

**SPECIFICATIONS FOR
BREAKWATER REPAIRS
PINE DOCK, MB**

Solicitation # F2470-140029/A



Department of Fisheries & Oceans
Small Craft Harbours Branch
Winnipeg, Manitoba

September 2014

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
01 11 05 – General Instructions	3
01 35 29 – Health and Safety Requirements	9
01 35 43 – Environmental Procedures	12
01 45 00 – Quality Control.....	16
01 77 00 – Closeout Procedures.....	18
01 82 01 – Weigh Scales.....	20
02 41 13 – Selective Site Demolition.....	22
03 20 00 – Concrete Reinforcing	24
03 41 02 – Precast Concrete Bases.....	26
05 50 00 – Metal Fabrications.....	29
06 05 73 – Wood Treatment.....	32
31 32 19 – Geotextiles.....	34
31 53 13 – Timber Cribwork.....	37
31 61 13 – Pile Foundations, General Requirements	41
35 31 24 – Rubble Mound Breakwater	44
35 59 11 – Timber Float Wharves.....	46

01 11 05 – GENERAL INSTRUCTIONS

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No measurement will be made under this Section.

1.2 DESCRIPTION OF WORK

- .1 The work site described in this specification is Pine Dock, Manitoba. See Chart of Location on Drawing C-1.
- .2 The work under this contract covers:
 - .1 Construction of a rubble mound breakwater including concrete base, pipe mast and navigation light.
 - .2 Supply and installation of timber float wharf and associated steel connections.
 - .3 Supply and installation of multiple timber crib wharves in the harbour basin including excavation for installation of cribs and geotextile.
 - .4 Installation of aluminum ramps and float wharves located on site including the supply and installation of steel connections and hinges.
 - .5 Transportation of three float wharves to Selkirk, MB.
- .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.

1.3 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.

1.4 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 Provide sufficient details in schedule to clearly illustrate entire instrumentation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.
- .3 As a minimum, work schedule to be prepared and submitted indicating work activities, tasks and other projects elements, their anticipated durations and planned dates for achieving key activities and major project milestones. It shall include sufficient details

and supported by narratives to demonstrate a reasonable plan for completion of project within designated time.

- .4 Submit schedule updates on a minimum monthly basis and more often, when requested by Engineer. Provide a narrative explanation of necessary changes and schedule revisions at each update. Take all necessary measures to complete work within approved time.
- .5 Work under this contract is to be performed 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 by **March 12, 2015**.
- .6 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.

1.5 CERTIFICATES AND TRANSCRIPTS

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

1.6 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.

1.7 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.

1.8 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.

1.9 CONTRACTOR'S USE OF SITE

- .1 Co-ordinate 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 interfere 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.

1.10 EXISTING SERVICES

- .1 Notify Engineer and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Engineer 72 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions.
- .3 Establish location and extent of service lines in area of work before starting Work. Notify Engineer of findings.
- .4 Submit schedule to and obtain approval from Engineer for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .5 Where unknown services are encountered, immediately advise Engineer and confirm findings in writing.

- .6 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .7 Record locations of maintained, re-routed and abandoned service lines.

1.11 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.

1.12 CONTRACT METHOD

- .1 Construct Work under a combined price contract. All costs for work not specifically identified as a unit price item shall be included in the lump sum arrangement.

1.13 CODES AND STANDARDS

- .1 Perform work in accordance with latest editions of National Building Code of Canada (NBC) and any other code of provincial or local application provided that 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.

1.14 PROJECT MEETINGS

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

1.15 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.

1.16 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.

1.17 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.

1.18 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.

1.19 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.

1.20 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.

1.21 VEHICLE AND PEDESTRIAN PROTECTION

- .1 Provide snow fencing, wooden barriers, or other approved barriers to prevent vehicles and pedestrians from accessing the site during construction.
- .2 Contractor shall provide appropriate signage for vehicle and pedestrian protection.

- .3 All barriers shall include delineation and reflectors to stand out at nightfall.

1.22 DRAWINGS

- .1 The following drawings are to be read in conjunction with this specification:
 - .1 C-1, C-2, C-3, C-4, C-5 Breakwater Repairs
 - .2 S-1 Pipe Mast for Mounting Lights

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.
 - .1

END OF SECTION

01 35 29 – HEALTH AND SAFETY REQUIREMENTS

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No measurement will be made under this Section.

1.2 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 Manitoba
 - .1 The Workers Compensation Act (latest edition).

1.3 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 Submit WHMIS MSDS – Material Safety Data Sheets to Engineer.
- .4 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.
- .5 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.
- .6 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.4 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.5 SAFETY ASSESSMENT

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

1.6 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.

1.7 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.

1.8 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of the Province having jurisdiction and advise Engineer verbally and in writing.

1.9 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have site-related working experience specific to activities associated with dock reconstruction at an active harbour site.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work.

1.10 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.

1.11 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 PROCEDURES

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No separate measurement will be for work of this section. Work is incidental to the project cost.

1.1 RELATED SECTIONS

- .1 Section 02 41 13 - Selective Site Demolition

1.2 FIRES

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

1.3 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.

1.4 WORK ADJACENT TO WATERWAYS

- .1 No in-water work or shoreline work is permitted between April 1 and June 15.
- .2 Construction equipment may not enter the lake unless the lake is frozen. If construction equipment will be located on the frozen surface of the lake, it will be removed from the lake each night if the on-ice component of the projects spans more than one day.
- .3 Construction equipment will enter and leave the lake at such a location and in such a manner that disturbance to the lakeshore.
- .4 Every effort will be made to minimize the introduction of sediment to the lake and creek during work activities. Any sediment tracked onto the ice during the project must be cleaned off at the end of the project. This includes any ice that needs to be removed from the shoreline to accommodate stabilization works. All material used for shoreline stabilization will be clean and free of silt and clay.
- .5 No construction debris from work activities will be allowed to enter the lake. The work site must be cleaned daily. Every effort will be made to minimize the introduction of sediment to the lake during work activities.
- .6 Do not use waterway beds for borrow material.

- .7 Waterways to be free of excavated fill, waste material and debris.
- .8 Design and construct temporary crossings to minimize erosion to waterways.
- .9 Do not skid logs or construction materials across waterways.
- .10 Avoid damage to shoreline.
- .11 Supply, install, and maintain approved erosion control blankets to unprotected slopes until revegetation is established.
- .12 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.
- .13 Reclaim and restore disturbed areas to previous or better condition.
- .14 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.
- .15 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.
- .16 The Contractor shall report spills of fuels or other contaminants to the Engineer.
- .17 The Contractor shall not remove, destroy or disturb species pursuant to Provincial Threatened Endangered and Extirpated Species regulation, or species listed in the federal Species at Risk Act.
- .18 The Contractor shall not disturb migratory bird nests.

1.5 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 100 metres from shore and comply with Provincial Environmental Legislation.
- .5 Refueling, servicing, or cleaning of equipment on ice or within 100 metres of shore is prohibited. 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.
- .9 Keep an emergency spill kit for in-water use on site during construction.

1.6 DISPOSAL OF WASTES:

- .1 Do not bury rubbish and waste materials on site.
- .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.

1.7 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.
- .3 The Contractor shall revegetate soil in areas exposed by construction with vegetation species native to the area. These areas shall be revegetated as quickly as possible following construction to prevent soil erosion and establishment of noxious weeds.

1.8 VERTICAL SILT CURTAIN

- .1 Contractor to isolate the work area from the lake with an approved silt curtain to prevent the drift of sediment from 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 launch ramp 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 MEASUREMENT FOR PAYMENT

- .1 No measurement will be made under this Section.

1.2 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.

1.3 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, 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. Pay costs for retesting and reinspection.

1.4 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.

1.5 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.

1.6 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and 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.

1.7 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.

1.8 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 77 00 – CLOSEOUT PROCEDURES

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No measurement will be made under this Section.

1.2 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 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.

1.3 FINAL CLEANING

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

1.4 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

01 82 01 – WEIGH SCALES

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Weigh all stone placed in the Work and measured in tonnes at the quarry or project site on a scale approved and certified as correct. 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 included in the lump sum cost for the project.
- .2 Provide the Departmental Representative with weigh tickets at time of delivery to site.

Part 2 Products

2.1 EQUIPMENT

- .1 Provide weigh scales of sufficient capacity to weigh loaded vehicles in a single operation.
- .2 Provide scale house to enclose mass indicator and in which Contractor's representative can perform work and maintain records.
- .3 Scale house to be waterproof and have one sliding window facing scale platform. Entrance door not face scale platform.

Part 3 Execution

3.1 INSTALLATION

- .1 Provide, install and maintain scale at quarry or project site at location approved by Engineer.
- .2 Remove scale and scale house when no longer required and level approach ramps.

3.2 OPERATION

- .1 Contractor's representative will be responsible for weighing materials.

3.3 MAINTENANCE

- .1 Maintain scale platform and scale mechanism clean and free from gravel, snow, ice and debris.
- .2 Maintain approach roads in good condition free from sags and ruts.
- .3 Have scales retested and recertified if requested by Engineer.

END OF SECTION

02 41 13 – SELECTIVE SITE DEMOLITION

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Mobilization, demobilization, all materials and work required for the demolition and removal of the existing concrete anchors as specified on the drawings to be included in lump sum costs for the project.

1.2 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.

1.3 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.

3.2 REMOVAL OPERATIONS

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.

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

03 20 00 – CONCRETE REINFORCING

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 No measurement will be made under this Section.

1.2 RELATED SECTIONS

- .1 Section 03 41 02 – Precast Concrete Blocks

1.3 MEASUREMENT PROCEDURES

- .1 Include reinforcement costs in items of concrete work in Section 03 41 02 – Precast Concrete Bases.

1.4 REFERENCES

- .1 Canadian Standards Association (CSA International).
- .2 CSA-A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .3 CSA-A23.3-04, Design of Concrete Structures.
- .4 CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement, a National Standard of Canada.

Part 2 Products

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Engineer.
- .2 Reinforcing steel: billet steel, grade 350, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CAN/CSA-G30.18.
- .4 Cold-drawn annealed steel wire ties: to ASTM A497/A497M.
- .5 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.

2.2 FABRICATION

- .1 Obtain Engineer's approval for locations of reinforcement splices other than those shown on placing drawings.

Part 3 Execution

3.1 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain Engineer's approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.

END OF SECTION

03 41 02 – PRECAST CONCRETE BASES

Part 1 General

1.1 MEASUREMENT PROCEDURES

- .1 Supply and installation new concrete bases will be paid for per unit supplied and installed. Any fasteners or connection hardware require shall be considered incidental to this item.
- .2 The cost to pick up and install the navigation light shall be included in the lump sum costs for the project including any required fasteners and backing plates.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-A23.3-04, Design of Concrete Structures.
 - .3 CSA-A23.4-05, Precast Concrete - Materials and Construction.
 - .4 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001-03, Cementitious Materials for Use in Concrete.
 - .5 CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement.
 - .6 CSA-W59-03, Welded Steel Construction (Metal Arc Welding) (Metric version).

1.3 PERFORMANCE REQUIREMENTS

- .1 Length of precast elements not to vary from design length by more than plus or minus 50 mm.
- .2 Cross sectional dimensions of precast elements not to vary from design dimensions by more than plus or minus 50 mm.
- .3 Precast elements not to vary by more than plus or minus 50 mm from true overall cross sectional shape as measured by difference in diagonal dimensions.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Transport concrete base with points of support and direction of reactions approximately same as when they will be in final position in work.
- .2 Handle, store and protect concrete base in order to avoid damage to concrete.
- .3 Identify lifting points by inserting hooks during manufacture.

Part 2 Products

2.1 MATERIALS

- .1 Cement to CAN/CSA-A3001, Type GU.
- .2 Water: to CSA-A23.1/A23.2.
- .3 Reinforcing steel: to CAN/CSA-G30.18.
- .4 Hardware and miscellaneous materials: to CSA-A23.1/A23.2.
- .5 Anchors and supports: to CAN/CSA-G40.21 Type 300 W.
- .6 Welding materials: to CSA W48.
- .7 Air entrainment admixtures: to ASTM C260.

2.2 MIXES

- .1 Concrete:
 - .1 Alternative 1 - Performance Method for specifying concrete: to meet Engineer performance criteria in accordance with CAN/CSA-A23.1/A23.2.
 - .1 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-1.
 - .2 Minimum compressive strength at 28 days: 30 MPa.
 - .3 Surface texture: steel trowel finish.
 - .2 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .3 Concrete supplier's certification.

2.3 MANUFACTURED UNITS

- .1 Manufacture units in accordance with CSA-A23.4.
- .2 Provide hardware suitable for handling elements.

2.4 SOURCE QUALITY CONTROL

- .1 Upon request, provide Engineer with certified copies of quality control tests related to this project as specified in CSA-A23.4.
- .2 Upon request, provide Engineer with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.

Part 3 Execution

3.1 VERIFICATION

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria and provide verification of compliance.

END OF SECTION

05 50 00 – METAL FABRICATIONS

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Steel pipe sliders will be paid for per unit supplied and installed including any required fasteners and backing plates (Type 1 and Type 2).
- .2 Float to pipe slider connections will be paid for per unit supplied and installed including any required fasteners and backing plates.
- .3 Whitefish float to pipe slider connections will be paid for per unit supplied and installed including any required fasteners and backing plates.
- .4 Aluminum ramp to timber crib wharf connections will be paid for per unit supplied and installed including any required fasteners and backing plates.
- .5 Steel pipe masts as per drawing S-1 shall be paid for per unit supplied and installed including any required fasteners and backing plates.
- .6 Pile to float connections will be paid for per unit supplied and installed including any required fasteners and backing plates.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A307[07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 CSA International
 - .1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA S16-09, Design of Steel Structures.
 - .4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) Metric.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province having jurisdiction.

- .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 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 A307, galvanized where exposed to weather.

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Where possible, fit and shop assemble work, ready for erection.
- .3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.

2.4 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.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.

3.2 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Engineer such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to be hot dipped galvanized and /or shall be compatible with material through which they pass.
- .5 Make field connections with bolts to CSA S16.
- .6 Touch-up field welds, bolts and burnt or scratched surfaces with primer;
 - .1 Primer: maximum VOC limit 250 g/L to GS-11.
- .7 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
 - .1 Primer: maximum VOC limit 250 g/L to GS-11.

3.3 CLEANING

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste off site at regular intervals for disposal.
- .3 Do not burn waste materials on site. Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 When Work is substantially completed, remove surplus products, tools, and equipment not required to complete remaining work.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal fabrications installation.

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/m³ 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 32 19 – GEOTEXTILES

Part 1 General

1.1 MEASUREMENT AND PAYMENT

- .1 Measure geotextiles in square metres of surface covered by material. No allowance will be made for seams and overlaps.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2-[2004], Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
 - .1 No.2-M85 Methods of Testing Geosynthetics - Mass per Unit Area.
 - .2 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
 - .3 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
 - .4 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
 - .5 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.
- .2 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 1860-November 2010, Material Specification for Geotextiles.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Test and Evaluation Reports:
 - .1 If requested, submit copies of mill test data and certificate at least 4 weeks prior to start of Work.

1.4 SAMPLES

- .1 Submit to the Engineer the following samples at least 1 week prior to commencing work:
 - .1 Minimum of 1 m of roll width of geotextile

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

- .2 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect geotextiles from direct sunlight and UV rays.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIAL

- .1 Non-woven geotextiles shall be Class II and consist of a manufactured sheet, web, or batt of directionally or randomly oriented fibres, filaments, or other elements produced by bonding or interlocking the elements by mechanical, thermal, or chemical means.
- .2 Tensile strength, Marv, minimum 660 N to CAN/CGSB 148.1, Method No. 7.3.
- .3 Elongation at break, typical, >50% to CAN/CGSB 148.1, Method No. 7.3.
- .4 Tear strength, MARV, minimum, 250 N to CAN/CGSB 4.2, Method No. 12.2.
- .5 Puncture strength, MARV minimum, 1375 N to ASTM D 6241.
- .6 Permittivity, minimum, to 0.05 CAN/CGSB 148.1, Method No. 4 s⁻¹.
- .7 Ultraviolet stability, minimum, 50% retained tensile strength at 500 hours to ASTM D 4355.

Part 3 Execution

3.1 EXAMINATION

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

3.2 INSTALLATION

- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with securing pins and washers.
- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Overlap each successive strip of geotextile 600 mm over previously laid strip.

- .4 Pin successive strips of geotextile with securing pins at 2000 mm interval at midpoint of lap as indicated.
- .5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .6 After installation, cover with overlying layer within 4 hours of placement.
- .7 Replace damaged or deteriorated geotextile to approval of Engineer.
- .8 Place and compact soil layers in accordance with relevant specification sections.

3.3 CLEANING

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

3.4 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

31 53 13 – TIMBER CRIBWORK

Part 1 General

1.1 MEASUREMENT PROCEDURES

- .1 Excavation for installation of timber cribs to be considered incidental to supply and installation of square sawn timber.
- .2 Treated decking will be paid for by the square metre of decking supplied, installed and remaining in the work. This item includes all fastenings.
- .3 Treated square sawn timber to be measured in cubic metres of timber supplied, installed and remaining in the work, including all fastenings. This item to include curb, stringers, cribwork timbers and all timber material required for the construction of the new wharf. This item includes all fastenings.
- .4 Ballast rock will be paid for by the cubic metre supplied, installed and remaining in the work.
- .5 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.
- .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. Ballast stone supplied to be well graded with maximum size not exceeding 250 mm and minimum size to be not less than 200 mm. Appropriately sized clean ballast rock from the existing wharf may be used for ballast rock.

Part 3 Execution

3.1 PREPARATION

- .1 Place and level crushed rock mattress as indicated.
- .2 Before construction, stockpile sufficient ballast to completely fill cribs.
- .3 Take closely spaced accurate soundings, precisely located by template, to surface of mattress, to determine actual configuration of base area of crib.
 - .1 Construct crib bottom to match base configuration.

3.2 DECKING 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 240 mm and not more than 310 mm wide. Deck planks to cross width of wharf in one length except where indicated on Drawing P-1.
- .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.

3.3 CRIB CONSTRUCTION

- .1 All longitudinal and cross timbers shall be of sufficient length to span crib in one length or as noted on drawing. Longitudinals 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 406 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 .7 Salvage and reinstall existing mooring bollards and steel safety ladders in locations designated by Engineer.

3.4 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.

3.5 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.

3.6 TOLERANCES

- .1 1 in 300 in overall dimensions.

3.7 CLEANING

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

END OF SECTION

31 61 13 – PILE FOUNDATIONS, GENERAL REQUIREMENTS

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Supply of 168 mm diameter, schedule 40 steel pipe piles will be measured in lineal metres delivered to site. Length of steel piles to be as shown on plan.
- .2 Installation of 168 mm diameter, schedule 40 steel pipe piles to be measured in lineal metres of pile installed and incorporated into the work. This item includes installing top plates, bottom plates and bottom tips for piles as well as the sand fill. Cost to prepare ice to support pile driving equipment shall be included in this item.

1.2 DELIVERY, STORAGE AND HANDLING

- .1 Protect piles from damage due to excessive bending stresses, impact, abrasion or other causes during delivery, storage and handling.
- .2 Replace damaged piles as directed by Engineer.

1.3 EXISTING CONDITIONS

- .1 Notify Engineer in writing if subsurface conditions at site differ from those indicated and await further instructions from Engineer.

1.4 SCHEDULING

- .1 Drive piles in what is considered to be the most economical sequence.
- .2 Provide schedule of planned sequence of driving to Engineer for review, not less than two weeks prior to commencement of pile driving.

1.5 PROTECTION

- .1 Protect public and construction personnel, adjacent structures and work of other sections from hazards attributable to pile driving operations.

Part 2 Products

2.1 MATERIALS

- .1 Supply full length piles as indicated and provide equipment to handle full length piles without cutting and splicing.
- .2 Pile lengths indicated on plans are based on lengths estimated to remain in completed structure.
- .3 Do not splice piles without written permission of Engineer.

2.2 EQUIPMENT

- .1 Equipment information: prior to commencement of pile installation operation, submit to Engineer for approval, details of equipment for installation of piles. For impact hammers give manufacturer's name, type, rated energy per blow at normal working rate, mass of striking pars of hammer, and mass of driving cap. For non-impact methods of installation such as auguring, jacking, vibratory hammers or other means, give full details of characteristics necessary to evaluate performance.
- .2 Hammer:
 - .1 Hammers to be selected on basis of driveability analysis using wave equation theory, performed to show that piles can be driven to levels indicated.
 - .2 Driveability analysis to include, but not be limited to, following: hammer, cushion, and cap block details; static soil parameters; quake and damping factors, total soil resistance, blow count, pile stresses and energy throughput at representative penetrations.
 - .3 When required criteria can not be achieved with the proposed hammer, use larger hammer and take other measures as required.

Part 3 Execution

3.1 PREPARATION

- .1 Protection:
 - .1 Piles to be driven from ice surface, existing structures may not be used as a platform and contractor to prepare ice to support pile driving equipment.
 - .2 Protect adjacent structures, services and work of other sections from hazards due to pile driving operations.
 - .3 Arrange sequencing of pile driving operations and methods to avoid damages to adjacent existing structures.
 - .4 When damages occur, remedy damaged items to restore to original or better condition at own expense.
- .2 Ensure that ground conditions at pile locations are adequate to support pile driving operation and load testing operation.
 - .1 Make provision for access and support of piling equipment during performance of Work.

3.2 INSTALLATION

- .1 Leads: construct pile driver leads to provide free movement of hammer.
 - .1 Hold leads in position at top and bottom, with guys, stiff braces, or other means reviewed by Engineer to ensure support to pile while being driven.
 - .2 Length: except for piles driven through water, provide sufficient length of leads to ensure that use of follower is unnecessary.
- .2 Followers:

- .1 Provide followers of such size, shape, length and mass to permit driving pile in desired location to required depth and resistance.

3.3 APPLICATION / DRIVING

- .1 Hold piles securely and accurately in position while driving.
- .2 Deliver hammer blows along axis of pile.
- .3 Cut-off piles neatly and squarely at elevations indicated. Provide sufficient length above cut-off elevation so that part damaged during driving is cut-off.
- .4 Remove cut-off lengths from site on completion of work.

3.4 OBSTRUCTIONS

- .1 Where obstruction is encountered that causes sudden unexpected change in penetration resistance or deviation from specified tolerances, proceed as directed by Engineer.

3.5 REPAIR AND RESTORATION

- .1 Remove rejected pile and replace with new, and if necessary, longer pile.
- .2 No extra compensation will be made for removing and replacing or other work made necessary through rejection of defective piles.
- .3 Engineer will reject any pile that is driving out of position, is driven below cut-off elevation, or is damaged during driving or handling.

END OF SECTION

35 31 24 – RUBBLE MOUND BREAKWATER

Part 1 General

1.1 MEASUREMENT PROCEDURES

- .1 Removal and re-use of existing breakwater material to be included in lump sum costs for the project.
- .2 Measure core stone in tonnes of material supplied and installed.
- .3 Measure armour stone in tonnes of material supplied and installed.
- .4 Maintenance of haul roads to be incidental to this work.
- .5 Contractor to make own arrangements with Provincial authorities, municipalities and owners of private properties, for the quarrying and transportation of rock materials and machinery for work over their property, roads or streets.

1.2 SOURCE SAMPLING

- .1 Inform Engineer of proposed source of materials and provide access for sampling at least 1 week prior to commencing work.

Part 2 Products

2.1 MATERIALS

- .1 Rock materials:
 - .1 Contractor to provide all materials.
 - .2 Armour stone:
 - .1 Greatest dimension of each stone not to exceed two times least dimension.
 - .2 Stone sizes to be in range of 600mm to 1000mm. Armour stone to be fractured and angular. Field stone not acceptable.
 - .3 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 stone shall be durable, blasted limestone or granite. Slate and shale not acceptable.
 - .3 Core stone:
 - .1 Quarry run core: percent by mass passing 12.5mm sieve not to exceed 10. Maximum size to be 300mm.
 - .2 Material to be free of roots and other deleterious material.

Part 3 Execution

3.1 ARMOUR STONE

- .1 Place armour stone to lines, grades and dimensions as indicated.
- .2 Place armour stone in thickness courses to total layer thickness as shown on the drawing.
- .3 Place each armour stone in stable position.
- .4 Remove ice from sides of breakwater prior to installing armour stone.

3.2 TOLERANCES

- .1 Completed component layers to be within following tolerances of lines and grades as indicated:
 - .1 Armour: plus or minus 200 mm.
 - .2 Core: plus or minus 100mm.

3.3 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 Contractor to be responsible for obtaining approval from applicable agencies for using access roads to site. Contractor is not to use existing launch ramp as a haul road.
- .3 Contractor to repair any damage caused to roads or property as a result of hauling operations.

END OF SECTION

35 59 11 – TIMBER FLOAT WHARVES

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

- .1 Supply and install of timber float wharves to be measured by as indicated on the Unit Price Table.
- .2 Cost to deliver three float wharves to Selkirk, MB shall be included in the lump sum cost for the project.
- .3 Connections between float wharves, fastenings, hardware and bollards shall not be measured separately for payment, but considered incidental to the work.
- .4 Re-installation of existing timber float wharves and aluminum ramp to be included in lump sum costs for the project.

Part 2 Products

2.1 MATERIALS

- .1 Lumber and timber: except as otherwise specified, use lumber and timber graded and stamped in accordance with applicable grading rules and standards of associations or agencies approved to grade lumber by Canadian Lumber Standards Administration Board of CSA.
 - .1 Species: Douglas Fir Group 1b.
 - .2 Grade: structural or better
 - .3 Grading authority: BCLMA
 - .4 All timber to be S4S.
 - .5 Galvanized bolts and nuts: to ASTM A307-07b.
 - .6 Countersunk head bolts to CSA B34-67(R1972).
 - .7 Washers: pressed steel.
 - .8 Galvanized spikes and nails: spiral type to CSA B111-1974(R2003).
 - .9 Hot-dip galvanized, stainless steel, silicone, bronze or copper wood screws and fasteners: to ASTM Standards: ASTM-A153 (for hot-dip fastener products), and ASTM-A653 (coating designation G-185 for hot-dip connector and sheet products) and Type 305 and 316 for stainless steel.
 - .10 Plastic bushings: ultra high molecular weight polyethylene (UHMWPE), density 0.94, black.
 - .11 Shapes, plates: fabricated from steel conforming to CAN/CSA-G40.20-04 and CAN/CSA-G40.20-04, Grade 300W.
 - .12 Primer: CAN\CGSB-1.40-M80 primer, structural steel, oil alkyd type.
 - .13 Preservative:

- .1 Pressure Treatment: all specified treated timber and planks to be pressure treated with CCA or ASA preservative salts to 0.64 g/cu. cm. (0.40 lbs/cu. ft.) retention.
- .14 Machine bolts used are to be of sufficient length to accept two washers and one fully threaded hexagonal headed nut.
- .15 Mooring Cleats: galvanized grey iron ship or dock cleat (two hole type) indicated on drawings.
- .16 Bollards: fabricated from steel conforming to CAN/CSA-G40.20-04 and CAN/CSA-G40.20-04, Grade 300W.
- .17 Floatation units:
 - .1 Dimensions/Capacity:
 - .1 Floatation units for 4.276m x 7.925m whitefish float wharves shall be of size 1219mm x 1829mm x 610 mm deep with a buoyancy of approximately 1225 kg each.
 - .2 Alternate floatation units shall be used only with written approval of engineer.
 - .2 Materials:
 - .1 One piece, seamless rotational moulded outer shell.
 - .2 Manufactured from linear polyethylene resin with UV inhibitors and carbon black pigment.
 - .3 Nominal shell thickness minimum 3.8 mm.
 - .4 Heavy duty, reinforced moulded in mounting slots.
 - .5 Built in vent.
 - .6 Foam filled to 1.0-1.5 lbs/ft³
 - .3 Warranty:
 - .1 Manufacturer to warrant floats for a period of ten (10) years from date of purchase against cracking, peeling, sloughing and ultraviolet deterioration. Floatation units shall retain their resiliency against being frozen in or other abrasions from normal usage.
 - .2 Contractor will submit to engineer manufacturer's documentation indicating date of purchase.
 - .3 Alternate floatation units meeting or exceeding the above specification may be used only upon written approval of the engineer.

Part 3 Execution

3.1 CONSTRUCTION

- .1 Construct timber floats as indicated on drawings.
- .2 Build work square, true, straight and accurate to the required size, with all joints closely fitted and properly secured.
- .3 Except where specified, use of shims, wedges, or short pieces of timber not permitted.

- .4 Drill holes for bolts the same size as bolt diameter.
- .5 Lay deck planks, stringers and headers in one piece.
- .6 Project all bolts at least 6 mm beyond nut.
- .7 Place a washer under the head of each bolt and under nuts in contact with wood.
- .8 Connect floatation units with lag bolts c/w rubber and stainless steel washer as indicated on drawings.
- .9 Install stringers as designated.
- .10 Decking: Screw planks to each stringer contact with two (2) wood screws to a minimum penetration of 50 mm. Holes in decking are to be pre-drilled. Drill all screws 2 mm below deck surface. Space planks maximum 10 mm apart.
- .11 Curbing: If specified on drawings, nail timber curb along edges of deck with spiral nails at 600 mm centers. Chamfer exposed sides of curb 12 mm along upper edges. Curbing in minimum lengths of 4 m. Nail riser blocks to deck with 2 spiral spikes.
- .12 Fabricate and install all connection hardware as indicated.
- .13 Paint all float connectors, shapes and plates with one coat of primer prior to installation.

END OF SECTION