
PART 1 - GENERAL

- 1.1 Description
- .1 The site of the work is Petit-de-Grat SCH, Richmond County, Nova Scotia. Area to be dredged is shown on plan with disposal including disposal site location.
 - .2 This section specifies requirements for excavating underwater materials in areas and to dimensions and coordinates indicated on plan, and for transporting and disposing of excavated materials to specified disposal site.
- 1.2 Related Work
- .1 Refer to **Environmental Protection Procedures for Marine Work - Section 01 35 44** for related information.
- 1.3 Definitions
- .1 Dredging: excavating, transporting and disposing of underwater materials as specified.
 - .2 Class "A" Material: boulders of any size, and solid rock requiring drilling and blasting or hydraulic splitting to loosen.
 - .3 Obstruction: material other than Class "A", i.e. Concrete, having individual volumes of any size.
 - .4 Class "B" Material: loose or shale rock, sand, quick sand, mud, shingle, clay and sand, gumbo, hardpan, clay, marine clay, clay sizes, marine silt, silt and gravel, gravel, cobbles, boulders, marine shells, or any other materials not defined under Class "A" material.
 - .5 Debris: pieces of wood, wood chips, bark, logs, submerged logs, tree branches, scrap vehicle tires, concrete, steel cable, steel chain, wire rope, scrap steel, etc.
 - .6 Grade: plane or planes above which all material is to be dredged.

- .7 Estimated Quantity: volume in cubic metres of material calculated to be above dredge grade and within side slopes, unless otherwise specified.
- .8 U.T.M. Coordinates: Universal Transverse Mercator plan rectangular grid system to be used for all horizontal control of dredging operations as indicated on plan. (NAD 83)
- .9 Matrix Block: each block area is presented as a number of 1.2 X 3.0 m long blocks. Dependent on the position of the sounding a block may have 1 to 4 sounding contained within it. A blank Matrix Block will indicate that no sounding was registered for that matrix.
- .10 Minimum Mode: a mode of operation of hydrographic survey equipment where the minimum sounding over the length of travel between position updates will be retained in memory.
- .11 Least of Minimum Plan: a hydrographic survey plan in which the least sounding in that matrix block is plotted.
- .12 Instantaneous Mode: a mode of operation of hydrographic survey equipment where only the sounding observed at a predetermined distance interval is retained in memory.
- .13 Average of Instantaneous Plan: a hydrographic survey plan in which the average of instantaneous soundings in that matrix block is plotted.
- .14 Side Slope: inclined surface or plane from grade at side limit of dredging area to intersect original ground line outside of side limit and to be expressed as a ratio of horizontal to vertical. All material above side slopes is to be dredged.
- .15 Cleared Area: a dredge area that has been accepted by the *Departmental Representative*

as complying with plans and specifications and all material removed to grade.

.16 Chart Datum: by international agreement, a plane below which the tide will seldom fall. The Canadian Hydrographic Services has adopted the plane of Lowest Normal Tide (LNT) as Chart Datum. As the rise, fall and ranges of tides varies daily, The Canadian Hydrographic Services should be consulted for tidal prediction and other tidal information relating to the work.

.17 CEPA: Canadian Environmental Protection Act.

.18 Dredging Area: a rectangle or polygon, defined by coordinates in which dredging is to take place.

1.4 Location

.1 Contract drawings indicate those areas which required dredging at the time of the most recent surveys. Actual extent of dredging within the areas may vary slightly from those indicated on the drawings.

1.5 Schedule of Work

.1 Submit to *Departmental Representative*, within 10 working days after award of Contract, a schedule of work including time periods during which each operation involved in the work will be undertaken. Also submit an estimated monthly dredging production of material in cubic metres for each operation. At the time of submission of the schedule meet with the *Departmental Representative* to review the schedule.

.2 Include in the above schedule of work a list of buoys which interfere with the progress of this work. Coordinate with the *Departmental Representative* arrangements to be made to relocate these buoys to avoid unnecessary delay.

.3 Adhere to the schedule and take immediate action to correct any slippage by effectively altering existing dredging operations or mobilizing other equipment. The *Departmental*

Representative is to be notified of the corrective action to be taken.

1.6 Interference
to Navigation

- .1 Be familiar with activities at dredging sites and vessel movements in areas affected by dredging operations.
- .2 Plan and execute work in a manner that will not impede navigation including movement of vessels in the basin or channel, at any wharf or channel site being dredged, or any other boat traffic at adjacent wharves in the harbour.
- .3 Plan and execute work in a manner that will not interfere with activities at wharf sites, or access to wharves by land or water.
- .4 The *Departmental Representative* will not be responsible for loss of time, equipment, material or any other charges related to interference with vessels in the harbour, weather conditions, or due to other Contractor's operations.
- .5 Prior to any removal/reinstallation of navigational aids/buoys, contact Canadian Coast Guard in Charlottetown at 1-902-566-7936, Attention: Claire MacClaren.
- .6 Keep Canadian Coast Guard informed of dredging operations, in order that necessary Notices to Shipping can be issued.
- .7 Be responsible for damage to buoys or other navigation markers cause by dredging operations. If such occurs, notify Canadian Coast Guard. Assume responsibility for replacement or repairs.

1.7 Interference to
Fishery Operations
and Damage to
Fishing Gear

- .1 Become familiar with fishery activities. Clearly mark dredging area, disposal areas and routes to and from dredging and disposal

areas during periods when fishing gear is set in areas adjacent to dredging operations with "Cautionary Buoys" in accordance with Coast Guard Standard TP968 (<http://www.ccg-gcc.gc.ca/folios/00020/docs/CanadianAidsNavigationSystem2011-eng.pdf>). All buoys must be coloured cautionary yellow - CGSB # 505-108, and be equipped with radar reflectors.

Be responsible for all costs associated with the supply, installation and removal of all necessary temporary aids. The Contractor will receive approval from the District Fisheries Officer for the location of the buoys, upon review and acceptance of temporary aids by the *Departmental Representative*.

Keep Canadian Coast Guard informed of buoyed corridors in order that necessary Notices to Shipping can be issued.

- .2 Execute the work to ensure damage does not occur to fishing gear and interference to fishing operations is minimized by conducting operations within the areas so marked.
- .3 Be responsible for damage to fishing gear outside marked areas, if as a result of dredging activities, and if damage occurs, assume responsibility for replacement or repair costs and cost of lost fishing opportunity.

1.8 Requirements of Regulatory Agencies

- .1 Perform work in accordance with the National Building Code of Canada (NBC) and any other municipal, provincial and/or national codes relating to the project. In any case of conflict or discrepancy, the more stringent requirements will apply.
- .2 Meet or exceed requirements of specified standards, codes and referenced documents.

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- .3 Mark floating equipment with lights in accordance with Regulations for the Prevention of Collisions, as required by Transport Canada.
 - .4 Contractor will be required to obtain prior approval from applicable regulatory agencies for any dredging outside specified dredging limits.
- 1.9 Floating Plant
- .1 Dredges or other floating plants which are to be employed on this work, must meet the requirements as specified in General Instructions R2710T.
- 1.10 Datums
- .1 Horizontal Datum: All horizontal coordinates used in this specification and contract drawings are in metres referenced to U.T.M. projection based on the North American Datum, 1983, (NAD83, Zone 19). Survey control monuments are shown on Plan. Additional coordinate monument locations and values can be obtained from Land Registration and Information Service (L.R.I.S.), Surveys and Mapping Division, 120 Water Street, Summerside, Prince Edward Island, C1N 1A9, Phone: (902) 436-2107.
 - .2 Vertical Datum: All elevations and soundings used in this specification and contract drawings are in metres referenced to Chart Datum. For purposes of this contract see Section 3.1.6 for tidal data information.
- 1.11 Inspection of Site
- .1 The Contractor must visit the site of the work before tendering and make himself thoroughly familiar with the extent and nature of the work and all conditions affecting the work.
- 1.12 Site Information
- .1 Results of the most recent soundings are included on the drawings. This pre-tender data is made available for tendering purposes only. It should be noted that this information may differ from present site conditions.

The Department will carry out a Pre-Dredging Survey to provide updated information and will provide a Pre-Dredge Plan showing the requirements for contract dredging. The Contractor should take this into consideration when submitting his tender.

- .2 It is anticipated that the following materials will be encountered within the dredging limits, but are not limited to:

Class "A" Boulders in Area C

Class "B" Materials in all areas

- .3 The Contractor shall take the necessary steps to become fully familiar with potential inclement weather and sea conditions in this area.
- .4 The Contractor will be responsible for making his own interpretation of soil conditions.

1.13 Dredging
Equipment

- .1 Provide suitable lighting on the dredge for free movement of *Departmental Representative* to inspect work in progress during night dredging operations. Lighting to illuminate all walkways, ladders etc. to safely permit inspection of dredging operation.
- .2 The physical description of materials, as described in **Appendix "B"** (Marine Sediment Sampling Results), is based on small samples and is not necessarily indicative of the overall soil conditions.
- .3 On request, prove to the satisfaction of the *Departmental Representative* that the dredging equipment and plant are adequate to finish the work to quality, time and production rates specified. If Inadequate, replace or provide additional equipment or plant as directed.

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- .4 Contractor shall be responsible for ensuring that equipment can access and function at the disposal site.
- 1.14 Survey
Requirements
- .1 The Contractor shall provide, at his expense, a survey vessel, equipment and crew to set up and maintain survey control for the location of the dredge and dredge limits and to sound areas immediately after dredging to verify that grade depth has been attained. Areas are to be sounded with adequate coverage to provide a bathymetric printout of at least a 5 metre spacing on a UTM grid to the approval of the *Departmental Representative*. A copy of the Contractor's positioning and sounding records shall be provided to the *Departmental Representative*.
- 1.15 Sequence of
Acceptable Work
- .1 Post-dredge survey will be conducted by PWGSC using electronic survey equipment sounding in the instantaneous mode. Sounder will be the Ross sounder sweep system using a 190-210 kHz transducer frequency positioned by DGPS Trimble R7 system. The results will be shown on survey plan at scale of 1:500 plotting average of instantaneous depths. Other survey procedures may be approved by the *Departmental Representative*.
- .2 The elevations shown on the contract drawing will be considered the pre-dredge survey.
- .3 Post-dredge survey will be undertaken by the Contractor upon completion of dredging of all areas identified in pre-dredge survey. Submit results as indicated in item 1.14 above. Only when this survey shows that all soundings are at or below grade that the *Departmental Representative* will do a post-dredge survey. The survey will use the same type of equipment as used in the pre-dredge survey. It will be subject to weather conditions and the availability of functional survey equipment. The survey will confirm if dredging is completed as

specified. Survey will be by electronic sweep equipment sounding in instantaneous mode. Survey plan at 1:500 scale plotting the average of instantaneous depths obtained in this survey will identify areas requiring reworking to obtain the dredge grade depths where indicated on the plan.

The Contractor will redredge as necessary to remove all material within the dredge areas which is found to be above the average of instantaneous elevations as specified on post dredge survey drawings.

- .5 All additional surveys require to clear the dredge area will be undertaken by the *Departmental Representative* at Contractor's cost.
- .6 All surveys will be performed to Canadian Hydrographic Service Standards.

1.16 Measurement
for Payment

- .1 Dredging and removals will be measured in accordance with **Section 01 29 00**.
- .2 The dredge areas are defined by coordinates and dimensions, as shown on the drawings.
- .3 For the purpose of quantity computation, existing seabed elevation will be represented by and "Average of Instantaneous" sounding for each matrix block of the pre-dredge survey performed by the *Departmental Representative* as soon as practical after contract award. Post dredging elevations for quantity computations will be: (1) grade, or (2) the "Average of Instantaneous" sounding for each matrix block of the postdredge survey, whichever is shallower. The method of calculation and the quantity of material removed for measurement for payment will be determined by the *Departmental Representative*.

- .4 No payment will be made for the Contractor's survey vessel, equipment and crew or diving services.
- .5 All operations in connection with the field positioning of dredging equipment will be considered incidental to the work and will not be measured separately for payment.
- .6 Payment for dredging shall include the disposal of dredge material, at locations and in manners specified.
- .7 There will be no additional payment for temporary structures used in dredging operations.
- .8 There will be no additional payment for delays caused by fishing seasons.
- .9 There will be no additional payment for delays caused by vessel traffic.
- .10 There will be no additional payment for down time, mechanical or weather-related.
- .11 There will be no additional payment for delays caused by navigational buoys in dredge areas.
- .12 Once designated areas have been dredged and cleared, all subsequent infilling shall be deemed as additional to the contract if removal is required.
- .13 Removal of material infilling during dredging will not be measured separately for payment.
- .14 There will be no additional payment for land disposal of debris not suitable for the disposal site.
- .15 There will be no additional payment for berthing or mooring facilities for the dredge plant or any other floating equipment.

- .16 The entire area of each site, at all sites, as shown on the plan, shall be fully covered during dredging.
- .17 There will be no additional payment for delays or changes in dredging methods required as a result of water quality monitoring results.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 General

- .1 The Contractor shall do the following in executing the work:
 - .1 Mark floating equipment with lights in accordance with International Rules of Road and maintain a radio watch on board.
 - .2 Place and maintain buoys, ranges, markers and lights required to define work. The *Departmental Representative* will provide the coordinate values for all dredge limits on the drawings.
 - .3 Maintain and lay out work form bench marks and control points as shown on Plan and noted in the Specifications. Any additional control points and tidal reference stations required to control dredging operations are the responsibility of the Contractor. The Contractor is to maintain these control points and tidal reference stations for the duration of the project and at the Contractor's cost.

Obtain owner's permission, in writing, to establish layout monuments and erect targets on private property and pay all associated rental costs. Provide access to layout monuments for departmental survey crews. Any damage to private

property will be made good by the Contractor to the satisfaction of the *Departmental Representative* at no cost to the owner.

- .4 For accurate dredge control, the Contractor is to provide and maintain on the dredge electronic position fixing and distance measuring equipment with associated computer software capable of providing a printout showing dredge position. Equipment is to provide a continuous coordinated position of the dredge in the U.T.M. Coordinate Grid System with an accuracy of ± 3.0 metres or less.
- .5 All survey equipment provided on the dredge by the Contractor is to be made accessible to the *Departmental Representative* for his use.
- .6 Establish accurately and maintain water level gauges or tide boards in order that proper depth of dredging can be determined. Locate gauges so as to be clearly visible at all times.

The Contractor is to provide a tidal monitoring system to read and record the tide level at a maximum of 15 minute intervals. These records are to be made available for the inspection and use of the *Departmental Representative*. If using an electronic tide gauge, the Contractor must check the accuracy of the gauge daily. The gauge must be accurate to ± 2 cm. The monitoring system is to be approved by the *Departmental Representative*.

- .7 Dredge areas to grade depths below Chart Datum where indicated on the drawing.
- .8 Dredge all side slopes to two horizontal to one vertical unless otherwise noted.

- .9 Remove all materials above specified grade depth and side slopes, within limits indicated. Material removed from below grade depth or outside specified area or side slope is not part of work and will not be measured.
- .10 Remove shoaling which occurs as a result of the work at no expense to *Departmental Representative*.
- .11 Remove material cast-over onto surrounding area and dispose of it as dredged material at Contractor's expense. Casting over of material is not permissible unless authorized by the *Departmental Representative*.
- .12 The Contractor is responsible for the removal of infilling in dredge areas which occurs prior to acceptance by the *Departmental Representative*.
- .13 It will be the Contractor's responsibility to gain access to the dredge area. The construction of causeways, roads, etc., will be at the Contractor's expense and will be removed at the completion of the project. Any derricks, power lines, etc., which will require removal will be done so at the Contractor's expense and will be replaced to satisfaction of the *Departmental representative*. Contractor to advise *Departmental representative* of his proposed method to carry out dredging and disposal of the material.
- .14 Immediately notify the *Departmental Representative* upon encountering any object which might be classified as an obstruction. By-pass the object, after clearly marking its location by coordinates and continue work.
- .15 Provide dump scows capable of maintaining dredge materials within

hoppers until delivery to disposal site. The *Departmental Representative* has the right to order removal of dump scows from the site where leakage from the dump scows is deemed to be excessive.

- .16 Arrange and pay for berthing and mooring facilities for dredge plant and other floating equipment.

3.2 Rock Removal

- .1 If rock or boulders are to be removed by blasting, submit to *Departmental Representative* for review, two weeks before removal, details of proposed blasting operations showing types and quantities of explosives, loading charges and patterns, type of caps, blasting techniques, blast protection measures, time of blasting and other pertinent details. Submit subsequent charges to *Departmental Representative* before proceeding.
- .2 It is mandatory that Contractor contact *Departmental Representative* minimum five (5) days prior to commencing any drilling or blasting operations to discuss details shown on the plan with *Departmental Representative*.
- .3 No blast pattern permitted that contains pile location within inside of blast pattern.
- .4 Failure of Contractor to comply with contractual requirements for drilling and blasting shall render the Contractor responsible for any damage to structures.

3.3 Existing Navigation Buoys

- .1 The Contractor will make arrangements with Canadian Coast Guard for the removal and reinstallation of the existing buoys, as required to carry out the dredging operations.

3.4 Disposal of

Dredge Material

- .1 Refer to **Environmental Protection Procedures for Marine Work - Section 01 35 44** for related information.

The Contractor shall dispose of dredged material by depositing in the disposal area as identified in **Section 01 35 44** and in such a manner as approved by *Departmental Representative*.

- .2 All materials deposited on private or public roads or properties in vicinity of site or as a result of trucking material to dump site will be removed by Contractor to satisfaction of owners involved at no additional cost to Department.
- .3 The contractor shall ensure that trucks used in the transportation of spoils are roadworthy and have tight fitting gates to prevent spoils spills on the road. Trucks not meeting this criteria may be removed from the project by the *Department Representative*.
- .4 Clean truck boxes and wheels of dredge spoils before moving onto provincial roads. Vehicle wash down stations may be required at both the loading and offloading sites to ensure the above requirements are met.
- .5 Timber, logs and cable must not be disposed of at the dumpsites. This debris must be disposed of ashore at an appropriate landfill other than the containment facility. This debris and its disposal will not be measured for payment but is incidental to dredging.

3.5 Operations in
Vicinity of
Structures

- .1 Use extreme care when dredging adjacent to existing structures. Any damage to these structures caused by dredging closer than specified to be repaired at Contractor's expense. In completing repairs, new materials are to be used. All materials and work performed to be approved by the *Departmental Representative*.

- .2 Dredging operations are not to undermine the existing breakwaters.

Protect existing structures during dredging operations. Ensure the shore protection slope is not disturbed. Contractor will be responsible for repairs to the slope protection should damage occur.

- .3 The use of existing wharf structures will be permitted for dredging operations. Contractor must take all precautions to prevent damage to the structure.

- .4 Floating docks, gangway, and anchor blocks must be removed to accomodate dredging operations. All components must be reinstated to original location and condition following completion of dredging.

3.6 Cooperation and
Assistance to
Departmental
Representative

- .1 Cooperate with *Departmental Representative* on inspection work and provide assistance requested.

- .2 On request of *Departmental Representative*, furnish use of such boats, equipment, labour and materials forming ordinary and usual part of dredging plant as may be reasonably necessary to inspect and monitor work. Provide approved duty boat to transport inspectors to and from dredge, at beginning and end of each inspection shift. Inspection shifts will be 8 hours in duration. The duty boat must be of adequate size and power to operate safely in conditions encountered. It must be fitted with a sufficient number of approved life jackets and hard hats for inspection staff.

- .3 Provide adequate, weather-tight, heated work space for exclusive use by the *Departmental Representative* and inspection staff, on board the dredge or dredges used to carry out dredging under this contract. Equip with 1 X

Channel and Basin Dredging**Petit-de-Grat SCH****Richmond County, NS****Project No. R.077417.001**

Dredging

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2 m table, 3 chairs, one 3 drawer filling cabinet, and maintain in clean condition. The work space is to be for the sole use of the *Departmental Representative* and inspection staff. Work space shared with Contractor's staff will not be permitted.

- .4 Provide *Departmental Representative* or inspector with copies of, or access to, daily records of dredging activity, including areas dredged, type of material, scow measure of material dredged (daily and accumulated), hours of dredging, hours and reasons for downtime, and other information regarding dredging and disposal as requested by the *Departmental Representative*.

Appendix A

APPENDIX A - Copy of Navigation Protection Act (NPA) Approval

Appendix B

**Grain Size analysis (table) from Marine Sediment Sampling Program (MSSP)
Report for Petit-de-Grat (AMEC, January 2016)**