

This specification outlines the requirements for fertilizing and preserving root systems of trees and plants affected by changing grades or excavation. This specification also outlines the requirements for supplying and placing topsoil and appropriate finished grading, and the application of seed and mulch for permanent cover. This specification also outlines the requirements for the supply, site preparation, weed control, application and maintenance of a Filtrexx Erosion Control Compost Blanket (includes Filtrexx Growing Media™, a permanent native seed mixture, and a nurse crop seed mixture) over all areas to be re-vegetated following site clean-up and fine grading.

PART 1 REFERENCES

This specification refers to the following standards, specifications, or publications:

ASTM International

D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³))

Canadian Standards Associations

A23.1/A23.2 Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete

Government of Newfoundland and Labrador, Department of Transportation and Infrastructure (TI), Highway Design and Construction Division, Specifications Book:

Section 631 Seeding, Sub-section 02.01 Topsoil

US Composting Council (USCC) Test Method for the Examination of Composting and Compost (TMECC) guidelines

TMECC 04.11-A Electronic pH Determinations for Compost

TMECC 02.02-B Sample Sieving for Aggregate Size Classification

Other

Canada Seeds Act (R.S.C., 1985, c. S-8)

Canada Seeds Regulations (C.R.C., c. 1400)

PART 2 GENERAL

2.1 SOURCE QUALITY CONTROL

- .1 Inform the Owner of proposed source of topsoil to be supplied and provide access for sampling. Acceptance of topsoil subject to inspection and/or

soil analysis test results. Do not commence work until topsoil is accepted by the Owner.

.2 The Contractor shall notify the Owner not less than three (3) days before the cutting of sod begins. Sod will be approved by the Owner in its original position before cutting and delivery to the project.

2.2 DELIVERY AND STORAGE

.1 Deliver and store grass seed in original containers showing:

- .1 Analysis of seed mix.
- .2 Percentage of pure seed
- .3 Year of production
- .4 Net mass
- .5 Date when tagged and location.
- .6 Percentage germination.
- .7 Name and address of distributor.

.2 Deliver wood fibre mulch and erosion control agent in moisture-proof containers indicating manufacturer, content and net air-dry mass.

2.3 SCHEDULING OF WORK

.1 Schedule placing of topsoil and finish grading to permit sodding or seeding operations under optimum conditions. Seeds planted, sods and hydroseeding placed in the autumn will not be accepted until the following growing season.

2.4 TERRASEEDING

.1 The placement of materials shall be carried out by a certified Filtrexx installer.

.2 The Contractor shall be responsible for all labour, materials and equipment necessary to Terraseed the specified compost material and seed mixtures.

.3 Re-seeding and preparation of soil surface for unacceptable areas is part of the scope of work under this specification at no increase cost to the contract amount.

.4 The preparation of the final grades ready for Terraseeding shall be in accordance with Section 02215 – Earthworks and Related Work.

.5 A minimum of 21 calendar days prior to Terraseeding, the Contractor shall submit the following to the Owner:

- .1 A legible, valid Seed Analysis Report, from a Certified Seed Testing Laboratory for all single species within the Native Seed Mixtures and the nurse grass species, including seed germination, hard seed and purity expressed as percentages. Seed germination tests or tetrazolium test shall have been completed within 6 months of the seeding operation.
- .2 The final bulk seed rate of application for the Native Seed Mixture.
- .3 The Contractor shall provide a copy of the order to the Owner showing the appropriate final bulk seed rate and amount required. Refer to subsection Terraseeding below
- .6 Schedule Terraseeding works following site clean-up, installation of tree and shrub plantings, and the Owner's site inspection and authorization to proceed with this operation.

PART 3 PRODUCTS

3.1 MATERIALS

- .1 The topsoil shall be obtained from approved areas off the site. The soil shall be reasonably free from subsoil, clay lumps, brush, objectionable weeds and other litter, and shall be free from stones, stumps and other objects larger than 50 mm in diameter, from roots, toxic substances and from any other material or substances that might harm growth or be a hindrance to grading, planting, or maintenance operation.
- .2 Asphalted felt in accordance with CSA A23.1/A23.2.
- .3 Fertilizer shall be 6-12-12 grade, uniform in composition, free flowing and suitable for application with approved equipment delivered to the site in bags or other convenient containers, each fully labelled, conforming to the applicable local government laws, and bearing the name, trademark or tradename and warranty of the producer.
- .4 Wound dressing: horticulturally accepted, non-toxic, non-hardening emulsion.
- .5 Lime shall be ground limestone containing not less than 85 % of total carbonates and shall be ground to such fineness that at least 50 % will pass through a 100 mesh sieve and at least 90 % will pass through a 20 mesh sieve. Coarser materials will be acceptable, provided the specified rates of application are increased proportionally on the basis of quantities passing the 100 mesh sieve, but no additional payment will be made for the increased quantity.

- .6 Grass seed: Certified Canada No. 1 Grade in accordance with the Canada Seeds Act and Regulations, and having minimum germination of 75 % and minimum purity of 97 %.
- .7 Turf establishment blanket: uniform, open weave jute matting, wood excelsior covered biodegradable extruded plastic mesh as indicated in contract drawings.
- .8 Staples: 25 mm wide by 300 mm deep by 3 mm thick steel wire.
- .9 Mulch shall be of natural sun dried plant fibers (straw, cotton and paper specially treated) processed in lengths of 20 mm – 40 mm.
- .10 Water: potable, free of impurities that would inhibit germination or otherwise adversely affect growth.
- .11 Binder shall be capable of joining seeds mulch and soil particles together on slopes and erodible surfaces until plant growth has been established. The binder must not form an impervious seal which would prevent the penetration of moisture to the underlying soil. The binder shall be supplied as a water-soluble powder composed of polymerised and organic substances and must be absolutely non-toxic.

3.2 GRASS SEED MIXTURE

- .1 Grass seed mixture to comprise;
 - 50 % Creeping Red Fescue
 - 30 % Kentucky Bluegrass
 - 15 % Colonial Bent
 - 5 % Dwarf Timothy
- .2 The Contractor may provide an alternate mix design provided it is prepared by a qualified agricultural expert.

3.3 TERRASEEDING

- .1 Seed
 - .1 The seed mixture of this specification is available directly from approved Vendor.
 - .2 The Native Seed Mix shall be packaged by the supplier in parcels suitable for the full or partial tank loads of the blower truck. Completed Import Declaration Forms shall be required for the direct importation of the seeds.
- .3 Grade Standards

- .1 All seed, supplied either as single seed species, or as a seed mix shall be in accordance with the Canada Seeds Act and Regulations and the grade standards for that particular seed kind.
- .4 Pure Live Seed
 - .1 The quantities of the Floodplain and Upland Seed Mixtures in the table are given in terms of pure live seed (kg or lb PLS). Pure Live Seed (PLS) is a unit of measure used to define the amount of viable seed in a seed lot taking the purity and germination of the seed lot into account. Bulk quantity received will be greater, based on the purity and germination of available seed lots.
- .5 Seed Quality
 - .1 All specified seeds shall be in accordance with the Canada Seeds Act and Regulations for minimum acceptable levels of noxious weed seed content. All seeds shall meet or exceed the minimum acceptable germination (MAG) level of 60 %. All seed shall meet or exceed the minimum acceptable purity (MAP) level of 50 %.
- .6 Seed Analysis Report
 - .1 A legible, valid Seed Analysis Report, from a Certified Seed Testing Laboratory by the Canadian Food Inspection Agency (CFIA) for all single species within the Native Floodplain and Upland Seed Mixtures, including seed germination, hard seed and purity expressed as percentages and Pure Live Seed (PLS) content of the specified species.
 - .2 Seed germination percentage shall be the result of a germination test or a tetrazolium test within six months of the seeding operation. If hard seed is present, the percent hard seed is to be added to the percent seed germination test.
 - .3 The grass seed for the nurse crop shall be Certified Canada No. 1 Grade in accordance with the Canada Seeds Act and Regulations.
- .7 Packaging, Labelling and Storage
 - .1 All seed mixtures shall be in the original sealed package with a legible label securely attached. Labelling shall be in accordance with the Canada Seeds Act and Regulations. Each package shall be labelled to show:
 - .1 The name and address of the seed supplier and date bagged.

- .2 The seed species or the name of the seed mix and the various individual seed species that comprise the seed mix and the percentage by mass.
- .3 The grade of the seed or seed mix.
- .4 The supplier's lot designation number, corresponding to the Seed Analysis Report.
- .5 Mass in kilograms.
- .6 Prior to using all seeds shall be stored in dry cool locations. Seeds shall not be subject to temperatures less than 0 °C or greater than 25 °C.
- .7 All seed and inoculants shall be stored in cool, dry location until use.

.8 Critical Timing for Ordering Seed Mixture

- .1 The Contractor shall order the Floodplain and Upland Seed Mixtures as soon as the Project is awarded in order to secure the seed mixtures and to allow for a minimum period of 21 calendar days between the time of ordering until the date of delivery. These delays are due to time required for preparation of the seed mixture and shipping time across the border.

.2 Native Seed Mixture

Scientific Name	Common Name	(kg PLS per/10,000 sq. m.)	Proportion of seed mix (%)
Forbs (broad-leaved species)			
Desmodium canadense	Hoary (Canada) tick-trefoil	0.9	2.0 %
Helianthus divaricatus	Woodland sunflower	0.9	2.0 %
Onoclea sensibilis	Sensitive fern	1.35	3.0 %
Rudbeckia hirta	Black eyed Susan	2.70	6.0 %
Thalictrum pubescens	Tall meadowrue	0.9	2.0 %
Total native species			15 %
Grasses			
Agrostis stolonifera	Creeping bent grass	3.6	8.0 %

Calamagrostis canadensis	Canada bluejoint	4.5	10.0
Elymus canadensis	Canada wild rye	9.0	20.0
Elymus hystrix	Bottlebrush Grass	9.0	20.0
Elymus virginicus	Virginia wild rye	9.0	20.0
Glyceria striata	Fowl manna grass	3.15	7.0
Total native grass species			85.0 %
	Total	45.0	100.0 %

.3 Nurse Crop Seed Mixture Required for Floodplain Seed Mixture Application

Species	Common Name	Seeding rate (PLS kg/10,000 sq. m.)	PLS Required (kg/3,347 sq. m.)
Lolium multiflorum	annual rye grass	25	8.0
Lolium perrene	perrenial rye grass	30	10.0
Elymus canadensis	Canada wild rye	15	5.0
Total nurse grasses		70	23.0

.4 Filtrexx Growing Media™

.1 Filtrexx Growing Media™ shall be weed free and derived from a well-decomposed source of organic matter. The Growing Media™ shall be produced using an aerobic composting process meeting, or exceeding CCME Type "A" and Type "AA" regulation and the Compost Quality Alliance (CQA) program, including time and temperature data indicating effective weed seed, pathogen and insect larvae kill. The Growth Media™ shall be free of any refuse, contaminants or other materials toxic to plant growth. Non-composted products will not be accepted. Test methods for the items below shall be in accordance with USCC TMECC guidelines for laboratory procedures:

.1 pH of 5.0-8.0 in accordance with TMECC 04.11-A

- .2 Moisture content of less than 60 % in accordance with standardized test methods for moisture determination.
- .3 The Growing Media™ shall incorporate the specified Floodplain Seed mixture at the specified seeding rate and required bulk seed amount at the time of application. The following Particle Sizes shall be followed: 100 % passing a 50 mm sieve, 99 % passing a 25 mm sieve, minimum of 60 % passing a 12.5 mm sieve in accordance with TMECC 02.02-B.
- .4 Non seeded option: Particle size-100 % passing a 50 mm sieve, 99% passing a 25 mm sieve, minimum of 30% passing a 18.25 mm sieve. All other testing parameters remain the same.
- .5 Material shall be relatively free (<1 % by dry weight) of inert or foreign man made materials.
- .6 A sample of the compost shall be submitted to the Owner for approval prior to being used and must comply with all local, provincial and federal regulations.
- .7 Copies of the purchase order / receipt from Filtrexx Canada™ for the Growing Media™ must also be submitted to the Owner for verification and approval prior to the site delivery and installation of the Filtrexx.

.5 Pneumatic Blower Truck

- .1 The pneumatic blower truck shall be a custom manufactured, fully integrated, truck-mounted unit. The blower truck shall be equipped with a computer-calibrated seed injection system and shall be capable of uniformly applying composted topsoil and seed at a rate greater than 0.25 m³ of material per minute. The blower truck shall also be equipped with an application hose capable of extended 100 m from the blower truck unit.

.6 Filtrexx LockDown Netting

- .1 Filtrexx LockDown Netting is a single net rolled erosion control product that is designed to increase the slope stabilization and erosion control capabilities of the Compost Erosion Control Blanket. This netting is used to increase soil surface roughness and stability of disturbed soil on slopes. The tensile strength selection of the netting is to be reviewed and approved by the project Landscape Architect. The functional longevity shall be up to 4 years.

PART 4 EXECUTION

4.1 FERTILIZING EXISTING TREES

- .1 Apply fertilizer at rate of 50 g/mm of calliper to existing trees to be retained. Take calliper measurement 0.3 m above grade. Apply once early in growing season except where specified or otherwise shown on the drawings.
- .2 Distribute fertilizer equally into holes drilled 200-250 mm deep, spaced 600 to 750 mm apart and located in circular pattern between 2/3 and limit of each tree's branch spread. Water thoroughly after fertilizer applied.
- .3 Water retained trees three (3) times during summer. Soak area immediately below tree crown sufficiently deep to reach feeder roots.

4.2 RAISING GRADE AROUND EXISTING TREES

- .1 Apply fertilizer before revising grade.
- .2 Protect bark of buried portion of tree from abrasion by surrounding trunk with water impervious material. Leave minimum 50 mm space between protective material and bark. Fill space with washed stones.
- .3 Use approved topsoil to raise grade to required level, making allowance for topsoil in accordance with TI, Highway Specifications Book, Section 631.02.01.
- .4 Compact fill without disturbing or damaging roots. Use frost-free materials over frost-free ground conditions. Compact fill to a minimum 80 % of the maximum dry Standard Proctor density in accordance with ASTM D698.

4.3 LOWERING GRADE AROUND EXISTING TREES

- .1 Cut slope from edge of branch spread to new grade level or retaining wall at degree indicated. Build dike of topsail for each tree at periphery of branch spread to hold water where required.
- .2 If excavation through roots is required, excavate by hand and cut roots with sharp axe, tree lopper or saw. Seal cut edges 10 mm in diameter and larger with wound dressing.
- .3 Apply fertilizer after excavation is backfilled and grading is completed. Do not permit root system to dry out at any time.

4.4 TOPSOIL

- .1 The topsoil shall be uniformly distributed on the designated areas and evenly spread to an average thickness of 100 mm with a minimum

thickness of 75 mm. The spreading shall be performed in such a manner that planting can proceed requiring little additional soil preparation or tillage. Irregularities in the surface resulting from top soiling or other operations shall be corrected so as to prevent the formation of depressions where water will stand. Topsoil shall not be placed where the subgrade is frozen, excessively wet, extremely dry or in a condition otherwise detrimental to the proposed planting or to proper grading.

.2 After the topsoil has been spread and graded as required, the surface shall be cleared of stone, stumps or other objects larger than 50 mm in thickness or diameter, and or root, brush, wire or other objects that might be a hindrance to planting or maintenance operations.

4.5 APPLICATION OF FERTILIZER

.1 Fertilizer shall be distributed uniformly at a rate of 1,125 kg/ha over the areas indicated on the drawings to be seeded, and shall be incorporated into the soil to a depth of at least 100 mm by disking, harrowing, or other acceptable methods. The incorporation of fertilizer may be a part of the tillage operation specified in other parts of this specification. Distribution by means of an approved seed drill equipped to sow seeds and distribute fertilizer at the same time will be acceptable.

4.6 APPLICATION OF LIME

.1 Immediately following the incorporation of the fertilizer, lime shall be applied in such quantities to obtain a pH value of 6.5 for the topsoil and shall be incorporated into the soil to a depth of at least 25 mm by disking, harrowing, or other acceptable methods.

.2 No area shall be limed until surface preparation has been completed to the satisfaction of the Owner.

4.7 PREPARATION OF SURFACES

.1 Undulation or irregularities in the surface resulting from tillage, fertilizing, limning or other operations shall be levelled before seeding operations are begun. The grassed area when completed and settled shall be on such a grade necessary to facilitate drainage.

4.8 APPLICATION OF SEED

.1 Sow during calm weather (winds less than 10 km/h) using equipment suitable for area involved to the approval of the Owner. Seed shall be applied at the rate of 175 kg/ha.

- .2 Sow half of required amount of seeds in one direction and remainder at right angles to first seeding pattern. Incorporate seed into soil to a minimum depth of 5 mm simultaneously or within one hour after seeding operation. Mix carefully with light chain harrow or wire rakes and roll area immediately afterward with water ballast type lawn or agricultural type roller.
- .3 Water with fine spray, avoiding washing out of seed. Apply enough water to ensure penetration of minimum 50 mm.
- .4 Add erosion control agent, into seeder and mix thoroughly to complete seeding slurry when indicated in the contract documents.
- .5 Complete slurry to be applied per hectare:
 - .1 Seed (mixture as specified)
 - .2 Mulch 1000 kg
 - .3 Erosion Control Agent 300 kg
 - .4 Water, minimum 10000 litres

4.9 SEED PROTECTION ON SLOPES

- .1 Cover seeded slopes (where slope is 3:1 or steeper) with turf establishment blanket. Roll blanket down over slopes without stretching or pulling.
- .2 Lay blanket smoothly on soil surface, burying top end of each section in narrow 150 mm trench. Leave 300 mm overlap from top roll over bottom roll. Leave 100 mm overlap adjacent section.
- .3 In ditches, unroll blanket in direction of flow. Overlap ends of strips 300 mm with upstream section on top.
- .4 Staple outside edges and overlaps at 1000 mm intervals and at intermediate points to ensure close contact between blanket and soil.

4.10 SODDING

- .1 Before sodding, the surface is to be raked smooth to provide uniform slopes. Topsoil with a uniform organic content will be placed to a thickness of 100 mm or as directed on site by the Owner, and raked smooth to conform to the preparation slopes. Lime will be added to the topsoil at the rate of 1,125 kg/ha. The lime may be placed up to 21 calendar days ahead of placing of sod. Fertilizer will be spread evenly over the top 50 mm of the soil.
- .2 Fertilizer cannot be added at the same time as the lime. The fertilizer shall be applied at the rate of 1,125 kg/ha, and will have a plant food ratio of 10 nitrogen to 20 phosphorous to 20 potash plus 2 % Fritted Trace Elements

(FTE). The fertilizer must be placed not more than 7 calendar days ahead of sodding. After adding fertilizer, the surface shall be fine graded.

- .3 Sod shall be laid on the prepared sod bed within 24 hrs after cutting, except that sod may be stored in stacks or piles, grass to grass and roots to roots for not more than five (5) calendar days. Sod shall be protected against drying from sun or wind and from freezing as necessary. The moving and laying of sod shall, as far as possible, be done when weather conditions and soil moisture are favourable. On slopes, stakes shall be driven flush with the top of the sod, spacing stakes shall not exceed 600 mm across the face of slopes.
- .4 If rainfall is insufficient during the period of sodding and initial grass growth, then water shall be applied immediately before and after sodding and subsequently thereafter until the grass is established, as directed by the Owner. Cost will be included in the unit price for laying sods.

4.11 HYDROSEEDING

- .1 Before hydroseeding the surface is to be raked smooth to provide uniform slopes. Topsoil with a uniform organic content will be placed to a thickness of 100 mm, and raked smooth to conform with the prepared slopes.
- .2 Lime will be added to the topsoil at a rate of 1,125 kg/ha. The lime may be placed up to 21 calendar days ahead of the placing of hydroseeding.
- .3 Areas to be treated with hydroseeding and mulching shall be staked out by the Owner in the field. Operations will not commence until the Contractor has the approval of the Owner and the lime applied.
- .4 Two operations shall be employed in the hydroseeding of designated areas.
 - .1 The first operation shall consist of the distribution of a slurry composed of grass seed, fertilizer, lime and binder. The rate of application of these ingredients shall be as follows:

Grass seed mixture	150 kg/ha
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Fertilizer	600 kg/ha
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Binder	20 kg/ha
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(75% straw, 15% cotton, 10% cellulose)

- .2 The second operation shall consist of the distribution of a slurry composed of mulch, plus binder. The rate of application of these ingredients shall be as follows:

Mulch	2,250 kg/ha
Binder	25 kg/ha
(45% straw, 45% cotton, 10% cellulose)	

- .5 The contractor shall measure the quantities of each of the materials to be charged into the seeder, either by mass or by a system of mass-calibrated volume measurements approved by the Owner. The Contractor shall provide all equipment required for this purpose.
- .6 Both operations require that the ingredients be thoroughly mixed with water in a hydroseeding tank. The mix must be continuously agitated during the hydroseeding operation to ensure that a homogenous slurry is produced.
- .7 The distribution of the slurry shall be by means of an approved hydroseeder and shall be applied uniformly and in such a manner as to prevent puddling and movement of the soil surface.
- .8 Work shall proceed only in calm weather and on ground free of frost, snow, ice or standing water and when, in the opinion of the Owner, weather and seasonal conditions are suitable. Hydroseeding shall not be carried out during periods of rainfall.

4.12 MAINTENANCE

- .1 Ensure maintenance equipment suitable to the Owner.
- .2 Keep soil moist during germination period and adequately water grassed areas until accepted by the Owner.
- .3 Apply water to ensure moisture penetration of 75 to 100 mm. Control watering to prevent washouts.
- .4 The Contractor shall be responsible for maintaining seeded areas to ensure proper and adequate growth of the grass during a period of two months following sowing.
- .5 Should the treated area require watering in the Owners Representative's opinion, then the Contractor shall thoroughly water the seeded area taking care not to cause any erosion.
- .6 During the maintenance period, any defect caused by defects in materials, workmanship or damages caused by watering or the weather shall be re-seeded with grass seed at the Contractor's expense.
- .7 The Contractor shall be responsible for maintaining hydroseeded areas to ensure proper and adequate growth of the vegetation during the warranty period. The Contractor shall also be responsible for an additional

application of fertilizer the following spring. This application shall be by a method approved by the Department. The fertilizer shall be 5- 10-30 and shall be applied at a rate of 300 kilograms per hectare. No additional payment will be made for maintenance or the extra application of fertilizer.

- .8 The Contractor shall be responsible for the care of all completed sodding for a period of one month following the completion of placing.
- .9 During this period any break, which may occur through slipping of sod, shall be repaired and any sod which is dead shall be removed and replaced by the Contractor, with fresh, live sod, without charge. Should the sodding become wilted during the maintenance period, the Contractor shall thoroughly water the sodding taking care not to cause any erosion.

4.13 PROTECTION AND REPAIR

- .1 The area shall be protected against traffic or other use by erecting barricades immediately after seeding is completed and by placing warning signs of an approved type on the various areas.
- .2 If at any time before completion and acceptance of the entire work covered by this contract any portion of the surface becomes gullied or otherwise damaged following seeding, or the seedlings have been winter-killed or otherwise destroyed the affected portion shall be repaired to re-establish the condition and grade of the soil prior to seeding and shall then be re-seeded as specified in previous sections.

4.14 ACCEPTANCE

- .1 Areas will be accepted by the Owner provided that:
 - .1 Seeded areas are properly established.
 - .2 Turf is free of eroded, bare or dead spots and 98 % free of weeds.
 - .3 No surface soil is visible when grass has been cut to height of 40 mm.
- .2 Areas seeded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

4.15 TERRASEEDING

.1 Operational Constraints

- .1 Ordering of the seed shall not commence until the Owner is in receipt of the seed analysis report and has approved any changes in the seed mix composition in writing.
- .2 Terraseeding operations shall not commence until the Owner is in receipt of the Certificates of Seed Analysis for the seed being

applied and has approved the seed test results of the Certificates of Seed Analysis.

- .3 Terraseeding operations shall not commence until the Owner has reviewed and approved the surface preparation; and the layout of the different permanent seed mixes locations and different cover types.
- .4 Seed and cover application or re-application shall not be carried out under adverse field conditions such as high wind; heavy rain or when field conditions are not conducive to seed germination such as frozen soil or soil covered with snow, ice, or standing water.
- .5 The site and erosion control shall be maintained until final acceptance of the seed and cover.
- .6 No seed or cover shall come in contact with the foliage of any trees, shrubs, or other vegetation. Seed or cover shall not come in contact with waterbodies.
- .7 Terraseeding of the permanent Native Seed Mixtures shall be done between September 15 and freeze up, or between spring start up and May 31.

.2 Surface Preparation

- .1 The surface to be seeded shall be prepared not more than seven (7) calendar days before the seeding operation.
- .2 Before Terraseeding, areas designated for this operation shall have been top soiled, graded, and approved by the Owner as specified in other sections of this contract document.
- .3 At the time of Terraseeding, all surface areas designated for this operation shall be free of erosion and shall be friable, loose and shall have a fine graded, to a relative uniform surface. The surface shall be uniformly cultivated to a minimum depth of 50 mm (2 inches) and a maximum depth of 100 mm (4 inches) and shall not have surface stones greater than 25 mm (1 inch) in diameter, foreign material, and weeds or other unwanted vegetation. LockDown Netting Installation shall be installed prior to the application of the Filtrexx Growing Media. LockDown Netting shall be anchored to the soil using 150 to 200 mm (6 to 8 inches) sod stakes to be driven along entire perimeter of the net and netting area.
- .4 Staples shall be spaced 600 mm (2 feet) apart on all sides. Where more than one roll of LockDown Netting is required for slope width or slope length, netting edges shall be overlapped by a minimum of 150 mm (6 inches). LockDown netting shall be installed from top to bottom on the slope under the entire area of the Filtrexx Growth Media blanket.

.3 Terraseeding Application

- .1 The Contractor shall ensure that the terraseeding equipment is calibrated to provide the coverage of Pure Live Seed as specified or as amended by the Owner based on the final composition of the Native Seed Mixtures. The Contractor shall ensure that there is a uniform dispersal of the mixed material over the entire area designated for Terraseeding and that the spray does not dislodge soil or cause erosion.
- .2 Seed and fertilizer may also be applied separately by a cyclone spreader. Seeding shall overlap the adjoining ground cover by 300 mm.
- .3 For this Erosion Control Living Compost Blanket, the seeds must be injected at the time of application in the top 25 mm (1 inch) layer of the compost blanket, at the specified PLS rates per square metre. All other testing parameters remain the same.
- .4 The Erosion Control Living Compost Blanket will be placed at locations and respective thickness in accordance with the Contract drawings.

.4 Application Rates

- .1 The Native Seed Mixture shall be applied at the appropriate bulk seed rate to provide the specified PLS rate of 45 kg/10,000 m² for the 75 mm thick blanket.
- .2 Seeding Rate for a 50 mm thick Blanket shall also be 45 kg per 10,000 m².
- .3 The Nurse Crop Seed shall be applied at a rate of 70 kg per 10,000 m².

.5 Quality Assurance

- .1 The Certificate of Seed Analysis must be reviewed and approved by the Owner prior to ordering the seed to ensure that seed germination, seed purity, weed seed content and the various seed species components meet the values in accordance with the Native Seed Mixture Table in subsection Terraseeding of this specification. The Contractor must certify in writing that the seed mixtures and application rates have been done in accordance with the specifications. No substitutions within the seed mixtures shall be permitted without prior written approval of the Owner. Do not proceed if there is any uncertainty. Contact the Owner for directions.
- .3 All seeded areas will be visually inspected by the Owner to ensure compliance with this specification at 30, 60, and 90 calendar day periods following the Terraseeding operations and at the end of the second growing season.

- .4 Terraseeded areas will be accepted by the Owner provided that soil surface has not been eroded or otherwise degraded since completion of Terraseeding.
- .5 At the 30 calendar Day inspection within the seeded earth area:
 - .1 The applied cover shall be visually intact and shall form a uniform, cohesive mat.
 - .2 Germination of the nurse crop shall be visually evident.
- .6 At the 60 calendar Day inspection within the seeded earth area:
 - .1 The nurse crop shall be evident at mature height in an evenly dispersed, uniform cover.
 - .2 Germination of some of the permanent seed species may be visually evident in an evenly dispersed uniform cover.
 - .3 There shall not be any significant bare areas, both in terms of quantity and size.
 - .4 Non-seeded, non-specified vegetation shall not exceed 3 % of the seeded earth area.
- .7 At the 90 calendar Day inspection within the seeded earth area:
 - .1 The specified permanent seed species shall be at an average height of 50 mm in an evenly dispersed, uniform cover.
 - .2 There shall not be any significant bare areas, both in terms of quantity and size.
 - .3 Non-seeded, non-specified vegetation shall not exceed 3 % of the seeded earth area.
- .8 At the second full growing season inspection (end of August), and within the seeded earth areas of the Native Seed Mixtures:
 - .1 A survivability percentage shall be required in excess of 90 % of sown species.
 - .2 An average of 90 % combined cover of all sown species and 30 % cover of native species shall be required for successful completion. This shall be based on sampling of 10 random 1 metre squared plots taken during the second year in late August by the Owner. Bare soil shall constitute less than 3 % of the total area with individual bare areas not to be larger than 1 m².
 - .3 No inspections will be made during the winter dormant period or when site conditions prohibit a visual field inspection. The timing intervals between inspections will be suspended during the winter dormant period.

.6 Failure to Meet Performance Measure

- .1 If the values in the Certificate of Seed Analysis do not meet the values for seed germination, seed purity and weed seed content as specified, the seed lot will not be approved for use on the Contract and the Contractor shall supply a new seed lot and a new Certificate of Seed Analysis for approval prior to seeding.
- .2 If the values in the Certificate of Seed Analysis do not meet the specified values for seed species composition, the Contractor shall supply a legible, valid copy of the Seed Mixing Sheet from the seed supplier for approval by the Owner prior to seeding.
- .3 If the completed work does not meet the performance measures of the 30 Calendar Day inspection, the Owner shall document the failed areas, notify the Contractor of those areas, and re-inspect at the 60 Calendar Day inspection.
- .4 If the completed work does not meet the performance measures of the 60 Calendar Day inspection, and during the following growing season, the Owner shall notify the Contractor in writing of the failed areas. The Contractor shall re-apply the specified material according to the specification within 14 calendar days of receiving the notification. The Owner shall re-inspect the Terraseeded area at the 90 Calendar Day inspection.
- .5 If the completed work does not meet the performance measures of the 90 Calendar Day inspection, the Owner will notify the Contractor in writing of the failed areas. The Contractor shall re-apply the specified seed mixtures and compost materials according to this specification within 14 calendar days of receiving the notification. The Owner will re-inspect the Terraseeded earth area 30 calendar days after re-application.
- .6 Inspections and re-application of material shall continue, as outlined in the 90 Calendar Day and Second Growing Season Inspection paragraphs above, until the seeded earth area has been accepted.
- .7 The Contractor shall maintain the site and control erosion until conditions permit application or re-application of seed and cover.
- .8 Terraseeded areas will be accepted by the Owner provided that soil surface has not been eroded or otherwise degraded since completion of Terraseeding.

All replaced seed and cover shall be subject to the Quality Assurance section of this specification.

PART 5 PAYMENT

PART 65.1 MEASUREMENT FOR PAYMENT

- .1 Manual seeding and seed protection will be measured in square metres of actual area covered.
- .2 Temporary cover for seed protection measurement shall be in square metres following the contours of the ground of the areas designated for temporary cover.
- .3 Measurement for hydraulic seeding and mulching shall be the area actually hydroseeded, from within the limits identified in the Contract Documents, and measured in square metres, rounded to the nearest whole number.
- .4 Shrub and tree preservation will be measured by the each and as detailed on the contract documents.
- .5 Preparation of sub-grade for placing of topsoil will not be measured.
- .6 Placing of topsoil will be measured in square metres to thickness specified.
- .7 Supply and application of agricultural limestone will be measured in square metres of area treated.
- .8 Supply and application of fertilizer will be measured in square metres of area treated.
- .9 Measurement for sodding will be by actual area of sod placed by the square metre.
- .10 Plan Quantity measurement – Terraseeding: When measurement is by Plan Quantity, such measurement shall be based on the units shown on the Contract Drawings and listed in the Seed Mixture Table.
- .11 Actual measurement - Terraseeding: Measurement shall be in square meters, following the contours of the ground with no allowance for overlap, as measured on-site by the Contractor and verified by the Owner.

PART 75.2 BASIS OF PAYMENT

- .1 All costs associated with the work outlined in this specification shall be deemed to be included in the appropriate unit and lump sum prices quoted as outlined in the Measurement for Payment subsection of this section and as included in the MERX Schedule of Quantities and Prices.
- .2 Unit price relating to Installation of Terraseeding shall include all labour, equipment and materials needed to undertake the all of the Terraseeding and maintenance works (including any watering required) during the

establishment and warranty period, including any re-seeding required under warranty. Supply of Terraseeding shall include all shipping, duties, currency exchange, permits, and brokerage fees. The basis of payment shall be per Plan Quantity Measurement.

- .3 Payment at the contract price for seeding shall be compensation for all labour, materials and equipment use for: the preparation of the ground to be treated with seeding, the supply and placing of topsoil, lime, fertilizer and grass seed and the raking of the freshly seeded ground, together with such watering and maintenance as may be required over the two month maintenance period.
- .4 Payment of the contract price for hydroseeding shall be compensation in full for all labour, materials and equipment use for: supplying the inoculated seed mixture as specified; supplying the fertilizer, binder and mulch; carrying-out the hydroseeding operation; and supplying and placing the fertilizer in the following spring; together with a one year warranty period, during which time the Contractor shall be responsible for making good any defect to the growth of the vegetation.
- .5 Full payment shall not be made until the final acceptance of the work on satisfactory completion at the end of the warranty period. A holdback in the amount of 25 % of the total payment for hydroseeding shall be retained for the warranty period and until additional application of fertilizer the following spring, as per Section 632.05.

Payment at the Contract price for sodding shall be compensation for all labour, materials and equipment use for: the preparation of the ground to be treated with sodding, the supply and placing of topsoil, sod and pegs, together with any necessary maintenance work, materials, and watering required during the one month maintenance period.