

PART 1 - GENERAL

- 1.1 RELATED SECTIONS
- .1 Section 31 09 16.01 - Pile Driving Template.
 - .2 Section 31 62 16.13 - Steel Sheet Piling.
 - .3 Section 31 63 19 - Bored and Socketed Piles.
 - .4 Section 05 50 00 - Metal Fabrications.
- 1.2 SUBMITTALS
- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data: submit manufacturer's printed product literature, specifications and datasheet.
 - .3 Borehole data: when site conditions differ from those indicated, submit written notification to Departmental Representative and await further instructions.
 - .4 Submit schedule of planned sequence of driving to Departmental Representative for review, as specified.
 - .5 Spliced piles: when authorized, submit design details of splice complete with signature and stamp of qualified professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.
 - .6 Equipment:
 - .1 Submit prior to pile installation for approval by Departmental Representative, list and details of equipment for use in installation of piles.
 - .2 Impact hammers: submit manufacturer's written data as specified.
 - .3 Non-impact methods; submit characteristics to evaluate performance.
 - .7 Submit driveability analysis as specified, to Departmental Representative for approval of hammers.

.8 Quality assurance submittals:

- .1 Test reports: If requested, submit 3 copies of certified test reports for piles from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
- .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.3 PROTECTION

.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 Departmental Representative.

1.4 FABRICATION

.1 Fabricate structural steel for templates: to CAN/CSA-S16 and approved shop drawings.

.2 Welding: to CSA W59.

.3 Use welding companies qualified under CSA W47.1.

1.5 SEQUENCE

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

1.6 GENERAL

.1 Supply or fabricate full length piles as indicated and provide equipment to handle full length piles without cutting and splicing.

.2 Splice piles only with written approval of Departmental Representative.

- .1 When permitted, provide details for Departmental Representative review.

- .2 Design details of splice to bear dated signature stamp of professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.

1.7 EQUIPMENT

.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. Impact hammers must be used.

.2 Non-impact methods of installation such as augering, jacking, vibratory hammers or other means are not permitted to be used.

.3 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.

1.8 PROTECTION

.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 Make provision for access and support of piling

equipment during performance of Work.

1.9 LEADS

- .1 Leads: construct pile driver leads to provide free movement of hammer.
- .2 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.
- .3 Length: Provide sufficient length of leads to ensure that use of follower is unnecessary.
- .4 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.
 - .3 Method to be approved by Departmental Representative.
- .5 Installation of each pile will be subject to approval 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 approve final driving of all piles prior to removal of pile driving rig from site.
 - .3 Drive each pile to practical refusal in bedrock. Refer to Section 31 63 19 for additional requirements for piles with rock sockets.
 - .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.

1.10 CAPS

- .1 Use driving caps and cushions to protect piles.
- .2 Reinforce pile heads as required by Departmental Representative.

.3 Piles with damaged heads as determined by Departmental Representative will be rejected.

.4 Hold piles securely and accurately in position while driving.

.5 Deliver hammer blows along axis of pile.

.6 Do not drive piles within 10 m of concrete which has been in place less than 7 days.

.7 Ensure no contact between pile and structure takes place when driving batter piles adjacent to existing structures.

.8 Restrike already driven piles lifted during driving of adjacent piles to confirm set.

.9 Use of water jet:

.1 If permitted, provide details for Departmental Representative approval.

.2 Restriction: when conditions are unacceptable, as determined by Departmental Representative, stop using water jet.

.10 Cut off piles neatly and squarely at elevations as indicated.

.1 Provide sufficient length above cut-off elevation so that part damaged during driving is cut off.

.11 Do not cut tendons or other reinforcement, which will be used to tie pile caps to pile.

.12 Remove cut-off lengths from site on completion of work.

1.11 TOLERANCES

.1 Pile heads to be within 50 mm of locations as indicated.

.2 Piles not to be more than 0.4% of length out of vertical alignment

1.12 OBSTRUCTION

Where obstruction is encountered that causes sudden unexpected change in penetration resistance

or deviation from specified tolerances, proceed as directed by Departmental Representative.

1.13 REJECTED PILES

.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.

1.14 RECORDS

.1 Replace/adjust hammer and modify cap, cushions, and other equipment, as directed by Departmental Representative.

.2 Maintain accurate records of driving for each pile, including: type and make of hammer, stroke or related energy, other driving equipment including water jet, driving cap, cushion, pile size and length, location of pile in pile group, location or designation of pile group, sequence of driving piles in group, number of blows per metre for entire length of pile and number of blows per 300 mm for last 600 mm, final tip and cut-off elevations, other pertinent information such as interruption of continuous driving and pile damage.

.3 Record elevation taken on adjacent piles during before and after driving of each pile.

.4 Provide Departmental Representative with three copies of records.