

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart
- .3 Section 01 32 16.06 - Construction Progress Schedule - Critical Path Method (CPM).
- .4 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .5 Section 01 74 11 - Cleaning.

1.2 MEASUREMENT PROCEDURES

- .1 Measure supplying, placing and spreading topsoil and finish grading in cubic metres as determined from actual surface area covered and depth of topsoil specified in Statement of Work (SOW) or as specified by the Departmental Representative.
 - .1 Specified depth of topsoil: measured and approved by Departmental Representative after settlement and consolidation.
 - .2 Transportation, Delivery, Loading and Unloading of materials will be paid under section 02 41 16.
 - .3 All necessary tools, equipment required to install the topsoil will be paid under section 02 41 16.
 - .4 Labour will be paid under bid items.

1.3 PAYMENT

- .1 Testing of topsoil: Payment for tests are specified in Section 2.3.

1.4 REFERENCE STANDARDS

- .1 Agriculture and Agri-Food Canada
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment
 - .1 PN1340-2005, Guidelines for Compost Quality.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- .4 Statement of Work to be provided on a site specific basis.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality control submittals:

- .1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in the SOW.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 QUALITY ASSURANCE

- .1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart and Section 01 32 16.06 - Construction Progress Schedule - Critical Path Method (CPM).

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse or recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Divert unused soil amendments to suppliers or dispose of unused soil amendments in accordance with applicable regulations.
- .3 Do not dispose of unused soil amendments into sewer systems, into waterways, onto ground, or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 TOPSOIL

- .1 Topsoil for sodded areas and for capping contaminated sites: mixture of particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth.
 - .1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70 % sand, minimum 7 % clay, and contain 2 to 10 % organic matter by weight.
 - .2 Contain no toxic elements or growth inhibiting materials.
 - .3 Finished surface free from:
 - .1 Debris and stones over 50 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
 - .4 Consistence: friable when moist.

2.2 SOIL AMENDMENTS

- .1 Fertilizer:
 - .1 Fertility: major soil nutrients present in following amounts:
 - .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
 - .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.

- .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
- .5 Calcium, magnesium, sulphur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
- .6 Ph value: 6.5 to 8.0.
- .2 Peatmoss:
 - .1 Derived from partially decomposed species of Sphagnum Mosses.
 - .2 Elastic and homogeneous, brown in colour.
 - .3 Free of wood and deleterious material which could prohibit growth.
 - .4 Shredded particle minimum size: 5 mm.
- .3 Sand: washed coarse silica sand, medium to coarse textured.
- .4 Organic matter: compost Category A or B in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.
- .5 Use composts meeting Category B requirements for land fill reclamation and large scale industrial applications.
- .6 Limestone:
 - .1 Ground agricultural limestone.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- .7 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

2.3 SOURCE QUALITY CONTROL

- .1 Advise Departmental Representative of sources of topsoil to be utilized with sufficient lead time for testing.
- .2 Contractor is responsible for amendments to supply topsoil as specified.
- .3 Testing of topsoil will be carried out by testing laboratory designated and paid by Departmental Representative.
 - .1 Soil sampling, testing and analysis to be in accordance with Federal and Provincial standards.
 - .2 Topsoil should be natural soil with no contaminants. It should not contain any brick, ceramics, concrete, asphalt, plastics, wood, glass, food or animal wastes or other materials. Nor should it contain any petroleum hydrocarbons, polyaromatic hydrocarbons, polychlorinated biphenyls or other organic or contaminants at concentrations above laboratory detection limits.
 - .3 Soil metal concentrations should be below CCME Soil Quality Guidelines for Agricultural land use. Maximum acceptable concentrations of selected chemicals are as follows.

Maximum Acceptable Soil Concentrations for Fill or Topsoil

Parameter	Maximum Concentration (mg/kg)
Metals	
Antimony	20
Arsenic	17
Barium	500
Beryllium	4
Cadmium	1.4
Chromium	64
Cobalt	40
Copper	63
Lead	70
Mercury	6.6
Molybdenum	5
Nickel	45
Selenium	1
Silver	20
Thallium	1
Tin	5
Uranium	23
Vanadium	130
Zinc	200

- .4 Department Representative will have soil samples tested for the identified parameters.
- .5 Department Representative will pay for first round of testing.
- .6 If soil concentrations do not meet targets, contractor to provide alternate source of topsoil and pay for all future testing-related requirements including travel, time and expenses.

Part 3 Execution

3.1 GENERAL

- .1 Sodding, and topsoil placement, grading and capping for the site must wait for soil testing and analysis to be conducted by Departmental Representative.
- .2 Area to be backfilled or capped with a minimum of 0.3 m of compacted topsoil, as indicated in SOW. Sod to be placed on topsoil.

3.2 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 walkways, in accordance with provincial regulations.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
- .2 Place filter fabric over area to be covered.
- .3 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage. Sufficient grading for drainage to be away from onsite structures. Use good clean fill to the satisfaction of the Departmental Representative and compact to 98% Standard Proctor Density.
- .4 Ensure final grades will not impede building access. Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .2 Remove debris which protrudes more than 75 mm above surface.
 - .3 Dispose of removed material off site at the direction of the Departmental Representative.
- .5 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.4 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

- .1 Place topsoil after Departmental Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm.
- .3 For sodded areas keep topsoil 15 mm below finished grade.
- .4 Spread topsoil to following minimum depths after compacting and allowing for settlement.
 - .1 300 mm for sodded areas.
 - .2 150 mm for seeded areas.
 - .3 135 mm for sodded areas.
 - .4 300 mm for flower beds.
 - .5 500 mm for shrub beds.
- .5 Add sufficient topsoil and so outside the excavation area to blend into the surrounding ground with positive drainage. Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.5 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.

- .2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.
 - .1 Leave surfaces smooth, uniform and firm against deep foot-printing.
- .3 Blend covered areas into surrounding soil to ensure positive drainage away from the site structures.

3.6 ACCEPTANCE

- .1 DCC Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil, finish grading, and capping.

3.7 SURPLUS MATERIAL

- .1 Dispose of materials except topsoil not required at a provincially approved disposal facility.

3.8 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 43 - Environmental Procedures
- .3 Section 01 35 29.06 - Health and Safety Requirements.
- .4 Section 01 74 21 - Construction/Demolition Waste Management and Disposal
- .5 Section 01 74 11 - Cleaning.
- .6 Section 32 91 19 13 - Topsoil Placement and Grading

1.2 MEASUREMENT AND PAYMENT

- .1 Payment for sodding will be made at unit price bid of actual area surface measurements taken and computed by Departmental Representative. It will include the capped area, and the transition between the capped area and the surrounding ground surface:
 - .1 Supply, placement of Grade Turf Grass Nursery Sod will be paid in square meters acceptably incorporated into the work specified under each call-up.
 - .1 Pegged Commercial Grade Turf Grass Nursery Sod per square metre
 - .2 Transportation, loading and unloading of materials will be paid under section 02 41 16.
 - .3 Topsoil to be paid under item 32 91 19.13.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling:
 - .1 Schedule sod laying to coincide with preparation of soil surface.
 - .2 Schedule sod installation when frost is not present in ground.
 - .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.4 REFERENCE STANDARD

- .1 Statement of Work to be provided on a site specific basis.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for sod and fertilizer, and include product characteristics, performance criteria, physical size, finish and limitations.

- .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures and Section 01 35 29.06 - Health and Safety Requirements.
- .3 Samples:
 - .1 Submit:
 - .1 Sod for each type specified.
 - .1 Install approved samples in 1 square metre mock-ups and maintain in accordance with maintenance requirements during establishment period.
 - .2 0.5 kg container of each type of fertilizer used.
 - .2 Obtain approval of samples by Departmental Representative.
 - .4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements of seed mix, seed purity, and sod quality.
 - .5 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties of seed mix, seed purity, and sod quality.
 - .1 Industry Certified Technician with Turf Maintenance designation.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with supplier's recommendations.
 - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return of pallets, packaging materials, and padding, as specified in in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal or Section 01 74 11 - Cleaning.

Part 2 Products

2.1 MATERIALS

- .1 Sod to be of quality that can grow and thrive in the area.
- .2 Sod establishment support:
 - .1 Wooden pegs.
- .3 Water:
 - .1 Supplied by Contractor.
- .4 Fertilizer:
 - .1 See Section 32 91 19 13 - Topsoil Placement and Grading

2.2 SOURCE QUALITY CONTROL

- .1 Obtain written approval from Departmental Representative of sod at source.
- .2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

Part 3 Execution

3.1 INSTALLERS

- .1 Use qualified installer.

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sod installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.3 PREPARATION

- .1 Verify that grades are correct and prepared in accordance with Section 32 91 19.13 - Topsoil Placement and Grading. If discrepancies occur, notify Departmental Representative and commence work when instructed by Departmental Representative.
- .2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
- .3 Fine grade surface free of humps and hollows to smooth, even grade, elevations indicated for surface to drain naturally.
- .4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site in location as directed by Departmental Representative with applicable provincial requirements.

3.4 SOD PLACEMENT

- .1 Ensure sod placement is done under supervision of qualified personnel.
- .2 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.
- .3 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .4 Roll sod as directed by Departmental Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.5 SOD PLACEMENT ON SLOPES AND PEGGING

- .1 Start laying sod at bottom of slopes.
- .2 Peg sod on slopes steeper than 3 horizontal to 1 vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:
 - .1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.
 - .2 Not less than 3 pegs per square metre.
 - .3 Not less than 6 pegs per square metre in drainage structures. Adjust pattern as directed by Departmental Representative.
 - .4 Drive pegs to 20 mm above soil surface of sod sections.

3.6 FERTILIZING PROGRAM

- .1 Fertilize during establishment and warranty periods.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean and reinstate areas affected by Work.
- .3 Waste Management: separate waste materials for recycling, reuse, and compost in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal or Section 01 74 11 - Cleaning.
 - .1 Remove recycling and compost containers and bins from site and dispose of materials at appropriate facility.
 - .2 Divert unused fertilizer from landfill to official hazardous material collections site approved by Departmental Representative.

3.8 PROTECTION BARRIERS

- .1 Protect newly sodded areas from deterioration with snow fence on rigid frame as directed by Departmental Representative.
- .2 Remove protection 2 weeks after installation as directed by Departmental Representative.

3.9 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of installation until acceptance.
 - .1 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
 - .2 Cut grass to 50 mm when or prior to it reaching height of 75 mm.
 - .3 Maintain sodded areas weed free 95%.

- .4 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
- .5 Temporary barriers or signage to be maintained where required to protect newly established sod.

3.10 ACCEPTANCE

- .1 Sod areas will be accepted by Departmental Representative provided that:
 - .1 Sodded areas are properly established.
 - .2 Sod is free of bare and dead spots.
 - .3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.
 - .4 Sodded areas have been cut minimum 2 times prior to acceptance.
- .2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.
- .3 When environmental conditions allow, all sodded areas showing shrinkage cracks shall be top-dressed and seeded with a seed mix matching the original.
- .4 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.11 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations from time of acceptance until end of warranty period:
 - .1 Water sodded areas at weekly intervals to obtain optimum soil moisture conditions to depth of 100 mm.
- .2 Repair and re-sod dead or bare spots to satisfaction of Departmental Representative.
- .3 Cut grass and remove clippings that will smother grass as directed by Departmental Representative to height as follows:
 - .1 Cut grass at 2 week intervals or as directed by Departmental Representative, but at intervals so that approximately one third of growth is removed in single cut.
 - .2 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
 - .3 Eliminate weeds by mechanical means to extent acceptable to Departmental Representative.

END OF SECTION