

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 31 63 23 – Bored Concrete Piles

**1.2 ACTION AND INFORMATIONAL 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 Sub-surface investigation report: when site conditions differ from those indicated, submit written notification to Contract Administrator and await further instructions.
- .4 Submit schedule of planned sequence of pile installation to Contract Administrator for review.
- .5 Spliced piles: when authorized, submit design details of splice complete with signature and stamp of qualified professional engineer registered or licensed in the Province of Manitoba, Canada.
- .6 Equipment:
  - .1 Submit prior to pile installation for review by Contract Administrator, list and details of equipment for use in installation of piles.

**1.3 DELIVERY, STORAGE AND HANDLING**

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

**1.4 EXISTING CONDITIONS**

- .1 Sub-surface investigation report is attached to the specifications.

**1.5 SCHEDULING**

- .1 Provide schedule of planned sequence of installation to Contract Administrator for review, not less than two weeks prior to commencement of pile installation.

**PART 2 Products**

**2.1 MATERIALS**

- .1 Material requirements for piles are specified in Section 31 63 23 – Bored Concrete Piles

**PART 3 Execution**

**3.1 PREPARATION**

- .1 Protection:
  - .1 Protect adjacent structures, services and work of other sections from hazards due to pile installation operations.
  - .2 Arrange sequencing of pile installation 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 ground conditions at pile locations are adequate to support pile installation operations.
  - .1 Make provision for access and support of piling equipment during performance of Work.
- .3 Install piles only when excavation has been completed.

**3.2 PREPARATION**

- .1 Bored concrete piles have been designed for skin friction based on Ultimate Limit States in accordance with Part 4 of the National Building Code of Canada. Allowable design load capacity of pile at factored load is indicated on the drawings.
- .2 Installation of each pile will be subject to review of Contract Administrator.
  - .1 Contract Administrator will be the sole judge of acceptability of each pile with respect to criteria used to determine load capacity.
  - .2 Contract Administrator to review final installation of all piles prior to removal of pile equipment from site.

**3.3 OBSTRUCTIONS**

- .1 Where obstruction is encountered that prevents the installation of the pile or deviation from specified tolerances, proceed as directed by the Contract Administrator.

**3.4 REPAIR AND RESTORATION**

- .1 Proceed to remove, repair, replace or augment rejected as directed by Contract Administrator.
- .2 No extra compensation will be made for removing and replacing or other work made necessary through rejection of defective piles.

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**3.5 FIELD QUALITY CONTROL**

- .1 Measurement:
  - .1 Maintain accurate records of the installation for each pile, including:
    - .1 Pile size and length, location of pile in pile group, location or designation of pile group.
    - .2 Sequence of installation of piles.
    - .3 As-built survey of center line of piles and top of pile elevations.
  - .2 Provide Contract Administrator with two copies of records.
  - .3 Contractor to provide full time review of pile foundation installation by a qualified Geotechnical Engineer. Pay the costs as per 01 29 83 – Payment Procedures for Testing Laboratory Services

**3.6 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.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE**

- .1 Section 31 61 13 – Pile Foundations, General Requirement

**1.2 REFERENCES**

- .1 All references to be the latest edition as of the date indicated on the specifications.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CAN/CSA-G30.18, Billet Steel Bars for Concrete Reinforcement

**1.3 ACTION AND INFORMATIONAL 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 Shop Drawings:
  - .1 Indicate: pile type, reinforcing size and spacing, pile cap type and reinforcing size and spacing.
  - .2 Submit each drawing complete with signature and stamp of Qualified Professional Engineer registered in the Province of Manitoba, Canada.
- .4 Quality assurance submittals:
  - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .2 Instructions: submit manufacturer's installation instructions.
  - .3 Records and reports: submit Mill report and concrete tests as described in PART 2 - SOURCE QUALITY CONTROL.
  - .4 Submit for review by Contract Administrator two copies of pile installation records as described in PART 3 - FIELD QUALITY CONTROL

**Part 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.

.2 Reinforcing steel: to CAN/CSA-G30.18 and in accordance with Section 03 20 00 - Concrete Reinforcing.

.3 Refer to General Notes: Specification to be read in conjunction with General Notes

## 2.2 SOURCE QUALITY CONTROL

1. Mill report: to CAN/CSA-S16.

2. Concrete tests: to CSA-A23.1/A23.2

## 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 datasheets.

### 3.2 INSTALLATION

.1 Bore holes to diameters and lengths as indicated on the drawings. Pile length is calculated from the top of pile elevations and not from the top of grade elevation.

.2 Protective steel casing:

.1 Where required, use steel protective casing approved by Contract Administrator.

.1 Ensure penetration of casing to required depths either by self mass or driving.

.3 Dispose of excavated materials off site.

.4 Contract Administrator to inspect pile excavation prior to placing of concrete.

.1 Remove loose material, foreign matter and water as directed by Contract Administrator.

.5 Install steel reinforcement in accordance with Section 03 20 00 - Concrete Reinforcing and as indicated.

.6 Fill pile excavations with concrete to elevations as indicated.

.1 Place concrete in one continuous pour in accordance with Section 03 30 00 - Cast-in-Place Concrete.

.2 Place concrete immediate upon completion of pile boring. Do not wait for multiple bore holes to be completed prior to placing concrete.

- .7 Steel protective casing may be removed at option of Contractor, unless otherwise specified.
- .8 Where steel protective casing is to be removed, provide concrete with minimum slump of 125 mm and with retarder to prevent arching or setting of concrete.
  - .1 Withdraw casing in conjunction with concrete placing, keeping bottom of casing 600 mm below level of concrete.
  - .2 Do not vibrate concrete internally.
- .9 Where steel protective casing is left in place, fill void space between casing and shaft excavation with concrete.
- .10 Use tremie pipe or concrete pumping with approval of Contract Administrator.
- .11 Contractor to provide steel casing as required to prevent sloughing and squeezing of the bored hole.
- .12 Contractor to remove water from bored hole prior to placing concrete.

### **3.3 DEFECTIVE PILES**

- .1 Cased concrete shaft piles rejected where:
  - .1 Soil has entered casing.
  - .2 Water has entered casing.
  - .3 Casing is damaged, out of tolerance or alignment.
- .2 Defective pile to be removed, repaired, replaced or augmented as directed by Contract

### **3.4 FIELD QUALITY CONTROL**

- .1 Field Records: maintain pile installation record for each pile.
- .2 Complete concrete testing in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .3 Provide as-built drawing of final center of pile locations and final top of pile elevations.

### **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.

**END OF SECTION**