Fisheries and Oceans
Canada

SPECIFICATIONS FOR

HARBOUR IMPROVEMENTS

MAMAINSE HARBOUR, ONTARIO

Department of Fisheries & Oceans
Small Craft Harbours Branch
Burlington, ON

2016

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Appendices

01 11 05 – GENERAL INSTRUCTIONS

Part 1 General

1.1 DESCRIPTION OF WORK

.1 The work site described in this specification is Mamainse Harbour, Ontario. The site is located on the east shore of Lake Superior, approximately 90 kilometres northwest of Sault Ste. Marie, Ontario. Refer to Key Plan on MA-01.

.2 The work under this contract covers the following:

.1 Demolition and removal of designated areas of the existing timber cribs and spans.

.2 Expansion of the existing harbour basin including removal of Class “A” rock.

.3 Disposal of dredged materials on site as additional shore protection.

.4 Supply and installation of a new timber crib wharf.

.5 Supply and installation of new armour stone.

.6 Upgrades to harbour electrical pedestals and lighting.

.3 The work to be done by the Contractor under this Contract shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, insurance, and all things necessary for and incidental to the satisfactory performance and completion of all work as specified herein. All work to be done in accordance with details shown on the accompanying plans as specified herein.

1.2 DEFINITIONS

.1 The word, "provide", means "supply and install".

.2 For purposes of this contract, "Departmental Representative", "Architect/Engineer" and "Engineer" shall have the same meaning.

1.3 WORK SCHEDULE

.1 Provide within 10 working days after Contract award, schedule showing anticipated progress stages and final completion of work within time period required by contract documents.

.2 Interim reviews of work progress based on word schedule will be conducted as decided by Engineer and schedule updated by Contractor in conjunction with and to approval of Engineer.

.3 Work under this contract is to be performed to completion in a timely manner. Commence planning and preparatory work immediately upon receipt of official notification of acceptance of Contract and schedule the work so that the project will be complete within the specified time frame.

.4 Work sequence:

.1 Before work is undertaken, ensure that all materials and trades required are available to finish work in as short a period as possible.

.2 No area to be renovated shall be placed out of service until it is confirmed that there shall be no need to stop the work waiting for receipt of materials, equipment or labour.

1.4 CERTIFICATES AND TRANSCRIPTS

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

1.5 FEES, PERMITS AND CERTIFICATES

.1 Provide authorities having jurisdiction with information requested.

.2 Pay fees and obtain certificates and work permits required.

.3 Furnish certificates and permits when requested.

1.6 MEASUREMENT FOR PAYMENT

.1 Notify Engineer sufficiently in advance of operations to permit required measurements for payment.

.2 Submit to Engineer, at least 14 days before Information for first application for payment; cost breakdown, Progress Payment in detail as directed by Engineer, for parts of Work, aggregating total amount of Contract Price, so as to facilitate evaluation of applications for payment. After approval by Engineer, cost breakdown will be used as basis for progress payments.

1.7 INTERPRETATION OF DOCUMENTS

.1 In the event of discrepancies or conflicts in interpreting the Plans (drawings) and Specifications, Specifications take precedence over drawings bound with specifications.

.2 Drawings and specifications are complementary. When work is shown or mentioned on the drawings but is not indicated in the specifications, or when work is indicated in the specifications but is not shown or mentioned on the drawings, it shall nevertheless be included in the Contract.

.3 The sub-division of the Specification into sections, identified by title and number, is for convenience only and does not modify the singularity of the document, nor does it operate to make or imply that the Engineer is an arbiter to establish the limits or extent of contract between Contractor and Subcontractors or to determine the limits or extents of work that may be decided by trade unions or contractors' organizations. Extras to the Contract will not be considered on the grounds of differences in interpretation of the Specification and/or Drawings as to which trade performs the work.

.4 Do not scale off drawings.

1.8 CONTRACTOR'S USE OF SITE

.1 Coordinate use of premises under direction of the Engineer.

.2 Do not unreasonably encumber the site with materials and equipment.

.3 Assume full responsibility for protection and safekeeping of products under this Contract.

.4 Move stored products or equipment which interferes with operations of Engineer or other harbour users.

.5 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.6 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.7 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Engineer.

.8 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

.9 Hoard-off construction site with suitable safety fences and signage to prevent access to the construction area by public, and allow public to move by the construction hoarding to use the main wharf areas with at least a 1.5M wide minimum safe path of access.

1.9 EXISTING SERVICES

.1 Establish location and extent of service lines in area of work, if there are any services before starting work. Notify Engineer of findings.

1.10 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed Shop Drawings.
.5 Change Orders.
.6 Other Modifications to Contract.
.7 Copy of Approved Work Schedule.
.8 Health and Safety Plan and Other Safety Related Documents.
.9 Other documents as specified.

1.11 CODES AND STANDARDS

.1 Perform work in accordance with National Building Code of Canada (NBC) and any other code of provincial or local application. In any case of conflict or discrepancy, the more stringent requirements shall apply.

.2 Work to meet or exceed requirements of contract documents, specified standards, codes and referenced documents.

1.12 PROJECT MEETINGS

.1 Engineer will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

1.13 SETTING OUT OF WORK

.1 Engineer will provide only those survey control points and set such stakes as necessary to define general location, alignment and elevations of work. Give engineer reasonable notice of requirements for such control points and stakes.

.2 Set grades and lay out work in detail from control points and grades established by Engineer.

.3 Provide devices needed to lay out and construct work.

.4 Supply such devices needed to lay out and construct work.

.5 Supply such devices as straight edges and templates required to facilitate Engineer's inspection of work.

.6 Supply stakes and other survey markers required for laying out work.

1.14 ADDITIONAL DRAWINGS

.1 Engineer 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.

.2 When additional drawings and instructions are required by the Contractor, provide reasonable notice in writing to the Engineer in advance of the date they are required.

1.15 EXAMINATION

.1 Before submitting tender, examine existing conditions and determine conditions affecting work.

.2 Obtain all information which may be necessary for proper execution of Contract.

1.16 SITE INSPECTION

.1 The submission of a tender is deemed to be a confirmation of the fact that the Tenderer has inspected the site and is fully conversant with all the conditions under which the work is to be carried out.

1.17 MATERIAL AND EQUIPMENT

.1 Use new products unless otherwise specified.

.2 Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.

.3 When material or equipment specified by standard performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.18 SECURING WORK AREA

.1 Secure the work areas in each stage in an approved manner. This includes fencing or barricades to prevent public access to any areas where construction activities occur and construction materials are stored.

1.19 DRAWINGS

.1 The following drawings are to be read in conjunction with this specification:

.1 MA-01 through and including MA-05.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

01 35 29 – HEALTH AND SAFETY REQUIREMENTS

Part 1 General

1.1 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

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

.1 Material Safety Data Sheets (MSDS).

.3 Province of Ontario

.1 The Occupational Health and Safety Act and Regulations for Construction Projects, revised statues of Ontario 1990, Chapter 0.1 as amended, O.Reg. 213/91 as amended by O.Reg. 631/94, O.Reg. 143/99, O.Reg 571/99, O.Reg. 145/00, O. Reg.527/00. R.R.O. 1990, Reg. 834, 0. Reg. 278/05 (Asbestos – Construction), O. Reg. 845/90 (Silica) as amended by O. Reg. 521/92 and O. Reg. 391/00.

.2 Workplace Safety and Insurance Act, 1997.

.3 Municipal statutes and authorities.

1.2 SUBMITTALS

.1 Submit site-specific Health and Safety Plan: Within 10 days after date of Notice to Proceed and prior to commencement of Work.

.2 Submit copies of incident and accident reports to Engineer.

.3 Engineer will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor after receipt of plan. Revise plan as appropriate and resubmit plan to Engineer within 5 days after receipt of comments from Engineer.

.4 Engineer's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

1.3 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.4 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Observe and enforce construction safety measures required by Canadian Construction Safety Code, Provincial Government, Worker’s Compensation Board and municipal statutes and authorities.

.3 In the event of a conflict between any provisions of above, authorities having the most stringent provision will apply.

1.5 RESPONSIBILITY

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

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

1.6 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative verbally and in writing.

1.7 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or 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 may stop Work if non-compliance of health and safety regulations is not corrected.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

01 35 43 – ENVIRONMENTAL PROTECTION - DREDGING

Part 1 General

1.1 GENERAL

.1 The material to be dredged is classified loose stone and bedrock, and is not contaminated.

.2 Conduct Work in accordance with the Letter of Advice issued by the Department of Fisheries and Oceans Canada.

1.2 DISPOSAL OF MATERIALS

.1 Dispose of dredged material upland and off Site.

.2 The Contractor may be required to temporarily suspend dredging operations if the turbidity plume from dredging activities adversely affects the quality of water at water intake pipes located in the area. Make no claim for delays resulting from the above.

1.3 DREDGING SCHEDULE RESTRICTIONS

.1 Due to Fisheries' concern in this area, no dredging will be permitted at this location between March 31st and June 30th.

1.4 DRAINAGE

.1 Provide temporary drainage and pumping required to keep excavations and site free from water.

.2 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.5 WORK ADJACENT TO WATERWAYS

.1 Construction equipment will enter and leave the lake at such a location and in such a manner that disturbance to the lakeshore is minimal.

.2 Every effort will be made to minimize the introduction of sediment to the lake during work activities.

.3 Do not use waterway beds for borrow material.

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

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

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

.7 Avoid damage to shoreline.

.8 Supply, install, and maintain approved erosion control blankets to unprotected slopes until re-vegetation is established.

.9 Any impacts below ordinary high water mark that are not shown on the site plan are not permitted without written approval from the Engineer. Up to 30 days may be required for approval.

.10 Protect shoreline with a build-up of snow.

.11 Reclaim and restore disturbed areas to previous or better condition.

.12 Areas used for stockpiling construction materials, including fill or other equipment storage will be well back from the edge of the water body and, if possible, in areas which have already been disturbed or are devoid of vegetation.

.13 All required machinery should be supplied with appropriate spill containment kits as a precaution in the event of accidental fuel spills or hydraulic leaks. Additional kits should be available on site with the capacity to contain any spills of deleterious substances that may be reasonably expected to occur. Contractors should ensure that all personnel are familiar with the spill kits.

1.6 POLLUTION CONTROL

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

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

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

.4 Locate temporary fuel storage a reasonable distance from shore and comply with Provincial Environmental Legislation, as well as Land Owner’s express approval in writing.

.5 Refueling, servicing, or cleaning of equipment on ice or within a reasonable distance from shore as designated by the Departmental Representative. Contractor to ensure all equipment operating on project is free of external fluid leaks, grease, oil, and mud.

.6 Contractor to contain all oil leaks from equipment working adjacent to waterways.

.7 No maintenance of vehicles or equipment in construction areas.

.8 Use drip pans to catch leaking oil from compressors, pumps, etc.

1.7 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site unless approved by Engineer.

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways. Hazardous wastes including fuels, oils and lubricants to be disposed of by a licensed hazardous waste carrier/handler in accordance with Provincial Environment Legislation.

.3 Collect all rubbish and waste material and dispose of in accordance with applicable governing authorities.

.4 Do not allow debris of any type to enter waterway.

1.8 FIRES

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

1.9 PLANT PROTECTION

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

.2 Avoid disturbance of topsoil and vegetation unless otherwise specified. Contractor is responsible to restore all impacted areas to original state.

1.10 VERTICAL SILT CURTAIN

.1 Contractor to isolate the work area from the lake with an approved silt curtain to prevent the drift of sediment form the work area into the lake as required. The silt curtain must extend from the top of the ice/water to within 300mm of the lake bottom. The silt curtain must be left in place until all suspended sediments are settled out. On completion of the project carefully remove silt curtain to ensure settled sediment is not disturbed. An acceptable product is “Tough Guy” Type 1E Turbidity Barrier or approved equivalent. Costs for supply, installation, maintenance, and removal to be included in lump sum costs for the project.

.2 Construction shall be monitored to ensure that the mitigation measures are effective at containing the sediment to the construction area. Adjustments may have to be made to get the containment to function properly.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

01 45 00 – QUALITY CONTROL

Part 1 General

1.1 INSPECTION

.1 Allow Engineer access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Engineer.

.3 Engineer will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.2 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies may be engaged by Engineer for purpose of inspecting and/or testing portions of Work.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

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

.4 If defects are revealed during inspection and/or testing, an appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Engineer at no cost to Crown. Pay all costs for retesting and re-inspection if required.

1.3 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.4 PROCEDURES

.1 Notify Engineer in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

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

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

.3 If in opinion of Engineer it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Engineer.

1.6 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

1.7 MILL TESTS

.1 Submit mill test certificates as requested.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

01 52 00 – TEMPORARY FACILITIES - DREDGING

Part 1 General

1.1 ACCESS

.1 Provide and maintain adequate access to and exit from Project Site.

.2 Provide snow removal for temporary access throughout the period of Work.

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

.4 Make good damage to any existing land, roads, vegetation, or structures resulting from Contractor's equipment and operations. Restore to original condition at no additional cost to departmental representative

.5 Contractor to restrict all activities to within the Work areas shown. Provide additional Work and storage areas at own cost.

1.2 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in 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 manner to cause least interference with work activities.

1.3 SANITARY FACILITIES

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

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

1.4 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

END OF SECTION

01 77 00 – CLOSEOUT PROCEDURES

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

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

.2 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by Engineer.

.2 When Work is deemed incomplete according to Engineer, complete outstanding items and request re-inspection.

.3 Final Payment:

.1 When Engineer considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.4 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.2 FINAL CLEANING

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

1.3 RECORD DRAWINGS

.1 Maintain project “as-built” record drawings and record accurately significant deviations from Contract documents caused by site conditions and changes ordered by Engineer.

.2 Mark “as-built” changes in red coloured ink.

.3 Record the following information:

.1 Field changes of dimension and detail.

.2 Changes made by Change Order or Field Order.

.4 At completion of project and prior to final inspection, neatly transfer “as-built” notations to second set and submit both sets to Engineer.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

02 41 13 – SELECTIVE SITE DEMOLITION

Part 1 General

1.1 DESCRIPTION

.1 Removal and disposal of designated parts of the existing timber crib and span wharf.

.2 Salvage and re-installation of, ladders, ballast rock and other items designated for future use.

.3 Removal and disposal of existing electrical pedestals and conduit. Salvage service wiring for re-installation of new electrical pedestals.

1.2 MEASUREMENT FOR PAYMENT

.1 Mobilization, demobilization, all materials and work required for the demolition, removal and disposal of all components identified on the drawings and as specified are considered part of the lump sum arrangement. The items to be demolished, removed and disposed of, but not limited to, are as follows unless specified otherwise:

.1 Timber related components: Cribwork, Stringers, Binder Posts, Fenders, Waling and Associated Metal Fasteners.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Storage and Protection.

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

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

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

.4 Handle salvaged materials as new materials.

1.4 SITE CONDITIONS

.1 Site Environmental Requirements.

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

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 PREPARATION

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

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

.3 Notify and obtain approval of utility companies before starting demolition, if any services are found at the site.

3.2 REMOVAL OPERATIONS

.1 Remove items as indicated.

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

.3 Salvage existing ballast rock if removal is necessary. Contractor will be responsible for storage of stone until it is reinstalled.

3.3 REMOVAL FROM SITE

.1 Dispose of materials not designated for salvage or re-use in work, off-site at location acceptable to Engineer.

3.4 RESTORATION

.1 Remove debris, trim surfaces and leave work site clean, upon completion of Work.

.2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.

END OF SECTION

06 05 73 – Wood Treatment

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

.1 No measurement will be made under this Section.

1.2 RELATED SECTIONS

.1 Section 31 53 13 – Timber Cribwork

1.3 REFERENCES

.1 American Wood-Preservers' Association (AWPA)

- .1 AWPA M2-01, Standard for Inspection of Treated Wood Products.
- .2 AWPA M4-06, Standard for the Care of Preservative-Treated Wood Products.

.2 Canadian Standards Association (CSA International)

- .1 CSA O80 Series-97(R2002) - O80S2-05, Wood Preservation.
- .2 CSA O80.20-1.1-M97(R2002), This Standard applies to the fire-retardant treatment of lumber by pressure processes..
- .3 CSA O80.27-1.1-M97(R2002), This Standard covers the fire-retardant treatment of Douglas Fir, hardwood, softwood, and Poplar plywood by pressure processes.
- .4 CSA O80.201-M89, This Standard covers hydrocarbon solvents for preparing solutions of preservatives.
- .5 CSA O322-02, Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood Foundations.

Part 2 Products

2.1 MATERIALS

.1 Preservative treatment by a pressure process to CSA O80 Series.

Part 3 Execution

3.1 APPLICATION: PRESERVATIVE

.1 Treat timber to CSA O80 Series preservative to obtain minimum net retention of 6.4 $kg/m^3$of wood.

3.2 CARE OF PRESSURE-TREATED WOOD PRODUCTS

.1 Apply the recommended and accepted practices followed in the care and handling of all wood products to pressure-treated wood products.

.2 Avoid damage of field fabrication causing alteration of the original pressure-treated surface.

.3 Thoroughly saturate all cuts or injuries occurring subsequent to pressure treatment by liberal brushing, spraying, dipping, soaking or coating with preservative solution.

.4 Fill holes necessarily bored after pressure treatment with preservative solution to allow ample soaking time for penetration of solution.

.5 Use in any of the above the same preservative solution as that used in the original pressure treatment or a field treating solution of colour to match original treatment.

END OF SECTION

31 53 13 – TIMBER WHARF WORK

Part 1 General

1.1 MEASUREMENT PROCEDURES

.1 Deconstruction and all removals shall be measured under the Lump sum arrangement and shall include disposal offsite. Existing Ballast rock will also be included in the lump sum for removal, storage and reuse.

.2 Treated square sawn timber to be measured in cubic metres of timber supplied, installed and remaining in the work, including all fastenings, posts, post caps and cribwork timbers

.3 Wood timber in the form of stringers, and curbing shall be measured in linear metres of timber supplied, installed and remaining in the work, including all fastenings.

.4 Treated decking will be paid for by the square metre of timber supplied, installed and remaining in the work. This item includes all fastenings.

.5 Ladder installations will be measured at each ladder location installed and shall include all labour, equipment and materials necessary to complete the work.

.6 New Bollards will be measured at each location installed and shall include all labour, equipment and materials necessary to complete the work.

.7 Supply and installation of new 203 x 203 Fenders will be measured by each unit installed and shall include all labour, equipment and materials necessary to complete the work.

.8 Repairs to existing 140 x 140 Fenders will be measured by each unit installed and shall include all labour, equipment and materials necessary to complete the work.

.9 Repairs to existing 140 x 140 Horizontal Waling will be measured by each unit installed and shall include all labour, equipment and materials necessary to complete the work

.10 New Ballast rock will be paid for by the cubic metre supplied, installed and remaining in the work.

.11 Cubic measure of timber to be determined by product of actual cross-sections and length dimensions in place. The cross-section dimensions will be obtained from Table N-9 in “Metric Handbook for Canadian Softwood Lumber”.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM A307-04, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 Canadian Standards Association (CSA International)

.1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.

.2 CSA-O80 Series-97 (R2002), Wood Preservation.

.3 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2003 edition.

1.3 QUALITY ASSURANCE

.1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

.2 Worker protection:

.1 Workers must wear gloves, eye protection and protective clothing when handling, drilling, sawing or cutting preservative treated wood and applying preservative materials.

.2 Workers must not eat, drink or smoke while applying preservative material.

.3 Clean up spills of preservative materials immediately with absorbent material. Safely discard of absorbent material to approved landfill.

1.4 WASTE MANAGEMENT

.1 Do not dispose of preservative treated wood through incineration.

.2 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.

.3 Dispose of treated wood, end pieces, wood scraps and sawdust at an approved landfill.

Part 2 Products

2.1 MATERIALS

.1 Timber: use timber graded and stamped in accordance with applicable grading rules and standards of associations or agencies approved to grade lumber by Canadian Lumber Standards Accreditation Board of CSA.

.1 Species: Group A (Douglas Fir).

.2 Grade: Structural, No 2 or better.

.3 Grading authority: BCLMA

.4 All timber to be rough sawn.

.5 All decking to be square sawn sized lumber.

.6 All specified treated timber and planks to be pressure treated with CCA or ACA preservative, incision method, to 6.4 kg/cubic metre (0.40 lb/cubic foot) retention or refusal. Treatment to conform to the latest edition of CSA specification 080.

.7 All end cuts, abrasions and bolt holes to be well soaked with two coats of ACQ preservative acceptable to Engineer.

.8 Machine bolts used are to be of sufficient length to accept two washers and one fully threaded hexagonal headed nut.

.9 Drift bolts to have countersunk, tapered head and chisel point as manufactured by Dominion Bridge or equivalent.

.10 Bore holes for drift bolts 1.5 mm smaller diameter than bolt and 52 mm short of length of bolt. Bore holes for machine bolts to same diameter as bolt.

.11 All end cuts to be placed above high water line where possible.

.2 Miscellaneous steel:

.1 Hot dip galvanized: to CAN/CSA-G164.

.2 Wire nails, spikes, staples: to CSA-B111.

.3 Bolts, nuts, washers: to ASTM A307.

.4 Steel straps and plates: to CAN/CSA-G40.21, Grade 300.

.5 Primer: rust inhibiting, low VOC, modified alkyd resin primer, 51% solids by volume, compatible with specified paint.

.6 Paint: two component, high solids, polyester-aliphatic urethane suitable for marine environment, volume of solids 65%; Colour: traffic yellow.

.3 Ballast for filling cribs to following requirements:

.1 Stone, consisting of hard durable particles free from clay lumps, organic material and other deleterious materials.

.2 Ballast stone supplied to be well graded with maximum size not exceeding 200 mm and minimum size to be not less than 150 mm.

.3 Crushed rock mattress: 100 mm minus.

Part 3 Execution

3.1 DECONSTRUCTION AND REMOVALS

.1 Carefully remove designated curb, curb blocks, decking, stringers, fenders, and crib timbers and stockpile for removal to an approved sanitary landfill site.

.2 Remove and store existing crib rock ballast for reuse.

.3 Maintain adjacent area of wharf structure not designated for removal. Restore areas damaged during removals.

.4 Dispose of removed materials off site at an approved sanitary landfill facility.

3.2 PREPARATION

.1 Confirm existing measurements on site and confirm materials supply is sufficient. Inform engineer of any measurement discrepancies present.

.2 Before construction, stockpile sufficient ballast to completely fill cribs, allowing reuse of existing core stone.

3.3 DECKING, FASCIA AND CURB

.1 Decking will be 76 mm square sawn sized lumber laid heart side down. Planks will be spaced 6 mm apart and secured with two 200 mm galvanized spiral spikes per timber contact. Plank widths to be not less than 200 mm and not more than 310 mm wide. Decking to extend into Crib #9 as part of the retrofitting of the new outer section into the existing wharf.

.2 Planks to be cut flush with outer faces of work.

.3 All planks to be pre-drilled for the spikes to prevent splitting.

.4 In cases where the thickness of deck planks vary due to shrinkage or swelling, planks are to be sorted and installed so that changes in elevations are kept to a minimum. Chamfer edges of plank where changes cannot be avoided.

.5 Place curb on risers and secure with countersunk 20 mm diameter machine bolts as shown on the plan.

.6 Riser blocks are to be secured to the deck with two 200 mm galvanized spiral spikes.

.7 Fascia boards to be installed vertically on shore face of cribs 76 mm square sawn sized lumber laid heart side against cribs. Planks will be spaced 6 mm apart and secured with two 200 mm galvanized spiral spikes per timber contact. Plank widths to be not less than 200 mm and not more than 310 mm wide.

3.4 CRIB CONSTRUCTION

.1 All longitudinal timbers and cross timbers shall be of sufficient length to span crib in one length or as noted on drawing. Longitudinal timbers and cross timbers to be drifted to each other at each contact point with 20 mm x 355 drift bolts. Each longitudinal and cross timber to be fastened to vertical binder post with 20 mm machine bolt complete with nut and 2 washers. All machine bolts used to be of sufficient length to accept 2 washers and have room for fully threading a hexagonal nut. All machine bolts to be countersunk on exterior faces.

.2 Place ballast floor on pockets on bottom or second course from bottom timbers. Secure each ballast floor timber to bottom timbers with 20 mm x 305 drift bolts.

.3 Vertical binder posts to be in one length from bottom of cribwork to top of cribwork.

.4 Stringers to be installed in lengths as shown on drawings. Stringers to be fastened to crib timbers with 20 mm x 355mm drift bolts at each contact.

.5 Maximum spacing between cross timbers and longitudinal not to exceed 215mm.

.6 Bore holes for drift bolts 1.5 mm smaller diameter than bolt 52 mm short of length of bolt. Bore holes for machine bolts to same diameter as bolts.

.7 Salvage and reinstall steel safety ladders in locations as shown on drawings.

3.5 HANDLING TREATED TIMBER

.1 Handle treated material without damaging original treatment.

.1 Replace treated timber with major damage to original treatment, as instructed by Engineer.

.2 Field treatment: apply and saturate cuts, minor surface damage, abrasions, and nail and spike holes with preservative to CAN/CSA-O80 Series.

3.6 SHOP PAINTING

.1 Primer: VOC limit 250 g/L maximum to GS-11 CCD-047a CCD-048.

.2 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.

.3 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.

.4 Clean surfaces to be field welded; do not paint.

3.7 PIPE BOLLARDS

.1 Fabricate and install pipe bollards in locations and in matter shown.

.2 Steel sections and plates and bars: to CAN/CSA-G40.20/G40.21, Grade 350W.

.3 Steel Pipe: to ASTM A53/A53M-07, Grade B

.4 Finish: shop painted.

.5 Primer: VOC limit 250 g/L maximum to GS-11 when applied on site.

.6 Traffic Yellow

3.8 BALLAST

.1 Place ballast to avoid damage to timber cribwork.

.2 Place ballast so that differential height of fill between adjacent cells, at any time, will be less than 1 m.

.3 Cribs to be fully ballasted from ballast floor to bottom of stringers.

3.9 TOLERANCES

.1 1 in 300 in overall dimensions.

3.10 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

35 20 23 - DREDGING

Part 1 General

1.1 DEFINITIONS

.1

.1 Dredging: excavating, transporting and disposing of underwater materials.

.2 Class "A" material: solid rock requiring drilling and blasting to loosen, and boulders or rock fragments of individual volumes $1.5m^3$; or more.

.3 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 $1.5m^3$;.

.4 Obstructions: material other than class A, having individual volumes of $1.5m^3$; or more.

.5 Debris: pieces of wood, wire rope, scrap steel, pieces of concrete and other waste materials.

.6 Grade: plane above which material is to be dredged.

.7 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.

.8 Side slope: inclined surface or plane from grade depth 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.

.9 CMPM: Cubic metres place measurement at dredging site.

.10 CMSM: Cubic metres scow measurement.

.11 SQM: Area in square metres projected on horizontal plane.

.12 Box Cut: Dredging channel area with vertical side slopes and allowing side slope of excavation collapse to a natural equilibrium slope.

.13 Cleared Area: Area of dredging accepted as complying with plans and specifications.

.14 Mechanical Sweep: Clearing all the dredged areas to the grade depth using a mechanical device suspended from a barge.

.15 Chart Datum: permanently established plane from which soundings or tide heights are referenced, usually Lowest Normal Tide (LNT).

.16 Universal Transverse Mercator Projection (UTM) or Modified Transverse Mercator Projection (MTM) Co-ordinates: plane rectangular coordinates used in grid system in which grid network is applied to UTM. or MTM. projection. Horizontal control information as indicated.

.17 Mechanical Dredging Plant: Equipment that is comprised of the following: clamshell, dragline, dipper, or backhoe dredge with dump scows.

.18 Hydraulic Dredging Plant: Equipment that uses the movement of water to excavate and transport underwater materials such as: cutter suction dredger, suction dredger or trailing suction hopper dredger.

.19 Lowest Normal Tide (LNT): plane so low that tide will seldom fall below it.

1.2 REFERENCES

.1 .1 Transport Canada:

.1 TP 10739 Collision Regulations, Office Consolidation, 2008.

.2 Transportation of Dangerous Goods Act, 1992.

.2 Department of Justice Canada:

.1 Explosives Act, 2009.

.3 Department of Fisheries and Oceans, Canada:

.1 Wright, D.G., and G.E. Hopky. 1998. Guidelines for the use of explosives in or near Canadian fisheries waters. Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p.

1.3 LOCATION

.1 Work comprises dredging of a 386 m^2 area as indicated in the attached drawings, to a depth of 2 metres below Chart Datum where Chart Datum is (183.2m).

1.4 INTERFERENCE WITH NAVIGATION

.1 Navigation co-ordination:

.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, marina operations, construction activities at wharf sites, 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 District Manager, Canadian Coast Guard, Fisheries and Oceans, informed of dredging operations in order that necessary Notices to Mariners will be issued.

1.5 REQUIREMENTS OF REGULATORY AGENCIES

.1 Mark floating equipment with lights in accordance with International Rules of Road and maintain radio watch on board.

.2 Comply with municipal, provincial and national codes and regulations relating to project.

.3 Blasting of bedrock to Guidelines for Use of Explosives In or Near Canadian Fishing Waters, by Fisheries and Oceans Canada, latest update.

1.6 SITE INFORMATION

.1

.1 Area ‘A’ consists of top layer of Class “B” material with the majority of the material below this layer consisting of Class “A” material (bedrock).

.2 Area “B” consists of infilled sand and silt from the nearshore area. The material designated for removal in this area is of Class”B”:. We estimate the quantity to be roughly 50 CMPM.

.3 Results of geotechnical investigations are included in these specifications.

.4 Results of prior soundings are made available for tendering purposes only. It should be noted that this information may differ from site condition. Take this into consideration when submitting tender.

.5 Contractor to visit and inspect work site and become thoroughly familiar with extent and nature of Work and conditions affecting Work before tendering.

.6 Take necessary steps to become fully familiar with potential inclement weather and sea conditions in this area.

.7 Survey requirements:

.1 Provide, at own expense, survey equipment and crew to set up and maintain control for location of dredge limits and to sound areas immediately after dredging to verify that grade depth has been attained to approval of Departmental Representative.

1.7 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 Costs for Mobilization and Demobilization of dredging equipment. Removal and disposal of dredged material, including all machinery required to grade the materials at the (disposal location), and site clean-up shall be included in the Lump Sum arrangement.

.2 Costs for Preconstruction Survey and Environmental Monitoring shall be measured as a Single Fixed Item

.3 Dredging: Costs for removal of Class “A” material will be measured in Cubic Metres, In place Measurement CMPM, determined from soundings taken by the Departmental Representative after the removal of cribwork and prior the commencement of blasting. Post dredging elevations for quantity computations will be shallowest of grade or bedrock sounding for each matrix block.

.4 Dredging: Costs for removal of Class “B” material shall be included in the Lump Sum Arrangement and will not be measured separately for payment.

.5 Only material excavated above grade plane and within side slopes indicated or specified will be measured.

.6 Operations in connection with field positioning of dredging equipment will not be measured separately for payment.

.7 No separate payment will be made for Contractor's survey vessel, equipment and crew or diving services.

.8 Payment will include disposal of dredge material, at locations specified.

.9 No additional payment for delays incurred during fishing seasons and during periods when no dredging is permitted.

.10 No additional payment for downtime and for delays caused by vessel traffic.

.11 Removal of infilling material will not be measured for payment.

.12 Mobilization and demobilization of dredging equipment to be lump sum.

.13 No separate payment will be made for sweeping.

.2 Scheduling:

.1 Submit to Departmental Representative within two weeks after award of Contract, 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.

1.8 PRECONSTRUCTION SURVEY AND ENVIRONMENTAL MONITORING

.1 Submit to Departmental Representative for approval, two weeks before blasting, details of proposed blasting operations showing types and quantities of explosives, loading charges and patterns, type of blasting caps, blasting techniques, blast protection measures, time of blasting and other pertinent details. Submit subsequent changes to Departmental Representative before proceeding.

.2 Provide seismographic blast monitoring during entire progress of blasting operations.

.3 Retain specialist company to carry out seismographic survey before rock excavation is started, to determine maximum charges that can be used at different locations in area of rock excavation. Following survey, full report detailing control requirement throughout project will be made available. Report or any part of it will not over-rule requirements of local authority having jurisdiction unless report requirements are more conservative.

.4 Submit to Departmental Representative complete photographic and descriptive record of buildings, roads and structures in general area of Project Work, before blasting is started. Describe buildings both inside and out. Record existing cracks in walls or structural components.

1.9 QUALITY ASSURANCE

.1 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, Marine Directorate and this certificate to accompany Tender submission.

.2 Requests for certification in format of attached questionnaire to be directed to Director, Defense and Marine, Directorate, Industry Canada, 235 Queen Street, 7th Floor, East Tower, Ottawa, Ontario, K1A 0H5, and to be received there not less than 14 days prior to [bid] closing.

Part 2 Products

2.1 DREDGING EQUIPMENT

.1 Contractor to determine required equipment necessary to dredge material specified and to dispose of dredged material at the following location:

.1 Unfinished breakwater location adjacent (north) to the existing wharf.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of location:

.1 Work comprises dredging of a 386 m^2 area as indicated in the attached drawings to a depth 2 metres below Chart Datum (181.2m, where Chart Datum is 183.2m).

.2 Surveys and acceptance of work:

.1 As soon as practical after Contract award, Departmental Representative will provide pre-dredge survey of dredge area locations.

.2 No area will be dredged prior to Departmental Representative's and Contractor's mutual acceptance of pre-dredge 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 Departmental Representative's cost, for those areas not meeting acceptance criteria for dredging. Additional surveys required to clear areas will be undertaken by Departmental Representative at Contractor's cost.

3.2 DREDGING

.1 Place and maintain buoys, markers and lights required to define work and disposal areas.

.2 Lay out Work from bench marks established by Departmental Representative. Be responsible for accuracy of Work relative to established bench marks. Provide and maintain electronic position fixing and distance measuring equipment, laser transits and such other equipment as normally required for accurate dredging control.

.3 Areas to be dredged are to be referenced to vertical bench marks for each location of dredging as indicated.

.4 Chart datum for soundings indicated is 183.2m.

.5 Establish and maintain water level gauges in order that proper depth of dredging can be determined. Locate gauges so as to be clearly visible.

.6 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.

.7 Dredge 386 m^2 area to grade depth of 181.2m, as shown on the attached drawings.

.8 Dredge side slopes to 0:1 horizontal to vertical.

.9 Remove materials above specified grade depths, within limits indicated. Material removed from below subgrade depth or outside specified area or side slope is not part of Work.

.10 Remove shoaling which occurs as result of Work at no expense to Departmental Representative.

.11 Remove material cast-over on surrounding area and dispose of it as dredged material. Do not cast-over material unless authorized by Departmental Representative.

.12 Immediately notify Departmental Representative upon encountering object which might be classified as obstruction. By-pass object after clearly marking its location and continue Work.

.13 Tolerances:

.1 Do not dredge material from areas lying within 1m of existing structure unless authorized by Departmental Representative.

3.3 CLASS 'A' REMOVAL

.1 Complete removal of Class 'B' material and obstructions in area before blasting for Class 'A'. Work toothed buckets over area to remove Class 'B' material until Departmental Representative is satisfied that further removal cannot be accomplished without blasting.

.2 Provide specialist with qualifications acceptable to Departmental Representative and Municipal or Provincial Authorities to programme and supervise blasting.

3.4 SITE QUALITY CONTROL

.1 Site test and inspections:

.1 Co-operate with Departmental Representative on inspection of Work and provide assistance requested.

.2 Upon 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. Volume of material transported in partially filled scows will be determined by Departmental Representative.

.3 Sweep dredged areas on completion of dredging to confirm that grade depth has been achieved.

.4 Sweeping equipment to consist of heavy steel beam suspended from scow at required grade depth. Beam to be capable of adjustment and calibration and approved by Departmental Representative.

.2 Non-conforming work:

.1 If, as result of incomplete Work, additional verification of depths by sounding or sweeping becomes necessary, additional costs involved shall be paid by Contractor.

.2 Re-dredge unsatisfactory Work and verify depths with additional sounding or sweeping to approval of Departmental Representative.

3.5 CLEANING

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

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

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

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.2 Metals, wood and recyclable materials removed during the dredging activities must be diverted appropriate recycling facilities.

.3 Dispose of dredged material by depositing in disposal areas indicated in manner approved by Departmental Representative.

3.6 REPAIRS TO EXISTING DOCKS AND BUILDINGS

.1 Contractor is responsible to make good and repairs for existing wharf, docks, utilities, and buildings to the preconstruction survey at no cost.

END OF SECTION

35 31 24 – SHORE PROTECTION

Part 1 General

1.1 MEASUREMENT PROCEDURES

.1 New Armour stone and Core stone supply will be measured in tonnes of material supplied and placed to the final dimensions indicated on the drawings and incorporated into the completed work and shall include all labour, equipment and materials necessary to complete the work.

.2 Dredged Materials salvaged as reused as Core stone will be measured as part of the lump sum arrangement and shall include all labour, equipment and materials necessary to complete the excavating, stockpiling and reinstatement.

.3 Reclaimed Native materials will be measured as part of the lump sum arrangement and shall include all labour, equipment and materials necessary to complete the excavating, stockpiling and backfilling of native backfill.

.4 Disposal of surplus native fill off site is considered included in item 1.1.3 above.

.5 Weigh all stone placed in the Work at the quarry on a scale approved and certified as correct by the Department of Consumer and Corporate Affairs Weights and Measures Inspection Branch. Prior to use, have weigh scale certified as meeting requirements of Statutes of Canada, Chapter 36, Weights and Measures Act 1971 and subsequent amendments. Provide the Departmental Representative with a copy of the certificate and display certificate in prominent location. Costs for maintenance and operation of scale shall be considered incidental to the work.

.6 Provide the Departmental Representative with weigh tickets at time of delivery to site.

Part 2 Products

2.1 MATERIALS

.1 Rock materials:

.1 Contractor to provide all materials.

.2 Armour stone:

.1 The largest dimension of each stone is not to exceed two times the smallest dimension.

.2 Armour stone: Type A – 500kg to 2.0 tonnes each by weight.

.3 Stones are to be fractured and angular. Field stone is not acceptable.

.4 The Armour stone is to be free from cracks, seams and other defects which may impair durability. The Los Angeles abrasion loss determined using ASTM procedures shall not exceed 35%. The armour rock shall be durable, blasted limestone or granite. Slate and shale are not acceptable.

3 Core stone:

.1 The largest dimension of each stone is not to exceed three times the smallest dimension.

.2 Quarry Run Core Stone: 2.7kg to 180kg each by weight, shovel run material for core, with 60 percent of the total volume to be at the midpoint of the specified size range, and not more than a maximum 5 percent content less than 25mm.

.3 Material is to be free of roots and other deleterious material.

Part 3 Execution

3.1 EXCAVATING

.1 Excavate and stockpile native fill material that is suitable for reuse as core material in new breakwater. Unsuitable material is to be disposed of off-site.

.2 Suitable native fill material is to be clear of all metals (i.e. Bollards, Tie Rods, Steel Sheet Piling Anchors, Wales, Metal Fastenings) and timber.

.3 Excavate and stockpile existing core stone from rock revetment berms as required.

.4 Reinstall rock materials as indicated on drawings.

3.2 PLACEMENT OF CORE STONE

.1 Place core stone to lines, grades and dimensions as indicated on the drawings.

.2 Place core stone in thickness courses to total layer thickness, as shown on the drawing.

.3 Place core stone on a slope of 1.5 horizontal to 1 vertical

.4 No allowance made for material placed outside specified limits

3.3 PLACEMENT OF ARMOUR STONE

.1 Place armour stone to lines, grades and dimensions as indicated on the drawings.

.2 Place each armour stone in stable position.

.3 Place armour stone in thickness courses to total layer thickness, as shown on the drawing.

.4 Sort, fit and tightly key each rock to ensure stability of faces.

.5 Placement not deemed acceptable must be removed and replaced

3.4 TOLERANCES

.1 Completed component layers to be within following tolerances of lines and grades as indicated:

.1 Armour: plus or minus 300 mm.

.2 Core: plus or minus 150 mm.

3.5 HAUL ROADS

.1 Be solely responsible for construction and maintenance of haul roads. Remove haul roads from site upon completion of project. No separate payment to be made for construction, maintenance and removal of haul roads.

.2 The Contractor is to be responsible for obtaining approval from applicable agencies for using access roads to site.

.3 The Contractor to repair any damage caused to roads or property as a result of hauling operations.

END OF SECTION

26 05 00 – ELECTRICAL WORK

Part 1 MEASUREMENT PROCEDURES

1.1

.1 Supply and installation of new electrical service pedestals shall be measured by each new unit installed into the work, including reinstallation of existing service wiring in new conduits on new wharf. Work shall include all labour, equipment and materials necessary to complete the work. Connection to existing distribution panel shall be considered incidental.

.2 Supply and installation of New Solar Powered Light Post shall be measured by each new unit installed into the work, New pipemast shall include all labour, equipment and materials necessary to complete the work.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-[06], Canadian Electrical Code, Part 1 (20th Edition), Safety Standard for Electrical Installations.

1.3 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235.

1.4 SUBMITTALS

.1 Quality Control: in accordance with Section 01 45 00 - Quality Control

.1 Provide CSA certified equipment and material.

.2 Submit test results of installed electrical systems and instrumentation.

.3 Permits and fees: in accordance with General Conditions of contract.

1.5 QUALITY ASSURANCE

.1 Qualifications: electrical Work to be carried out by qualified, licensed in accordance with authorities having jurisdiction as per the conditions of Provincial Act respecting manpower vocational training and qualification.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

.1 <u>New pipe mast to have the following:</u>

.1 Steel sections and plates: to CSA G40.20/ G40.21, Grade 350W.

.2 Welding materials: to CSA W59

.3 Welding electrodes: to CSA W48 Series

.4 Bolts and anchor bolts: to ASTM A325

.5 Primer: rust inhibiting. , low VOC, modified alkyd resin primer, 51% solids by volume, compatible with specified paint

.6 Paint: two component, high solids, polyester-aliphatic urethane suitable for marine environment, volume of solids 65%; Colour: Black

.2 Service Pedestals

.1 Use APR Series Marine Grade Power Pedestals manufactured by Ace Manufacturing Inc – or an approved equal. Pedestals to be equipped with minimum (2) - 30 Amp, 125 Volt twist-lock receptacles, with ground fault protection.

2.2 WIRING TERMINATIONS

.1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.3 WIRING IDENTIFICATION

.1 Colour coding: to CSA C22.1.

.2 Use colour coded wires in communication cables, matched throughout system.

Part 3 Execution

3.1 INSTALLATION

.1 Solar Powered Lighting Unit to be supplied by others. Contractor is responsible for fabrication and installation of new 100mm Schedule 40 pipemast to new wharf as shown on the drawings.

.2 New Electrical Pedestals to be supplied and installed by contractor, including connections to existing electrical distribution panel.

.3 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

.4 Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

3.2 NAMEPLATES AND LABELS

.1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3 CONDUIT AND CABLE INSTALLATION

.1 Install cables, conduits and fittings as required by code to install the system as specified.

3.4 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished ground to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

END OF SECTION

Geotechnical Investigation

Mamainse Harbour
Highway 17 North, Ontario

Prepared for:
TSH
523 Wellington Street East
Sault Ste. Marie, Ontario

Prepared by:

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Contract 7789

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Table of Contents

1.0 Introduction

This report contains comments and recommendations concerning the results of a soils investigation which was conducted at Mamainse Harbour, Highway 17 North, Ontario.

Recommendations are based on results of tests, which were conducted on samples of soil and rock which were recovered at the site during the drilling of one test hole. Tests were conducted at the site in order to provide information on rock quality and excavation requirements of the bedrock. One borehole was drilled at the site to obtain sub-surface soils information. This soils information was used to prepare recommendations for methods of excavation in the site soil and rock, and comment on their suitability for re-use at the site. Authorization to proceed with the work was received from Mr. J Tullock, TSH and fieldwork was conducted on June 26, 2007.

2.0 Description of the Site

Mamainse Harbour is located approximately 95 kilometres north of the City of Sault Ste. Marie. The property is adjacent to Lake Superior. The site is relatively flat. A wood timber wharf is located on the west side of the parking lot that provides mooring for fishing vessels and pleasure craft. South of the wharf, a commercial fisheries and cannery operation and a number of private dwellings are located.

Ontario Geological Maps indicate this area to be a bedrock ridge landform and Ontario Geological Survey Map 2419 indicates igneous bedrock.

Site Plan Drawing No. CO1 attached as Appendix A to this report shows the location of the borehole completed as part of this investigation.

3.0 Description of Test Methods

One borehole was advanced by a CME 850 High Torque track mounted drill rig equipped with diamond drill and NQ core barrel. Soil samples were recovered to a depth of 3.4 metres and a bedrock core 3.05 metres in length was recovered at which point drilling operations were suspended. The soil sample and rock core sample were retained for laboratory analysis.

The boundaries between soil stratum have been established only at the borehole location and as such is not necessarily indicative of the depth of overburden or the elevation of top of bedrock over the whole site.

4.0 Soil Conditions

The borehole at this site generally recorded soil conditions from grade elevation downward, consisting of:

- Overburden of boulders, cobbles and gravel
- Bedrock

The borehole was located in the boat launch ramp area and the observed overburden was a combination of imported and native soils. Soils were dry to an approximate depth of 1.2 metres at the time of the investigation. This depth represents the approximate level of Lake Superior.

Below the cobbles and boulders, at depth 3.4 metres, the bedrock stratum was encountered. Laboratory examination determined a Rock Quality Value (RQD) of 87.9%. According to Table 3.6 in the Foundation Engineering Manual, 3rd Edition, with RQD of 87.9% rock is classified as "Good Quality".

Borehole Log No. 1 is located in Appendix B attached to this report.

5.0 Excavation Conditions

Excavation of the top stratum of cobbles and boulders near grade and extending to bedrock can be completed with the use of conventional excavation equipment. Dewatering will be required due to ground water and lake water. Dewatering methods may prove to be very complicated and costly and are beyond the scope of this report.

In accordance with the current Occupational Heath and Safety Act and Regulations for Construction Projects the existing soils at this site would be classified as Type 3 soils. Open cut excavations are not expected to remain stable if excavated with vertical sides. Accordingly, excavations, if unshored, should be constructed at a maximum slope of 1:1 (one horizontal to one vertical).

Bedrock has been determined to have an RQD Value of 87.9% and is of Good Quality. As such, it is expected that the use of pneumatic rock hammers would not produce satisfactory results in breaking the igneous rock for excavation purposes. Rather, it is recommended that conventional drill and blast methods be utilized for any rock removal.

Blasting design by a licensed blasting company could pattern drill holes so as to provide rock shatter of acceptable size to be used as rip-rap for shoreline stabilization, protection and breakwaters thus decreasing the amount of excavated rock removed from site.

6.0 Environmental and Safety Considerations

A blasting design would have to be detailed by a licensed blasting company to meet existing environmental conditions. Considerations in the design should include the close proximity to Lake Superior and the surrounding commercial fisheries operations that are conducted adjacent to this site.

During rock drilling procedures, considerable amounts of rock flour and dust are generated and precautions to prevent the migration of this material into the lake waters must be implemented. Methods that can be used, but not limited to, are straw bale weirs, silt curtains etc.

Blasting mats must be utilized during actual blasting operations to prevent flying debris entering lake waters and damaging surrounding buildings, watercraft and utilities.

7.0 Statement of Limitation

This report has been prepared in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

This report and the geotechnical investigation were conducted for TSH, Consulting Engineers to provide the designers with information as it relates to subsurface soils conditions at the site under consideration.

Classification and identification of soils, and geologic units have been based upon commonly accepted methods employed in professional geotechnical practice.

The soil stratum reported herein has been established at borehole locations only. If conditions at the site during excavation differ from those reported, we require notification in order to allow review of our recommendations.

Whereas this investigation has estimated the groundwater level at the time of the field work and commented on general construction problems, the presence of conditions which would be difficult to establish from a small diameter borehole may affect the type and nature of dewatering procedures which should be used in practice. These conditions include local and seasonal fluctuations in the

groundwater table, erratic changes in the soil profile, thin layers of soil with large or small permeability's compared with the general soil mass, and possible sources of relatively large run-off.

MRW normally disposes of all unused soil and rock samples after 60 days of completing the testing program for which the samples were obtained. Further storage or transfer of samples can be made at the owner's request.

8.0 Closure

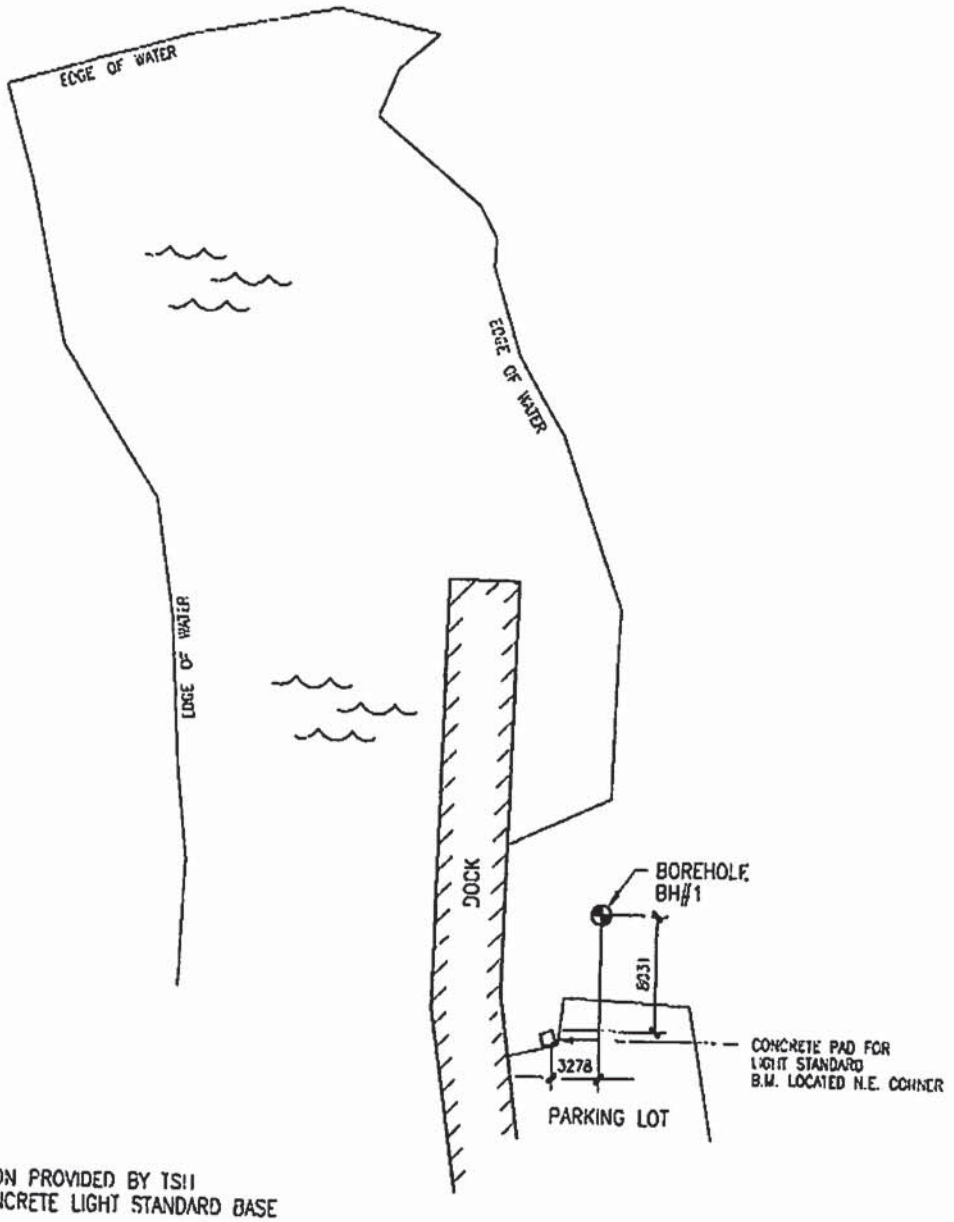
We trust that the information and recommendations in this report will be found to be complete and adequate for your consideration. Should further elaboration be required for any portion of this project, we would be pleased to provide assistance.

Respectfully submitted,

M. McDonald
MM:mm

G. Saunders, P. Eng.

Appendix A: Site Plan Drawing of Borehole Location



BENCHMARK INFORMATION PROVIDED BY TSH
- BRASS PLUG IN CONCRETE LIGHT STANDARD BASE N.E. CORNER
- HYDROGRAPHIC SERVICE CANADA 1982 #8516
- ELEVATION 1.518M ABOVE IGLD 1985

SITE PLAN

SCALE 1:500M

MAMAINSE HARBOUR
HIGHWAY 17 NORTH, ONTARIO

JULY 2007

PROJECT No. 7789

Consulting Engineers
MRW
M.K. WRIGHT & ASSOCIATES CO. LTD.
SAULT STE. MARIE, ONTARIO

DRAWING No. C01

Appendix B: Borehole Log

Project No: 7789

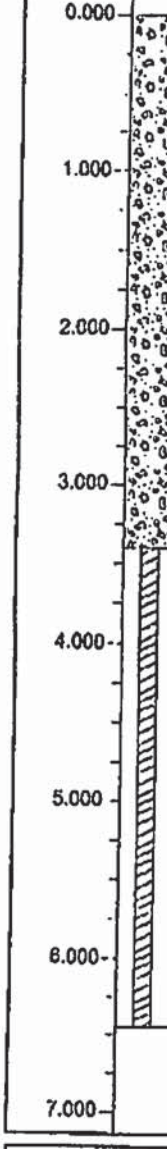
Project: Mamainse Harbour

Site Location: Highway 17 North, Ontario

Client: T.S.H.

Borehole Number: 1

Inspector: M. McDonald



SUBSURFACE PROFILE				SAMPLE				Standard Pentration Test "N" Values blows / 300mm 0 20 40 60 80 100	Remarks
Depth (M)	Legend	Description	Elevation (M)	Number	Method	Blows / 300mm	% Recovery		
0.000		Ground Surface	1.00						
							50		Overburden is a mixture of native & imported material
1.000		100mm to 150mm Roulders, Cobbles & Clean Washed Gravel							
2.000									
3.000			-2.40						
4.000		Bedrock							3.05M Core length RQD= 87.9%
5.000									
6.000			-5.44						
		End of Borehole							
7.000									

Drilled By: Land Core

Drill Method: NQ. Diamond Drill

Drill Date: June 26, 2007

Consulting Engineers
MRW
M.R. WRIGHT & ASSOCIATES CO. LTD.
SAULT STE. MARIE • ONTARIO

Datum: Hydrographic Services Canada 1982, #8516, Elev. 1.518M Above IGLD 1985 As Set By T.S.H.

Sheet: 1 of 1