

DIVISION 32 - EXTERIOR IMPROVEMENTS

Section 32 00 00 Site Design and Construction - General

- 1 Reference Standards
 - 1.1 Halifax Regional Municipality, Engineering & Works Department Standards for Municipal Services.
 - 1.2 Standard specification for Municipal Services - NSRBA and NSCEA.
 - 1.3 CAN/CSA-B651-95 for Barrier-free Design.
 - 1.4 Halifax Regional Water Commission Design Standards, Latest Edition.
- 2 Role of the Landscape Architect
 - 2.1 The Contractor shall include the services of a landscape architect in the project consultant team. The role of the landscape architect shall include the following:
 - 2.1.1 preparation of a Site Analysis Plan including identification of natural resources and development constraints
 - 2.1.2 preparation of a Site Plan Concept
 - 2.1.3 preparation of the Site Layout and Grading Plan
 - 2.1.4 meeting with School Planning Committee to confirm community needs and interests including:
 - 2.1.4.1 type and location of play equipment
 - 2.1.4.2 type and location of natural learning area
 - 2.1.4.3 landscaping priorities
 - 2.1.5 preparation of construction drawings and tender documents for site work in association with project architect and engineers
 - 2.1.6 preparation of Landscape Plan
 - 2.1.7 on wooded sites, conduct site visit prior to commencement of construction to ensure adequate fencing and protection of preservation areas, special places and trees.
 - 2.1.8 site visits during construction as required
 - 2.1.9 site visit at completion of construction to ensure compliance with tender documents
 - 2.1.10 preparation of maintenance specifications
- 3 Design Process
 - 3.1 The site design shall be developed in consultation with the Province. The level of involvement in this process of a School Steering Team or the School Board, shall be as directed by the Province.

3.2 Submittals / Approvals

3.2.1 The following Site Design Plans are required to be submitted by the Contractor prior to the commencement of specified activities.

3.2.1.1 A Site Analysis Plan and report prepared by a Landscape Architect to the Province for review prior to proceeding with site planning. The Site Analysis Plan shall identify natural features including topography and vegetation as well as development constraints.

3.2.1.2 A Site Plan Concept drawing prepared by a qualified site designer for review and approval by the Province prior to proceeding with the preparation of construction and tender drawings. The Site Concept Plan drawing shall also be submitted to the School Planning Committee for review, as directed by the Department of Education.

3.2.1.3 A Site Layout and Grading Plan prepared by a qualified site designer for review and approval by the Department of Education prior to proceeding with construction (see Part 2, Section 2, Division 00 and Division 01).

3.2.1.4 A Landscape Plan prepared by a qualified Landscape Architect for review and approval by the Department of Education prior to proceeding with construction. The Landscape and Planting Plan shall also be submitted to the School Planning Committee for review, as coordinated by the Department of Education.

3.2.1.5 Permits: As specified in DC350, Part 1, Section 2, Division 32

Section 32 10 00 Bases, Ballasts, and Paving

1 Asphalt Concrete Pavement

1.1 Refer to Part 1, Section 2, Division 02, 32 10 00.

1.2 Quality Assurance

1.2.1 Obtain and submit certificates from asphalt suppliers attesting that materials comply with specifications upon request.

1.2.2 Submit affidavits that fill materials placed under Work of this Section have been compacted to specified density and approved by the soils consultant.

1.2.3 Obtain and submit certificates from rubberized surface suppliers attesting that materials comply with specifications upon request.

1.3 References

1.3.1 ASTM C88-90, Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.

1.3.2 ASTM C117-90, Test Method for Material Finer Than 0.075 mm Sieve in Mineral

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Aggregates by Washing.

- 1.3.3 ASTM C123-83(1990), Test Method for Lightweight Pieces in Aggregate.
- 1.3.4 ASTM C127-88, Test Method for Specific Gravity and Absorption of Coarse Aggregate.
- 1.3.5 ASTM C128-88, Test Method for Specific Gravity and Absorption of Fine Aggregate.
- 1.3.6 ASTM C131-89, Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- 1.3.7 ASTM C136-84a, Method for Sieve Analysis of Fine and Coarse Aggregates.
- 1.3.8 ASTM D698-91, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).
- 1.3.9 ASTM D995-88, Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
- 1.3.10 ASTM D1559-89, Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.
- 1.3.11 ASTM D2419-91, Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
- 1.3.12 ASTM D3203-91, Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.
- 1.3.13 ASTM D4318-84, Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- 1.3.14 ASTM D4791-89, Test Method for Flat or Elongated Particles in Coarse Aggregate.
- 1.3.15 CAN/CGSB-8.1-88, Sieves Testing, Woven Wire.
- 1.3.16 CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.
- 1.3.17 CAN/CGSB-16.1-M89, Cutback Asphalts for Road Purposes.
- 1.3.18 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.
- 1.3.19 CAN/CGSB-16.3-M90, Asphalt Cements for Road Purposes.
- 1.3.20 Asphalt Institute MS-2-88, Mix Design Method for Asphalt Concrete.

1.4 Materials

- 1.4.1 Tack Coat: to meet specified requirements of Nova Scotia DTIR Standard Specification Highway Construction & Maintenance, Division 04, Section 1 for emulsified asphalt.
- 1.4.2 Bituminous paving: use asphalt concrete type B-HF for base course and type C-HF for riding surface...asphalt cement should be 150-200 and conform to specification for 150/200 penetration asphalt cement.
- 1.4.3 Granular base course:
 - 1.4.3.1 Sub-base: 8" of type 2.
 - 1.4.3.2 Base course: 6" of type 1
 - 1.4.3.3 Line Marking Paint: Traffic line marking paint by PPG or C.I.L. Colour:

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- Yellow, except handicapped area markings shall be blue.
- 1.4.3.4 Installation
 - 1.4.3.4.1 Sub-base gravel to be placed and compacted in layers not exceeding 4" in thickness
 - 1.4.3.4.2 Bituminous Paving: Asphalt concrete thickness (spread rate) to be type B-HF, @ 135 kg/m²; type C-HF @ 110 kg/m².
 - 1.4.3.4.3 Levelling: Build up with surfacing and seal material all hollows and low spots found to retain water, until a uniform grade is achieved. Feather edges of built up areas evenly and uniformly to meet previously installed paving.
 - 1.4.3.5 Joints In Pavement:
 - 1.4.3.5.1 Make transverse and longitudinal joints, and joints between new and old work, precisely and carefully.
 - 1.4.3.5.2 Make joints by keying or butting and bond them well.
 - 1.4.3.5.3 Ensure that a bond is provided between new and old pavements, or between work of successive days, by cutting through full depth of older course to expose a clean vertical surface, clean and remove loose or broken material from vertical surface, and paint it with tack coat. Place hot mixture of new pavement against joint and rake to required depth and grade.
 - 1.4.3.6 Line Painting: Apply two coats of line marking paint for parking stall lines 4" wide.

Section 32 18 00 Athletic and Recreational Surfacing

1 Sports Fields

- 1.1 Build sports fields to the dimensions specified in PART 2, Section 1, or as specifically described in the Program.
- 1.2 Where the sports field to be provided is for soccer, there must be a minimum slope of 1.5% on the finished turf surface.
- 1.3 Where surface and subgrade conditions are dry, and the subgrade is considered to be adequate to provide subsurface drainage by a Geotechnical Engineer and the Landscape Architect, surface drainage may be relied upon for drainage.
- 1.4 Where the subgrade conditions are low permeable soil (clay, or compacted silty material), a sand layer will be provided under the topsoil layer, and will be specified by the Landscape Architect, informed by the Geotechnical Report.

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- 1.5 Where subsurface drainage is required, it shall be accomplished with perforated PVC DR 35 pipe, laid at grade for positive drainage. Field drainage shall be discharged into the formal site drainage system.
 - 1.6 All topsoil must meet the requirements of PART 1, Section 2, Division 31 and 32.
 - 1.7 All seeded areas and sod shall meet the requirements of PART 1, Section 2, Paragraph 02920, except where modified by the Landscape Architect and approved by the Province.
 - 1.8 Subgrade, topsoil and drainage materials and design shall allow for straightforward installation of field irrigation system if a sports field irrigation system is required for the school, as noted in PART 2, Section , 9 Site Design.
 - 1.9 Where required, sports field irrigation systems shall be designed to PART 1, Section 2, Division 32, 32 84 23.
- 2 Play Area Safety Surface
- 2.1 CSA approved engineered wood fibre play safety surface or CSA approved poured in place rubber surface at the discretion and direction of DTIR in collaboration with DOE. :
 - 2.1.1 an edging system with accessible ramp
 - 2.1.2 special mat product under swings and at slide exits
 - 2.1.3 prefabricated or engineered subgrade drainage system
 - 2.1.4 geotextile
 - 2.1.5 subgrade preparation and construction to be in strict accordance with manufacturers' specifications
 - 2.2 Materials and installation shall comply with the following:
 - 2.2.1 ASTM 1292 Standard Specification of Impact Attenuation of Surface Systems Under and Around Playground Equipment for new and 12 year old engineered wood fibre material.
 - 2.2.2 ASTM 1991 Standard Specification for Determination of Accessibility of Safety Systems Under and Around Playground Equipment.
 - 2.2.3 Americans with Disabilities Act proposed regulations.
 - 2.2.4 Standard CAN / CSA - Z614 Children's Play Spaces and Equipment, latest edition.
 - 2.3 Acceptable Products: Fibar System, as supplied by ABC Recreation Ltd. Paris, Ontario, tel: 800 267-5753, or Woodcarpet Recreational Surfacing, as supplied by Zeager Bros. Inc., Middletown, Pennsylvania, tel: 800 364-8524, or approved equal.

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- 2.4 Engineered wood fibre shall be placed to a depth after compaction to accommodate the maximum height of fall from the play equipment, in accordance with the “Critical Heights of Various Surfacing Materials” table prepared by the Consumer Product Safety Commission’s Handbook for Public Playground Safety. Depth of material as specified by the supplier.
- 2.5 Edging for safety surface to be set flush with adjoining grades.
- 2.6 A subsurface drainage system shall be provided for all play areas unless directed otherwise by the Province.

Section 32 32 00 Retaining Walls

- 1 The use of retaining walls should only be employed when demonstrated by civil engineers that no other option exists including, but not limited to, site grading techniques.
- 2 When necessary to incorporate retaining walls into landscaping design, the structure features of retaining walls shall be designed by a structural engineer licenced to practice in Nova Scotia.

Section 32 90 00 Planting

- 1 Plant trees, shrubs and ground covers in accordance with the Canadian Standards for Nursery Stock Seventh Edition of the Canadian Nursery Landscape Association.
- 2 Assure plant materials for landscape development are suitable for the locality, using native plant species material where practical.
- 3 Do not plant under building overhangs or within 900 mm of foundations.
- 4 The Contractor shall warrant that plant material will remain free of defects for 1 full growing season, following date of Acceptance.
- 5 The Contractor shall perform the following maintenance operations during the warranty Period.
 - 5.1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion. For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.
 - 5.2 Remove weeds monthly.
 - 5.3 Replace or respread damaged, missing or disturbed mulch.
 - 5.4 For non-mulched areas, cultivate and remove weeds monthly.
 - 5.5 Apply fertilizer in early spring at manufacturer's suggested rate.

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- 5.6 Avoid use of pesticides. When required to control insects, fungus or disease, apply pesticides only with approval from the TIR Representative and in accordance with Federal, Provincial and Municipal regulations.
- 5.7 Remove dead or broken branches from plant material.
- 5.8 Keep trunk protection and guy wires in proper repair and adjustment.
- 5.9 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
- 5.10 Remove trunk protection, tree supports and level watering saucers at end of first growing season.

Section 32 91 00 Planting Preparation

1 General Topsoil and Finish Grading:

- 1.1 The Contractor shall provide all topsoil required to complete the work . This may include improved grubbing material stockpiled on-site, and topsoil imported from off site.
- 1.2 Topsoil shall meet the requirements for its intended use and for the vegetation to be established according to the landscape plan.
- 1.3 Source Quality Control
 - 1.3.1 Advise DTIR of source of topsoil to be utilized 7 days in advance of starting work.
 - 1.3.2 Contractor is responsible for soil analysis and amendments to soil as specified.
- 1.4 Testing
 - 1.4.1 All topsoil or other planting medium to be used in any project shall be tested for soil texture by an approved laboratory designated by the Province of Nova Scotia. Soil sampling, testing and analysis to be in accordance with provincial standards. Contractor will arrange and pay for cost of tests. Contractor shall submit copies of Soils Texture Report to the Province for approval prior to delivery of soil to the site.
 - 1.4.2 All topsoil or other planting medium to be used in any project shall be tested for fertility, organic matter sieve analysis, chemical analysis and pH value by the NS Department of Agriculture and Fisheries laboratory in Truro, NS. Soil sampling, testing and analysis to be in accordance with provincial standards. Contractor will arrange and pay for cost of tests. Contractor shall submit copies of Soils Analysis Report to the Province for approval prior to delivery to the site and again prior to Acceptance.

2 Products

- 2.1 Topsoil or other planting medium to be used for any project to consist of material stripped from site (grubbings) and/or imported topsoil to be supplied by the Contractor.
 - 2.1.1 Topsoil: mixture of mineral particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.

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- 2.1.2 Lime, fertilizer and/or compost amendments to be made according to the fertility and pH requirements specified in the Soil Analysis Report.
- 2.1.3 Contain no toxic elements or growth inhibiting materials.
- 2.1.4 Free from debris and stones over 25 mm diameter and coarse vegetative material, 12 mm diameter and 50 mm length, occupying more than 2% of soil volume.
- 2.1.5 Consistence: friable when moist.

- 2.2 Planting Soil for Trees, Shrubs and Groundcover
 - 2.2.1 A mixture consisting of 7 - 8 parts topsoil, and 2 - 3 parts compost, manure, peat moss or decomposed ground bark.
 - 2.2.2 Soil Amendments to improve fertility and/or texture
 - 2.2.2.1 Peat moss: Derived from partially decomposed species of Sphagnum Mosses; Elastic and homogeneous, brown in colour; Free of wood and deleterious material which could prohibit growth; Shredded particle minimum size: 5 mm.
 - 2.2.3 Sand: washed coarse silica sand, medium to coarse textured.
 - 2.2.4 Limestone: Ground agricultural limestone containing minimum calcium carbonate equivalent of 85%; Graduation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
 - 2.2.5 Fertilizer: Complete, commercial, with 35% soluble nitrogen.
 - 2.2.6 Manure: Well aged cattle manure, free of lumps and impurities.
 - 2.2.7 Compost: Shall meet provincial and CCME guidelines.

- 3 Execution
 - 3.1 Preparation of Subgrade
 - 3.1.1 Verify that grades are correct. If discrepancies occur, notify DTIR and do not commence work until instructed.
 - 3.1.2 Grade soil, eliminating uneven areas and low spots to ensure positive drainage.
 - 3.1.3 Remove debris, roots, branches, stones in excess of 25 mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes more than 50 mm above surface. Dispose of removed material at an approved site.
 - 3.1.4 Coarse cultivate entire area which is to receive topsoil to depth of 100 mm. Cross cultivate those areas where equipment used for hauling and spreading have compacted soil.

 - 3.2 Placing and Spreading of Topsoil/Planting Soil
 - 3.2.1 Place topsoil after subgrade has been approved by DTIR.
 - 3.2.2 Spread topsoil in uniform layers not exceeding 150 mm, over unfrozen sub-grade free of standing water.
 - 3.2.3 Spread topsoil over areas to be seeded to a minimum depth of 100 mm after settlement and 80% compaction.

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- 3.2.4 Place planting soil in shrub planting beds and pits to a minimum depth of 450 mm after settlement.
- 3.2.5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.
- 3.3 Soil Amendments
 - 3.3.1 Apply and thoroughly mix soil amendments and fertilizer into full depth of soil at rates recommended by Soils Analysis Report or qualified Vegetation Consultant.
- 3.4 Finish Grading
 - 3.4.1 Grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.
 - 3.4.2 Consolidate topsoil to leave surfaces smooth, uniform and firm against deep foot printing.
- 3.5 Acceptance
 - 3.5.1 DTIR will inspect materials in place and determine acceptance of material, depth of topsoil and finish grading. Approval of topsoil material subject to soil testing and analysis.
 - 3.5.2 Restoration of Stockpile Sites: Restore stockpile sites acceptable to DTIR
 - 3.5.3 Surplus Material: Dispose of materials not required at approved site.

Section 32 92 00 Turf and Grasses

- 1 General
 - 1.1 Related Sections
 - 1.1.1 Section 32 91 00 - Planting Preparation
 - 1.2 Product Data: Provide product data for: Seed, fertilizer and soil amendments
 - 1.3 Scheduling:
 - 1.3.1 Seed between May 1 and June 1, or between August 25 and September 10, when possible.
 - 1.3.2 When seeding is required during summer months, contractor must be prepared to irrigate to maintain moisture until seeded mixture is well established.
 - 1.4 Warranty
 - 1.4.1 All lawns shall remain free of defects for 1 full growing season, commencing at final acceptance.
 - 1.4.2 A growing season shall be from May 1 - Oct. 31.
 - 1.4.3 End of warranty inspection to be conducted by DTIR.
 - 1.4.4 Warranty may be extended if development and growth is not sufficient to ensure future survival as determined by the DTIR.
 - 1.4.5 For seeded and sodded areas accepted before June 30, warranty period may end on October 31 of the same year provided all conditions have been met.

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2 Products

2.1 Grass Seed

2.1.1 Canada “Certified” seed, in accordance with Government of Canada “Seeds Act” and “Seeds Regulations”.

2.1.2 Use seed mix approved for end use of area to be seeded.

2.1.2.1 “Canada No. 1 Lawn Grass Mixture” for lawns and other areas to consist of Creeping Red Fescue, Kentucky or Canada Bluegrass, Annual Rye and White Clover in an approved mixture, or at the recommendations of a Turf Specialist.

2.1.2.2 Canada No. 1 Grass seed mixture for sports field to be determined by a Turf Specialist to meet the requirements at the site.

2.1.2.3 For reclamation sites, the Nova Scotia Highway Seed Mix may be used, or other reclamation mixture recommended by a Reclamation Specialist.

2.1.2.4 In packages individually labeled in accordance with “Seeds Regulations” and indicating name and supplier and date bagged.

2.2 Sod

2.2.1 Nursery grown sod shall be a cultivated product utilizing specific turf grass species containing not less than 40% Kentucky Bluegrass and shall be free of weeds and having no surface soil visible when mowed to a height of 50 mm. The soil portion shall be of uniform thickness of not more than 20 mm and conform to Section 17 of the Canadian Standards for Nursery Stock.

2.2.2 Sodding is useful on disturbed areas which require immediate and permanent vegetative cover, or where it is preferred to other means of grass establishment. Locations particularly suited to stabilization with sod are: a. waterways and channels carrying intermittent flow at acceptable velocities, b. areas around drop inlets, when the drainage area has been stabilized, c. lawns, d. steep critical areas and under the face of a building.

2.2.3 The sod shall be strongly rooted and free of noxious weeds, undesirable plants, roots, stones, and other foreign materials that will be detrimental or will hinder the proper development of the sod. It shall be cut from living, thickly matted turf and shall be mowed to a height not to exceed 50 - 70 mm and thoroughly watered before the sod is cut.

2.2.4 Documentation of the source of the sod and verification of species used in the sod shall be submitted to the DTIR.

2.2.5 Care shall be exercised at all times to retain soil on the sod roots during transportation, handling and planting. The sod shall be transported to the site within twenty-four (24) hours from the time it is cut, unless it can be stored to the satisfaction of the Project Engineer. During delivery and while in stacks, all sod shall be kept moist and protected from exposure to the wind, sun and freezing. All damaged or dry sod shall be rejected.

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- 2.3 Water
 - 2.3.1 Free of impurities that would inhibit germination and growth.
 - 2.3.2 Supplied by Contractor.
 - 2.4 Fertilizer
 - 2.4.1 To Canada “Fertilizers Act” and “Fertilizers Regulations”.
 - 2.4.2 Complete synthetic, slow release with 35% of nitrogen content in water insoluble form.
 - 2.5 Organic Binder or Tackifier
 - 2.5.1 Binder or Tackifier acts as an adhesive to bind soil, fiber and seed particles together and to temporarily control the effects of wind and water erosion during seed germination and plant establishment.
 - 2.5.2 May be supplied in liquid or powder form and shall be applied at the Manufacturer’s recommended application rate. It shall not contain any toxic or growth inhibiting chemicals or compounds.
 - 2.6 Hydraulic Mulch
 - 2.6.1 Hydraulic mulch is specifically manufactured for use in hydraulic seeding equipment.
 - 2.6.2 It shall be locally procured, non-toxic, water activated, green coloured, and free of germination and growth inhibiting factors. Requests to use other products not locally produced shall be submitted to DTIR for approval before they are used.
 - 2.7 Organic Amendments to Enhance germination or growth may be used at the discretion of DTIR. This includes compost.
 - 2.8 Herbicide
 - 2.8.1 No herbicide shall be used.
- 3 Execution
- 3.1 Workmanship
 - 3.1.1 Work is not to be undertaken under adverse field conditions such as frozen soil, excessively wet or dry soil or soil covered with snow, ice or standing water.
 - 3.2 Seed or Sod Bed Preparation
 - 3.2.1 Verify that grades are correct. If discrepancies occur, notify DTIR and do not commence work until instructed.
 - 3.2.2 Fine grade surface free of humps and hollows to smooth, even grade, to elevations indicated, to tolerance of plus or minus 15 mm, surface draining

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- naturally.
- 3.2.3 Cultivate fine grade approved by DTIR to 25 mm depth immediately prior to seeding.
 - 3.2.4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; at an approved site.
 - 3.2.5 If seeding using a mechanical seeder or when sodding, work fertilizer and lime at rates recommended by the Soil Analysis Report, into the top few centimeters of soil prior to seeding or laying sod.
- 3.3 Turf Establishment, Mechanical Seeding
- 3.3.1 Use mechanical landscape seeder such as “Brillion” type which accurately places seed at specified depth and rate and rolls in a single operation.
 - 3.3.2 On cultivated surfaces, sow seed uniformly at rate of 1.0 kg/22.5 sq metres along with appropriate proportion of water and fertilizer.
 - 3.3.3 Blend applications 150 mm into adjacent grass areas to form uniform surfaces.
 - 3.3.4 Sow half of required amount of seed in one direction and remainder at right angles.
 - 3.3.5 Embed seed into soil to depth of 10 mm. Not less than 85% of seed to be placed at specified depth and covered by soil.
 - 3.3.6 Immediately after seeding, use agricultural, water ballast type roller, not less than 500 mm diameter with smooth steel drum and a width not less than the width of the landscape seeder to mechanically consolidate the seeded area if soil conditions warrant or if directed by DTIR.
 - 3.3.7 Water with fine spray to avoid seed wash-out. Water to ensure penetration of minimum 50 mm.
 - 3.3.8 Protect seeded areas against damage. Remove this protection after lawn areas have been accepted.
- 3.4 Turf Establishment, Hydraulic Seeding
- 3.4.1 Thoroughly mix the specified seed mixture, recommended fertilizer, lime if needed, hydraulic mulch and tackifier with water and apply with an approved hydraulic seeder.
 - 3.4.2 Seed mix at rate of 100 kg/ha
 - 3.4.3 Fertilizer at recommended formulation at rate of 625 kg/ha
 - 3.4.4 Hydraulic mulch shall be mixed in a hydroseeding unit with the other ingredients, and sprayed evenly and uniformly over the designated areas at a rate of 2200 kg/ha +/- 10%.
 - 3.4.5 Hydroseed during calm wind conditions. Re-apply where application is not uniform.
 - 3.4.6 Remove slurry from areas and items not designated to be sprayed.
- 3.5 Turf Establishment, Sodding
- 3.5.1 Sod delivered to the site shall not be dried out nor frozen. Sod shall not be dumped

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- from vehicles nor shall it be handled with pitch forks.
- 3.5.2 Sod should be placed as soon as possible after the ground surface has been graded, to take advantage of the ground moisture. Sod shall not be applied on frozen ground. The sod bed shall be moist prior to laying the sod.
- 3.5.3 Sod may be laid any time from April until December. Sod should not be laid between June 10 and September 10 without irrigation or some other means of assuring the roots are in contact with moist soil.
- 3.5.4 The sod shall be applied by hand in rows at right angles to the direction of the slope, starting at the base of the area to be sodded and working upward. The strips shall be laid together tightly so that no open joints are left between strips or between the ends of strips. The joints shall be staggered between the ends of strips. The edges of the sod at the top of the slopes shall be tucked slightly under. A layer of soil shall be compacted over the edge to conduct surface water over and onto the top of the sod.
- 3.5.5 Sod shall be laid perpendicular to the flow of water on slopes and in ditches and waterways.
- 3.5.6 The sod shall be firmly tamped or rolled immediately after it is placed to eliminate all air pockets and to provide a smooth, even surface.
- 3.5.7 Immediately after rolling or tamping the sod, sufficient water will be applied to completely saturate the sod.
- 3.5.8 All excess earth, stones or other debris shall be removed by the Contractor when sodding is completed.
- 3.5.9 Sodding at face of building: Sod to a distance from the face of building minimum distance of 7 m with the balance of the site seeded, unless required otherwise by the program. Water run-off from the building will be directed away from any sodded areas around building perimeter.
- 3.6 Maintenance During Establishment Period: Perform following operations from time of seed and sod application until acceptance by Project Manager:
- 3.6.1 Water seeded and sodded areas with fine spray to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.
- 3.6.2 At the Contractor's expense, any sod which shows signs of settlement shall be cut out and replaced.
- 3.6.3 Dead or bare spots shall be repaired and re-seeded to allow establishment of turf prior to acceptance.
- 3.6.4 For lawns and other manicured areas, cut grass to 50 mm whenever it reaches height of 75 mm.
- 3.6.5 Fertilize seeded and sodded areas after first cutting in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water it well.
- 3.6.6 Eliminate weeds by means approved by Project Manager.

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- 3.7 Fertilizing Program
 - 3.7.1 In the fall following seeding of lawn areas, apply a general fall lawn fertilizer.
 - 3.7.2 In the following spring, apply an application of 6-12-12 fertilizer at the recommended rate to all areas seeded or sodded the year before.

- 3.8 Acceptance: Seeded or sodded areas will be accepted by Project Manager provided that:
 - 3.8.1 Seeded or sodded areas are uniformly established and turf is healthy, dark green and free of rutted, eroded, bare or dead spots and free of weeds.
 - 3.8.2 Lawn areas have been cut at least twice.
 - 3.8.3 All seeded and sodded areas have been fertilized.

- 3.9 Maintenance During Warranty Period. Perform following operations from time of acceptance until end of warranty period:
 - 3.9.1 Repair and reseed dead or bare spots to satisfaction of Project Manager.
 - 3.9.2 Fertilize seeded areas in accordance with fertilizing program. On lawn areas, spread half of required amount of fertilizer in one direction and remainder at right angles and water it well.
 - 3.9.3 Eliminate weeds by means approved by Project Manager.

Section 32 93 00 Recommended Plants for Landscaping

- 1 Inspection and written certification by the Landscape Architect will be required for all landscape planting.

- 2 The following is a list of native and other hardy plants recommended for planting at school sites in the province of Nova Scotia. (* indicates non native species) The plants on this list are recommended for the following reasons:
 - 2.1 disease resistance
 - 2.2 low maintenance
 - 2.3 year round interest berries, flowers, fall colour, interesting bark and twigs
 - 2.4 attract birds
 - 2.5 to promote and sustain natural habitat and ecosystems

2.5.1 Deciduous Trees

Common Name	Botanical Name
Red Maple	Acer rubrum
Sugar Maple	Acer saccharum
Striped Maple	Acer pensylvanicum
Serviceberry	Amelanchier laevis
Yellow Birch	Betula alleghaniensis
Paper Birch	Betula papyrifera
White Ash	Fraxinus americana
Beech	Fagus grandifolia

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Ironwood	Ostrya virginiana
Trembling Aspen	Populus tremuloides
Red Oak	Quercus rubra
Mountain Ash	Sorbus americana
Basswood	Tilia americana
2.5.2 Coniferous Trees	
Common Name	Botanical Name
White Spruce	Picea glauca
White Pine	Pinus strobus
Eastern Hemlock	Tsuga canadensis
2.5.3 Shrubs: refer to Part 2 Section 1, Site Design	
2.5.4 Groundcover	
Common Name	Botanical Name
Bearberry	Arctostaphylos uva ursi
Bunchberry	Cornus canadensis
Teaberry	Gaultheria procumbens
Wild Blueberry	Vaccinium angustifolium
Partridgeberry	Vaccinium vitis-idaea minor
Cranberry	Vaccinium vitis-idaea major

END