

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Section 01 35 43 - Environmental Procedures.

1.2 MEASUREMENT PROCEDURES

- .1 Excavation is measured on a hourly basis, A quotation shall be requested under item 35 00 01, Miscellaneous Wharf Repairs.
- .2 Backfilling: All backfilling materials such as base, sub-base, and all rip-rap will be paid under this item and measured by the metric tonnes of material supplied and acceptably placed in the works to the lines and grades specified. Payment will include supply, handling, stockpiling, mixing, placing, compacting, trucking and all related work.
- .3 Mobilization and Demobilization of excavation equipment will be measured by each piece of floated Heavy Equipment.

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM D 4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.4 SUBMITALS

- .1 Samples:
 - .1 Inform Departmental Representative at least 4 weeks prior to commencing Work, of proposed source of fill materials and provide access for sampling.
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1.5 PROTECTION OF EXISTING FEATURES

- .1 Existing buried utilities and structures:
 - .1 Maintain and protect from damage, water, electric, and other utilities and structures encountered.
 - .2 Where utility lines or structures exist in area of excavation, obtain direction of the Departmental Representative before removing or re-routing. Costs for such Work to be paid by the Departmental Representative.
 - .3 Record location of maintained, re-routed and abandoned underground lines.

PART 2 - PRODUCTS

2.1 GRANULAR MATERIALS

- .1 Armour Stone (1-4 tonnes): granitic or 2.59 when tested to ASTM C 127-01 (AASHTO T85-77). Larger stone to be placed as directed by. the Departmental Representative
 - .1 Greatest dimension of each stone not to exceed two times least dimension.
 - .2 The average size of the rip-rap stones being placed will be in the mid range of accepted gradation which will ensure that there is a uniform gradation of stone across the size range. The contractor will arrange the placement of stone to ensure that he has a proper gradation not being high or low.
- .2 Rip-Rap Stone (200-500 KG): granitic or 2.59 when tested to ASTM C 127-01 (AASHTO T85-77). Larger stone to be placed as directed by. the Departmental Representative
 - .1 Greatest dimension of each stone not to exceed two times least dimension.
 - .2 The average size of the rip-rap stones being placed will be in the mid range of accepted gradation which will ensure that there is a uniform gradation of stone across the size range. The contractor will arrange the placement of stone to ensure that he has a proper gradation not being high or low.
- .3 Random R5 Rip-Rap: to consist of hard, durable, quarry or pit run material of an approved quality. The material will be free

2.1 GRANULAR

MATERIALS (Cont'd)

- .3 Random R5 Rip-Rap:(Cont'd)
from frost, snow stumps, weeds, sod, roots, logs, silt, organic material, garbage, or any other waste materials and must be capable of being compacted to degree as specified herein and meeting approval of the Departmental Representative. Material to be uniformly graded having a stone size between 70 to 220 mm (R5 random rip-rap) on any dimension. Slate, sandstone or shale rock will not be accepted. Specific gravity not less than 2.59 when tested to ASTM C127-77 (AASHTO T85-77).

- .1 Gradation to meet NBDOT 'R5' Random Rip-Rap limits as follows:

ASTM Sieve size	% passing
220 mm	100
190 mm	70 - 90
150 mm	40 - 55
70 mm	0 - 15

- .4 Granular Base and Sub-Base:
.1 Granular Base rock, clear, hard durable, angular, crushed quarried rock aggregate free from silt, clay lumps, organic matter, foreign substances and free from splits, seams or defects. Specific gravity not less than 2.6 when tested to ASTM C127-77 (AASHTO T85-77).

- .2 Gradation to be within following limits when tested to ASTM C136-84 and ASTM C117-87 and giving a smooth curve without sharp breaks when plotted on a semi-log grading chart.

- .3 Gradation - Granular Base:

ASTM Sieve Size	% Passing
31.5 mm	95-100
25.0 mm	81-100
19.0 mm	66-90
12.5 mm	50-77
9.5 mm	41-70
4.75 mm	27-54
2.36 mm	17-43
1.18 mm	11-32
300 µm	4-19
75 µm	0-8

- .4 Gradation - Granular sub-base material:

2.1 GRANULAR .4 Granular Base and Sub-Base:(Cont'd)

(Cont'd)

ASTM Sieve Size	% Passing
75.0 mm	100
0.425 mm	30 max
0.075 mm	8 max

- .5 Imported Sandstone: To be of good durability course sandstone rock that is of approved quality, sound, hard, dense, angular, resistant to weathering and salt water, free from overburden, spoils, and organic material. Free from cracks, seams or other defects which may impair durability; slate, shale, and sandstone will be acceptable.

PART 3 - EXECUTION

- 3.1 GENERAL .1 Site excavation to consist of removal of all material and substrate materials up to a depth of maximum 5 metres deep.

- 3.2 EXCAVATION .1 Site excavation to consist of the removal of all material and substrate bottom material to the excavation limits of 5m depths.
- .2 Contractor to submit excavation method adjacent to existing wharf structures. Method to define protection of existing structures and foundations.

- 3.3 BACKFILLING .1 Do not proceed with backfilling operations until the Departmental Representative has inspected and approved areas to be backfilled.
- .2 Install filter fabric if required.
- .3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .4 Do not use backfill material which is frozen or contains ice, snow or debris.

3.3 BACKFILLING
(Cont'd)

- .5 Place backfill material in uniform layers not exceeding 300 mm compacted thickness. Compact each layer to 95% of Standard Proctor dry density before placing succeeding layer.
- .6 When using hand operated tamping devices, place backfill material in layers not exceeding 100 mm in thickness.
- .7 Backfilling around installations.
 - .1 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

3.4 GRANULAR BASE

- .1 Do not place granular base until sub-base surface is compacted, inspected and approved.
 - .2 Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow and ice.
 - .3 Place materials to the lines, grades, and depths as indicated on Plan or as directed by the Departmental Representative.
 - .4 Remove and replace portion of work in which material becomes segregated during spreading.
 - .5 Compact to a density not less than 98% of maximum dry density ASTM D698-78, (AASHTO T99-74, Method D).
 - .6 Shape and roll alternately to obtain a smooth, even and uniformly compacted base.
 - .7 Apply water as is necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
 - .8 In areas not accessible to rolling equipment, compact to required density with approved mechanical tampers.
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3.5 GRANULAR
SUB-BASE

- .1 Do not place granular sub-base until finished sub-grade is inspected and approved by the Departmental Representative
- .2 Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow and ice.
- .3 Begin spreading sub-base material on a crown line or high side of a one way slope.
- .4 Place material in uniform layers not exceeding 150mm when compacted or to such other depth as approved by the Departmental Representative.
- .5 Shape each layer to a smooth contour and compact to specified density before a succeeding layer is placed.
- .6 Remove and replace portion of a layer in which material has becomes segregated during spreading.
- .7 Compact to 95% maximum density, AASHTO T99-74, Method D except last 150mm up to subgrade elevation. Compact last 150mm to 100% maximum density, AASHTO T99-74, Method D.
- .8 Shape and roll alternately to obtain a smooth, even and uniformly compacted sub-base.
- .9 Apply water as is necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
- .10 In areas not accessible to rolling equipment, compact to required density with approved mechanical tampers.

3.6 RIP-RAP

- .1 Place stone material to lines, grades and dimensions indicated or as directed.
- .2 Place stones in manner approved by the Departmental Representative to secure surface and create a stable mass.
- .3 Material may be placed with the aid of mechanical means or other approved method subject to the Departmental Representative's

- 3.6 RIP-RAP
(Cont'd)
- .3 (Cont'd)
review and approval. End dumping onto sloped
areas will not be permitted.
- .4 Contractor will choose his stones and place
them in such a way that the whole structure
will be bonded and consolidated to as great an
extent as nature or rock will allow.

- 3.7 RESTORATION
- .1 Upon completion of Work, remove waste
materials and debris in accordance to Section
01 74 21.
- .2 Remove surplus materials and debris and
correct defects noted by the Departmental
Representative.

PART 1 - GENERAL

<u>1.1 DESCRIPTION</u>	.1	This section specifies requirements for the supply and installation of synthetic non-woven filter fabric to be used under the rip-rap and filter rock material as shown.
<u>1.2 RELATED SECTIONS</u>	.1	Section 01 74 21 - Construction/Demolition
<u>1.3 MEASUREMENT PROCEDURES</u>	.1	Supply and installation of filter fabric of surface covered as shown on drawings will be measured by sq. m.
	.2	Supply, installation and removal of full depth silt curtain -3.5 m below L.N.T will be measured by lump sum for each installation.
	.1	length of each unit will be 30 metres.
<u>1.4 REFERENCES</u>	.1	American Society for Testing and Materials International, (ASTM)
	.1	ASTM D 4491-99a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
	.2	ASTM D 4595-86(2001), Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
	.3	ASTM D 4751-99a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
	.2	Canadian General Standards Board (CGSB)
	.1	CAN/CGSB-4.2 No. 11.2-M89(April 1997), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
	.2	CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
<u>1.5 SUBMITTALS</u>	.1	Submit to the Departmental Representative the following at least 2 weeks prior to beginning Work.
	.1	manufactures specifications on the proposed materials to be used.
	.2	samples of proposed materials.

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| 1.5 SUBMITTALS
(Cont'd) | .1 (Cont'd) | |
| | .2 (Cont'd) | |
| | .2 | Submit to the Departmental Representative 2 copies of mill test data and certificate at least 2 weeks prior to start of Work. |
| 1.6 DELIVERY,
STORAGE AND
HANDLING | .1 | During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents. |
| 1.7 WASTE
MANAGEMENT AND
Disposal. | .1 | Separate waste materials for reuse and recycling in accordance with Section 01 74 21. |
| | .2 | Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material. |
| | .3 | Fold up metal banding, flatten and place in designated area for recycling. |

PART 2 - PRODUCTS

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| 2.1 FILTER FABRIC | .1 | Non-woven synthetic fibre fabric, rot proof, unaffected by action of oil or salt water and not subject to attack by marine life, insects or rodents to be supplied in rolls. |
| | .2 | Physical properties: <ul style="list-style-type: none"> .1 Mass per unit area: minimum 380 g/m². .2 Grab tensile strength and elongation: <ul style="list-style-type: none"> .1 Breaking force: minimum 1,600 N, wet condition. .2 Elongation at break: minimum - maximum 70-100%. .3 Bursting strength: minimum 3,700 kPa. |
| | .3 | Hydraulic properties: <ul style="list-style-type: none"> .1 Apparent opening size (AOS): 75 to 150 micrometres. .2 Permeability (K cm s⁻¹) 2.0x10⁻¹. |
| | .4 | Factory seams: sewn in accordance with manufacturer's recommendations. |

- 2.1 FILTER FABRIC
(Cont'd)
- .5 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.
 - .6 Floating silt curtain is same material as filter fabric.

PART 3 - EXECUTION

- 3.1 INSTALLATION
- .1 Place geotextile material by unrolling in orientation, manner and locations indicated and retain in position with securing pins and washers or weights.
 - .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 as recommended by manufacturer.
 - .5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material.
 - .6 After installation, cover with overlying layer within 4 hrs of placement.
 - .7 Replace damaged or deteriorated geotextile to approval of Departmental Representative .

PART 1 - GENERAL

1.1 GENERAL .1 Pile driving is site specific. Therefore no unit price will be quoted, rather if item is called up, the price will be negotiated based on depth of driving and soil types.

1.2 RELATED SECTIONS .1 Section 31 62 19 -Timber Piles.
.2 Section 31 62 16.16 - Steel H-Piles

1.3 SUBMITTALS .1 Product Data: submit manufacturer's printed product literature, specifications and data sheet.
.2 Spliced piles are not permitted.

1.4 DELIVERY, STORAGE AND HANDLING .1 Deliver, store and handle materials in accordance with manufacturer's instructions.
.2 Protect piles from damage due to excessive bending stresses, impact, abrasion or other causes during delivery, storage and handling.
.3 Piles damaged by the contractor will be replaced as directed by the Departmental Representative at contractor's cost.

1.5 EXISTING CONDITIONS .1 The Contractor must make his own evaluation of soil conditions based on geotechnical studies provided by Departmental Representative.

1.6 SCHEDULING .1 Provide schedule of planned sequence of driving to Departmental Representative for review, not less than two weeks prior to commencement of pile driving.

PART 2 - PRODUCTS

- 2.1 MATERIALS
- .1 Timber Piles see Section 31 62 19
 - .2 Steel H Piles see Section 31 62 16.16
- 2.2 EQUIPMENT
- .1 Prior to pile installation, submit to Departmental Representative for review, details of equipment for installation of piles.
 - .1 Impact hammers: provide manufacturer's name, type, rated energy per blow at normal working rate, mass of striking parts of hammer, mass of driving cap and type and elastic properties of hammer and pile cushions.
 - .2 Non-impact methods of installation such as augering, jacking, vibratory hammers or other means: provide full details of characteristics necessary to evaluate performance.
 - .2 Hammer:
 - .1 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 Protect adjacent structures, services and work of other sections from hazards due to pile driving operations.
 - .2 Arrange sequencing of pile driving operations and methods to avoid damages to adjacent existing structures.
 - .3 When damages occur, remedy damaged items to restore to original or better condition at own expense.
 - .2 Ensure that structures and ground conditions at pile locations are adequate to support pile driving operation.
 - .1 Make provision for access and support of piling equipment during performance of Work.
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- 3.1 PREPARATION
(Cont'd)
- .2 (Cont'd)
.2 Contractor to assess state of access structure(s) for load carrying capability.
- 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 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.
.3 Swing leads:
.1 Obtain approval from Departmental Representative prior to using swing leads.
.2 Firmly guy top and bottom to hold pile in position during driving operation.
- .2 Installation of each pile will be subject to review of Departmental Representative.
.1 Departmental Representative will be sole judge of acceptability of each pile with respect to final driving resistance, depth of penetration or other criteria used to determine load capacity.
.2 Departmental Representative to review final driving of all piles prior to cutting and removal of pile driving rig from site.
- .3 Drive each timber pile to practical refusal to bedrock.
.1 Do not overdrive to cause damage to piles in bedrock.
.2 Departmental Representative will determine refusal criteria for piles driven to rock based on type of pile and driving equipment.
- .4 Steel H-piles to be set a minimum 2.0 metres in to bedrock as shown on drawings.
- 3.3 APPLICATION / DRIVING
- .1 Use driving caps and cushions to protect piles.
.1 Reinforce pile heads as required by Departmental Representative.
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3.3 APPLICATION /
DRIVING
(Cont'd)

- .1 (Cont'd)
- .2 Piles with damaged heads as determined by Departmental Representative will be rejected.
- .3 Hold piles securely and accurately in position while driving.
- .3 Deliver hammer blows along axis of pile.
- .4 Restrike already driven piles lifted during driving of adjacent piles to assure set.
- .5 Cut off piles neatly and squarely at elevations as indicated on drawings.
 - .1 Provide sufficient length above cut-off elevation so that part damaged during driving is cut off.
- .6 Remove cut-off lengths from site on completion of work.

3.4 FIELD
MEASUREMENTS

- .1 Maintain accurate and daily records of driving for each pile, including:
 - .1 Type and make of hammer, rated energy, observed stroke, and observed number of blows per minute.
 - .2 Other installation equipment including details on use of pile cushion, follower, etc.
 - .3 Pile size and length, location of pile in pile group, and location or designation of pile group.
 - .4 Time for start and finish of driving pile and sequence of pile driving for piles in group.
 - .5 Penetration for own weight and weight of hammer, number of blows per meter of penetration from start of driving and numbers of blows per 100 mm for the last meter.
 - .6 Toe elevation upon termination of driving pile and final toe and cut-off elevations upon completion of pile group.
 - .7 Records of restriking.
 - .8 Other pertinent information, such as interruption of continuous driving, observed pile damage, etc.
 - .9 Records of elevations of adjacent piles before and after driving of pile.
 - .10 Record all information on forms provided by Departmental Representative.
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3.5 FINAL
PENETRATION
RESISTANCE

- .1 Installation of each pile will be subject to approval of Departmental Representative, who will be sole judge of acceptability of pile with respect to final penetration resistance, depth of penetration, or other criteria. Departmental Representative to approve final penetration resistance of all piles prior to removal of pile driving equipment from site.
- .2 Each pile shall be installed as shown. Do not overdrive to cause damage to piles.
- .3 Departmental Representative will determine refusal criteria for piles.
 - .1 Timber Piles: Refusal may be taken as 4 blows per 25 mm of pile penetration when driven using a hammer with a maximum rated driving energy in the order of 750 joules times the pile tip diameter in centimetres.
 - .2 Steel H-Piles: Drive each pile a minimum of 2.0 metres into bedrock as indicated.

3.6 OBSTRUCTIONS

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

3.7 REPAIR AND
RESTORATION

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

PART 1 - GENERAL

1.1 GENERAL .1 Pile driving is site specific. Therefore no unit price will be quoted, rather if item is called up, the price will be negotiated based on depth of driving and soil types.

1.2 RELATED SECTIONS .1 Submittal Procedures: Section 01 33 00.
.2 Miscellaneous Metals: Section 05 50 00

1.3 DELIVERY and HANDLING .1 Protect piles from damage due to excessive handling during delivery, storage and bending stress, impact, abrasion or other causes handling.

1.4 EXISTING SUB-SURFACE CONDITIONS .1 Any information pertaining to soils and all borehole logs are furnished by the Departmental Representative as a matter of general information only. Borehole descriptions shown on the logs are only

descriptive of conditions at locations

.2 The Contractor must make his own evaluation of soil conditions.

1.5 MEASUREMENT PROCEDURES .1 Negotiated at request from Section 35 00 01

1.6 REFERENCES .1 Canadian Standards Association (CSA International)
.1 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel Structures.

1.7 SUBMITTALS .1 Quality Assurance:
.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

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| <u>1.8 WASTE
MANAGEMENT AND
DISPOSAL</u> | .1 | Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal. |
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PART 2 - PRODUCTS

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| <u>2.1 MATERIALS</u> | .1 | Steel H piles: to CSA-G40.20/G40.21, Grade 350.
.1 Size and weight as indicated.
.2 It is the contractor's responsibility to estimate the minimum length of H-pile required for the work. |
| | .2 | Pile points for driving are required. |
| | .3 | Welding materials: to CSA W48. |
| | .4 | Do not splice piles. |

PART 3 - EXECUTION

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| <u>3.1 INSTALLATION</u> | .1 | The steel H-piles are to be installed true and plumb along the baseline as shown on drawings. |
| | .2 | All piles are to be installed a minimum of 2.0 meters into the bedrock. The bottom elevations may vary depending on the exact location of the bedrock. |
| | .3 | Hold piles securely and accurately in position while installation. |
| | .4 | Prior to commencement of pile installation operation, submit to Engineer for approval, details of equipment and method to be used for the installation of piles. |
| | .5 | Cut off piles as required at elevation required. |
| <u>3.2 TOLERANCES</u> | .1 | H-piles are to be install as shown on the drawings and specified herein. |
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3.2 TOLERANCES .2 Deviations from the vertical in any direction
(Cont'd)

.3 Each set of piles at the mud line to be
within ± 30 mm of the location indicated on
the drawing.

3.3 WELDING .1 Weld to CSA W59.

.2 Welding certification of companies: to CSA
W47.1.

3.4 RECORDS .1 Keep complete and accurate record of each
pile driven.

.2 Indicate:
 .1 Pile location.
 .2 Deviations from design location.
 .3 Cross section shape and dimensions.
 .4 Original length.
 .5 Ground elevation.
 .6 Tip elevation.
 .7 Cut-off elevation.

3.5 CLEANING .1 Proceed in accordance with Section 01 74 11 -
Cleaning.

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

PART 1 - GENERAL

- 1.1 GENERAL .1 Timber Pile lengths are site specific.
Therefore no unit price will be quoted, rather
if item is called up, the price will be
negotiated based on depth of driving and soil
types.
- 1.2 RELATED SECTIONS .1 Section 31 61 13 - Pile Foundation, General
Requirements.
- 1.3 MEASUREMENT PROCEDURES .1 Negotiated at request from Section 35 00 01
- 1.4 REFERENCES .1 Canadian Standards Association (CSA
International)
.1 CAN3-O56-M79 (R2001), Round Wood Piles
(Metric version).
.2 CSA O80 Series-97 Series-97(R2002), Wood
Preservation.
.1 CSA-O80.18-97(R2002), Pressure
Treated Piles and Timbers in Marine
Construction.
- 1.5 SUBMITTALS .1 Provide submittals in accordance with Section
01 33 00 - Submittal Procedures.
.2 Product Data: submit manufacturer's printed
product literature, specifications and data
sheet.
.3 Spliced piles are not permitted.
.4 Equipment: submit prior to pile installation
for review by the Departmental Representative,
list and details of equipment for use in
installation of piles.
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1.6 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Do not dispose of preservative treated wood through incineration.
- .3 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .4 Dispose of treated wood, end pieces, wood scraps and saw dust at sanitary landfill as approved by the Departmental Representative.
- .5 Dispose of unused wood preservative material at official hazardous material collections site.
- .6 Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other location where they will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 The following Treated Round timber piles (CCA treated), 300 mm minimum butt size, are supplied by DFO and are as follows:
 - .1 to CAN3-056, with tip diameter related to length as indicated in table A-1 of 056-1962 (R2001).
 - .2 vertical piles: 108 each at 12.20 metres long,
 - .3 batter piles: 14 each at 13.72 metres long,
 - .2 Pile species: Red Pine.
 - .3 Pressure treated in accordance with Section 06 05 73 - Wood Treatment.
 - .4 Piles are stored on site. Contact the Departmental Representative to confirm location.
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2.2 EQUIPMENT .1 Pile hammer: select and use pile hammer of sufficient weight and energy to suitably install specified pile without damage into soils as indicated.

2.3 PRESERVATIVE TREATMENT .1 Preservative Treatment: to CSA-O80.18.

2.4 PILE SHOES .1 Provide size to fit tip indicated.
.2 Fabricate point type of 6 mm steel plates, fully welded and sized to adequately cover full pointed area of pile. Provide each plate with 4 nail hole.

2.5 ACCESSORIES .1 Wire nails, spikes, staples: to CSA B111-1974 (R1998).
.2 Bolts, nuts and washers: to ASTM A 307-02.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.

3.2 PROTECTION .1 Avoid dropping, bruising or breaking of wood fibres.
.2 Avoid breaking surfaces of treated piles.
.3 Do not damage surfaces of treated piles below cut-off elevation.
.4 Treat cuts, breaks or abrasions on surfaces of treated piles, bolt holes and field cuts in accordance with CSA O80 Series-97 Series.

- 3.3 PREPARATION
- .1 Select piles in each bent for uniformity of size and straightness to facilitate placing of brace timbers.
 - .2 Submit details of proposed method of pile head and tip protection during driving to the Departmental Representative for review.
- 3.4 INSTALLATION
- .1 Install piles in accordance with Section 31 61 13 - Pile Foundations, General Requirements.
 - .2 Restrain lateral movement of piling, during driving at intervals not exceeding 6 m over length between ground surface and driving head.
 - .3 Treat exposed ends of cut off piles with two liberally brushed coats of CCA product allowing sufficient interval between applications to permit total absorption.
 - .4 Protection: treat end cut-offs and bolt holes with preservative.
- 3.5 BRACING
- .1 Install bracing as indicated.
- 3.6 APPLICATION / DRIVING
- .1 Place cap and cushion block combination capable of protecting pile head between top of pile and ram to prevent impact damage to pile.
 - .2 Replace block if it is damaged, split, highly compressed, charred or burned or has become spongy or deteriorated, with a new block.
- 3.7 TOLERANCES IN DRIVING
- .1 Center of butts: within 50 mm of location indicated.
 - .2 Manipulation of piles: not be permitted.
 - .3 Remove and replace damage piles, mislocated piles, driven out of alignment piles and provide additional piles, driven as directed.
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