

PART 1 - GENERAL

- 1.1 Related Work .1 Refer to other Specification Sections for related information.
- 1.2 Reference Standards .1 ASTM D698-12e1 (or latest edition), Standard Compaction Characteristics of Soil Using Standard Effort (600kN-m/m³).
- 1.3 Measurement for Payment .1 Granular sub-base will be measured in accordance with **Section 01 29 00**.
- .2 Backfill will be measured in accordance with **Section 01 29 00**.

PART 2 - PRODUCTS

- 2.1 Materials .1 Granular sub-base material to **Section 31 05 17** and following requirements:
- .1 Gravel borrow, crushed stone or gravel consisting of hard durable angular particles free from clay lumps, cementation, organic material, frozen material and other deleterious materials (Gravel Borrow definition as per the Nova Scotia Transportation and Infrastructure Renewal (NSTIR) Standard Specification for Highway Construction, Division 3, Section 1).

ASTM SIEVE SIZE	% PASSING BY MASS
112 mm	100
14 mm	15 - 65
0.08 mm	3 - 10

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- .2 Type 2 granular material gradation will be within the following limits (Type 2 definition as per the Nova Scotia Transportation and Infrastructure Renewal (NSTIR) Standard Specification for Highway Construction, Division 3, Section 2):

ASTM SIEVE SIZE	% PASSING BY MASS
80 mm	100
56 mm	70 - 100
28 mm	50 - 80
14 mm	35 - 65
5 mm	20 - 50
0.16 mm	3 - 10
0.08 mm	0 - 7

PART 3 - EXECUTION3.1 Inspection of
Existing Sub-Base
Surface

- .1 Do not place new granular sub-base until underlying gravel borrow and backfill material is compacted, inspected and approved by the *Departmental Representative*.

3.2 Placing

- .1 Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow or ice.
- .2 Place Type 2 and gravel borrow to full width in uniform layers not exceeding 300 mm uncompacted thickness. *Departmental Representative* may authorize thicker lifts (layers) if specified compaction can be achieved.
- .3 Shape each layer to a smooth contour and compact to specified density before the succeeding layer is placed.
- .4 Remove and replace portion of a layer in which material has become segregated during spreading.

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3.3 Compacting

- .1 Compact to density of not less than 95% maximum dry density in accordance with ASTM D698 (Standard Procter).
- .2 Shape and roll alternately to obtain a smooth, even and uniformly compacted sub-base.
- .3 Apply water as necessary during compaction to obtain specified density. If sub-base is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
- .4 In areas not accessible to rolling equipment, compact to specified density with approved mechanical tampers.

3.4 Finish
Tolerances

- .1 Granular sub-base compacted thicknesses will be as follows: maximum compacted lifts of 300mm.
- .2 Backfill material will be compacted to the thickness as required to attain the grades indicated on the drawings.
- .3 Finish compacted surface to within plus or minus 25 mm of established grade but not uniformly high or low.
- .4 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.5 Maintenance

- .1 Maintain finished gravel borrow sub-base in condition conforming to this section until succeeding Type 2 sub-base is constructed, or until gravel borrow sub-base is accepted by *Departmental Representative*.
- .2 *Departmental Representative* will pay costs for inspection and testing. Refer to **Section 01 45 00.**

Turf and Topsoil Stripping, Replacement and Grading

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PART 1 - GENERAL

1. RELATED
REQUIREMENTS

- .1 Section 01 35 43 - Environmental Procedures
- .2 Section 31 23 10 - Excavation and Backfilling

2. Measurement
Procedures

- .1 This item will not be measured separately.

PART 2 - PRODUCTS

.1 Materials

- .1 On site turf vegetation and topsoil.

PART 3 - EXECUTION

.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 according to the Erosion Control Plan called for by section 01 35 24. A permeant sediment trap and its location has been indicated on site plans.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and temporary sedimentation controls and restore and stabilize areas disturbed during removal.

2. Stripping of
Vegetation and
Topsoil

- .1 Begin vegetation and topsoil stripping from within the footprint of the new construction
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and stockpile at a location on site as identified by the *Departmental Representative* for later reuse to assist with revegetation.

.1 Stockpile height not to exceed 2m.

.2 Protect stockpiles from contamination and compaction.

.3 Replacing and Spreading
Vegetation and Topsoil

.1 Replace vegetation and topsoil after *Departmental Representative* has accepted subgrade. Vegetation and topsoil will be placed upon the exterior berms followed by interior berms. Any access material will be disposed on site at the discretion of the *Departmental Representative*.

.2 Spread vegetation and topsoil in uniform layers not exceeding 150mm.

4. Finish Grading

.1 Grade and eliminate rough spots and low areas and ensure positive drainage.

.2 Consolidate topsoil to required bulk density using equipment approved by the *Departmental Representative*.

.1 Leave surfaces smooth, uniform and firm against deep footprinting.

5. Acceptance

.1 The *Departmental Representative* will inspect topsoil and determine acceptance of depth of topsoil and finished grading.

6. Cleaning

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

PART 1 - GENERAL

1. Hydraulic Seeding

- .1 The work is for the supply of all labour, equipment and material necessary to perform the work as indicated on the drawings and as specified. Work is for hydraulic seeding of the berms and disturbed area outside of the containment cell.

2. Submittals

- .1 Product data:
 - .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures
- .2 Provide product data for:
 - .1 Seed
 - .2 Mulch
 - .3 Tackifier
 - .4 Fertilizer
- .3 Submit in writing to *Departmental Representative* two weeks prior to commencing work:
 - .1 Volume capacity of hydraulic seeder in litres.
 - .2 Amount of material to be used per tank based on volume.
 - .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

3. Quality Assurance

- .1 Test reports: certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 - .3 Pre-installation meeting: conduct pre-installation meeting to verify project requirements, installation instructions and warrantee requirements.
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4. Waste Management
and Disposal

- .1 Divert unused fertilizer from landfill to official hazardous material collection site approved by the *Departmental Representative*.
- .2 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, rivers, onto ground or in locations where it will pose a health or environmental hazard.
- .1 Obtain written approval of *Departmental Representative* for filter fabric before installation of material in work.

PART 2 - PRODUCTS

.1 Materials

- .1 Grass: "Canada pedigree grade" in accordance with Government of Canada Seeds Act and Regulations.
 - .1 Grass mixture: "Certified" labeled, "Canada No. 1 Lawn Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
 - .2 Seed mixture shall meet or exceed the requirements of the Canada Seeds Act for Canada No. 1 Ground Cover Mixture.
 - .3 Seed mixture composition:
 - .1 30-40% Birdsfoot Trefoil "Leo" (Lotus corniculatus) inoculated seed.
 - .2 20-30% Kentucky Bluegrass (Pos pratensis).
 - .3 15-20% Tall Fescue (Festuca arundinacea)
 - .4 7-12% Creeping Red Fescue (Festuca rubra)
 - .5 3-7% Hard Fescue (Festuca trachyphylla).
 - .6 3-7% Alsike Clover (Trefolium hybridum).
 - .4 Seed shall be kept dry and protected from direct sunlight and other detrimental conditions.
- .2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic,

Hydraulic Seeding

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water activated, green colouring, free of germination and growth inhibiting factors with the following properties:

- .1 Type 1 mulch:
 - .1 Made from wood cellulose fibre.
 - .2 Organic matter content: 95% plus or minus 0.5%.
 - .3 Value of pH: 6.0
 - .4 Potential water adsorption: 800-900%.
- .3 Tackifier: water dilutable, liquid dispersion, containing polyvinyl acetate terpolymer emulsion.
- .4 Water: free of impurities that would inhibit germination and growth.
- .5 Fertilizer:
 - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
 - .2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.
- .6 Inoculants: inoculant containers to be tagged with expiry date.
- .7 Bags of seed and fertilizer shall be labelled identifying mass (kg), mix components and percentages, date of bagging, supplier's name and address, and lot number.
- .8 When applied, the hydraulic seed mixture shall be capable of forming an absorptive mat which will allow moisture to percolate into the underlying soil.

PART 3 - EXECUTION

.1 Workpersonship

- .1 Do not spray onto structures, signs, guide rails, fences, plant material, utilities and other than surfaces intended.

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- .2 Clean-up immediately, any material sprayed where not intended, to the satisfaction of the *Departmental Representative*.
2. Preparation of Surfaces
- .1 Fine grade areas to be seeded free of humps and holloes. Ensure area are free of deleterious and refuse materials.
- .2 Ensure areas to be seeded are moist to depth of 15mm before seeding.
- .3 Obtain *Departmental Representative* approval of grade and topsoil depth before starting to seed.
3. Preparation of Slurry
- .1 Measure quantities of material by weight or weight-calibrated volume measurement satisfactory to *Departmental Representative*. Supply equipment required for this work.
- .2 Combine seed mix, fertilizer, and mulch with water and thoroughly mix in a hydraulic seeder tank that is capable of continually agitate the mixture during the seeding operation to ensure a homogenous slurry is produced.
- .3 Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
- .4 After all materials are in the seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.
- .4 Slurry Application
- .1 Notify *Departmental Representative* 24 hours in advance of all intended hydraulic seeding operations.
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- .2 Schedule hydraulic seeding to occur during periods of dry weather. Be prepared to install temporary erosion control measures if unforecasted rain occurs prior to establishment of erosion controls.
 - .3 Hydraulic seeding equipment:
 - .1 Slurry tank: min 4500L
 - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
 - .3 Pumps capable of maintaining continuous non-fluctuating flow of solution.
 - .4 Supplied with not less than 6 spray pattern nozzles.
 - .5 Capable of seeding by hand operated hoses and appropriate nozzles.
 - .6 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".
 - .4 Slurry mixture applied per 100m².
 - .1 Seed: Grass mixture 2.0kg.
 - .2 Mulch: Type 1, 10kg.
 - .3 Tackifier: 3kg.
 - .4 Water: Minimum 1000L.
 - .5 Fertilizer: 2.25kg, ratio 1:2:2.
 - .5 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
 - .1 Using correct nozzle for application.
 - .2 Using hoses capable of reaching the extremities of the seeded areas.
 - .6 Blend application 300mm into adjacent grass areas or sodded areas with previous applications to form uniform surfaces.
 - .7 Re-apply where application is not uniform.
 - .8 Remove slurry from items and areas not designated to be sprayed.
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| | .9 | Protect seeded areas for trespass satisfactory to <i>Departmental Representative</i> . |
| | .10 | Remove protection devises as directed by <i>Departmental Representative</i> . |
| .5 | <u>Erosion Control</u> | .1 Install and maintain erosion control measures. |
| .6 | <u>Maintenance</u> | .1 Perform following operations from time of seed application until acceptance by <i>Departmental Representative</i> . |
| | | .2 Seeded areas: <ul style="list-style-type: none">.1 Repair erosion and reseed to allow establishment of seed prior to acceptance..2 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance..3 Water seeded areas to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts. Apply water to ensure moisture penetration of 75 to 100mm depth. |
| .7 | <u>Acceptance</u> | .1 Seeded areas will be accepted by <i>Departmental Representative</i> provided that: <ul style="list-style-type: none">.1 Plants are uniformly established over a minimum of 95% of the area seeded..2 Areas seeded after September 1st will achieve final acceptance in following spring, on month after start of growing season provided acceptance conditions are fulfilled. |
| .8 | <u>Cleaning</u> | .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers. |
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