump sum arrangement and should be included in the amount in subparagraph 1(a) of BA03

## APPENDIX B - GEOTECHNICAL REPORT

## APPENDIX C - BASIC IMPACT ASSESSMENT

## APPENDIX B - GEOTECHNICAL REPORT

**April 20, 2020**

**Andrew Melanson, P.Eng.**

Senior Project Engineer  
Crandall Engineering Ltd., a division of Englobe Corp.  
133 Prince William Street, Suite 703  
Saint John, NB E2L 2B5  
Via E-mail: andrew.melanson@englobecorp.com

**Subject: Geotechnical Investigation: Parks Canada Cape Spear Lighthouse Waste Water Treatment  
St. John's NL  
(Project No. 1900387.03)**

Dear Mr. Melanson:

Further to your written authorization of March 30, 2020, Crandall Engineering Ltd. (a division of Englobe Corp.) was retained by Parks Canada (the Client), to undertake a geotechnical investigation at the property (e.g. the "site") located at the Cape Spear Lighthouse National Historic Site in the City of St. John's, Newfoundland and Labrador. We understand that a geotechnical investigation and laboratory testing in support of the replacement or refurbishment of an existing septic system.

This development is currently in the design phase and a geotechnical investigation has been requested as part of the design and evaluation process. The layout and size of the proposed new/replacement septic system was not known at the time of the investigation but is likely to encompass the existing septic field footprint size of approximately 25 by 25 m. The purpose of this geotechnical investigation was to evaluate and report the factual subsurface conditions for this development for design and construction.

This report presents the factual results of the field investigation, including discussion of field procedures, subsurface conditions, and laboratory analysis general discussion of the site.

## **INVESTIGATION SCOPE OF WORK**

Englobe Corp. completed the field investigation component of the work on April 3, 2020, and provided the principal findings of the field investigation, including site photos on April 8, 2020, pending the completion of our laboratory testing of soil samples obtained during the investigation. The scope of work undertaken for this geotechnical investigation consisted of the following:

- Completion of field investigation program to consist of excavating of up to (3) mechanically excavated test pits using a mini track-mounted excavator subcontracted by Englobe;
- Completion of a laboratory testing program to consist of two (3) sieve (gradation) analysis tests and one (1) falling head permeability test to characterize select soil samples obtained in the test pits and their associated parameters for use in engineering design; and,
- Completion of a geotechnical report to include the factual results of the field conditions at the project organized with the items above in the following structure:
  - Laboratory testing results;

- Soil Classification as per ASTM standards;
- Groundwater levels at each test pit along with observed seepage rates;
- Elevation of inferred bedrock;
- Test Pit Records and photographs at each test pit;
- Recommendations for site preparation; and,
- Test Pit Location Plan.

## **SITE DESCRIPTION**

The project site is located to the north of the existing Cape Spear Light House entry pavilion. A Test Pit Location Plan is presented on Drawing No. 1900387-P07, attached in Appendix 1.

The site consists of lands occupied by two (2) detached buildings located to the south. The main paved visitor parking area is located to the southwest of the existing septic field. The existing septic field is slightly under-elevated relative to the aforementioned buildings, parking areas and including land located to the east and west. To the west and north, the ground surface consists of barrens with minor grassy areas and bedrock outcroppings. Further to north and downslope is the exposed bedrock coastline of the Atlantic Ocean. To the east is an existing minor drainage ditch and a paved walking trail. Beyond and to the east of the paved walking trail lies elevated terrain consisting of a minor to moderate bedrock ridge and interspersed with lower-lying brush and vegetation growth.

In general, the immediate site topography and surrounding area can be described as situated within a minor sloping valley fold that is apparently bedrock-controlled. Topographic information was not available at the time of this report issuance, but it appears but the surface slopes about less than 2 meters at the existing septic field. A larger relief of the terrain is apparent and varies by more than a few meters to south and upgradient at the visitor parking areas and up to 10 m down-gradient to the north towards the (up to 40 m overall to the coastline).

## **SITE GEOLOGY**

Surficial geology mapping indicates the site is underlain by a thin veneer of glacial till soil (e.g. till), exposed bedrock and peat organic deposits. The till soil consist of predominately sandy gravels with varying proportions of silt with minor clay fraction, and minor fractions of cobbles and boulders. The till soil is deposited by glacial action, predominantly via an ablation drift with minor undifferentiated and glacio-fluvial action. The process of glacial till deposition with the St. John's-Avalon Peninsula region typically resulted in unsorted sedimentation in a compact to very dense and over-consolidated soil matrix.

Based on publicly available bedrock mapping of the area (A.F. King, 1988), bedrock at the site is mapped as reddish brown conglomerate sandstone of the Signal Hill Group. The rock formation dates to the Precambrian period of about 541 million years ago, when hard-shelled creatures first appeared in abundance but predating significant terrestrial flora and fauna.

## **FIELD INVESTIGATION PROCEDURE AND LABORATORY TESTING**

The geotechnical site investigation was carried out under the direct supervision of geotechnical personnel from Englobe who maintained detailed field records of the various soil strata, inferred bedrock depths and groundwater conditions encountered. The field investigation was completed on April 3, 2020, and comprised of excavating three (3) test pits using a track-mounted mini excavator provided under subcontract by Englobe.



The quantity and locations of test pits were specified by Englobe and laid out in the field by our personnel to avoid the existing buried septic field infrastructure. The approximate test pit locations completed for this investigation are shown on the Test Pit Location Plan, Drawing No. 1900387.03-P07, attached in Appendix 2.

The test pits were excavated through any overburden soils until refusal due to inferred bedrock or large boulders at depths ranging from 1.4 to 2.2 m below the existing ground surface.

Select and representative soil samples were obtained directly from the test pits in the form of bulk soil sample for this investigation with a minimum sample size of 20 kilograms or greater. Oversized particles, e.g. cobble- and boulder-sized particles, were excluded from bulk soil sample as discussed in the next section. All soil samples were visually assessed in the field, clearly labelled and stored in moisture-proof containers and transported to our Mount Pearl laboratory.

A total of three (3) samples were tested in Englobe's laboratory located in Mount Pearl for soil gradation and moisture content testing. A single (1) soil sample was also tested in our laboratory for soil permeability using the falling head testing method in accordance with ASTM D5084. The soil gradation test results are attached in Appendix A and discussed in the next report section.

Upon completion, the test pits were backfilled with the excavated materials and nominally compacted using the equipment during backfilling. It should be noted that settlement of backfilled materials could occur at the test pit locations. It is the responsibility of the Client and/or site Owner to address any potential hazards due to settlement of backfilled materials should it occur at the test pit locations. During site preparation and earthworks, the test pit locations should be re-excavated and replaced with a compacted structural fill material in the manner noted in this report.

## **SUBSURFACE CONDITIONS**

The subsurface soil classification and methodology used herein is based on visual-manual field observations and any laboratory soil classification testing results using the Unified Soil Classification System (USCS) in general accordance with ASTM Test Standards D2487 and D2488. The USCS provides for a descriptive classification of soils based on the engineering properties based on soil classification and which is also referenced in many geotechnical engineering design approaches and literature.

The USCS also utilizes a shorthand abbreviation using two (2) parenthesized capitalized letters, e.g. (SP) for poorly graded sand, (SW) well-graded sand, etc., which is described on the Symbols and Terms used on the Test Records attached in Appendix 1. Additionally, the USCS discusses oversize particle fractions above 75 mm diameter as cobbles and above 300 mm as boulders and are assessed based on a volumetric percentage that is typically visually estimated based on drilling conditions, excavated test pit material stockpiles, etc. Particle sizes below 75 mm diameter are described as a soil according to this classification system.

A summary of the subsurface conditions encountered at the site is provided in the paragraphs below and in detail on the Test Pit Records, attached in Appendix 1. On the Test Pit Records, any stratigraphic boundaries typically represent a transition of one soil type to another and do not necessarily indicate an exact plane of geologic change. Stratigraphic boundaries using a solid line indicates measured or observed boundaries and those represented with a dashed line represent inferred or estimated transitions or the continuation of the same stratum description (e.g for fill, etc.) but where the soil classification changes. Further, subsurface conditions may vary between and beyond the testing and sampling locations and the Test Pit Record information is provided for guidance and is only accurate for the exact location where completed; therefore, inference on subsurface conditions between borehole locations is left for the user(s) of the information to determine and to generalize and in estimation purposes.

In general, the encountered subsurface soil conditions at this site can be described in three (3) divisions as summarized below (ordered in descending layer depth):

- Fill Materials: Well-graded gravel with silt and sand to silty gravel with sand (GM)
- Organic peat and silty sand soils; and,
- Inferred bedrock.

### **Fill**

A layer of fill was encountered in all test pits and extending to approximate depths ranging from 1.1 to 1.2 m below the ground surface. A thin and eroded surficial layer of sod-like material was also noted at the testing locations. The fill was described as a brown, well-graded gravel with silt and sand (GW-GM) to silty gravel with sand (GM), and contained some to frequent cobbles, occasional boulders and trace to some organic matter.

The relative density of the fill was generally determined to be loose based on equipment performance during excavating of the test pits and from on visual assessment.

Four (4) bulk soil samples (approximately 20 kg each) were obtained from the till layer and tested for soil gradation analysis in Englobe's Mount Pearl laboratory with the test results attached in Appendix 1. The following summarizes the range in the testing results obtained from this layer:

- USCS Soil Classification:
  - Well-Graded GRAVEL with silt and sand (GW-GM) – two (2) samples;
  - Silty GRAVEL with sand (GM) – single (1) sample;
- Gravel: 45.9 to 66.3%;
- Sand: 20.1 to 29.9%;
- Fines (major silt and minor clay fraction): 13.2 to 15.4%;
- Moisture: 6.9 to 9.1%; and,
- Estimated over-sized particle content excluded from sample: 15 to 30% by volume.

A single (1) soil sample obtained from test pit TP3 was tested in Englobe's laboratory for soil permeability using the falling head testing method in accordance with ASTM D5084. The following is the laboratory testing result obtained:

- Soil Permeability,  $K_{SOIL} = 2.8 \times 10^{-3}$  cm/sec.

For comparison purposes, a range in the order of magnitude for the soil permeability of silty gravels (GM) to silty sand with gravels (SM) is typically published in literature as  $K_{SOIL} = 2.5 \times 10^{-2}$  to  $2.5 \times 10^{-5}$  cm/sec.

### **Organic Peat with Silty Sand**

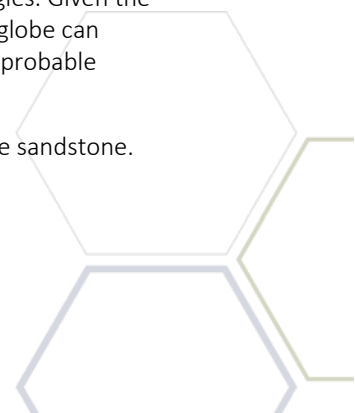
Underlying the fill layer described in the previous paragraphs, a layer described as dark brown, organic peat (PT) with silt, sand and gravel was encountered in test pit TP3 and at a depth of 1.2 m below the existing ground surface.

The relative density of the organic peat layer was generally determined to be very loose to loose based on equipment performance during excavating of the test pits and from on visual assessment.

### **Inferred Bedrock**

Bedrock was inferred based on excavation refusal in all test pits at depths ranging from 1.2 to 2.1 m below the ground surface. It is possible that excavation refusal may also arise due to large boulders and/or very dense soils and that confirmation of the bedrock surface, including any rock quality parameters, strength, etc., would be normally be determined from rock specimens obtained during a borehole drilling site investigation methodologies. Given the presence of exposed bedrock outcropping, in particular located along the western side of the site, Englobe can determine with a higher degree of certainty that the noted excavation refusal would be attributed to probable bedrock.

Based on adjacent bedrock outcropping, bedrock at the site consists of a reddish-brown conglomerate sandstone.



### **Groundwater**

Groundwater seepage was only encountered in test pits TP1 and at a depth of 0.9 m below the ground surface. Groundwater seepage was noted to be rapid or fast. It should be noted that the groundwater level at the site may fluctuate with seasonal precipitation, site usage, construction and future use not identified herein.

Groundwater was not observed in the remaining test pits. In test pit TP3, the soil appeared to be saturated at depth of 1.2 m below the ground surface, within the peat layer, indicating a possible water level might have been present at that depth such as during precipitation events.

## **GENERAL INVESTIGATION RESULTS AND DISCUSSION**

The site is currently developed with an existing septic field. It should be noted that in the Client's desire to not damage the existing septic field, this investigation was completed by excavating test pits at the periphery as shown in the Test Pit Location Plan, attached in Appendix 2. Therefore, some inference on the existing soil condition and presence of a possible drainage/infiltration bedding materials within the existing septic field is left to the Client to assess.

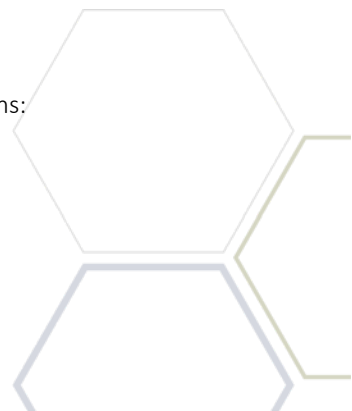
Our investigation revealed fill materials and minor buried organic materials or topsoil layers underlying the fill in test pit location TP3 located at the north and downslope end of the existing septic field. General site preparation for this site would likely consist of excavating the area down to bedrock in order to reach suitable drain line inverts and suitable bedding material coverage. Some rock excavation work would be anticipated at this site to install services.

**Site Photo:** Visible surface water flowing from visitor parking area flow down-gradient onto the existing septic field area. Test pit TP1 location at mini excavator location.



Our investigation indicated that the site is relatively poorly drained based on the following observations:

- Relatively shallow depth of soil and/or imported fill overburden materials overlying bedrock;



- Site topography and situation of the existing septic field located within minor valley relief; and,
- Overland surface water flow/drainage from the adjacent visitor parking area (see site photo above). Rapid/fast water seepage was also noted within a highly permeable rockfill layer that likely extends further south and was like imported to build up the existing visitor parking lot to existing grades.


The following observations are provided that might be considered for this development to improve the functionality of the proposed septic field replacement at this site:

- Install a raised concrete curb and gutter along the north and east of the existing visitor parking lot to collect surface water flows into a new catch basin and in turn appropriately divert these flows via a positive gradient downslope and past the septic field location;
- Install a French drain to intercept/cut-off and divert subsurface water flows originating from within the existing visitor parking lot and to the south an up-gradient from the septic field location. The water should be diverted via a positive gradient downslope and past the septic field location;
- Raise the final grade of the septic field by 1 to 2 meters overall to match or raise the grade above the parking lot grade, if possible, and slope final grades to provide positive surface gradients throughout.
- Provide or extend existing ditching to the south and west and towards the existing entrance buildings to improve surface water drainage and divert flows from higher terrain to the east and south.
- Cap the new septic field with a less permeable soil at the surface such as using 500 to 800 mm of a silty sand and gravel material with at least 15% fines content.
- Provide appropriate materials quality control for any imported materials and construction monitoring to ensure future functionality of the septic field.

## CLOSING

We thank you for allowing us to consult with you on this project. We trust this letter meets your present requirements. Should any additional information be required, please do not hesitate to contact our office at your convenience.

Yours truly,  
Englobe Corp.

  
Erich Lenz, PE, P. Eng.  
Sr. Civil/Geotechnical Engineer  
Geotechnical and Materials Engineering



### Attachments:

- Appendix 1:** Symbols and Terms Used on the Test Records (1 p.)  
Test Pit Records (3 pp.)  
Figure 1.1: Gradation Curves (1 pp.)
- Appendix 2:** Test Pit Location Plan, Dwg. No. 1900387-P01 (1 p.)



**Appendix 1: Symbols and  
Terms Used on  
the Test Records  
(1 p.)**

**Test Pit Records  
(3 pp.)**

**Figure 1.1:  
Gradation Curves  
(1 pp.)**



## Soil Description

**Behavioural properties (i.e. plasticity, permeability) take precedence over particle gradation in describing soils. Terminology describing soil structure:**

- Desiccated: Having visible signs of weathering by oxidation of clay minerals, shrinkage cracks etc.
- Fissured: Having cracks, and hence a blocky structure.
- Varved: Composed of regular alternating layers of silt and clay.
- Stratified: Composed of alternating layers or different soil types, e.g. silt and sand or silt and clay.
- Well-Graded: Having wide range in grain sizes and substantial amounts of all intermediate particle sizes.
- Poorly Graded: Predominantly of one grain size.

**Terminology used for describing soil strata based upon the proportion of individual particle size present:**

Trace, or occasional	Less than 10%
Some	10-20%
Adjective (e.g. silty or sandy), or frequent	20-35%
And (e.g. silt and sand), or frequent	35-50%

**The standard terminology to describe cohesionless soils includes the relative density, as determined by laboratory test or by the Standard Penetration Test (SPT) to obtain the 'N'-value: the number of blows of 140 pound (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (e.g. 305 mm) into the soil. This is the Standard Penetration Test referred to in ASTM D1586.**

Relative Density	'N'-Value	Relative Density %
Very loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

**The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by in situ vane tests, penetrometer tests, unconfined compression test, or occasionally by standard penetration tests (SPT).**

Consistency	Undrained Shear Strength (Kips/sq.ft.)	Undrained Shear Strength (kPa)	'N'-Value
Very Soft	<0.25	<12.5	<2
Soft	0.25-0.5	12.5-25	2-4
Firm	0.5-1.0	25-50	4-8
Stiff	1.0-2.0	50-100	8-15
Very Stiff	2.0-4.0	100-200	15-30
Hard	>4.0	>200	>30

### Soil Samples

TYPE - The type of sample is indicated in this column as follows:

A - auger sample	D - drive sample	SS - split spoon (SPT)
B - block sample	G - grab sample	U - thin-walled, tube sample
C - rock core, or	O - other (see report text)	W - wash or air return sample
frozen soil core	P - Pitcher tube sample	

Condition of the sample is indicated as follows:

- Undisturbed
- Disturbed
- Not Recovered

Note: Dashed/dotted lines separating subsurface descriptions on the records indicates inferred stratigraphy boundaries.

## Unified Soil Classification System (USCS)

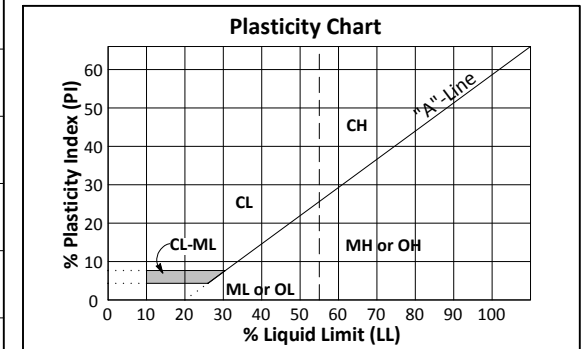
(ASTM D2478/2488)

Unified Soil Classification and Symbol Chart	
<b>Coarse-Grained Soils</b> (more than 50% of material is larger than No. 200 sieve size)	
<b>GRAVELS</b> More than 50% of coarse fraction larger than No. 4 sieve size	<b>Clean Gravels (less than 5% fines)</b>
	<b>GW</b> Well-graded GRAVEL or, Well-graded GRAVEL with sand
	<b>GP</b> Poorly graded GRAVEL or, Poorly graded GRAVEL with sand
	<b>Gravels with fines (more than 12% fines)</b>
	<b>GM</b> Silty GRAVEL or, Silty GRAVEL with sand
	<b>GC</b> Clayey GRAVEL or, Clayey GRAVEL with sand
<b>SANDS</b> More than 50% of coarse fraction larger than No. 4 sieve size	<b>Clean Sands (less than 5% fines)</b>
	<b>SW</b> Well-graded SAND or, Well-graded SAND with gravel
	<b>SP</b> Poorly graded SAND or, Poorly graded SAND with gravel
	<b>Sands with fines (more than 12% fines)</b>
	<b>SM</b> Silty SAND or, Silty SAND with gravel
	<b>SC</b> Clayey SAND or, Clayey SAND with gravel
<b>Fine-Grained Soils</b> (50% or more of material is smaller than No. 200 sieve size)	
<b>SILTS and CLAYS</b> Liquid Limit (LL) less than 50%	<b>ML</b> SILT, SILT with sand or gravel, sandy or gravelly SILT, sandy or gravelly SILT with sand or gravel
	<b>CL</b> LEAN CLAY, LEAN CLAY with sand or gravel, sandy or gravelly LEAN CLAY with/with out sand or gravel
	<b>OL</b> ORGANIC SOIL, ORGANIC SOIL with sand or gravel, sandy or gravelly ORGANIC SOIL with sand or gravel
	<b>MH</b> ELASTIC SILT, ELASTIC SILT with sand or gravel, sandy or gravelly ELASTIC SILT, sandy or gravelly ELASTIC SILT
<b>SILTS and CLAYS</b> Liquid Limit (LL) greater than 50%	<b>CH</b> FAT CLAY, FAT CLAY with sand or gravel, sandy or gravelly FAT CLAY with sand or gravel
	<b>OH</b> ORGANIC SOIL, ORGANIC SOIL with sand or gravel, sandy or gravelly ORGANIC SOIL with sand or gravel
	<b>PT</b> Peat and other highly organic soils
<b>HIGHLY ORGANIC SOILS</b>	

Other typical material symbols use on the records:

- Fill
- Till
- Bedrock
- Sod/Topsoil

Laboratory Classification Criteria	
$C_u$ - Hazen coefficient of uniformity $C_c$ - Coefficient of curvature or gradation $D_{10}$ , $D_{30}$ , $D_{60}$ - Effective grain size as % finer passing on gradation curve	
<b>GW</b>	$C_u = \frac{D_{60}}{D_{10}}$ and $> 4.0$ ; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} > 1.0$ and $\leq 3.0$
<b>GP</b>	Not meeting all gradation criteria above for GW
<b>GM</b>	Atterberg limits below "A"-line or P.I. less than 4.0
<b>GC</b>	Atterberg limits above "A"-line with P.I. greater than 7.0
<b>SW</b>	$C_u = \frac{D_{60}}{D_{10}}$ and $> 4.0$ ; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} > 1.0$ and $\leq 3.0$
<b>SP</b>	Not meeting all gradation criteria above for SW
<b>SM</b>	Atterberg limits below "A"-line or P.I. less than 4.0
<b>SC</b>	Atterberg limits above "A"-line with P.I. greater than 7.0



Classification of Particle Sizes	
Clay:	<0.002 mm
Silt:	0.002 to 0.075 mm
Sand:	0.075 to 4.75 mm
Gravel:	<3 inches (<75 mm)
Cobbles*:	3 to 12 inches (75 to 305 mm)
Boulders*:	>12 inches (>305 mm)

\*NOTE: Boulders and cobbles are not considered soil or part of the soil classification or description, except under miscellaneous descriptions; i.e. with occasional cobbles at about 5 percent (volume), etc.



Project No.: 1900387.030

**Geotechnical Investigation: Parks Canada Cape Spear Lighthouse Waste  
Water Treatment  
St. John's, NL**

**Symbols and Terms  
Used on the Test  
Records**

DWN.:		CKD.:	DATE(S) EXCAVATED:	EQUIPMENT/ METHOD:	COORDINATES:-	
DEPTH ft m	ELEV. (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES		OTHER TESTS/ NOTES
				TYPE/ No.	TEST	
0.5		[Cross-hatched pattern]	Loose, brown, well-graded GRAVEL with silt and sand (GW-GM); some to frequent cobbles, trace organic matter. [Fill] - Approx. 50 mm of grass sod or moss at surface. - Inferred 100 mm minus clean rockfill material from 0.3 m depth to bottom of test pit.			Well-graded GRAVEL with silt and sand (GW-GM) [FILL] Gravel = 51.0% Sand = 37.2% Silt/Clay = 11.8%
1.0				GRAB 1	M S	
1.5	0.5					
2.0						
2.5						
3.0	▽					
3.5	1.0					
4.0			<b>End of Test Pit at 1.2m depth</b> <i>Test Pit terminated due to probable bedrock.</i> <i>Fast water seepage observed.</i> <i>Inferred groundwater at 0.9m depth.</i>			
4.5						
5.0	1.5					
5.5						
6.0						
6.5	2.0					
7.0						
7.5						
8.0	2.5					
8.5						
9.0						
9.5						
3.0						



TEST PIT EXCAVATION



SPOIL PILE OR TEST PIT DETAIL



**Geotechnical Investigation: Parks Canada Cape Spear Lighthouse Waste  
 Water Treatment  
 St. John's, NL**  
 Report Date: 20/04/20  
 Project No.: 1900387.030

**Test Pit Record No.  
 TP1**

DWN.:		CKD.:	DATE(S) EXCAVATED:	EQUIPMENT/ METHOD:	COORDINATES:-	
DEPTH ft m	ELEV. (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES		OTHER TESTS/ NOTES
				TYPE/ No.	TEST	
0.5			Loose, brown, well-graded GRAVEL with silt and sand (GW-GM); some cobbles, occasional boulders, trace organic matter. [Fill]			Well-graded GRAVEL with silt and sand (GW-GM) [FILL] Gravel = 52.4% Sand = 39.2% Silt/Clay = 8.4%
1.0						
1.5						
2.0				GRAB 1	M S	
2.5						
3.0						
3.5						
4.0			<b>End of Test Pit at 1.1m depth</b> <i>Test Pit terminated due to probable bedrock. No water seepage observed.</i>			
4.5						
5.0	1.5					
5.5						
6.0						
6.5	2.0					
7.0						
7.5						
8.0	2.5					
8.5						
9.0						
9.5						
3.0						



TEST PIT EXCAVATION



SPOIL PILE OR TEST PIT DETAIL



**Geotechnical Investigation: Parks Canada Cape Spear Lighthouse Waste  
 Water Treatment  
 St. John's, NL**

Report Date: 20/04/20  
 Project No.: 1900387.030

**Test Pit Record No.  
 TP2**



DWN.:		CKD.:	DATE(S) EXCAVATED:	EQUIPMENT/ METHOD:	COORDINATES:-	
DEPTH ft m	ELEV. (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES		OTHER TESTS/ NOTES
				TYPE/ No.	TEST	
0.5		[Cross-hatched symbol]	Loose, brown, silty GRAVEL with sand (GM); some to frequent cobbles, occasional boulders, trace organic matter. [Fill]			Silty GRAVEL with sand (GM) [FILL] Gravel = 45.9% Sand = 39.8% Silt/Clay = 14.4%
1.0						
1.5	0.5			GRAB 1	M S	
2.0						
2.5						
3.0						
3.5	1.0					
4.0		[Wavy symbol]	Loose, dark brown, PEAT with sand and gravel; occasional cobbles and boulders. [ORGANIC PEAT]			
4.5						
5.0	1.5					
5.5						
6.0						
6.5	2.0					
7.0						
7.5			End of Test Pit at 2.1m depth Test Pit terminated due to probable bedrock. No water seepage observed; soil saturated.			
8.0	2.5					
8.5						
9.0						
9.5						
3.0						



TEST PIT EXCAVATION

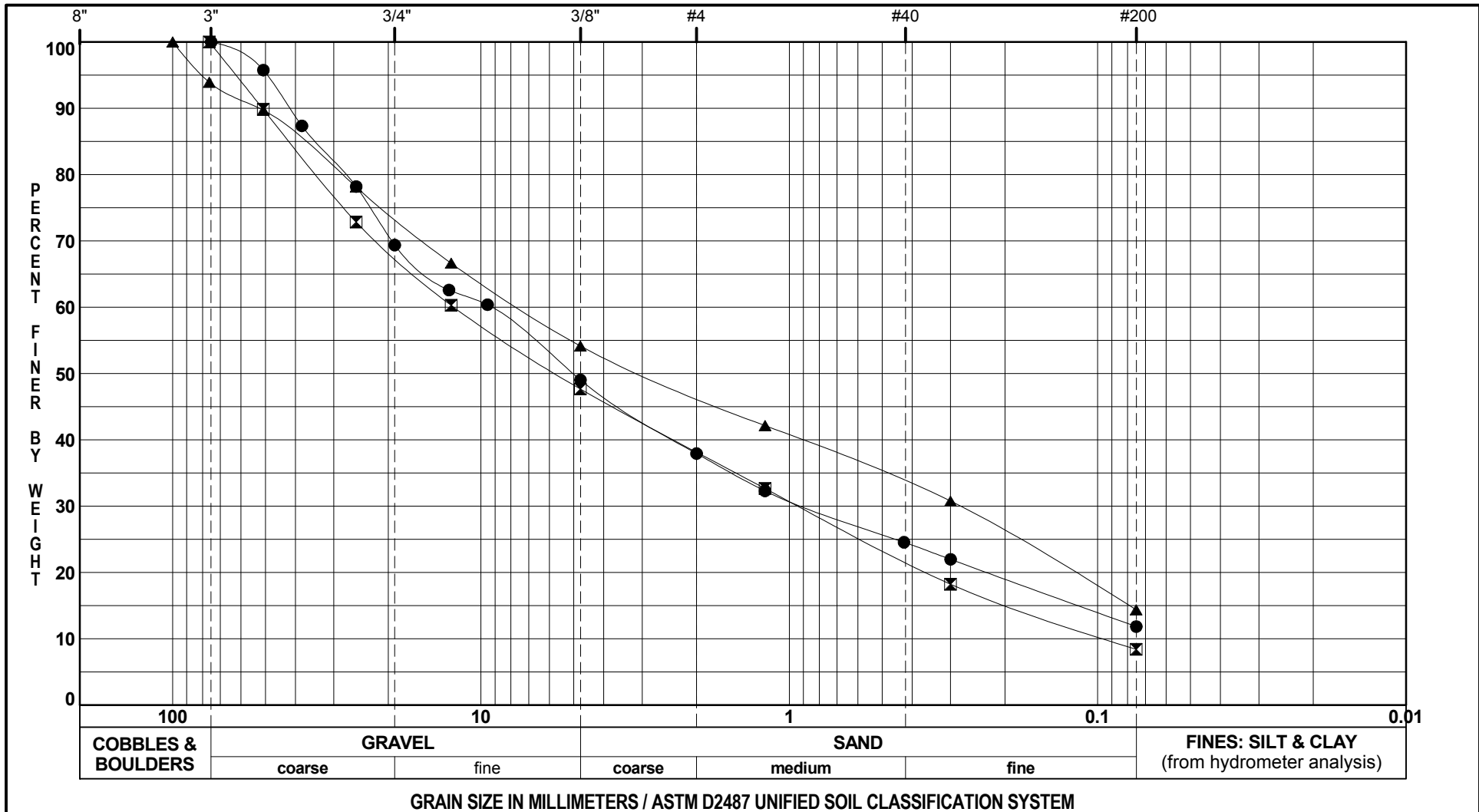


SPOIL PILE OR TEST PIT DETAIL



**Geotechnical Investigation: Parks Canada Cape Spear Lighthouse Waste**  
**Water Treatment**  
**St. John's, NL**  
 Report Date: 20/04/20  
 Project No.: 1900387.030

**Test Pit Record No.**  
**TP3**



**Appendix 2: Test Pit Location  
Plan, Dwg. No.  
1900387-P01  
(1 p.)**





C:\2019\1900387\03 - CAPE SPEAR SEPTIC TANK CAD DESIGN PRESENTATION\DWGS\1900387 BOREHOLE LOCATIONS.DWG, 05/03/2020 10:16 AM

NOTES

1. EXISTING SERVICES ARE APPROXIMATE ONLY AND BASED OFF PDF VERSION OF DMG CONSULTING LTD. DRAWINGC-1.01 NEW SITE PLAN AND PROFILE. CONTRACTOR IS RESPONSIBLE TO ARRANGE FOR ON SITE LOCATES WITH ALL UTILITIES PRIOR TO THE START OF WORK.
2. AERIAL IMAGE TAKEN FROM: ST. JOHN'S MAPCENTRE
3. SURVEY TOP OF EACH BOREHOLE. IF GPS EQUIPMENT IS UNAVAILABLE, USE TOP OF DOSING VALVE CHAMBER AS REFERENCE ELEVATION.

A.0	MAR 05/20	ISSUED FOR GEOTECH	KKM	KKM
NO.	DATE	REVISIONS	BY	APPR.



PROJECT TITLE  
**CAPE SPEAR LIGHTHOUSE WASTE WATER TREATMENT PARKS CANADA**

CAPE SPEAR NFLD

DRAWING TITLE  
**TEST PIT LOCATION PLAN**

Scale 	Drawn By	Design By
	Checked By	Cadd Check
	Sheet	1 of 1

File Name  
 1900387 BOREHOLE LOCATIONS.DWG

Drawing No.  
**1900387-P01**

## APPENDIX C - BASIC IMPACT ASSESSMENT



# Basic Impact Assessment

**Parks Canada**  
Version IAA 2019

## 1. PROJECT TITLE & LOCATION

**Installation of Septic Filed – Cape Spear National Historic Site**

## 2. PROPONENT INFORMATION

Melissa Martin – Project Manager, Project Delivery Services (902) 478 7423

## 3. PROPOSED PROJECT DATES

Planned commencement: 2020-08-24

Planned completion: 2021-10-16

## 4. NOTICES ON REGISTRY

**Title for Registry:** Installation of Septic Field

Project notice posted on Registry 2020-05-06

BIA or any permits approval cannot be taken before 2020-06-06

## 5. PROJECT FILE NUMBER (internal /Registry) TN-2020-05

## 6. PROJECT DESCRIPTION

The Cape Spear Lighthouse National Historic Site (CSLNHS) is located at the most easterly point in Canada. Just 20 minutes east of St. John's, CSLNHS was designated as historically significant in 1962 for the age and the architecture of the historic lighthouse. In order to protect the commemorative integrity of the site, Parks Canada restored this lighthouse to its original appearance and CSLNHS was officially opened to the public in 1983. Today, Cape Spear continues to be protected as a National Historic Site for two main reasons: the age and architecture of the lighthouse and its significance as a gun battery during the Second World War.

Parks Canada has enhanced the site facilities by adding a café and more washrooms.

Completion of this project will result in an adequate and reliable sewer treatment infrastructure system capable of servicing the current and anticipated CSLNHS requirements.

This includes:

- A new septic field in the same location as the existing field.
- A new dosing system to control flow into the new field.
- A curb and gutter along the north and east of the existing visitor parking lot to convey waterflow away from the septic field.
- French drain to intercept groundwater flow;
- Raising the field to match the grade of the parking lot;
- Extend ditching to the south and west to improved drainage and repair culvert;
- Cap the septic field with a less permeable soil.
- The existing septic tank and holding tank will remain.

CSLNHS is situated in the highlands of the Avalon Peninsula and is underlain mainly by Precambrian Rock. Topography in the region is steeply sloping. Soils are of the Red Cove soil series and are characterized by reddish-grey, very firm, very stony, sandy loam and are moderately well-drained. The long, narrow ridge that forms the site is bordered by large water sources on three sides. Cape (Spear) Bay is located northwest of the site, the Atlantic Ocean is to the north, and Broad Cove is to the southeast. A small brook marks the western boundary of the site.

Flora on site consists of a combination of introduced and native species, mostly in the form of dense shrub vegetation resulting from successive fires in the area. A variety of vegetative communities exist within the site, however the area is predominated by rock barrens and alder barrens. The rock barrens consist primarily of bare soil and rock, along with carpets of vegetation consisting primarily of crowberry species (*Empetrum eamesii* and *Empetrum nigrum*). The alder barrens are comprised of sweet bayberry (*Myrica gale*) and dwarf alder (*Alnus crispa*) mixed with tufts of grass and herbs. Basin bogs and seepage fens are also found on site and consist primarily of sphagnum species. The presence of Rocky Mountain willowherb (*Epilobium saximontanum*) had been noted by Parks Canada Staff in 2001, a provincially listed rare species, on the north side of the trail situated between the lookout and the most easterly point of the site. The plant has not been noted since or elsewhere and is thought to have been misidentified. It is generally associated with calcareous habitats of western Newfoundland. Alpine Fescues (*Festuca brachyphylla*) was noted during a vascular plant survey in 1979. This species is also listed as a rare species in Newfoundland. It has not been recorded since and is thought to have been misidentified as it is an alpine species with the only known records from western Newfoundland. A survey of the vegetation on the proposed construction corridors was conducted on November 2, 2017. These species were not found. There are no known flora species listed under the federal *Species at Risk Act (SARA)* or the provincial *Endangered Species Act (ESA)* occurring at the site.

Resident fauna is limited to smaller mammals such as rodents and snowshoe hare (*Lepus americanus*), with medium and large mammals passing through the site on occasion. Many bird species can be found at the site including the horned lark (*Eremophila alpestris*), savannah sparrow (*Passerculus sandwichensis*), willow ptarmigan (*Lagopus lagopus*), American robin (*Turdus migratorius*), various sandpiper (*Calidris sp.* and *Actitis macularia*) and snow bunting (*Plectrophenax nivalis*). Commonly sighted seabirds include murre (*Uria sp.*), shearwater (*Puffinus sp.*), black guillemot (*Cepphus grylle*), herring gull (*Larus argentatus*), greater black-backed gull (*Larus marinus*), and blacklegged kittiwake (*Rissa tridactyla*). The little brown bat (*Myotis lucifugus*) is classified as Endangered under *SARA* and the provincial *ESA* and may occur at the site although no known roosts or winter hibernacula have been previously identified. The short-eared owl (*Asio flammeus*) is classified as Special Concern under *SARA* and Vulnerable under the provincial *ESA*. This species could occur at the site. No breeding records or roosts have been confirmed and any occurrence would most likely be transient in nature. Marine species are abundant beyond the site boundaries and include, but are not limited to, such species as Atlantic cod (*Gadus morhua*), Atlantic salmon (*Salmo salar*), humpback whales (*Megaptera novaeangliae*), minke whales (*Balaenoptera acutorostrata*), and fin whales (*Balaenoptera physalus*).

The strategic location of the Cape Spear headland, overlooking the approaches to St. John's harbour, made it a key point for coastal navigation, communications, coastal defence and a special place for viewing. The natural features and relationships of the site that supported these activities still exist. The Cape Spear NHS Commemorative Integrity Statement provides details on the cultural resource inventory on site. The designated place includes the footprint of the original 1835 lighthouse building. The cultural resources of national historic significance (Level I) include the 1835 lighthouse and any structural remains of the original lighthouse on site. The cultural resources of other heritage value (Level II) include the structural components associated with the additions to the 1835 lighthouse, and the remains and vestiges of an attached fence and privy, the contemporary lighthouse complex including the VRC/Giftshop – the assistant keeper residence and, the World War II Battery complex. The cultural landscape consist of impressions left on the land as a result of activities relating to lightkeeping and WWII Defence at Cape Spear, i.e. footprints and former structures, remnants and evidence of ditches, wells and a water holding basin, evidence of pathways, roadways and, agricultural activities.



## **7. VALUED COMPONENTS LIKELY TO BE AFFECTED**

As identified in Appendix 1 - Effects Identification Matrix.

## **8. EFFECTS ANALYSIS**

The primary effects for all valued components will occur during the construction phase of the project.

### Natural Resources

Air - airborne dust particles from exposed soil and heavy equipment exhaust may result in reduced air quality. The effect is expected to be low given the small size of the construction area, reducing the potential for dust.

Water – wastes (e.g., garbage, litter, fuel and construction materials), erosion and sedimentation and surface water runoff may contaminate groundwater and the aquatic environments. The probability of a fuel spill is low, however, the area is subject to high winds and storm conditions. Erosion and sediment control and secure storage of materials will be important.

Soil and Landforms - excavation activities and operation of heavy machinery may result in soil compaction and rutting, soil erosion, loss of topsoil, exposure of subsoils, and soil contamination from waste (e.g., garbage, fuel). The septic field area is a previously disturbed area so effects are expected to be low. Effective restoration of the site will be important.

Flora (including species at risk) - excavation will require removal of vegetation resulting in disturbance of adjacent natural areas, potential root exposure and physiological stress; ground disturbance may result in the introduction of invasive species, or expansion of existing invasive alien populations. Effects are expected to be low given that the site is historically a disturbed area and there are currently invasive species existing on the site. Effective restoration, however, will be important. Effects to species at risk are not expected.

Fauna (including species at risk) - operation of heavy equipment, increased human presence and noise may result in temporary habitat displacement/ preferred habitat avoidance (e.g., birds); artificial food sources such as garbage and litter may cause wildlife habituation/attraction (e.g., seabirds, fox); potential fuel spills, sediment and runoff may contaminate aquatic habitat; and potential runoff from fuel spills may cause injury or mortality to aquatic life. Effects are expected to be low given that construction will take place on an existing disturbed area with, at times, high levels of human activity. Effects to species at risk are not expected.

### Cultural Resources

Archaeological sites –The archaeological potential of the area impacted by the project is low for the most part. The impact is to be mitigated by staging excavation and equipment on previously disturbed areas, Accidental Finds and Change of Scope Protocols. The Double Catch Basin Drain area is of moderate archaeological potential, archaeological impact assessment will be required

to determine whether or not additional excavations and/or archaeological monitoring is required. Additional information is needed in this regard.

Landscape and Landscape Features- Impact is expected to be low given that the new septic field will be installed on the existing field and that the proposed new elements to be visible harmonize with adjacent existing components and remain subordinate to the historic site.

### Visitor Experience

The potential effects on Visitor Experience are anticipated to occur during the construction period, including: reduced quality of visitor experience due to noise and presence of construction equipment; decreased aesthetic appeal and impacted viewscape; and potential hazard to visitors and staff due to construction activities (e.g., heavy equipment operation). The project will temporarily decrease the quality of the overall visitor experience but this is limited to the construction period. Most trails will remain accessible to visitors.

## **9. MITIGATION MEASURES**

### General

Work Site Conditions/Staging/Laydown:

1. A project start up meeting will be held with the key people working onsite to review the mitigation measures, Parks Canada contact information and any site specific considerations with Parks Canada staff before work begins.
2. Staging and parking areas for material and equipment will be located at an area approved by Parks Canada staff.
3. An established working corridor, and other existing disturbed areas approved by Parks Canada staff, will be used to access the site.
4. Clearly mark staging areas, work corridors and restricted areas with stakes, biodegradable flagging tape, fencing, temporary gates or other means; remove when project is completed.
5. Isolate operations and ground intrusion activities to the footprint of the working corridor and limit vehicle access to essential vehicles only.
6. Confirm presence of buried infrastructure prior to excavation and take precautions to avoid damage.

Equipment Operation:

7. Equipment from outside the national historic site must be washed/cleaned free of soils prior to arrival.
8. Equipment must be properly tuned, clean and free of contaminants, in good operating order, free of leaks (e.g., fuel, oil or grease), and fitted with standard air emission control devices and spark arrestors prior to arrival on site.

9. During construction, any required cleaning of tools and equipment must be done greater than 30 meters from the shoreline to prevent the release of wash water that may contain deleterious substances.
10. Equipment operators must be fully trained and experienced.
11. Use low pressure/rubber tracked equipment or access matting where feasible to minimize soil compaction and ground disturbance.
12. Minimize idling of engines, contingent on operating instructions and temperature consideration.
13. Machinery (e.g., excavators, bobcats, chainsaws, and generators) must be stored, maintained and refuelled on a flat surface at least 100 meters from the ocean and any wetland areas.
14. Only minor repairs and maintenance (e.g., lubrication) of 'non-mobile' equipment such as flatbeds or shovels are permitted; all major repairs must be undertaken at an appropriate offsite location.

Waste:

15. All solid waste will be securely stored and handled according to applicable federal/provincial regulations.
16. All waste materials (e.g., construction material, refuse material, waste petroleum, and demolition waste) shall be removed from the site on project completion and considered, prior to disposal, for reuse, resale or recycling and then disposed of at an approved facility; cover waste loads during transportation.
17. Portable sanitary facilities must be serviced on a regular basis and accumulated waste disposed of at a sanitary waste disposal facility.
18. Burning of waste is not permitted at the National Historic Site.

Hazardous Materials:

19. Prevent the release of hazardous substances into the environment, including but not limited to, petroleum products and their derivatives and chemicals.
20. All on-site personnel must be briefed on reporting requirements for hazardous materials spills; spills must be reported immediately to the designated Parks Canada contact.
21. All construction sites must be equipped with containers suitable for the secure, temporary storage of hazardous wastes, separated by type.
22. A spill contingency response kit including sorbent material and berms to contain 110% of the largest possible spill (i.e., fuel or other toxic liquids) related to the work must be available on site at all times. On-site personnel must be aware of its location and trained in its use. Any contaminants must be recovered at source and disposed of according to applicable laws, policies and regulations.
23. Handle and store hazardous materials as per applicable federal legislation/regulations. The contractor must have all relevant and current Material Safety Data Sheets available onsite.
24. Petrochemical products, paints and chemicals must be stored 100 meters from aquatic environments. They must be secured overnight in a Parks Canada approved enclosed area under lock and key.
25. Any hazardous waste or contaminated material uncovered during excavation / construction, must be investigated, source identified, removed and disposed of outside the protected heritage place at an approved facility. Disposal documentation must be provided to the designated Parks Canada contact.

## Natural Resources

### Air:

26. Implement dust control measures during grading and re-surfacing especially during dry, windy weather.

### Water:

27. Ensure all materials (e.g., organic materials, soil stockpiles, construction waste and materials) are securely stored in place, especially during high wind/storm conditions and at staging areas; materials must not enter aquatic environments or be allowed to disperse around the site.
28. Machinery will not be permitted into any wetland areas and must stay on established working corridors.

### Soil and Landforms:

29. The contractor must prepare an erosion and sediment control plan and submit same to the designated Parks Canada contact for approval prior to the start of project activities.
30. Regularly inspect and maintain erosion and sediment control structures during all phases of the project and modify measures as necessary.
31. Use erosion and sediment control products made of 100% biodegradable materials (e.g., jute, sisal or coir fiber) when possible. Ensure backing materials are also biodegradable. Hay bales are not permitted.
32. Limit duration of soil exposure; phase activities whenever possible and restore disturbed areas as soon as possible.
33. Topsoil separation may be required; stockpile topsoil away from subsoils and spoil material and more than 15 meters away from aquatic environments, drainage features and/or the top of steep slopes.
34. Salvaged topsoil for reclamation activities will be stored inside areas approved by Parks Canada staff. This material will not be pushed or stored in natural areas to be left undisturbed.
35. Sources of topsoil from outside the site boundaries must be pre-approved by the Departmental Representative before use.
36. Excavations must be drained (but not directly into any waterbody), back-filled and compacted as soon as possible.
37. Under thawed conditions, backfill material will be compacted prior to topsoil replacement; distribute topsoil evenly over the excavated area as per Parks Canada specifications.
38. Under frozen ground conditions, material will be sufficiently spread over the excavated site to allow for settlement under thawed conditions. Where practical, topsoil replacement will be postponed until the backfill has thawed.
39. Surface water shall be directed away from work areas. Sediment laden runoff must not enter any watercourse.
40. Remove temporary erosion and sediment control products, especially non-biodegradable materials, when they are no longer required.
41. When excavation is complete, shape loosened soils to match the local terrain and ensure noticeable construction impacts (e.g., ruts, holes, depressions, compacted areas) are appropriately re-graded, back-filled with topsoil, re-contoured and capped in preparation for restoration.

42. During grading, ensure that materials are not pushed, or permitted to enter or erode into water or wetlands and stay within delineated limits.

Flora:

43. Introduction of invasive plant species must be prevented:
  - Minimise bare soil exposure (e.g., plant native species, cover with natural mulch/ground coverings).
  - Minimise ground disturbance and vegetation removal, as practical and within project requirements.
  - Aggregate sources must be free of invasive species and capable of producing clean material to the satisfaction of the Departmental Representative.
  - Equipment must be washed/cleaned free of soils prior to arrival.
44. Clear minimum area necessary. Remove and maintain sod mats for replacement when practical to improve re-vegetation success when work is complete.
45. Trees must be preserved and left in place. Any alteration to trees must be pre-approved by the designated Parks Canada contact.
46. Protect roots of trees to drip line to prevent disturbance or damage. Avoid traffic, dumping or storage of materials over root zone.
47. Restore any areas affected by construction activity as closely as possible to the natural surrounding area. Specifically:
  - Preserve native topsoil/rootmat from the site, spread over the affected areas, re-grade to natural contour, install effective erosion control measures (e.g., erosion control blankets) on the steepest sections of the waterline to ensure the soil does not wash away prior to native plant re-population next season.
  - Hydro seeding mixes or sod sources shall be pre-approved by Parks Canada staff.

Fauna:

48. All wildlife attractants must be secured (e.g., petroleum products, human food, recyclable drink containers and garbage) within wildlife-proof containers, in a secured building or a vehicle. Keep food waste separate from construction waste and remove daily. Notify the designated Parks Canada contact immediately should wildlife gain access to the above mentioned attractants.
49. Minimize the time excavations remain open and cover or fence when left unattended.
50. Never approach or harass wildlife (e.g., feeding, baiting, luring).
51. Alert the designated Parks Canada contact, immediately to any potential wildlife conflict (e.g., aggressive behaviour, persistent intrusion), distress or mortality. In the case of aggressive behaviour or persistent intrusion, stop work and evacuate the area.
52. The breeding season for most birds within Newfoundland occurs between May 1<sup>st</sup> and August 15<sup>th</sup>. Vegetation clearing/grubbing should not take place within this time frame. However, some species protected under the *Migratory Birds Convention Act* nest outside these timeframes. Under section 6 of the *Migratory Birds Regulations*, it is forbidden to disturb, destroy or take a nest or egg of a migratory bird; or to be in possession of a live migratory bird or its carcass, skin, nest or egg except under authority of a permit.

53. The construction limits will be surveyed for wildlife prior to clearing grubbing. If any nest/dens are discovered within the clearing limits, protect the area from clearing activities and immediately contact Parks Canada staff.

#### Cultural Resources

54. If cultural or archaeological resources are encountered, work must cease in the immediate area and the Parks Canada project manager notified immediately. They will then notify John Higdon (Tel: 902-401-6568), Parks Canada Terrestrial Archaeologist. If features (i.e., structural remains and/or artifact concentrations) are encountered, leave in place, mark the location (e.g. with prominent flagging) and do not disturb prior to archaeological assessment of nature and significance being completed.
55. A geotextile membrane and/or crushed stone will be required on the ground at the location of any material stockpiled in undisturbed areas.

#### Visitor Experience

56. Construction should be completed in as short a time period as is practicable, to allow for visitor access and to ensure visitor safety.
57. Maintain the site in as tidy a condition as possible for the duration of work.
58. Safety risks to visitors during construction must be minimized:
- The work site must be closed and clearly delineated with fencing, barriers, temporary gates, caution tape, or combinations thereof.
  - Appropriate bilingual signage must be posted at common visitor access points and strategic locations.
  - Maintain a safe working distance between work activities and visitors, especially when transporting machinery and materials between any staging areas and the working corridor; consider the use of lookouts to manage traffic and direct visitors in this area.
  - Secure and clearly mark unattended safety hazards (e.g., excavations, debris piles) with fencing, warning signs, caution tape or combinations thereof.

#### **10. OTHER Considerations**

- Comments received from the public /stakeholder engagement

**No comments received.**

- Indigenous peoples engagement or consultation

- Surveillance**

**Periodic inspection by Parks Canada staff to ensure mitigations are being followed.**

Follow-up monitoring

SARA Follow-up monitoring

### 11. SIGNIFICANCE OF RESIDUAL ADVERSE EFFECTS

Given the magnitude of effects, the short term of the project, the timing and reversibility after construction, the project is not likely to cause significant adverse residual environmental effects to natural resources. The project is anticipated to have negligible to minor changes to cultural resources and visitor experience and as such is not likely to cause significant adverse residual effects to the same.

### 12. EXPERTS CONSULTED

*Include Parks Canada experts. Add as many entries as necessary for the project.*

Department/Agency/Institution: Parks Canada Indigenous Affairs and Cultural Heritage Directorate	Date of Request: 2020-04
Expert's Name & Contact Information: Sofie Dejardins John Higdon	Title: CRM Policy Advisor Archaeologist
Expertise Requested: Cultural Resource Impact Analysis (cultural resources, archaeological resources)	
Response: Work must stop immediately if cultural features / artifacts, are encountered during the course of the project and everything should be left in place. The findings should be photographed with something of a known size for scale, i.e. shovel or tape measure and the location should be documented with GPS and/or on a map showing the location of the find in relation to the work happening on site. The project manager should then contact Parks Canada's Terrestrial Archaeology section (John Higdon, Tel: 902-401-6568)) for advice and assessment of significance, which will in turn determine what actions will be required to mitigate the chance find. Construction can only resume following the development of an in-depth archaeological impact assessment and the implementation of the necessary mitigations measures.	

### 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**

*(Add additional blocks as required)*

<b>Prepared by:</b> IA author: Rod Cox - Resource Management Officer	Date: July 16,2020
<b>Recommended by:</b> Glenn Keough – Visitor Experience Manager, NHS	
<b>Signature:</b>	Date:
<b>Approved by:</b> Bill Brake – Superintendent, NEFU	
<b>Signature:</b>	Date:

**15. Attachments**

Archaeological Overview Assessment: Cape Spear Lighthouse NHS – Septic Filed Upgrades.





