

## **PART 1 - GENERAL**

### **1.1 DESCRIPTION**

- .1 This Section specifies the general requirements and execution for dredging and cribseat excavation. Suitable excavated material to be re-used and backfilled against the new structures. All unsuitable excavated material and surplus suitable material to be disposed of at an approved disposal site. Suitability of existing material to be re-used is at discretion of the Departmental Representative.

### **1.2 RELATED SECTIONS**

- .1 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Section 31 53 13 - Timber Cribwork.

### **1.3 DEFINITIONS**

- .1 Dredging: excavating, transporting and disposing of above and underwater materials.
- .2 Cribseat Excavation: excavating, transporting and disposing of above and below water materials.
- .3 Class "A" material: solid rock requiring drilling and blasting to loosen, and boulders or rock fragments of individual volumes 5.0 m<sup>3</sup> or more.
- .4 Class "B" material: loose or shale rock, silt, sand, quick sand, mud, shingle, gravel, clay, sand, gumbo, boulders, hardpan and debris of individual volumes less than 5.0 m<sup>3</sup>.
- .5 Obstructions: material other than Class "A", having individual volumes of 5.0 m<sup>3</sup> or more.
- .6 CMPM: cubic metres place measurement. SQM: area in square metres projected horizontal. CMSM: cubic meters scow measurement.
- .7 Debris: pieces of wood, wire rope, scrap steel, pieces of concrete and/or other waste materials.
- .8 Grade: plane above which material is to be dredged.

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**1.3 DEFINITIONS**  
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- .9 Estimated quantity:
  - .1 Volume of material calculated to be above grade and within specified side slopes unless otherwise specified.
  - .2 Areas in square metres of material calculated horizontally to exist above grade and within dredge limits, unless otherwise specified.
- .10 Side slope: inclined surface or plane from subgrade at side limit of dredging area to intersect original ground line outside of side limit and to be expressed as ratio of horizontal to vertical.
- .11 Chart Datum: permanently established plane from which soundings or tide heights are referenced, usually Lowest Normal Tide (LNT).
- .12 Coordinates:
  - .1 U.T.M.: universal transverse mercator projection.
  - .2 M.T.M.: modified transverse mercator projection.
  - .3 U.T.M. or M.T.M. Coordinates: plane rectangular coordinates used in grid system in which grid network is applied to U.T.M. or M.T.M. projection. Horizontal control information as indicated.
- .13 Minimum Mode: mode of operation of hydrographic survey equipment where minimum sounding over length of travel between position updates will be retained in memory. Soundings taken in this mode may be shallower than actual bottom elevations due to variations in water depths due to wave action.
- .14 Matrix Block: each dredge area is presented as number of 1.2 x 3.0 m long blocks. Dependent on position of sounding, block may have 0 to 4 soundings contained within it.
- .15 Least of Minimum Plan: hydrographic survey plan in which least sounding in grouping of matrix blocks is plotted.
- .16 Instantaneous Mode: mode of operation of hydrographic survey equipment where only sounding observed at predetermined distance interval is retained in memory.
- .17 Average of Instantaneous Plan: hydrographic survey plan in which average sounding in appropriate grouping of matrix blocks is plotted.
- .18 Lowest Normal Tide (LNT): plane so low that tide will seldom fall below it.
- .19 Cleared Area: area of dredging accepted as achieving the required grade and verified by a PWGSC survey.

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**1.3**     **DEFINITIONS**  
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- .20     Suitable Material: material excavated from cribseat excavation. This material that meets requirements of rock fill material shall be re-used as backfill against the new wharf structures as approved by the Departmental Representative.
- .21     Unsuitable Material: material excavated from the cribseat excavation and harbour bottom, that does not meet the requirements of rock fill material, shall be disposed of at an approved disposal site.

**1.4**     **QUALIFICATIONS**

- .1     Retain licensed explosives expert to program and supervise blasting work, to interpret recommendations of pre-blasting report, and to determine precautions, preparation and operations techniques. Specialist to have qualifications acceptable to the Departmental Representative and Municipal or Provincial Authorities. Contractor to arrange and pay for all blasting permits and insurance coverage.

**1.5**     **BLASTING OPERATION**

- .1     Submit to Departmental Representative and local authorities having jurisdiction for review, written proposal of operations for removal of rock by blasting. Proposal to be submitted, for review, to Departmental Representative at least two (2) weeks before any blasting is to take place. Departmental review does not relieve the Contractor from any damages that result from the blasting.
- .2     Indicate proposed method of carrying out work, types and quantities of explosives to be used, loading charts and drill hole patterns, type of caps, blasting techniques, blast protection measures for items such as flying rock, vibration, dust and noise control. Include details on protective measures, time of blasting and other pertinent details.

**1.6**     **BLASTING SURVEY**

- .1     The Contractor is responsible to visit property holders of adjacent buildings and structures to determine existing conditions and describe blasting and monitoring operations and obtain their permission for setting up monitoring devices.
- .2     Monitoring, as described in the blasting operation report will be conducted by the Contractor during entire progress of blasting operations. Submit monitoring results to Departmental Representative, if requested.

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**1.7 BLASTING AND VIBRATION CONTROL**

- .1 Reduce ground vibrations to avoid damage to structures or remaining rock mass. Specific requirements are to be determined by Contractor and must be outlined in the Contractor's Blasting Plan.
- .2 Maintain complete and accurate record of drilling and blasting operations. Submit records to Departmental Representative at end of each shift.

**1.8 REGULATORY REQUIREMENTS**

- .1 There are strict environmental procedures that must be followed during the Work.
- .2 Comply with municipal, provincial and national codes and regulations relating to project.
- .3 Mark floating equipment with lights in accordance with the provisions of the Canada Shipping Act Collision Regulations and Notices to Mariners.

**1.9 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Contaminated sediments must be disposed of as required by Authorities having jurisdiction.
- .3 Metals, wood and recyclable materials removed during the dredging activities must be diverted to appropriate recycling facilities.

**1.10 SCHEDULING**

- .1 Submit to Departmental Representative, within 2 weeks after acceptance of bid, schedule of work including time periods during which each operation involved in Work will be undertaken. At time of submission of schedule, meet with Departmental Representative to review schedule.
- .2 Adhere to schedule and take immediate action to correct any slippage by effectively altering existing dredging operations or mobilizing other equipment. Notify Departmental Representative of corrective action to be taken.

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**1.11 LOCATION**

- .1 Work comprises dredging of areas as indicated on the drawings.

**1.12 INTERFERENCE TO NAVIGATION**

- .1 Be familiar with vessel movements and fishery activities in area affected by dredging operations. Plan and execute Work in manner that will not interfere with fishing operations, marine operations and construction activities at wharf site, or access to wharves by land or water.
- .2 Departmental Representative will not be responsible for loss of time, equipment, material or any other cost related to interference with moored vessels in harbour or due to other Contractor's operations.
- .3 Keep the Marine Communications and Traffic Services' Centre, Fisheries and Oceans Canada, informed of dredging operations in order that necessary Notices to Mariners will be issued.

**1.13 DATUM, WATER GAUGES AND TARGETS**

- .1 Elevations used in this specification and contract drawings are in metres referred to Canadian Hydrographic Services Survey datum.
- .2 Areas to be dredged are to be referenced to vertical bench marks for each location of dredging as indicated.

**1.14 FLOATING PLANT**

- .1 Dredges or other floating plants to be employed on this Work, to be of Canadian registry, make or manufacture, or, must receive certificate of qualification from Industry Canada, Aerospace, Defence and Marine Branch and this certificate to accompany bid submission.
- .2 Requests for certification in format of form PWGSC-TPSGC 2843 (06/2007) attached to the Bid and Acceptance Form to be directed to Mr. Emile Rochon, Aerospace, Defence and Marine Branch, Industry Canada, CD Howe Building - Room 733C, 235 Queen Street, Ottawa, Ontario, K1A 0H5, and to be received there not less than 14 days prior to bid closing.

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**1.15 INSPECTION OF SITE**

- .1 Contractor to visit site of Work and become thoroughly familiar with extent and nature of Work and conditions affecting Work before bidding.
- .2 The Contractor will be responsible for making his own interpretation of soil conditions at any location, other than borehole locations. Borehole descriptions shown on the logs are only descriptive of conditions at locations described by the boreholes themselves.
- .3 The Contractor shall take the necessary steps to become fully familiar with potential inclement weather conditions in this area.

**1.16 SITE INFORMATION**

- .1 Information pertaining to sub-surface conditions may be available by contacting the contracting officer for viewing by appointment.
- .2 Results of most recent soundings are included on the drawings. This data will be used for all calculations for quantity purposes. If the contractor wishes to perform own survey, a written notice must be submitted to the Departmental Representative (at least 7 days' notice) so PWGSC can verify the sounding survey before the commencement of any work.
- .3 Results of prior soundings and geotechnical investigations are made available for bidding purposes only. It should be noted that this information may differ from site condition. Take this into consideration when submitting bid.
- .4 Take necessary steps to become fully familiar with potential inclement weather and sea conditions in this area.

**1.17 SURVEY REQUIREMENTS**

- .1 Provide, at own expense, survey vessel, equipment and crew as required to set up and maintain control for location of dredge limits and to sound areas immediately after dredging to verify grade depths. Areas are to be sounded at a minimum 2 m x 2 m UTM grid to approval of Departmental Representative.

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**1.18 SURVEYS AND ACCEPTANCE OF WORK**

- .1 After acceptance of bid, Contractor has 14 days to accept sounding survey in contract.
- .2 No area will be dredged prior to Departmental Representative and Contractor's mutual acceptance of pre-design survey for that area.
- .3 Post-dredge survey will be undertaken by Departmental Representative upon completion of dredging. Survey will confirm if dredging is completed as specified and whether area can be considered cleared area.
- .4 Contractor to re-dredge as necessary to remove all material within dredge areas which is found to be above grade.
- .5 One additional survey will be undertaken at Canada's cost, for those areas not meeting acceptance criteria for dredging. All additional surveys required to clear areas will be undertaken by the Departmental Representative at Contractor's cost.
- .6 The Contractor shall be responsible to place rock mattress/cribwork on hard bottom. The Contractor shall demonstrate through the use of excavation/dredging equipment or other means, that sufficient material has been removed to ensure rock mattress/cribwork will come to rest on hard bottom. Once the contractor has determined that hard bottom has been achieved through excavation/dredging equipment, the contractor shall thoroughly probe the area in a minimum 1.0 m x 1.0 m grid to confirm that all loose and soft unsound soils have been removed to hard bottom. All probing activities to be completed by divers using a 15 mm Ø x 2000 mm steel rod driven with a 2.5 kg hammer. Unless otherwise directed by the Departmental Representative, hard bottom is achieved when the probe cannot penetrate more than 400 mm into the underlying soils, within the footprint of the area to receive rock mattress/cribwork. All work to be overseen by the onsite inspector. If the probe penetrations exceed 400 mm, then the contractor shall be responsible to continue excavating/dredging to a depth which hard bottom is reached and re-probe to achieve the requirements noted above. The Contractor and Departmental Representative shall agree on site as to when the depths required to reach hard bottom are met.

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**1.19 MEASUREMENT FOR PAYMENT**

- .1 Dredging: Dredging of Class "A" and Class "B" materials will be measured in cubic metres, in-place measurement [CMPM], determined from existing seabed elevation established from the current sounding survey down to grade depth elevation within limits specified on the drawings. The pay limit for dredging is the outside face of the marginal wharf down to limits specified and as indicated on the drawings. Quantities will be determined from a sounding survey performed by the PWGSC Survey Crew after dredging survey is completed by using electronic sounding and DGPS positioning equipment. The Departmental Representative will verify that the Contractor has performed dredging down to bedrock or hard bottom. No payment will be made for over-dredging. PWGSC will conduct an interim and final survey. The Contractor will formally request at least seven (7) days in advance that the final after-dredging survey be performed upon completion of dredging. The timing of the survey may be dependent on weather and other circumstances. If the survey and inspection shows that all material has not been removed, the Contractor is to re-dredge to obtain grade depth. The Contractor will perform a sounding survey, using a method approved by the Departmental Representative to verify that the specified dredge depth has been obtained. The Departmental Representative will then perform a third survey for final verification of dredge depth. This third sounding survey and any subsequent surveys will be at the cost of the Contractor.
- .2 All dredging slope pay limits to be 1.5 H:1.0V except in rock, which shall be 1.0 H:4.0V, unless specifically indicated otherwise. Dredge limit slopes are for measurement for payment purposes only. Contractor to dredge in such a manner as to ensure stability of slopes. The Contractor is cautioned to make their own assessment of volume of material that may have to be removed outside the pay limits shown on the drawings, as there will be no additional payment for dredging outside the pay limits on the drawings.
- .3 No separate measurement for payment will be made for cribseat excavation of Class "A" and Class "B" materials required to bring the marginal wharf cribseat elevation to the depths indicated on the drawings and to facilitate placement of rock mattress. Materials removed inside the marginal wharf face shall be considered cribseat excavation. Include all costs associated with excavation for cribseat and rock mattress placement incidental to the unit price for treated timber cribwork.
- .4 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.



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**1.19 MEASUREMENT FOR PAYMENT  
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- .5 There will be no additional payment for delays incurred during fishing seasons. Contractor should contact the Harbour Authority to determine schedule of operations.
- .6 There will be no additional payment for the Contractor's survey vessel, equipment and crew, diving services, or probing activities.
- .7 There will be no additional payment for delays caused by vessel traffic.
- .8 There will be no additional payment for the backfilling of suitable excavated material. Include the cost for temporary storage, placement and compaction of the suitable excavated material to complete the work as specified in the lump sum price arrangement.
- .9 There will be no additional payment for disposal of unsuitable and surplus dredge/excavated material, using water tight boxes at locations specified or as directed by the Departmental Representative.
- .10 There will be no additional payment for down time.
- .11 The contractor will be responsible for levelling and cleaning up of the disposal site after all the material has been disposed and there will be no additional payment.
- .12 There will be no additional payment for mobilization and demobilization of dredging/excavation equipment.
- .13 Contractor to obtain and supply Departmental Representative with all applicable approvals for proposed dredge/excavated material disposal site prior to starting any dredging.
- .14 Payment will include disposal of dredge/excavated material to appropriate soil disposal facility as approved by the Departmental Representative.
- .15 Removal of infilling material will not be measured for payment.
- .16 Removal of obstructions, authorized by Departmental Representative, will not be measure separately for payment and will be included incidental to dredging.

## **PART 2 - PRODUCTS**

### **2.1 DREDGING EQUIPMENT**

- .1 Contractor to determine required equipment necessary to dredge material specified and to dispose of dredged material to an approved landfill site.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- .1 Mark floating equipment with lights in accordance with the provisions of the Canada Shipping Act Collision Regulations and maintain radio watch on board.
- .2 Place and maintain buoys, markers and lights required to define work and disposal areas.
- .3 Lay out Work from control points and baselines established by Departmental Representative. Be responsible for accuracy of Work relative to established bench marks and baseline. Provide and maintain electronic position fixing and distance measuring equipment, laser transits and such other equipment as normally required for accurate dredging control.
- .4 Establish and maintain water level gauges and/or tide boards in order that proper depth of dredging can be determined. Locate gauges and/or tide boards so as to be clearly visible.
- .5 Establish and maintain on-land targets for location and definition of designated dredge area limits. Targets to be suitable for control of dredging operations and locating soundings. Remove targets on completion of Work.
- .6 Dredge to depths required to reach grade depth, as indicated on the drawings. Required final dredge depths to be agreed on with Departmental Representative.
- .7 Remove materials above specified grade depth, within limits indicated. Material removed from below grade depth or outside specified area is not part of Work.
- .8 Remove shoaling which occurs as result of Work at no expense to Canada. Where shoaling occurs, Contractor to return the sea bottom elevations outside the footprint of the work to its original preconstruction elevations as determined by the pre-construction survey. This includes all areas over or near all dredge operation, excavation, and rock placement activities including barge work, dump scow routing to shore, temporary access infilling, transfer to shore operations as well as areas covered by silt plumes.

**PART 3 - EXECUTION**  
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**3.1 GENERAL**  
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- .8 (Cont'd)  
As a minimum, sea bottom elevations will be compared by PWGSC after completion of Contractors work and their confirmation of the above restoration for all areas within 15 meters of any of the above activities.
- .9 Remove material cast-over on surrounding area and dispose of it as dredged material. Do not cast-over material unless authorized by Departmental Representative.
- .10 Remove infilling in dredge areas which occurs prior to acceptance by Departmental Representative.
- .11 Immediately notify Departmental Representative upon encountering object which might be classified as obstruction. By-pass object after clearly marking its location and continue Work.
- .12 Installation of temporary dredge roads for dredging will not be permitted.
- .13 Dredging from existing wharves will not be permitted.
- .14 Dredging from new crib construction will not be permitted.

**3.2 DISPOSAL OF DREDGED MATERIAL**

- .1 Dispose of all dredged material by depositing it at an approved disposal site, and placing in such a manner as approved by the Departmental Representative and conforming to municipal, provincial and federal requirements.
- .2 Trucks used to haul dredged material must have water tight boxes. Contractor is responsible for obtaining and payment of dumping permit fees if applicable.

**3.3 DREDGING IN VICINITY OF STRUCTURES**

- .1 Dredging in the vicinity of existing structures may be required to facilitate construction of new structures. The contractor is solely responsible for protection of all existing structures and shall determine what measures need to be taken during construction activities.

**PART 3 - EXECUTION  
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**3.4 RE-DREDGING**

- .1 Re-dredge unsatisfactory work and verify depths with additional soundings or sweeping to approval of Departmental Representative.

**3.5 CO-OPERATION AND ASSISTANCE TO DEPARTMENTAL REPRESENTATIVE**

- .1 Co-operate with Departmental Representative on inspection of 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 supervise Work.