

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 14 13 – Soil Stripping and Stockpiling.
- .2 Section 31 22 13 – Rough Grading.

1.2 REFERENCES

- .1 City of Winnipeg Standard Construction Specification CW 3010-R4 Clearing and Grubbing.

1.3 DEFINITIONS

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
- .2 Grubbing consists of excavation and disposal of stumps and roots, boulders and rock fragments larger than 300mm ø to not less than specified depth below existing ground surface.

1.4 STORAGE AND PROTECTION

- .1 Prevent damage to trees, bench marks, existing pavement, utility lines, and root systems of trees which are to remain.
 - .1 Repair damaged items to approval of Contract Administrator. Replace trees designated to remain, if damaged, as directed by Contract Administrator.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Inspect site and verify with Contract Administrator items designated to remain.
- .2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
 - .1 Notify Contract Administrator immediately of damage to or when unknown existing utility lines are encountered.
 - .2 When utility lines which are to be removed are encountered within area of operations, notify Contract Administrator ample time to minimize interruption of service.
- .3 Notify utility authorities before starting clearing and grubbing.

- .4 Keep roads and walks free of dirt and debris.

3.2 CLEARING

- .1 Clear as indicated on drawings and directed Contract Administrator, by cutting at height of not more than 300mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 1000mm above ground surface.
- .2 Cut off branches overhanging area cleared as directed by Contract Administrator.
- .3 Cut off unsound branches on trees designated to remain as directed by Contract Administrator.

3.3 GRUBBING

- .1 Grub out stumps and roots to not less than 300 mm below ground surface.
- .2 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m³.
- .3 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.

3.4 REMOVAL AND DISPOSAL

- .1 Remove cleared and grubbed materials off site to disposal area located by the Contractor and approved by the Contract Administrator.
- .2 Chip and stockpile cleared and grubbed vegetative material on site as directed by Contract Administrator.
- .3 Remove diseased trees identified by Contract Administrator and dispose of this material to approval of Contract Administrator.

3.5 FINISHED SURFACE

- .1 Leave ground surface in condition suitable for immediate stripping of topsoil to approval of Contract Administrator.

3.6 RESTORATION

- .1 Repair any items damaged by Work of this Section to approval of Contract Administrator.
- .2 Replace any trees designated to remain, if damaged by Work of this Section, as directed by Contract Administrator.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 11 00 – Clearing and Grubbing.
- .2 Section 32 91 21 – Topsoil Placement and Grading.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 EXECUTION

3.1 STRIPPING OF TOPSOIL

- .1 Remove topsoil before construction procedures commence to avoid compaction of topsoil.
- .2 Handle topsoil only when it is dry and warm.
- .3 Remove vegetation and brush from targeted areas by non-chemical means to disposal area located by Contractor and approved by Contract Administrator.
- .4 Strip topsoil by scraper to depths as indicated as directed by Contract Administrator.
 - .1 Avoid mixing topsoil with subsoil.
- .5 Pile topsoil by mechanical hoe in berms in locations as directed by Contract Administrator
 - .1 Stockpile height not to exceed 2.5 – 3 m.
- .6 Dispose of unused topsoil in location as indicated by Contract Administrator.
- .7 Protect stockpiles from contamination and compaction.
- .8 Cover topsoil that has been piled for long term storage, with trefoil or grass to maintain agricultural potential of soil.

3.2 PREPARATION OF GRADE

- .1 Verify that grades are correct and notify Contract Administrator if discrepancies occur. Do not begin work until instructed by Contract Administrator
 - .1 Grade area only when soil is dry to lessen soil compaction.
 - .2 Grade soil with scrapers establishing natural contours and eliminating uneven areas and low spots, ensuring positive drainage.

3.3 PLACING OF TOPSOIL

- .1 Place topsoil only after Contract Administrator has accepted subgrade.

- .2 Spread topsoil during dry conditions in uniform layers not exceeding 200 mm, over unfrozen subgrade free of standing water.
- .3 Establish traffic patterns for equipment to prevent driving on topsoil after it has been spread to avoid compaction.

3.4 CLEANING

- .1 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 SECTIONS

- .1 Section 31 11 00 - Clearing and Grubbing.
- .2 Section 31 23 16 – Excavating
- .3 Section 31 23 23 – Backfilling.

1.2 REFERENCES

- .1 City of Winnipeg Standard Construction Specification CW 3170-R3
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM D698-[91(1998)], Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m ;).

1.3 EXISTING CONDITIONS

- .1 Examine geotechnical investigation report available from Contract Administrator.
- .2 Known underground and surface utility lines and buried objects are as indicated on site plan.
- .3 Refer to dewatering in Section 31 23 16 - Excavating.

1.4 PROTECTION

- .1 Protect existing bench marks, pavement, surface and underground utility lines which are to remain as directed by Contract Administrator. If damaged, restore to original or better condition unless directed otherwise.
- .2 Maintain access roads to prevent accumulation of construction related debris on roads.

Part 2 Products

2.1 MATERIALS

- .1 Backfill material: in accordance with of Section 31 23 23 - Backfilling.
- .2 Common Clay Fill: in accordance with City of Winnipeg Standard Construction Specification CW 3110-R10
- .3 Granular Base and Subbase Fill: in accordance with City of Winnipeg Standard Construction Specification CW 3110-R10
- .4 Excavated or graded material existing on site may be suitable to use as fill for grading work if approved by Contract Administrator.

Part 3 Execution

3.1 STRIPPING OF TOPSOIL

- .1 Strip existing topsoil in accordance with Section 31 14 13 – Soil Stripping and Stockpiling.

3.2 GRADING

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Uniformly slope surfaces between grades indicated, unless otherwise noted.
- .3 Compact subgrade to 98% standard proctor maximum dry density. Subexcavate soft areas and replace with granular fill as directed by Contract Administrator.
- .4 Rough grade to following depths below finish grades as indicated on drawings and as follows:
 - .1 100 mm for grassed areas.
 - .2 400 mm for shrub beds.
- .5 Slope rough grade away from building 1:50 minimum.
- .6 Grade swale to depth as indicated.
- .7 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .8 Place fill in maximum 150mm lifts. Compact to required density prior to placing additional lifts.
- .9 Compact filled and disturbed areas to standard proctor density as follows:
 - .1 85% under landscaped areas.
 - .2 95 % under paved and walk areas.
- .10 Do not disturb soil within branch spread of trees or shrubs to remain.

3.3 SURPLUS MATERIAL

- .1 Remove surplus material and material unsuitable for fill, grading or landscaping as directed by Contract

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Excavating for building foundations.

1.2 RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.
- .2 Section 01 52 00 - Construction Facilities.
- .3 Section 31 23 23 - Backfilling.

Part 2 Products

Not Used.

Part 3 Execution

3.1 PREPARATION

- .1 Identify required lines, levels, contours, and datum locations.
- .2 Locate, identify, and protect utilities that remain from damage.
- .3 Notify utility company to remove and relocate utilities.
- .4 Protect plant life, lawns and other features remaining as a portion of final landscaping.
- .5 Protect bench marks, survey control points, existing structures, from excavating equipment and vehicular traffic.

3.2 EXCAVATING GENERAL

- .1 Excavate subsoil to accommodate building foundations and crawlspace and site construction operations.
- .2 Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with Section 31 23 23.
- .3 Slope banks with machine to angle of repose or less until shored.
- .4 Do not interfere with 45 degree bearing splay of foundations.
- .5 Grade top perimeter of excavating to prevent surface water from draining into excavation.
- .6 Hand trim excavation. Remove loose matter.

- .7 Remove lumped subsoil, boulders, and rock.
- .8 Notify Contract Administrator of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- .9 Correct areas over excavated in accordance with Section 31 23 23.
- .10 Stockpile excavated material in area designated on site; remove excess or unsuitable material from site.

3.3 EXCAVATION FOR GRADE SUPPORTED SLABS

- .1 Excavate to the design subgrade ensuring all surficial vegetation, organic soils and underlying fill materials within slab area have been removed to a minimum depth of 0.6 m below existing grade.
- .2 Grade supported slabs include the garage floor; Generator pad, transformer pad, condenser pad and storage compound pad.

3.4 FIELD QUALITY CONTROL

- .1 Section 01 45 00 - Quality Control.
- .2 Provide for visual inspection of bearing surfaces.

3.5 PROTECTION

- .1 Prevent displacement or loose soil from falling into excavation; maintain soil stability.
- .2 Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Building perimeter backfilling to subgrade elevations.
- .2 Fill under slabs-on-grade within building footprint.
- .3 Fill for over-excavation.
- .4 Subsurface Drainage.
- .5 Consolidation and compaction as scheduled.
- .6 Sheet vapour retarder and ballast cover in crawl space.

1.2 RELATED SECTIONS

- .1 Section 01 4500 - Quality Control.
- .2 Section 31 23 16 - Excavating.
- .3 Section 03 30 00 - Cast-in-place Concrete: Concrete materials.

1.3 SITE COMPACTION TESTING

- .1 Testing of compacted fill materials will be performed by an independent inspection firm appointed and paid for by the City. Testing will be performed so as to least encumber the performance of the work.
- .2 The City will pay for the cost of one (1) series of tests only, on the area being evaluated. Pay for costs of additional testing as required due to improper performance of work.
- .3 When work of this section or portions of work are completed to own satisfaction, notify the testing firm to perform density tests. Do not proceed with additional portion of work until results have been verified and approved.
- .4 If, during progress of Work, tests indicate that compacted materials do not meet specified requirements, remove defective work, replace and retest at own expense, as directed by the Contract Administrator.
- .5 Ensure compacted fills are tested and approved before proceeding with placement of surface materials.

1.4 SAMPLES

- .1 Submit minimum 10 lb. samples of each type of fill materials to be used. Forward samples to appointed testing firm. Pack tightly in containers to prevent contamination.

1.5 REFERENCES

- .1 ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- .2 ASTM D3017 - Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

Part 2 Products

2.1 FILL MATERIALS

- .1 Common Fill: Excavated clay fill material; clean, sound, free of boulders, cobbles, topsoil, friable material and organic material, approved for reuse by Contract Administrator.
- .2 Granular Base Course: minimum 35% of the material retained on the 1.75 mm sieve shall consist of crushed materials; clean angular, crushed natural stone, free of shale, clay, friable material, debris, graded within the following limits.

| Sieve Size | Percent Passing |
|------------|-----------------|
| 19 mm | 100 |
| 16 mm | 80 to 100 |
| 4.75 mm | 40 to 70 |
| 2 mm | 25 to 55 |
| 0.450 mm | 15 to 30 |
| 0.75 mm | 8 to 15 |

- .3 Granular Sub-Base Course: minimum 15% of the material retained on the 1.75 mm sieve shall consist of crushed materials; clean angular, crushed natural stone, free of shale, clay, friable material, debris, graded within the following limits.

| Sieve Size | Percent Passing |
|------------|-----------------|
| 38 mm | 100 |
| 25 mm | 85 to 100 |
| 4.75 mm | 25 to 80 |
| 0.450 mm | 15 to 40 |
| 0.75 mm | 8 to 18 |

- .4 Clean gravel: clean natural stone 12-25 mm size, free from fines, shale, clay and friable materials
- .5 Sand: clean, natural, free from silt, clay, loam, friable or soluble materials and organic matter.

2.2 ACCESSORIES

- .1 Vapour Retarder: 0.25 mm thick, heavy duty polyethylene.

- .2 Subsurface drainage: 100 mm inch perforated and non-perforated corrugated plastic tubing c/w related items as manufactured by Big 'O' Drain Tile Co. Ltd. Provide geotextile wrap for perforated drain tile.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify dampproofing and insulation installation has been inspected.
- .2 Verify structural ability of unsupported walls to support imposed loads by the fill.

3.2 PREPARATION

- .1 Compact subgrade to density requirements for subsequent backfill materials.
- .2 Cut out soft areas of subgrade not capable of compaction in place. Backfill with common excavated fill and compact to density equal to or greater than requirements for subsequent fill material.
- .3 Scarify and proof roll subgrade surface to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.3 BACKFILLING

- .1 Backfill areas to contours and elevations with unfrozen materials.
- .2 Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- .3 Granular Base and Sub-Base Fill: Place and compact materials in equal continuous layers not exceeding 200 mm compacted depth.
- .4 Clay Fill Type : Place and compact material in equal continuous layers not exceeding 150 mm compacted depth.
- .5 Employ a placement method that does not disturb or damage other work.
- .6 Maintain optimum moisture content of granular backfill materials to attain required compaction density.
- .7 Maintain greater than optimum moisture content of clay backfill materials. Clay materials may not be placed over granular fill or bridging materials.
- .8 Backfill against supported foundation walls.
- .9 Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- .10 Fill building perimeter with well compacted fill topped with 600 mm medium to high plastic clay cap.

- .11 Slope grade away from building minimum 2% slope, unless noted otherwise.
- .12 Make gradual grade changes. Blend slope into level areas.
- .13 Remove surplus backfill materials from site.
- .14 Leave fill material stockpile areas free of excess fill materials.

3.4 SUB-GRADE DRAINAGE

- .1 Install perforated corrugated plastic tubing (weeping tile) and related items on min. slope of 2%.
- .2 Cover drainage tubing with 400 mm minimum top and 300 mm minimum side cover with clean stone.
- .3 Ensure weeping tile has been inspected by Consultant prior to covering with stone.

3.5 PROTECTION OF FINISHED WORK

- .1 Protect finished Work .

3.6 SCHEDULE

- .1 Interior Crawl Spaces:
 - .1 Common fill, rough grade crawlspace area, cut and fill as required to contours, level and elevations indicated. Fill materials to be suitable excavated material compacted to 95 percent,
 - .2 Cover with polyethylene vapour barrier and 75 mm sand. Lap vapour barrier 300 mm and tape joints.
- .2 Interior Slab-On-Grade (garage floor):
 - .1 Compact subgrade to 98 percent.
 - .2 Granular Sub-Base, 200 mm thick compacted to 98 percent
 - .3 Granular Base, 150 mm, compacted to 98 percent.
 - .4 Additional fill between subgrade and Sub-Base: Common fill compacted to 98%.
- .3 Exterior Slab-On-Grade (Generator pad, transformer pad, condenser pad, and storage compound pad):
 - .1 Compact subgrade to 98 percent.
 - .2 Granular Sub-Base, 200 mm thick compacted to 98 percent
 - .3 Granular Base, 150 mm, compacted to 98 percent.
 - .4 Additional fill between subgrade and Sub-Base: Common fill compacted to 98%.

- .4 Exterior Side of Foundation Walls:

- .1 Common Fill; topped with 600 mm medium to high plastic clay cap. to subgrade elevation , each lift, compacted to 95 percent.

END OF SECTION

Part 1 General

SECTION INCLUDES

- .1 Cast-in-place concrete piles.

1.2 RELATED SECTIONS

- .1 Section 03 30 00 - Cast-in-Place Concrete
- .2 Section 03 20 00 – Concrete Reinforcement

1.3 EXISTING SUB-SURFACE CONDITIONS

- .1 A geotechnical report is available for review at the office of the Contract Administrator. Contractor to formulate own conclusions and satisfy self as to the prevailing site conditions.

1.4 PROTECTION

- .1 Protect public and construction personnel, adjacent structures, services and work of other sections from hazards due to pile installations.

1.5 DESIGN CRITERIA

- .1 Pile allowable skin friction as stated on the contract drawings and in geotechnical report..

PART 2 Products

2.1 MATERIALS

- .1 Material requirements for piles are indicated on Drawings and in Section 03 30 00.

2.2 CONCRETE MIX

- .1 Mix concrete in accordance with Section 033000 to achieve design strengths and mixes as indicated on the Drawings.

PART 3 QUALIFICATIONS

- .1 Use fully experienced, qualified workers for piling work.
- .2 Submit proof of qualifications, and history of successfully completed, similar projects, when so requested.

PART 4 Execution

4.1 PREPARATION

- .1 Notify contract administrator at least 24 hours prior to piling to piling to arrange for inspection.

- .2 Locate and fix position of piles from established reference points indicated on drawings. Assume responsibility for the accuracy of such positions.

4.2 INSTALLATION

- .1 Install piles in proper locations to diameters and depths indicated on structural drawings. Install piles vertically, not out of plumb by more than 2% of pile length, nor out of location by more than 50 mm.
- .2 If obstructions are encountered, remove or fill holes with unshrinkable fill approved by the contract administrator and place new piles where directed by the contract administrator.
- .3 Keep drilled holes free of water and foreign materials.
- .4 Arrange for an inspection of pile shafts by the contract administrator prior to placement of reinforcing and concrete.
- .5 Place reinforcing steel as indicated on structural drawings. Provide suitable method of holding reinforcing steel in position for specified concrete coverage.
- .6 Carefully place concrete by means of vertical chute or elephant truck or other approved methods to prevent concrete from striking sides of shaft and to prevent foreign material from entering shaft.
- .7 Place concrete by means of tremie should an inflow of water occur that cannot be removed by pumping. Place to a height sufficient to affect a seal. Notify contract administrator prior to proceeding with this work.
- .8 Mechanically vibrate and compact top 3 m of each pile to produce a solid mass, free of honeycomb, air pockets, etc. Do not displace reinforcing steel.
- .9 Have temporary steel sleeves on site if required in conditions of non-cohesive soil or water seepage. Ensure penetration of casing to required depths either by self mass or driving. Withdraw casing in conjunction with concrete placing, keeping bottom of casing 600 mm below level of concrete.

4.3 COLD WEATHER CONDITIONS

- .1 When mean daily temperature is below 5°C, heat concrete aggregates and mix water to provide concrete temperature of 10°C to 30°C at placing.
- .2 After placing concrete, cover and heat, with approved heating device to prevent freezing of concrete.

4.4 PILE RECORD

- .1 Keep accurate piling records of all installed piles. Forward three (3) copies of piling records to the contract administrator on completion of piling work.

- .2 Pile records to indicate locations, diameters, top and bottom elevations and other pertinent data for each pile installed.

4.5 FOUNDATION INSPECTION

- .1 The contract administrator has full authority to reject work or materials that do not conform to the drawings or specifications and to take any action regarded as necessary to achieve a complete, satisfactory installation, as specified.
- .2 Cooperate with the contract administrator, who will approve pile borings, depths and placing of reinforcing steel.

4.6 EXCAVATED MATERIAL

- .1 As work proceeds, clean up and remove all excavated materials and debris. Leave site and all roads or other means of access to site clean and clear of all spillage.