

**SPECIFICATIONS FOR**  
**CAST-IN-PLACE CONCRETE PILES**

**1.0 DESCRIPTION**

The Work shall consist of:

- .1 Excavating, boring, digging, sleeving, and dewatering the pile shaft as required to prepare the pile for concrete placement;
- .2 Supplying and placing reinforcing steel; and
- .3 Supplying, placing, vibrating, heating and curing concrete.

**2.0 REFERENCES AND RELATED SPECIFICATIONS**

All reference standards and related specifications shall be current issue or latest revision at the date of tender advertisement.

2.1 References

- CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete
- CAN/CSA A3001, Cementitious Materials for Use in Concrete
- CAN/CSA G30.18, Billet-Steel Bars for Concrete Reinforcement

2.2 Related Specifications

- Specifications for Reinforced Cast-in-Place Concrete
- Specifications for Supplying and Placing Concrete Reinforcement

**3.0 SUBMITTALS**

Submittals shall be in accordance with the Specifications for Reinforced Cast-in-Place Concrete and the Specifications for Supplying and Placing Concrete Reinforcement.

**4.0 MATERIALS**

4.1 Concrete

Concrete shall be supplied as specified in the Specifications for Reinforced Cast-in-Place Concrete

4.2 Reinforcing Steel

Reinforcing steel shall be supplied as specified in the Specifications for Supplying and Placing Concrete Reinforcement.

## **5.0 CONSTRUCTION METHODS**

### **5.1 Location and Alignment of Piles**

Piles shall be placed at the locations shown on the Drawings or as directed by the Engineer. Piles shall not deviate more than 1% out-of-plumb. Piles shall not be more than 50 mm off centre measured at cut-off elevation.

### **5.2 Excavation**

Excavations for piles shall be made with equipment designed to remove a core and provide shafts with the required diameters and depths shown on the Drawings.

Upon reaching the required elevation, the bottom of the shaft shall be cleaned and, if called for, belled out to the required dimensions and elevations as shown on the Drawings or as directed by the Engineer.

The excavated material shall become the property of the Contractor and shall be removed from the site.

Upon completion of belling and cleaning out the bottom to the satisfaction of the Engineer, the reinforcement shall be set in place and the concrete poured immediately. Under no circumstances shall a hole be left to stand open after boring has been completed.

If any pile is condemned because of caving, it shall be filled with lean mix concrete and a new shaft bored as near as possible to the location shown on the Drawings. Payment will not be made for condemned piles.

### **5.3 Sleeving**

Steel sleeving shall be used to temporarily line the shaft to prevent bulging or caving of the walls prior to concrete placement.

The sleeving shall be designed and constructed to resist all forces which may tend to distort it.

The sleeving shall be withdrawn as the concrete is placed in the shaft. The sleeving shall extend at least 1.0 metres below the top of the freshly deposited concrete at all times.

The clearance between the face of the shaft and the sleeving shall not exceed 25 mm.

### **5.4 Inspection of Shafts**

Concrete shall not be placed until the shaft has been inspected and approved by the Engineer.

The Contractor shall have available suitable light for the inspection of each bore throughout its entire length. The Contractor shall have video equipment available to visually inspect bore holes that cannot be inspected from the top of the pile.

All improperly set sleeving, shaft, bell or bottom shall be corrected to the satisfaction of the Engineer.

## 5.5 Placing Reinforcing Steel

Reinforcement shall be:

- .1 Placed in accordance with the details shown on the Drawings;
- .2 Rigidly fastened together; and
- .3 Lowered into the shaft intact before concrete is placed.

Spacers shall be utilized to properly locate the reinforcing steel cage in the shaft.

## 5.6 Mixing and Placing Concrete

Mixing and placing concrete shall be done in accordance with the Specifications for Reinforced Cast-in-Place Concrete.

Concrete shall not have a free fall of more than 2.0 metres and shall be placed so that the aggregates do not separate or segregate.

Concrete shall be placed to the elevations as shown on the Drawings. Laitance on the top of the pile shall be removed before placing the pile cap. The concrete shall be vibrated throughout the entire length of the pile.

The shaft and bell shall be free of water prior to placing of concrete. Concrete shall not be placed in or through water unless authorized by the Engineer. In the event that tremie concrete is allowed by the Engineer, the concrete shall be placed as specified herein.

## 5.7 Tremie Concrete

The shaft of the pile shall be pumped clear of water so that the bottom can be cleaned and belled. Pumping shall then be stopped and water shall be allowed to come into the shaft until a state of equilibrium is reached. Concrete shall then be placed by means of a tremie pipe. The tremie pipe shall have a suitable gate in the bottom to prevent water from entering the pipe. The bottom of the pipe shall be maintained below the surface of the freshly placed concrete at all times during placement. The pipe shall be capable of being raised or lowered quickly in order to control the flow of concrete.

## 5.8 Cold Weather Precautions

Heating of the concrete shall be done in accordance with the Specifications for Reinforced Cast-in-Place Concrete.

## **6.0 QUALITY MANAGEMENT**

### 6.1 Quality Control

The Contractor shall be responsible for quality control testing in accordance with the Specifications for Reinforced Cast-in-Place Concrete.

### 6.2 Quality Assurance

The Engineer will undertake quality assurance testing in accordance with the Specifications for Reinforced Cast-in-Place Concrete.

**7.0 METHOD OF MEASUREMENT**

Supplying and placing cast-in-place concrete piles will be measured on a lineal metre basis. The length to be paid for will be the total number of lineal metres of piling placed in position and accepted by the Engineer. Pile lengths will be measured by the Engineer in the presence of the Contractor.

Supplying and placing reinforcing steel will be considered incidental and no measurement will be made for this Work.

Heating of concrete will be measured on a volume basis. The volume of heating concrete to be paid for will be the total number of cubic metres placed in the pile.

**8.0 BASIS OF PAYMENT**

Supplying and placing cast-in-place concrete piles will be paid for at the Contract Unit Price per lineal metre for "Placing Cast-in-Place Concrete Piles", measured as specified herein described and all other items incidental to the Work included in this Specification, unless otherwise provided for in this Specification.

Heating concrete materials will be paid for at the Contract Unit Price per cubic metre for "Heating Concrete", measured as specified herein, which price will be payment in full for performing all operations herein described and all other items incidental to the Work. Heating and hoarding to maintain the temperature of the deposited concrete will be considered incidental to the Work.