

PART 1.0 - GENERAL

1.1 General Requirements

- .1 Section 31 22 01 is a 'Landscaping' Section and refers to those portions of the *Works* that are unique to the preparation of sub grade, by rough grading and filling to provide a base that will allow placing of growing medium (topsoil) to specified depths. This Section does not apply to grading prior to placement of paved or concreted surfaces.
- .2 This section must be referenced to, and interpreted simultaneously with, all other sections pertinent to the Works described herein.

1.2 Related Work

- .1 Section 31 11 00 - Clearing and Grubbing
- .2 Section 31 23 01 - Excavation, Trenching and Backfill
- .3 Section 31 05 17 - Aggregate and Granular Materials
- .4 Section 32 91 21 - Topsoil and Finish Grading
- .5 Section 32 92 20 - Seeding
- .6 Section 32 92 19 - Hydraulic Seeding
- .7 Section 32 92 23 - Sodding
- .8 Section 32 92 01 - Planting of Trees, Shrubs and Groundcovers

1.3 References

- .1 Master Municipal Construction Documents (MMCD) Volume II 2009 Edition
- .2 Canadian Landscape Standards (current edition)
- .3 Canadian System of Soil Classification (current edition)

1.4 Interpretation of the Work

- .1 The Landscape Contractor shall be fully acquainted with the existing site and shall fully understand the difficulties and restrictions attending the execution of the work under this contract. Any 'interpretations' by the Landscape Contractor of the meaning of any section of the contract drawings and specifications herein prior to submitting a tendered price shall not remove the responsibility of completing the *Works* as per the directions of the City Representative/Consultant, including all costs associated with the *Works*, should the Landscape Contractor's 'interpretation' be incorrect. Prior to submitting a tendered price for the *Works*, the Landscape Contractor must seek clarification from the City Representative/Consultant for any items within the contract drawings and specifications that may appear to be unclear or conflicting.

1.5 Protection

- .1 Examine site with City Representative/Consultant and obtain approval of previous work prior to commencing Site Grading.
- .2 Comply with MMCD General Conditions, Clause 4.3 - Protection of Work, Property and the Public and, MMCD General Conditions, Clause 4.5 - Errors, Inconsistencies or Omissions in the Contract Documents.
- .3 Protect existing fencing, natural features, bench marks, existing buildings, existing pavement, sub surface and surface utility lines, and water courses and miscellaneous items noted on contract drawings as to remain.
- .4 Protect all existing trees, landscape plant beds, miscellaneous plant material and their associated root areas within the area to be rough graded that have been identified to remain on the contract drawings.
- .5 Protect all existing trees, landscape plant beds, miscellaneous plant material and their associated root areas that are outside of area to be rough graded.
- .6 Notify the Consultant immediately if any damage occurs.
- .7 Maintain access routes to prevent accumulation of mud on roads. Use all means necessary to control dust on and near the work caused by operations
- .8 The Contractor, at no cost to the Owner shall make good all damages incurred during the rough grading operation.

1.6 Quality Assurance

- .1 The City Representative/Consultant is to inspect and approve all stages of the work.
 - .1 Provide forty-eight (48) hours notice to the City Representative/Consultant when inspection is required.
- .2 At the City Representative/Consultant discretion, a licensed testing agency will be retained by the Contractor to perform periodic testing of the sub grade preparation to demonstrate proctor density has been achieved at no extra cost to the Owner.
- .3 Remove any base materials which are unacceptable for required sub-grade bearing capacities or Corrected Maximum Dry Density (MPD) as specified.

1.7 Coordination

- .1 The work shall include;
 - .1 Stripping and stockpiling of approved onsite fill material
 - .2 Importing and placement of fill material in place of unsuitable sub grade material
 - .3 Grading operation to attain sub grade design grades
 - .4 Compaction of fill materials
 - .5 Removal and off-site disposal of unsuitable material.
- .2 If sub grade non-structural, or structural, fills are required to meet design sub grades, use granular material as per MMCD Section 31 05 17 - Aggregate and Granular Materials.
- .3 Over Excavation
 - .1 Based on the Geotechnical Report prepared by the Consultant, the City Representative/Consultant does not anticipate need for over excavation unless it is discovered that conditions differ from those encountered at test hole locations. These changes or variations may be one of the following:
 - .1 Organics or topsoil encountered below the anticipated design sub grade elevations for:
 - .1 Footings
 - .2 Soft or wet, silty with clay soils within the sub grade.
 - .3 Buried concrete, wood debris or old foundations.
 - .2 If these conditions are encountered the contractor must notify the City Representative/Consultant, prior to over excavation.
 - .3 If unsuitable bearing materials are encountered at indicated elevations, carry excavation deeper and replace excavated material with suitable materials as directed by the City Representative/Consultant.
 - .4 Perform over excavation only by written authorization of the City Representative/Consultant. If additional over excavation is required, City Representative/Consultant shall be notified so that exact quantities can be measured.
- .4 Unauthorized Excavation
 - .1 Unauthorized excavation shall be any excavation beyond elevations and dimensions indicated, without specific direction by the City Representative/Consultant.
 - .2 The Landscape Contractor shall fill unauthorized excavation with approved fill material, to elevations and dimensions indicated, to the requirements of this section.
 - .3 Unauthorized excavation and remedial work shall be at Landscape Contractor's expense.

1.8 Measurement and Payment

- .1 Measurement and payment for rough site grading shall be by lump sum of area rough grading and, shall include cut and fill excavation and its on-site redistribution and compaction to design elevations and grades for the entire area graded.
- .2 Measurement and payment for removal and off site disposal of soft or unsuitable material revealed during proof-rolling include, all remedial work, equipment, materials and requirements for over excavation (over the sub grade design elevations) shall be made by loose truck box volume as determined by City Representative/Consultant.
- .3 Loads removed offsite that are not witnessed by the City Representative/Consultant will not be paid.

PART 2.0 – PRODUCTS

2.1 Materials(if backfill required)

.1 Fill Material

- .1 Soft Landscape Areas: Loose, friable, well drained, native on site fill or imported fill shall be free of rocks and boulders in excess of 100 mm (4") in size. Provide sample for review and approval by the City Representative/Consultant prior to use or import to site. Use suitable existing inorganic material and compact to at least 80% Standard Proctor maximum dry density.

.2 Type

- .1 Granular and fill material shall be as identified in:
 - .1 Section 31 23 01 – Excavating, Trenching and Backfilling
 - .2 Section 31 05 17 – Aggregate and Granular Materials
 - .3 Excavated or graded material conforming to the backfill specification may be used as site fill or for grading work after approval by the City Representative/Consultant.
 - .4 The City Representative/Consultant reserves the right to approve which of the excavated material is to be reused, and which is to be disposed offsite, based upon material quality and suitability for its intended purpose.
 - .5 Protect approved material from contamination.
 - .6 Pit Run Gravel
 - .1 To be well graded granular material, substantially free from clay clumps, organic material and other extraneous material, screened to remove all stones in excess of 75mm. Material to compact to specified density and conform to the following gradations:

<u>Sieve Size (mm)</u>	<u>Percent passing (%)</u>
75	100
50	70-100
25	50-100
4.75	22-100
2.36	10-85
0.075	2-8

- .7 Recycled concrete free from contaminated and other extraneous materials conforming to the specified gradations may be used as pit run gravel.

PART 3.0 – EXECUTION

3.1 Rough Grade Operations

- .1 Rough grade site to contours, lines, grades, elevations, and dimensions to the following minimum sub grade depths allowing for depths of finished surface treatment as indicated on contract drawings and to accommodate planting areas shall be as follows:

Depths

150mm(6")
300mm(12")
450mm(18")
900mm(36")

Areas

Lawn
Perennials, Grasses and Groundcovers
Shrub Planting
Tree Planting

- .2 Remove and dispose all deleterious material, grass sod, organic material, roots, branches, stones, concrete, asphalt waste, building materials or any other elements which may interfere with the installation of proposed hard landscape components noted on contract drawings. All material shall be disposed of in an approved off site disposal area.
- .3 Remove and dispose all deleterious material, grass sod, organic material, roots, branches, stones, concrete, asphalt waste, building materials, visible weeds and any other elements which may interfere with the healthy growth of the proposed landscape plant material. All material shall be disposed of in an approved off site disposal area.
- .4 Shape and roll alternately to obtain smooth, even and uniformly compacted sub grade surface. Finished sub grade shall have no irregularities exceed 15mm (5/8") when checked with a 3.0 metre (10'-0") straight edge placed in any direction.
- .5 Apply water as necessary during compaction to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is suitable for compaction.
- .6 Compaction Densities:
.1 Ensure that all rough grade sub grade areas are compacted to the following Modified Proctor Densities (MPD):
.1 Soft Landscape Areas - 80% MPD in compliance with ASTM D1557
.2 Hard Landscape Areas - 95% MPD in accordance with ASTM D1557
- .7 All landscape areas to be scarified to a depth of 200 mm (8") after compaction to ensure proper drainage.
- .8 Remove and dispose offsite all obstructions or debris encountered during excavation before any construction procedures commence to avoid contamination of sub grade.
- .9 Ensure the sub grade has a minimum gradient for positive subsurface drainage.
- .10 Re-usable common excavation may be stockpiled but must not cover any on-site stockpiled topsoil or grassed areas.
- .11 Do not disturb soil or rock below bearing surfaces.
- .12 Notify City Representative/Consultant when excavations are complete.
- .13 Excavation taken below depths shown on the Contract Drawings without the written authorization of the City Representative/Consultant must be filled at Landscape Contractor's expense.
- .14 If bearings are unsatisfactory, additional excavation will be authorized by City Representative/Consultant in writing, and paid for as per the contract unit price for common excavation.
- .15 Dispose of surplus and unsuitable excavated material offsite at an approved disposal area.
- .16 Do not obstruct flow of surface drainage or water courses.
- .17 Obtain City Representative/Consultant approval of completed excavation, backfilling and rough grading.
- .18 Hand trim tree exposed roots, remove and make firm areas of loose materials and debris from excavations.

3.2 Shortage and Surplus

- .1 Supply all necessary fill to meet backfilling and grading requirements.
- .2 Remove surplus material unsuitable for fill, grading or landscaping from site and dispose at an approved disposal area.

3.3 Dewatering

- .1 Keep excavations and construction site area free of water while work is in progress and protect against surface runoff.
- .2 Provide pumps, piping, temporary drains, trenches, sumps, and related equipment to remove water.
- .3 Provide settling basins, siltation fences, and or other siltation control facilities to remove suspended solids or other materials before discharging to storm sewers or water courses.
- .4 Submit for City Representative/Consultant review details of proposed dewatering methods. Maintain groundwater table a minimum of 300mm below elevations for sub grade.
- .5 Do not use sanitary sewers or private property for discharge of water.
- .6 Dispose of water in a manner not detrimental to the environment, public and private property, or any portion of work completed or under construction.

3.4 Grading Tolerances

- .1 General: Uniformly grade site, including adjacent transition areas. Smooth finish surface within specified tolerances of plus/minus 25mm; compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
- .2 Grade Control: During construction, maintain lines and grades including crown and cross-slope of sub grade course. Grading outside of the line defining the work of this contract shall consist of rough grading to grades indicated.
- .3 Grading Surface of Fill: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of ± 15 mm when tested with a 3 meter straight edge.
- .4 Compaction: After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.
- .5 Stripped grade below slabs shall be brought up to required elevation using free draining material in maximum 300 mm lifts and compacted to a minimum 98% Standard Proctor dry density.

3.5 Rough Fill Operations

- .1 Fill Placement – Soft Landscape: Place fill materials over acceptable sub grade to elevations and sections shown on contract drawings. Place in maximum 200 mm (8") lifts, compacting each lift to 80% Modified Proctor Density.
- .2 Fill Placement – Hard Landscape Areas: Place fill materials over acceptable sub grade to elevations and sections shown on contract drawings. Place in maximum 150mm (6") lifts. Each lift to be compacted to 95% MPD.
- .3 Ensure gradients conform to slopes and grades indicated on the contract drawings. Contractor shall inform the Consultant if the following grading guidelines cannot be attained, unless directed otherwise by City Representative/Consultant:

<u>Location</u>	<u>Minimum</u>	<u>Maximum</u>
Lawn and Grass	50:1(2%)	3:1(33%)
Grass Swales	50:1(2%)	10:1(10%)
Slope along inverts	6:1(16%)	3:1(33%)
Side Slopes - Planted areas	50:1(2%)	2.5:1(40%)

- .4 Ensure grade transitions are smooth and even and carried out such that ponding will not occur on sub grade surface.

3.6 Protection

- .1 Maintain finished surfaces in condition conforming to this section until acceptable by Contract Administrator.
- .2 Polyethylene sheets shall be placed on stockpiled re-usable native material to protect against erosion and contamination.
- .3 Polyethylene sheets shall be placed on all exposed surfaces to protect against erosion.
 - .1 Polyethylene sheets shall be pinned to prevent displacement by the wind.

3.7 Equipment

- .1 Excavation shall be carried out using an excavator equipped with a clean-up/landscape bucket to minimize disturbance to the sub grade.
- .2 Compaction equipment must be capable of obtaining required densities in materials on project. Equipment that does not achieve specified densities must be replaced or supplemented.

3.8 Finish Grading

- .1 See Section 2921 – Growing Medium Placement and Finish Grading for placement and finish grading of growing medium(topsoil).

END OF SECTION 31 22 01SS