

**Part 1            General**

**1.1                REFERENCES**

- .1       American Society for Testing and Materials (ASTM)
  - .1       ASTM D4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

**1.2                SAMPLES**

- .1       Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2       Allow continual sampling by Departmental Representative during production.
- .3       Provide Departmental Representative with access to source and processed material for sampling.
- .4       Install sampling facilities at discharge end of production conveyor, to allow Departmental Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by Departmental Representative to permit full cross section sampling.
- .5       Pay cost of sampling and testing of aggregates which fail to meet specified requirements.
- .6       Provide water, electric power and propane to Departmental Representative laboratory trailer at production site.

**1.3                WASTE MANAGEMENT AND DISPOSAL**

- .1       Divert unused granular materials from landfill to local facility as approved by Departmental Representative.

**Part 2            Products**

**2.1                MATERIALS**

- .1       Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
- .2       Flat and elongated particles of coarse aggregate: to ASTM D4791.
  - .1       Greatest dimension to exceed five times least dimension.
- .3       Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
  - .1       Natural sand.
  - .2       Manufactured sand.
  - .3       Screenings produced in crushing of quarried rock, boulders, gravel or slag.

- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
  - .1 Crushed rock.
  - .2 Gravel and crushed gravel composed of naturally formed particles of stone.
  - .3 Light weight aggregate, including slag and expanded shale.

## **2.2 SOURCE QUALITY CONTROL**

- .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.
- .2 If, in opinion of Departmental Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
- .3 Advise Departmental Representative four (4) weeks in advance of proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Processing
  - .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
  - .2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Departmental Representative.
  - .3 Wash aggregates, if required to meet specifications. Use only equipment approved by Departmental Representative.
  - .4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.
- .2 Handling
  - .1 Handle and transport aggregates to avoid segregation, contamination and degradation.
- .3 Stockpiling
  - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.
  - .2 Stockpile aggregates in sufficient quantities to meet Project schedules.
  - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

- .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.
- .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
- .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 h of rejection.
- .7 Stockpile materials in uniform layers of thickness as follows:
  - .1 Max 1.5 m for coarse aggregate and base course materials.
  - .2 Max 1.5 m for fine aggregate and sub-base materials.
  - .3 Max 1.5 m for other materials.
- .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .9 Do not cone piles or spill material over edges of piles.
- .10 Do not use conveying stackers.
- .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

### **3.2 CLEANING**

- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .2 Remove any unused aggregates from site.

**END OF SECTION**

## **Part 1 General**

### **1.1 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D422-63(2007), Standard Test Method for Particle-Size Analysis of Soils.
  - .4 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ; ) (600 kN-m/m ).
  - .5 ASTM D1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ; ) (2,700 kN-m/m).
  - .6 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
    - .1 CSA-A3001-03, Cementitious Materials for Use in Concrete.
  - .2 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

### **1.2 DEFINITIONS**

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
  - .1 Rock: any solid material in excess of 0.25 m<sup>3</sup> and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m<sup>3</sup> bucket. Frozen material not classified as rock.
  - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .4 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .5 Unsuitable materials:

- .1 Weak and compressible materials under excavated areas.
- .2 Frost susceptible materials under excavated areas.
- .3 Frost susceptible materials:
  - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.2.
  - .2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45
  - .3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.
- .6 Un-shrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

### 1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Samples:
  - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Inform Departmental Representative at least 4 weeks prior to commencing Work, of proposed source of fill materials and provide access for sampling.
  - .3 Submit 70 kg samples of type of fill specified including representative samples of excavated material.
  - .4 Ship samples prepaid to Departmental Representative in tightly closed containers to prevent contamination.

### 1.4 QUALITY ASSURANCE

- .1 Qualification Statement: submit proof of insurance coverage for professional liability.
- .2 Submit design and supporting data at least 2 weeks prior to commencing Work.
- .3 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Saskatchewan, Canada.
- .4 Keep design and supporting data on site.
- .5 Engage services of qualified professional Engineer who is registered or licensed in Province of Saskatchewan, Canadian in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.

## **1.5 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 Divert excess aggregate materials from landfill to local quarry or recycling facility for reuse as directed by Departmental Representative.

## **1.6 EXISTING CONDITIONS**

- .1 Examine soil report for original B3 building.
- .2 Buried services:
  - .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
  - .2 Prior to commencing excavation Work, notify Departmental Representative or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Departmental Representative or authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.
  - .3 Confirm locations of buried utilities by careful test excavations.
  - .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
  - .5 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing. Costs for such Work to be paid by Departmental Representative.
  - .6 Record location of maintained, re-routed and abandoned underground lines.
  - .7 Confirm locations of recent excavations adjacent to area of excavation.
- .3 Existing buildings and surface features:
  - .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, pavement, survey bench marks and monuments which may be affected by Work.
  - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair to approval of Departmental Representative.
  - .3 Where required for excavation, cut roots or branches as approved by Departmental Representative.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Type 1 and Type 2 fill: properties to Section 31 05 16 - Aggregate Materials and the following requirements:
  - .1 Crushed, pit run or screened stone, gravel or sand.
  - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.

.3 Table:		
Sieve Designation	% Passing	
	Type 1	Type 2
75 mm	-	100
50 mm	-	-
37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-
9.5 mm	50-100	-
4.75 mm	30-70	22-85
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
0.075 mm	3-8	0-10

.2 Type 3 fill: selected material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

.3 Unshrinkable fill: proportioned and mixed to provide:

- .1 Maximum compressive strength of 0.4 MPa at 28 days.
- .2 Maximum Portland cement content of 25 kg/m<sup>3</sup> with 40% fly ash replacement: to CAN/CSA-A3000-A5, Type 10.
- .3 Minimum strength of 0.07 MPa at 24 h.
- .4 Concrete aggregates: to CAN/CSA-A23.1.
- .5 Portland cement: Type 10.
- .6 Slump: 160 to 200 mm.

## **Part 3 Execution**

### **3.1 SITE PREPARATION**

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly in accordance with Section 02 41 13 - Selective Site Demolition.

### **3.2 PREPARATION/PROTECTION**

- .1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.

### **3.3 STRIPPING OF TOPSOIL**

- .1 Commence topsoil stripping of areas as directed by Departmental Representative after area has been cleared of brush, weeds, and grasses and removed from site.

- .2 Strip topsoil to depths as indicated. Do not mix topsoil with subsoil.
- .3 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2 m.
- .4 Dispose of unused topsoil off site.

### **3.4 STOCKPILING**

- .1 Stockpile fill materials in areas designated by Departmental Representative. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

### **3.5 SHORING, BRACING AND UNDERPINNING**

- .1 Construct temporary Works to depths, heights and locations as approved by Departmental Representative.
- .2 During backfill operation:
  - .1 Unless otherwise as indicated or as directed by Departmental Representative, remove sheeting and shoring from excavations.
  - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
  - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at an elevation at least 500 mm above toe of sheeting.
- .3 When sheeting is required to remain in place, cut off tops at elevations as indicated.
- .4 Upon completion of substructure construction:
  - .1 Remove cofferdams, shoring and bracing.

### **3.6 DEWATERING AND HEAVE PREVENTION**

- .1 Keep excavations free of water while Work is in progress.
- .2 Submit for Departmental Representative's review details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in manner not detrimental to public and private property, or any portion of Work completed or under construction.



- .6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

### **3.7 EXCAVATION**

- .1 Excavate to lines, grades, elevations and dimensions as indicated and specified in related sections.
- .2 Remove concrete, asphalt paving, walks and other obstructions encountered during excavation in accordance with Section 02 41 13 - Selective Site Demolition.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .5 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
- .6 Keep excavated and stockpiled materials a safe distance away from edge of trench as directed by Departmental Representative.
- .7 Restrict vehicle operations directly adjacent to open trenches.
- .8 Dispose of surplus and unsuitable excavated material off site.
- .9 Do not obstruct flow of surface drainage or natural watercourses.
- .10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .11 Notify Departmental Representative when bottom of excavation is reached.
- .12 Obtain Departmental Representative approval of completed excavation.
- .13 Remove unsuitable material from trench bottom to extent and depth as directed by Departmental Representative.
- .14 Correct unauthorized over-excavation as follows:
  - .1 Fill under bearing surfaces and footings with concrete specified for footings.
  - .2 Fill under other areas with Type 2 fill compacted to not less than 96 % of corrected maximum dry density.
- .15 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.

### **3.8 FILL TYPES AND COMPACTION**

- .1 Use fill of types as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698 ASTM D1557 in accordance with Section 31 05 10 - Corrected Maximum Dry Density for Fill.
  - .1 Exterior side of perimeter walls: use Type 3 fill to subgrade level. Compact to 95% of maximum dry density.
  - .2 Within building area: use Type 2 to underside of base course for floor slabs. Compact to 100% of maximum dry density.
  - .3 Under concrete slabs: provide 150 mm compacted thickness base course of Type 1 fill to underside of slab. Compact base course to 100%.
  - .4 Place un-shrinkable fill in areas as indicated.

### **3.9 BEDDING AND SURROUND OF UNDERGROUND SERVICES**

- .1 Place and compact granular material for bedding and surround of underground services as indicated and as specified in the appropriate Sections.
- .2 Place bedding and surround material in unfrozen condition.

### **3.10 BACKFILLING**

- .1 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfilling around installations.
  - .1 Place bedding and surround material as specified elsewhere.
  - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
  - .3 Place layers simultaneously on both sides of installed Work to equalize loading.
  - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
    - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative or:
    - .2 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.
- .6 Place un-shrinkable fill in areas as indicated.
- .7 Consolidate and level un-shrinkable fill with internal vibrators.

**3.11 RESTORATION**

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Construction/Demolition Waste Management And Disposal, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Replace topsoil as indicated.
- .3 Reinstate lawns to elevation which existed before excavation.
- .4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .5 Clean and reinstate areas affected by Work as directed by Departmental Representative.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1       Canadian Standards Association (CSA)
  - .1       CSA-A23.2-, Methods of Test for Concrete.
  - .2       CAN/CSA-G30.18-, Billet Steel Bars for Concrete Reinforcement.
  - .3       CSA-G40.21-, Structural Quality Steel.
  - .4       CAN/CSA-S16.1-, Limit States Design of Steel Structures.
  - .5       CSA W48-, Filler Metals and Allied Materials for Metal Arc Welding.

**1.2                SHOP DRAWINGS**

- .1       Submit shop drawings for reinforcing steel in accordance with Section 01 33 00 - Submittal Procedures.

**1.3                SOILS REPORT**

- .1       A copy of the geotechnical investigation is available at the Consultant's office for information purposes only.
- .2       The test boring data and the information given in soils report is believed to be correct and is given for the assistance of the Contractor, who shall be solely responsible for any interpretation which he may place on this information.
- .3       No warranty is made by the Owner to information contained in this report.
- .4       Should sub-surface conditions be found to vary substantially from those indicated in the Soils Report, notify the Consultant immediately

**1.4                WASTE MANAGEMENT AND DISPOSAL**

- .1       Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

**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       Steel casing: to ASTM A36/A36M .

**Part 3            Execution**

**3.1                FIELD RECORDS**

- .1        Maintain drilling record for each pile, including:  
  
          depth of pile, cut-off elevation, date and time of casting, reinforcing, size and length
- .2        Provide Consultant with copy of records.

**3.2                INSTALLATION**

- .1        Bore holes to diameters and depths as indicated
- .2        Protective steel casing:
  - .1            Where required, use steel protective casing. Ensure penetration of casing to required depths either by self mass or driving.
- .3        Dispose of excavated materials.
- .4        Testing agency to inspect pile excavation prior to placing of concrete. Remove loose material, foreign matter and water.
- .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. Place concrete in one continuous pour in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .7        Where required by ground conditions, the holes shall be sleeved with steel casing, minimum 5 mm. thick, to ensure a clean open hole. Where the soil is insufficiently stable to maintain a vertical shaft without sloughing in, the steel sleeve shall remain in position until the hole has been dewatered, reinforcing steel has been set in position and concrete is about to be placed in the hole. The casing shall be withdrawn at such a time and in such a manner as to prevent ground water or soil from entering the hole.
- .8        The Contractor shall include in his bid for all steel sleeving required for the installation of the piles.
- .9        All holes, whether sleeved or not, shall be dewatered before any concrete is placed therein.
- .10       All piles shall be installed in one continuous pour to finished pile cut-off elevation. Where the pile projects above ground level the pile projection shall be formed using removable steel casing or Sonotube forms not smaller in diameter than that of the pile.
- .11       Remove boulders as required and continue pile to specified depth. If boulders cannot be removed with reasonable effort, notify Consultant immediately. Changes to pile design or locations must be approved by the Consultant in writing.
- .12       Where steel protective casing is left in place, fill void space between casing and shaft excavation with concrete.

### **3.3 PLACING REINFORCING STEEL**

- .1 Reinforcing steel shall be placed immediately prior to concrete placing and the steel shall be securely held to maintain position during concrete placing and until the concrete has hardened. Place reinforcing in such a manner as to prevent loose earth or debris from falling into the hole.
- .2 No splices in reinforcing steel shall be permitted unless specifically shown on the drawings or approved by the Consultant. Where such splices are permitted, they shall be a minimum of 36 bar diameters and splices in adjacent bars shall be staggered.
- .3 Minimum cover to all pile reinforcing including ties shall be 75 millimeter or as called for on drawings.
- .4 Ties or spiral reinforcing shall be securely wired to main reinforcing at each bar intersection. No tack welding of reinforcing cages will be permitted. Provide additional reinforcing bars as required to securely brace the reinforcing steel cage.
- .5 Care shall be taken to clean all form oil or other deleterious substances from the reinforcing steel.

### **3.4 PLACING CONCRETE**

- .1 Concrete shall be handled to the place of final deposit in such a manner as to prevent segregation of the concrete.
- .2 Concrete shall be placed continuously as soon as possible after the hole has been drilled, cleaned out and reinforcing steel has been secured in position. Every care shall be taken to ensure that the hole is completely filled with concrete.
- .3 Concrete in the piles shall be compacted by the use of high frequency vibrators. The vibrator shall be lowered down the drilled holes, applied directly to the concrete and gradually withdrawn as the concrete placing progresses. Personnel experienced in vibrating concrete shall be used on this work and care shall be taken not to over-vibrate.
- .4 Protect concrete from rain, frost or snow during and after placing until the concrete has hardened.
- .5 Immediately after the concrete pouring is completed, clean all projecting reinforcing steel.

### **3.5 TOLERANCES IN PILE SIZE, LOCATION AND ALIGNMENT**

- .1 The maximum permissible error in location at cut-off shall be 40 millimeters in any direction. All piles shall be placed not more than two percent of their lengths out of plumb. The elevation of the top of all piles shall be within 25 millimeters of the elevation called for on the structural drawings. All reinforcing steel clearances shall be within a tolerance of + 12 millimeters of the dimension called for on the drawings.
- .3 The minimum diameter of all piles shall be as called for on the drawings.

- .4 Where piles have been placed outside the above tolerances, such piles may be rejected by the Consultant. The Contractor shall place additional piles and pile caps as directed by the Consultant to replace rejected piles and such additional piles and pile caps shall be installed at not additional cost to the contract.
- .5 The pile lengths called for on the drawings are the minimum lengths required below the pile cut-off elevations shown on the drawings.

### **3.6 COLD WEATHER REQUIREMENTS**

- .1 When the air temperatures are below 5°C., care shall be taken to keep forms and reinforcing steel free from ice.
- .2 Provision shall be made to protect the concrete from rain or snow while placing and after placing, until the concrete has hardened.
- .3 Where piles are drilled through frozen ground, enlarge the pile diameter by 100 mm for that portion of the pile.

### **3.7 PILE SHAFT ENCLOSURES**

- .1 All pile holes are to be protected with an enclosure, acceptable to the Consultant.

### **3.8 SITE CLEAN-UP**

- .1 Leave the site neat, tidy, free of plant and/or equipment and in safe condition. Remove excavation material from site or deposit on site as directed by the Consultant.

### **3.9 DEFECTIVE PILES**

- .1 Correct as directed all piles not meeting requirements of this specification at no additional cost to the contract.

**END OF SECTION**