

Harbour Improvements**Shag Harbour, Shelburne County, NS****R.118063.001**

Aggregates General

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PART 1 - GENERAL

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|-----|-------------------------|----|---|
| 1.1 | Related Work | .1 | Refer to other Specification Sections for related information. |
| | | .2 | Refer to Section 01 33 00 for Shop Drawing/Submission requirements. |
| 1.2 | Source Approval | .1 | Source of materials to be incorporated into work or stockpiled requires acceptance. |
| | | .2 | Inform <i>Departmental Representative</i> of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production. |
| | | .3 | If, in opinion of <i>Departmental Representative</i> , materials from the proposed source do not meet, or cannot reasonably be processed to meet specified requirements, procure an alternative source to demonstrate that materials from source in question can be processed to meet specified requirements. |
| | | .4 | Should a change of material source be proposed during work, advise <i>Departmental Representative</i> 4 weeks in advance of proposed change to allow sampling and testing. |
| | | .5 | Acceptance of material at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory. |
| 1.3 | Production Sampling | .1 | Aggregate will be subject to continual sampling during production. |
| | | .2 | Provide <i>Departmental Representative</i> with ready access to source and processed material for sampling and testing. |
| 1.4 | Measurement for Payment | .1 | This item will not be measured separately. |

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PART 2 - PRODUCTS

2.1 Materials

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.
- .2 Flat and elongated particles are those whose greatest dimension exceeds four times their least dimension.
- .3 Fine aggregates satisfying requirements of applicable section shall be one, or a blend of following:
 - .1 Natural sand
 - .2 Manufactured sand
 - .3 Screening produced in crushing of quarried rock, boulders, gravel or slag
- .4 Coarse aggregates satisfying requirements of applicable section shall be one of following:
 - .1 Crushed rock or slag
 - .2 Gravel and crushed gravel composed of naturally formed particles of stone.

PART 3 - EXECUTION

3.1 Development of
Aggregate Source

- .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by the *Departmental Representative*.
- .2 Clear, grub and strip an area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
- .3 When operating in stratified deposits use excavation equipment and methods that will produce a uniform, homogeneous aggregate.

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| | .4 | When excavation is completed, provide drains or ditches as required to prevent surface standing water. |
| | .5 | Trim off and dress slopes of waste material piles and leave site in a neat condition. |
| | .6 | Provide silt fence or other means to prevent contamination of existing watercourse or natural wetland features. |
| 3.2 Processing | .1 | Process aggregate uniformly using methods that prevent contamination, segregation and degradation. |
| | .2 | Blend aggregate if required to obtain gradation requirements specified. Use approved methods and equipment. |
| | .3 | Blending to increase percentage of crushed particles or decrease percentage of flat and elongated particles is permitted. |
| | .4 | When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation. |
| | .5 | Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements. |
| | .6 | Use only equipment approved in writing by Departmental Representative. |
| 3.3 Handling | .1 | Handle and transport aggregates to avoid segregation, contamination and degradation. |
| 3.4 Stockpiling | .1 | Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment. |
| | .2 | To ensure that no material other than stockpiled aggregate is used, do not |

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- incorporate bottom 300 mm of stockpile into work, if aggregates are stockpiled on ground.
- .3 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
- .4 Reject intermixed or contaminated materials. Remove and dispose of rejected materials as directed within 48 hours of rejection.
- .5 Stockpile materials in uniform layers of thickness as follows:
- .1 Max 1 m for coarse aggregate and base course materials.
- .2 Max 2 m for fine aggregate and subbase materials.
- .3 Max 1.5 m for other materials.
- .6 Complete each layer over entire stockpile area before beginning next layer.
- .7 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .8 Coning of piles or spilling of material over edges of pile will not be permitted.
- .9 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

END OF SECTION

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Pile Driving Templates

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PART 1 - GENERAL

- 1.1 Related Work
- .1 Refer to other Specifications Sections for related information.
 - .2 Refer to Section 01 33 00 for Shop Drawing/Submissions requirements.
 - .3 Section 31 61 13 - Pile Foundations General
 - .4 Section 31 62 18 - Steel H-Piles
 - .5 Section 31 62 19 - Timber Fender Piles
- 1.2 Reference Standards
- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM F3125-19, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 50 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.
 - .2 Canadian Standards Association (CSA International)
 - .1 CSA-G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.
 - .2 CSA-S16.1-14, Design of Steel Structures.
 - .4 CSA W47.1-09 (R2014), Certification of Companies for Fusion Welding of Steel.
 - .5 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding.
 - .6 CSA W59-18 (or latest edition), Welded Steel Construction (Metal Arc Welding).
- 1.3 Shop Drawings
- .1 Submit shop drawings in accordance with Section 01 33 00 - Submissions/Shop Drawings.
 - .2 Submit shop drawing for pile driving templates to Departmental Representative for review at least 2 weeks prior to fender pile installation.

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| | .2 | Indicate the following items: |
| | .1 | Material |
| | .2 | Anchorage, field control and alignment methods |
| | .3 | Design parameters |
| | .4 | Tolerance for driving pile |
| | .5 | Removable members |
| | .6 | Alternatives |
| 1.4 | Design Criteria | .1 Design templates to safely withstand following loads: |
| | | .1 All gravity loads to which template shall be subjected. |
| | | .2 Lateral loads to firmly hold pile in position when driving. |
| | | .3 All environmental and live loads that may be applied during pile driving activities. |
| 1.5 | Protection | .1 Protect templates from damage. Repair damage to templates, formwork or concrete arising from operations to satisfaction of <i>Departmental Representative</i> at no extra cost. |
| 1.6 | Measurement for Payment | .1 No measurement will be made under this section. Include costs in items of work that require templates. |

PART 2 - PRODUCTS

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| 2.1 | Materials | .1 Steel sections and plates: to CAN/CSA-G40.20 and CAN/CSA-G40.21, Type 300 W (minimum). |
| | | .2 Welding Materials: to CSA W59. |
| | | .3 Bolts, nuts and washers: to ASTM A307 or ASTM F3125/F3125M. |

PART 3 - EXECUTION

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| 3.1 | Fabrication | .1 Fabricate structural steel for templates in accordance with CAN/CSA-S16.1 and reviewed shop drawings. |
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| | .2 | Welding in accordance with CSA W59. |
| | .3 | Welding companies shall be qualified under provisions of CSA W47.1. |
| 3.2 Positioning and Installation | .1 | Position and hold template in location to receive piles with an accuracy which will ensure piles are within tolerances specified. |
| | .2 | Before driving piles set templates to within 10mm of elevations indicated on shop drawings. |
| | .3 | Remove members in templates as necessary to place piles. Replace members prior to placing other piles or driving of piles. Indicate members to be removed for this operation on shop drawings. Mark them "Removable". |
| 3.3 Removal of Templates | .1 | Avoid any damage to piling when removing templates. |
| | .2 | When instructed by <i>Departmental Representative</i> move templates from project site. |

END OF SECTION

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Sitework, Demolition and Removals

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PART 1 - GENERAL

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| 1.1 Description of Work | This Section includes but is not limited to the following: <ul style="list-style-type: none">.1 All normal removals as required to complete the work, including but not limited to:<ul style="list-style-type: none">.1 The partial removal of the existing steel sheet piling..2 The removal of all existing steel sheet piling fastening hardware including steel angles and brackets..3 Removal of existing fenders and ladders..4 Demolition and removal of existing deteriorated sections of reinforced concrete guard..2 All items to be verified by a site visit prior to submission of a tender. All available plans of the existing structure are available for viewing upon request to the Departmental Representative..3 All derricks, fuel lines, or buildings to be removed by others unless otherwise indicated. |
| 1.2 Site Information | <ul style="list-style-type: none">.1 Results of prior soundings, soil borings and geotechnical investigations may be available for inspection by contacting the Departmental Representative..2 Results of most recent soundings, geotechnical, and surveys are included with the drawings. This data is made available for tendering purposes only. It should be noted that this information may differ from present site conditions..3 The Contractor will be responsible for making their own interpretation of soil conditions at any location, other than borehole locations. Borehole descriptions shown on the logs are only descriptive of conditions at locations described by boreholes themselves. |

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|--------------------|-------------------------|----|---|
| 1.2 | Related Work | .1 | Refer to other specification sections for related information. |
| | | .2 | Refer to Section 01 33 00 for Shop Drawing/Submission requirements. |
| 1.3 | Submissions | .1 | Methodology:
.1 When requested provide methodology for carrying out the work |
| | | .2 | Provide submission in accordance with Section 01 33 00 . |
| 1.4 | Protection | .1 | Prevent movement, settlement or damage of adjacent structures. Provided bracing and shoring as required. In event of damage, immediately replace such items or make repairs to approval of <i>Departmental Representative</i> and at no additional cost to <i>Departmental Representative</i> . |
| | | .2 | Prevent debris from going adrift and becoming a menace to navigation. |
| | | .3 | All damage to existing structures, roadways, pipelines, electrical systems not specified for removal to be repaired at the Contractor's cost to the satisfaction of the <i>Departmental Representative</i> . |
| 1.5 | Measurement for Payment | .1 | Site work, demolition and removals will be measured in accordance with Section 01 29 00 . |
| PART 2 - PRODUCTS | | .1 | Not applicable. |
| PART 3 - EXECUTION | | | |
| 3.1 | Preparation | .1 | Inspect site and verify with <i>Departmental Representative</i> items designated for removal and items to be preserved. |

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- .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
 - .3 Provide temporary power and lighting as shown on the plan or as required by the *Departmental Representative*.
 - .4 Existing fill and vent pipes, oil waste tanks, above ground propane tanks, and underground storage tanks to be protected from any damages. All repairs to damages as a result of Contractor's operations to be at his cost and to the satisfaction of the *Departmental Representative*.
- 3.2 Removal
- .1 Remove items indicated.
 - .2 Do not disturb adjacent structures designated to remain in place. The contractor must exercise caution during removals adjacent to the existing wharf and breakwater structures.
 - .3 At end of each day's work, leave work in safe condition so no part is in danger of toppling or falling.
 - .4 Remove deteriorated sections of concrete guard as detailed on the drawings.
 - .1 Neatly saw-cut removal limits. Do not damage reinforcing steel in the existing guard.
- 3.3 Disposal of Material
- .1 Disposal of materials not designated for salvage or re-use in work, will be the contractor's responsibility, and must be disposed of off-site.
 - .2 The material to be disposed is to be transported and disposed of in an environmentally acceptable manner to the satisfaction of the *Departmental Representative*, and in accordance with any local, Municipal, Provincial and Federal restrictions and regulations.

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- 3.4 Restoration
- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.
 - .2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work. Match condition of adjacent, undisturbed areas.

END OF SECTION

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Pile Foundations General

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PART 1 - GENERAL

- 1.1 Related Work
 - .1 Section 31 09 18 - Pile Driving Templates
 - .2 Section 31 62 19 - Timber Fender Piles
- 1.2 Submissions
 - .1 Methodology:
 - .1 Provide methodology including type of pile driving equipment to carry out the work.
 - .2 Submit methodology to Departmental Representative minimum 2 weeks prior to pile installation.
 - .3 Include methodology to ensure that pile is installed within alignment tolerances indicated.
 - .2 Provide submissions in accordance with Section 01 33 00.
- 1.3 Existing Sub-Surface Conditions
 - .1 Limited sub-surface investigation reports may be available for inspection.
 - .2 Notify the Departmental Representative immediately if sub-surface conditions at site differ from those indicated.
 - .3 Design is based on subsurface information inferred from the surrounding site records. Pile installation details are based on this information. Installation must be reviewed by the Departmental Representative to confirm design assumptions and final acceptance criteria. Coordinate all work to facilitate the Departmental Representative's observations and review.
- 1.4 Protection
 - .1 Protect public and construction personnel, adjacent structures and work of other sections from hazards attributes to pile driving operations or any other operations.
 - .2 The contractor shall provide loading information to the Departmental Representative for review on any

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- construction equipment they intend to deploy on the wharf at least two weeks before deployment.
- .3 Contractor to submit construction methodology and provide a stamped letter from a Professional Engineer registered in the Province of Work confirming the proposed construction equipment and methodology is within current capacity of all structures that will be loaded by such equipment.
- .4 Tracked equipment, if approved by the Departmental Representative, will not be permitted on existing structures without two layers of rubber mat or a layer of 150 mm thick timber runners.
- .5 The site shall be protected from damages caused by leakage/spillage of oils and lubricants from equipment.
- 1.5 Scheduling of Work .1 Submit schedule of planned sequence of driving to Departmental Representative for review, not less than 2 weeks prior to start of pile driving.
- 1.6 Delivery, Storage And Handling .1 Protect piles from damage due to excessive bending stresses, impact, abrasion, or other damages due to storage and handling.
- .2 Replace damaged piles to satisfaction of the Departmental Representative.
- 1.7 Inspection of Work .1 All piles to be inspected and accepted by Departmental Representative prior to being incorporated in the work.
- .2 Pile Installation procedures are to be coordinated with the Departmental Representative minimum two (2) weeks prior to the pile installation. The method of advancing pile to specified tip elevation must be reviewed and approved by the

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Pile Foundations General

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Departmental Representative prior to starting work.

- .2 The Departmental Representative will review Work during the advancement of piles. Contractor to provide access and assistance as required to facilitate the review. Pile tip elevation and driving records must be reviewed and accepted by the Departmental Representative.

PART 2 - PRODUCTS

2.1 Materials

- .1 Supply full length piles as indicated in accordance with Section 31 62 19 - Timber Piles.
- .2 Provide equipment of sufficient capacity to handle full length piles without cutting and splicing.
- .3 Pile lengths indicated are based on lengths estimated to remain in completed structure.
- .4 Splicing of piles will not be permitted.

PART 3 - EXECUTION

3.1 Equipment Requirements

- .1 Equipment information:
- .1 Prior to commencement of pile installation operation, submit to Departmental Representative for review, 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 parts of hammer and mass of driving cap.
- .2 Hammer(s) for installation of Piles.
- .1 Supply a hammer of suitable size to advance the piles to specified tip elevation without pile damage. The hammer selected must be sufficient energy so as not to damage the piles. Acceptance of the hammer chosen by the

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Contractor will be on confirmation of reaching required pile tip elevation, as determined by the Departmental Representative.

- .2 When required penetration is not obtained by use of hammers complying with minimum requirements, either provide larger hammer or take other measures, acceptable to Departmental representative. Drop hammers are permitted. All piles damaged due to over driving to be replaced at the Contractor's cost. Reinforce pile tip and head as required to resist driving loads.

- .3 Hammer - Timber Piles

- .1 Hammers to weigh between 817 - 1,000 kg and be capable of developing a blow at normal speed of 20,340 joules.

- .3 Leads:

- .1 Construct pile driver leads to provide free movement of hammer. Hold leads in position at top and bottom, with guys, stiff braces, or other means approved by Departmental Representative, to ensure support to pile while being driven.

- .4 Followers:

- .1 When permitted, provide followers of such size, shape, length and mass to permit driving pile in desired location to required depth and resistance. Provide followers with socket or hood carefully fitted to top of pile to minimize loss of energy and prevent damage to pile.

3.2 Preparation

- .1 Ensure that conditions at pile locations are adequate to support pile driving operation. Make provision for access and support of piling equipment during performance of work.
- .2 Protect pile heads during driving and hold in position by using a combination cushion-driving head and pilot. Closely fit driving

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heads to top of pile, and extend down sides of pile for at least 75 mm. Where necessary protect pile heads by means of heavy steel straps of wrought iron rings.

- .3 Shape bottom of timber piles so that shoe will have full bearing on pile prior to driving. Install fabricated steel pile shoes using spikes.

3.3 Field Measurement
And Record Keeping

- .1 Maintain accurate records of driving for each pile, including:
- .1 Pile identification and location
 - .2 Deviations from design location
 - .3 Cross section shape and dimensions
 - .4 Original Length
 - .5 Harbour bottom, final tip, and cut off elevations (referenced to datum)
 - .6 Type and make of hammer, stroke or related energy.
 - .7 Other driving equipment including water jet, driving cap, cushion.
 - .8 Sequence of driving piles.
 - .9 Number of blows per 1000mm for entire length of pile and number of blows per 25 mm for last 300mm.
 - .10 Other pertinent information such as interruption of continuous driving, pile damage.
 - .11 Record elevation taken on adjacent piles during driving of each pile.
- .2 Provide Departmental Representative with three copies of records.

3.4 Installation

- .1 The Piles are to be installed true and on the batter indicated on the drawings, both at the harbour bottom and top cut-off. Provide driving templates to ensure alignment at the base the top and at the harbour bottom.
- .2 Hold piles securely and accurately in position while driving.
- .3 Deliver hammer blows in direct axis of pile.

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- .2 Use steel driving shoes to protect pile toes during driving to the approval of the Departmental Representative.
 - .4 Use driving caps to protect piles. Reinforce pile heads if necessary. Piles with damaged heads, as determined by the Departmental Representative, will be rejected. Reinforce pile heads if necessary.
 - .5 Do not drive piles within a radius of 8 m of concrete which has been in place less than 3 days.
 - .6 Re-drive piles lifted during driving of adjacent piles.
 - .7 Use of water jets will not be permitted.
 - .8 Cut off piles neatly and squarely at elevations indicated, to slope or profile as indicated. Provide sufficient length above cut-off elevation so that part damaged during driving is cut off.
 - .9 Remove cut-off lengths from site on completion of work.
 - .8 Installation of each pile will be subject to acceptance by Departmental Representative. Departmental Representative will be sole judge of acceptability of each pile with respect to final driving resistance and depth of penetration. Departmental Representative to accept final driving of all piles prior to removal of pile driving rig from site.
 - .9 Drive each Timber Fender Pile to a minimum penetration of tip elevation below harbour bottom as shown on the drawings, or to driving resistance, as determined by the Departmental Representative.
 - .10 Ensure no damage to the adjacent wharf structure during installation of pile work.

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3.5 Installation

Tolerances

- .1 Timber Fender Piles to be driven to achieve the following:
 - .1 Pile heads to be within 50 mm of locations indicated.
 - .2 Piles not to be more than 1% of length out of alignment.
 - .3 Close Faced piles to be driven in a manner that minimizes the gap between the piles.

3.6 Obstructions

- .1 Where obstruction is encountered that causes sudden and unexpected change in penetration resistance or deviation from specified tolerances, advise Department Representative and submit for their review the Contractor's proposed method(s) for achieving specified penetrations and tolerances. Incorporate review comments in the proposed method(s) and proceed with the work.

3.7 Damaged or

Defective Piles

- .1 Remove rejected pile and replace with a new.
- .2 No extra compensation will be made for removing and replacing or other work made necessary through rejection of a defective pile.

END OF SECTION

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Timber Piles

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PART 1 - GENERAL

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| 1.1 | Related Work | .1 | Refer to other Specification Sections for related information. |
| 1.2 | Reference Standards | .1 | CAN/CSA-080 Series 15- Wood Preservation. |
| | | .2 | NLGA standard grading rules for Canadian Lumber 1980 edition or most recent edition at time of tendering. |
| | | .3 | ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products. |
| | | .4 | ASTM A307-14, Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength. |
| | | .5 | ASTM B111-1974 (or latest edition), Wire Nails, Spikes and Staples. |
| | | .6 | CSA O56-10 (R2015), Round Wood Piles. |
| | | .7 | CSA G40.21-13, Structural Quality Steel. |
| | | .8 | CSA W59-18, Welded Steel Construction. |
| 1.3 | Measurement Procedures | .1 | Supply and installation of Timber Fender Piles will be measured in accordance with Section 01 29 00. |
| | | .2 | Mobilization of equipment will be considered to the installation of pile. |
| | | .3 | All methods employed to advance pile to designated tip elevation and refusal criteria within the alignment tolerances given will be considered incidental to the installation of the pile. |

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Timber Piles

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| 1.4 Submissions | .1 | At least two weeks prior to finalizing timber order, submit a schedule of pile lengths for review. |
| | .2 | Submit methodology for field treatment. |
| | .3 | Submit methodology for installation of Timber piles, including: |
| | .1 | Provide methodology including type of pile driving equipment to carry out the work. |
| | .2 | Submit methodology to Departmental Representative minimum 2 weeks prior to fender pile installation. |
| | .3 | Include methodology to ensure that pile tip is located in proper alignment and to specified tolerances. |
| | .3 | Provide submissions in accordance with Section 01 33 00. |
| 1.5 Protection | .1 | Avoid dropping, bruising or breaking of wood fibres. Protect piles from damage due to excessive bending stresses, impact, abrasion, or other damages due to storage and handling. |
| | .2 | Avoid breaking surfaces of treated piles. |
| | .3 | Replace damaged piles to satisfaction of the Departmental Representative. |
| | .4 | Do not damage surfaces of treated piles below cut-off elevation by boring holes or driving nails or spikes into them to support temporary material or staging. Support staging in rope slings carried over tops of piles or by attaching to pile clamps of approved design. |
| | .5 | Treat cuts, breaks or abrasions on surfaces of treated piles, bolt holes and field cuts in accordance with CAN/CSA-080 using field applied preservative. |

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Timber Piles

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2.1 Materials

.1 Timber Piles:

- .1 Red pine to CAN3-056, with minimum butt size of 300 mm and tip diameter in accordance with Table A-1. Order length to suit conditions indicated. Departmental Representative shall be sole judge as to quality and dimension of piles or equal to CAN3-056.
- .2 Supply full length piles and provide equipment of sufficient capacity to handle full length piles without cutting or splicing. Splicing of piles will not be permitted.

.2 Timber Pile Treatment:

- .1 Preservative treatment to CAN/CSA-080 Series for Marine Construction Coastal Waters. Where assay retentions are not indicated, they are to be taken as 1.5 times the indicated gauge retention. Creosote preservative will not be permitted for fender piles.
- .2 Make arrangements for timber testing by:
 - .1 Plant Inspection: Provide treatment plant identification, date of treatment, list of various pieces in the charge, charge number, plant assay testing results, concentration and type of preservative used, duration of treatment, gauge retention, species of wood; and make arrangements with the treatment plant to locate bundles, move bundles, break open bundles and carry out other measures to facilitate the inspection.
 - .2 Filling in and submitting a pre-printed form, agreed to by the *Departmental Representative*, containing the above information.
- .3 The *Departmental Representative* may test in the plant or in the field or may choose to not test some charges at either the plant or the field.

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Timber Piles

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- .4 Timber will be protected during handling, shipping, offloading and field handling, by use of suitable equipment and procedures. Use rope or fabric strap slings on site for moving bundles or individual timbers, rather than metal grabs, chains or cables.
- .5 Field treatment: Same as pile preservative.
- .3 Miscellaneous Hardware: Hardware must meet the following specifications:
 - .1 Machine bolts, drift bolts, nuts, round plate washers: to ASTM A307
 - .2 Spikes: to CSA B111
 - .3 Pile shoes: fabricated from steel plate minimum 6 mm thickness to details shown on drawings. Steel plate to CSA-G40.21, Grade 300W. Welding to CSA W59. No galvanizing required.
 - .4 Hot dip galvanize bolts, nuts, washers and spikes to ASTM A123 or CSA G164 with minimum zinc coating of 705 g/m².
 - .5 All hardware galvanized unless otherwise shown on plans or specified.

PART 3 - EXECUTION**3.1 Handling****Treated Timber**

- .1 Handle treated material to avoid damage causing alteration in original treatment. Timber will be protected during handling, shipping, offloading and field handling, by use of suitable equipment and procedures. Use rope or fabric strap slings on site for moving bundles or individual timbers, rather than metal grabs, chains or cables.
- .2 Treat in field, spike holes, boreholes, plugged holes, cuts and any damage to treated material, using preservative, as specified herein, regardless of plant treatment type.
- .3 Treat boreholes, using a pressurized container with an extension rod, to produce a fine spray in the holes with one application. Alternately a cylindrical brush may be used.

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Timber Piles

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- .4 Treat field cuts and any abrasions with minimum of two liberal applications, using either spray or brush.
 - .5 In addition, field cuts and underwater damaged areas will receive a coating of plastic compound, capped with lead flashing secured with galvanized roofing nails. Plastic compound not to be water soluble and is subject to approval.
 - .6 Environmental Concern: Ensure no spillage or excess application of field preservative. Provide workmen with sufficient training and protective gear to properly and safely handle the treated materials and to apply field treatment, so as to prevent undue hazard to themselves, others, or the environment.
 - .7 Contain all debris and leachates (films on water surface) within the area of the work by using containment facilities such as floating booms or screens.

3.5 Installation

- .1 Install Timber Fender Piles in accordance with Section 31 61 13 - Pile Foundations General.

END OF SECTION