

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 03 30 00 - Cast-in-Place Concrete.

1.02 REFERENCES

- .1 ASTM International
 - .1 ASTM D 698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft²) (600kN-m/m²).
- .2 CSA International
 - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA A3000-08, Cementitious Materials Compendium.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Site Quality Control Submittals: submit in accordance with Section 01 33 00 – Submissions and Shop Drawings.
- .3 Erosion and Sedimentation Control: submit erosion and sedimentation control plan in accordance with EPA 832/R92-005.

2 PRODUCTS

2.01 MATERIALS

- .1 Reuse existing stock piled rip rap and soil.
- .2 Addition backfill materials (as required): Granular Type I, Type II M Select Subgrade.
- .3 Bedding Sand: hard, granular, sharp-material, well graded from coarse to fine, free of impurities, chemicals or organic matter with 100% passing a 5 mm sieve and not more than 5% passing a 0.16mm sieve.

3 EXECUTION

3.01 EXAMINATION

- .1 Evaluation and Assessment:

- .1 Before commencing work verify establish locations of buried services on and adjacent to site.

3.02 PREPARATION

- .1 Temporary erosion and sedimentation control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and water courses, according to sediment and erosion control drawings and sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of Departmental Representative.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent stabilization or vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .2 Protection of in-place conditions:
 - .1 Protect excavations from freezing.
 - .2 Keep excavations clean, free of standing water, and loose soil.
 - .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.
 - .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
 - .5 Protect buried services that are required to remain undisturbed.
- .3 Removal:
 - .1 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas designated on drawings.
 - .2 Remove stumps and tree roots below footings, slabs, and paving, and to 600 mm below finished grade elsewhere.
 - .3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

3.03 EXCAVATION

- .1 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial regulations.
- .2 Excavate as required to carry out work.
 - .1 Do not disturb soil or rock below bearing surfaces.
 - .2 Notify Departmental Representative when excavations are complete.
 - .3 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.
 - .4 Excavation taken below depths shown without Departmental Representative's written authorization to be filled with concrete of same strength as for footings at Contractor's expense.

3.04 FIELD QUALITY CONTROL

- .1 Testing of materials and compaction of backfill and granular materials will be carried out by testing laboratory designated by Departmental Representative.

- .2 Do not begin backfilling or filling operations until material has been approved for use by Departmental Representative.
- .3 Not later than 48 hours before backfilling or filling with approved material, notify Departmental Representative to allow compaction tests to be carried out by designated testing agency.

3.05 BACKFILLING

- .1 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.
- .2 Compaction of subgrade: compact existing subgrade under foundations as noted in 3.05.04.
- .3 Placing:
 - .1 Place backfill in 150 mm lifts: add water as required to achieve specified density.
- .4 Compaction: compact each layer of material to following:
 - .1 Existing Subgrade: Proof Roll
- .5 Against foundations: Type 2 Gravel to 98% SPMMD

3.06 GRADING

- .1 Grade so that water will drain away from, walls and paved areas, to catch basins and other disposal areas approved by Departmental Representative.

3.07 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
 - .2 Dispose of cleared and grubbed material off site daily.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling and organics.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 03 30 00 – Cast-In-Place Concrete

1.02 MEASUREMENT PROCEDURES

- .1 See Section 01 29 00 – Project Particulars and Measurement for pricing details.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit schedule of planned sequence of driving to Departmental Representative for review.
- .3 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.

1.04 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Materials and Equipment and manufacturer's instructions.
- .2 Protect piles from damage due to excessive bending stresses, impact, abrasion or other causes during delivery, storage and handling.
- .3 Replace damaged piles as directed by Departmental Representative.

1.05 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.

2 PRODUCTS

2.01 EQUIPMENT

- .1 Non-impact methods of installation such as vibratory hammers or other means: provide full details of characteristics necessary to evaluate performance.

3 EXECUTION

3.01 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 ground conditions at pile locations are adequate to support pile driving operation and load testing operation.
 - .1 Make provision for access and support of piling equipment during performance of Work.
- .3 Drive piles only when excavation and removal of rip rap has been completed.
- .4 Pre-boring of holes may be acceptable to facilitate pile alignment control.

3.02 INSTALLATION

- .1 Installation of each pile will be subject to approval of Departmental Representative.
 - .1 Departmental Representative to approve final driving of all piles prior to removal of pile driving rig from site.
- .2 Drive each pile to depth as indicated on design drawings.
- .3 After approval from Departmental Representative fill piles with concrete in accordance with Section 03 30 00 – Cast-In-Place Concrete.

3.03 APPLICATION / DRIVING

- .1 Hold piles securely and accurately in position while driving.
- .2 Remove loose and displaced material from around piles after completion of driving, and leave clean, solid surfaces to receive foundation concrete.
- .3 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.
 - .2 Do not cut tendons or other reinforcement, which will be used to tie pile caps to pile.
- .4 Remove cut-off lengths from site on completion of work.

3.04 DRIVING TOLERANCES

- .1 Pile heads to be within 75 mm of locations as indicated.

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

3.05 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.

3.06 REPAIR AND RESTORATION

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

3.07 FIELD QUALITY CONTROL

- .1 Make allowance for probable interruption in driving for:
 - .1 Changing/modifying hammer, or other equipment;
 - .2 Replacing/adjusting of transducers and accelerometers;
 - .3 Assessing of monitored results.
- .2 Measurement:
 - .1 Maintain accurate records of driving for each pile, including:
 - .1 Type and make of hammer, stroke or related energy.
 - .2 Other driving equipment including water jet, driving cap, cushion.
 - .3 Pile size and length, location of pile in pile group, location or designation of pile group.
 - .4 Sequence of driving piles in group.
 - .5 Oscillating frequency and rate of penetration.
 - .6 Final tip and cut-off elevations.
 - .7 Other pertinent information such as interruption of continuous driving, pile damage.
 - .8 Record elevation taken on adjacent piles [during] before and after driving of each pile.

3.08 CLEANING

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

END OF SECTION