1 GENERAL

1.01 DESCRIPTION

.1 This section covers the full depth pavement removal of existing asphalt within the project limits.

1.02 RELATED SECTIONS

.1 Hot Mix Asphalt Concrete - Section 32 12 16

2 PRODUCTS

2.01 NOT APPLICABLE

.1 Not Applicable

3 EXECUTION

3.01 PREPARATION

.1 Prior to commencing removal operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt concrete pavement to be removed.

3.02 EQUIPMENT

.1 Use pulverizing/milling equipment and other equipment capable of removing all of asphalt concrete pavement surface and asphalt sand to depths or grades indicated.

3.03 REMOVAL

.1 Remove the full width of existing asphalt and asphalt sand by milling full depth.

.2 In areas with an amended granular base, a maximum of 128 mm of the milled material is to be mixed/blended thoroughly with 192 mm of virgin Class A gravel to form a gravel/milled asphalt mixture (40% millings and 60% Class A).

.3 The new blended material is to be spread to a uniform thickness of 320 mm over the required width.

.4 Additional Class A may be required to make up a shortfall in existing millings.

.5 Dispose of surplus millings off site.

.6 Use equipment and methods of removal and hauling which do not tear, gouge, break or otherwise damage or disturb underlying pavement.

.7 Prevent contamination of removed asphalt concrete pavement by topsoil, underlying gravel or other materials.

.8 Provide for suppression of dust generated by removal process.

.9 Compact underlying material.

.10 In areas where localized pavement removal is carried out within the traffic lane ensure traffic is restricted from area until the surface is restored.

3.04 TOLERANCE

.1 Compacted surface shall be within plus or minus 5 mm of elevations established by the Departmental Representative, but not uniformly high or uniformly low.

3.05 TRAFFIC CONTROL

.1 Maintain one lane of traffic at times.

END OF SECTION

1 GENERAL

1.01 RELATED WORK

.1 Rough Grading - Section 31 23 13

1.02 REFERENCES

.1 ASTM C117-13, Test Method for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.

.2 ASTM C131-14, Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.3 ASTM C136-14, Method for Sieve Analysis of Fine and Coarse Aggregates.

.4 ASTM D698-12e1, Test Methods for Moisture Density Relations of Soils and Soil Aggregate Mixtures Using 2.49 kg Rammer and 304.8 mm Drop.

.5 ASTM D4318-10e1, Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.6 CAN/CGSB-8.2-M88 (R10/3), Sieves Testing, Woven Wire, Metric.

.7 ASTM D1557-12e1, Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ftü (2,700 kN-m/mü)).

.8 ASTM D1883-14, Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

.9 ASTM D6938-15, Standard Test Methods for In-Place Density and Water Content of So8il and Soil-Aggregate by Nuclear Methods (Shallow Depth).

2 PRODUCTS

2.01 MATERIALS

.1 Granular Base: to meet PEI DOTIE Class A and the following requirements:

Sieve Size	Granular Class A	Granular Class B
50.0mm	-	-
45.0mm	-	-
38.0mm	-	-
31.5mm	100	100
25.0mm	95-100	95-100
19.0mm	-	-
12.5mm	50-83	50-83
9.5mm	-	-
4.75mm	30-60	30-60
1.18mm	15-40	15-43
600µm	10-32	10-35
300µm	5-22	5-26
75µm	3-9	3-7

.2 Type 1 Granular as identified on Drawings and in Specifications is equivalent to Granular Class A.

3 EXECUTION

3.01 INSPECTION OF UNDERLYING SUB-BASE

.1 Place granular base after surface is inspected and approved by Department Representative.

.2 Underlying material to be compacted to 100% of Standard Proctor Density to ASTM D698

3.02 PLACING

.1 In areas using granular Class A base, place granular material to compact thickness as indicated.

.2 Do not place frozen material.

.3 Place material only on clean unfrozen surface, properly shaped and compacted and free from snow and ice.

.4 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.5 Remove and replace that portion of layer in which material becomes segregated during spreading.

.6 Place and compact shouldering to specified cross slope in reconstruction areas. In overlay sections, feather new shoulder material from top of new asphalt to existing hinge point of shoulder slope.

.7 Compacted shouldering to be flushed with asphalt concrete surface.

3.03 COMPACTION EQUIPMENT

.1 Vibratory compaction equipment must be used and capable of obtaining required densities on aggregates on project.

3.04 COMPACTING

.1 Compact granular base to density not less than 100% corrected maximum dry density.

.2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.

.3 Apply water as necessary during compacting to obtain specified density. If aggregate 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 vibratory mechanical tampers approved by Departmental Representative.

.5 Density will be determined according to ASTM D698.

3.05 FINISH

.1 Shape and compact entire road base to within 12mm of design elevations but not uniformly high or low. After re-placement of the millings and placement of the granular base provide a table of cross section elevations at 20 meter grid showing the design and as constructed elevations, demonstrating that the specified tolerance has be achieved and that the road is not uniformly high or low.

.2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

.3 Shape shouldering cross slope in accordance with the Project Drawings.

3.06 MAINTENANCE

.1 Maintain finished base in condition conforming to this section until succeeding material is applied or until acceptance by Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.01 REFERENCES

.1 Department of Transportation and Infrastructure Renewal General Provisions and Contract Specifications for Highway Construction, latest edition.

.2 ASTM D3203-2017, Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.

.3 CAN/CSA B651-12(R2017), Accessible Design for the Built Environment.

1.02 SAMPLES

.1 At least two (2) weeks prior to commencing work inform Departmental Representative of proposed source of aggregates, liquid asphalt and asphalt cement and provide access for sampling.

.2 Preliminary approval of any sample or samples of any material will not constitute a final approval of the material or its source of supply.

.3 Continuously and regularly sample materials to be incorporated into the work and test in the field and in the laboratory. All materials must comply with the requirements of the material specification.

1.03 MATERIAL CERTIFICATION

.1 At least four (4) weeks prior to commencing work submit viscosity-temperature chart for asphalt cement to be supplied showing either Saybolt Furol viscosity in seconds or Kinematic Viscosity in centistokes, temperature range 105 to 175 C.

.2 Upon request, submit manufacturer's test data and certification that asphalt cement meets requirements of this section.

PART 2 PRODUCTS

2.01 MATERIALS

.1 Asphalt concrete: hot mixed, hot- laid combination of mineral aggregates, uniformly coated and mixed with an asphaltic binder in a suitable mixing plant. Asphalt materials and aggregates must meet the requirements of Item 603 of the General Provisions And Contract Specifications For Highway Construction as released by the PEI Department Of Transportation And Public Works, 2012 revision, mix type "A" (base) and type "B" (seal) for all paving surfaces.

.2 Bituminous tack coat to PEI DOTIE Standard Specification

2.02 PAVEMENT MARKINGS

.1 Pavement Markings: Traffic line marking paint or approved equal to CAN/CGSB 1.74:
.1 Parking lot lines: White.
.2 Barrier-free parking symbols: White with Blue background to Parks Canada Standard.
.3 Stop bars and pavement arrows: White.
.4 Driveway lane divider lines: Yellow.

PART 3 EXECUTION

3.01 EQUIPMENT

.1 Pavers: mechanical self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.

.2 Rollers: sufficient number of rollers of type and weight to obtain specified density of compacted mix.

.3 Haul trucks: of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
.1 Boxes with tight metal bottoms.
.2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
.3 In cool weather or for long hauls, insulate entire contact area of each truck box.

3.02 PLACING

.1 Obtain the Departmental Representative's approval of aggregate base prior to placing asphalt.

.2 Place asphalt concrete to thicknesses, grades and lines as indicated or as directed by the Departmental Representative.

.3 Placing conditions:
.1 Place asphalt mixtures only when air temperature is above 5°C.
.2 When temperature of surface on which material is to be placed falls below 10°C, provide extra rollers as necessary to obtain required compaction before cooling.
.3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.

.4 Place asphalt concrete in compacted lifts of thickness as indicated.

.5 Place, roll and compact asphalt concrete in accordance with Item 603 of the General Provisions and Contract Specifications for Highway Construction as released by the PEI Department of Public Work, 2012 revision.

.6 The minimum density acceptable will be 93% of the theoretical Maximum Relative Density determined according to ASTM D3203.

3.03 FINISH TOLERANCES

.1 Finished asphalt surface to be within 12mm of design elevation but not uniformly high or low.

.2 Finished asphalt surface not to have irregularities exceeding 12mm when checked with a 3m straight edge placed in any direction.

3.04 PROTECTION

.1 Restrict traffic during setting period to prevent damage as directed by the Departmental Representative.

3.05 DEFECTIVE WORK

.1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form a true and even surface and compact immediately to specified density.

.2 Repair areas showing checking or rippling.

.3 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

.4 If, at any time before the work is finally accepted, any raveling, shoving or other fault develops in the pavement as laid, remove all mixed materials in such places, cut edges of joints square and paint with tack coat. Place fresh asphalt mixture and compact. Remove and replace all such unsatisfactory material at no additional expense to the Contract.

3.06 TACK COAT

.1 Apply bituminous tack coat to PEI DOTIE Standard Specification.

.2 Apply tack coat to contact clean dry surfaces of castings and structures.

.3 Apply tack coat only to base course surfaces that are expected to be overlaid on same day.

3.07 PAVEMENT MARKINGS

.1 Allow asphalt to cure a minimum of seven (7) days before application of marking paint.

.2 Surface to be free from water, frost, ice, dust, dirt, oil, and grease.

.3 Layout pavement markings in parking areas accurately as indicated.

.4 Apply pavement markings in accordance with material manufacturer’s instructions.

.5 Barrier-free space markings to meet CAN/CSA B651.

.6 Guarantee pavement markings for two (2) years.

END OF SECTION

1 GENERAL

1.1 WORK INCLUDED

.1 To complete cast-in-place concrete sitework as shown, specified or required, and summarized but not restricted, to:

.1 Broom finished cast-in-place (CIP) concrete sidewalk, reinforced and non-reinforced including base granulars.

.2 Broom finished cast-in-place (CIP) concrete curbs, including base granulars and reinforcing where indicated on Drawings.

.1 Standard 150mm straightback curb.

.2 Drop curb and gutter for pedestrian access.

.3 Supply and installation of cast-iron detectable warning plates.

.4 Traffic signage and other miscellaneous post foundations.

.5 Foundation for flag pole including reinforcing.

1.2 RELATED WORK

.1	Section 01 35 43	Environmental Procedures
.2	Section 10 14 54	Site Signage
.3	Section 10 75 00	Flagpole
.4	Section 31 23 11	Excavation,Trenching and Backfilling
.5	Section 32 12 16	Asphalt Paving
.6	Section 32 37 00	Miscellaneous Sitework Construction

1.3 REFERENCES

.1 ASTM C150/C150M-17 Standard Specification for Portland Cement

.2 ASTM C260/C260M-10a(2016) Standard Specification for Air-Entraining Admixtures for Concrete

.3 ASTM C920-14 Standard Specification for Elastomeric Joint Sealants

.4 ASTM A1064/A1064M-16b Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

.5 ASTM D1752-04a(2013) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

.6 CAN/CGSB 51.34-M86 Vapour Barrier, Polyethylene Sheet for Use in Building Construction

.7 CSA A23.1-14 Concrete Materials and Methods of Concrete Construction.

.8 CSA A23.2-14 Methods of Test for Concrete, Includes Update No.1 (2011).

.9 CSA G30.18-09(R2014) Carbon Steel Bars for Concrete Reinforcement

.10 CSA G40.20-13/G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel

.11 CSA S269.3-M92(R2013) Concrete Formwork.

.12 CSA B651-12(R2017) Accessible Design For the Built Environment

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Seal emptied containers and store safely for disposal.

.4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

1.5 LEED DOCUMENTATION

.1 Submit a LEED material submittal form as specified in Section 01 35 21 – LEED Requirements, to identify recycled and/or regional content of materials for inclusion by the Owner/Consultant in a submission for LEED certification.

.2 Conform to the requirements outlined in Section 01 74 21 – Construction Waste Management.

1.6 SOURCE SAMPLING

.1 Inform Departmental Representative of proposed source of material to be supplied and provide samples as requested. Concrete plant source to meet CSA A23.1.

1.7 TESTING AND INSPECTION

.1 On-site inspection and testing of concrete materials will be carried out by an independent testing company engaged by the Departmental Representative.

.2 Provide samples of materials for testing and labour as necessary to obtain and handle samples.

.3 Contractor to pay for costs of testing non-compliant material.

.4 Inspection or testing will not augment or replace contractor quality control nor relieve him of him contractual responsibility.

.5 Frequency of testing to be in accordance with CSA A23.1/A23.2

1.8 TOLERANCES

.1 Finish horizontal and vertical surfaces to within 6mm in 3000mm from line, level or grade as measured with a straightedge placed on surface.

.2 Detectable warning plates to within 3mm of concrete surface.

1.9 SUBMITTALS

.1 Prepare 1500mm x 1500mm panel for broom finish concrete surfaces for use as a standard of acceptance. Subject to Departmental Representative's approval, sample panel may be retained as part of finished work. If sample is not retained, contractor to remove and properly dispose.

.2 Submit shop drawing of concrete curb slip form, as required

.3 Maintain and submit records of concrete deliveries and placement.

.4 Submit shop drawing for detectable warning plate including installation instructions.

.5 At project completion submit As-Built CAD survey of all new concrete surfaces indicating location and elevations. This information to be submitted with other As-Built information.

2 PRODUCTS

2.1 CONCRETE MIXES

.1 Submit mix design of concrete for review by Departmental Representative. Provide in accordance with CSA A23.1 and CSA A23.2 for exposure Class C-1 and C-2.

.2 Strength: to CSA A23.1 and CSA A23.2; 35 Mpa at 28 days. Mixtures must meet the minimum cement content but may exceed the minimum strength requirements.

.3 Aggregate: to conform to CSA A23.1; 25 mm maximum size, 12 mm minimum size coarse aggregate.

.4 Slump: to CSA A23.1 and CSA A23.2; 75 mm slump at time and point of deposit.

.5 Portland cement: to ASTM C150.

.6 Water: Mixing water to be fresh, clean and potable to CSA A23.1.

.7 Curing compound: chlorinated rubber type compound to CSA A23.1, Type 1.

.8 Air entrainment mixture: to CSA A23.1 and ASTM C260.

.9 Chemical admixtures: to CSA A23.1. Departmental Representative to approve the use of any chemical admixture, set retardant or accelerant.

2.2 REINFORCING

.1 Bars to CSA G30.18, billet steel, grade 400 deformed.

.2 Welded Steel Wire Fabric: to ASTM A1064/A1064M.

.3 Bar Supports and Spacers: to CSA A23.1.

.4 Smooth plain round bars: to CSA G40.21

2.3 FORMWORK

.1 Forms to CSA A23.1 and CSA S269.3, wood or metal, sound, straight, free from warp, smooth and sufficiently strong to withstand, without deformation, any stress placed upon them.

.2 Form stripping agent: chemically active release agents containing compounds that react with free lime present in concrete to provide water soluble soaps, preventing set of film of concrete in contact with form.

.3 Fibreboard Foundation Form: Spiral wound, laminated fibreboard. Minimum wall thickness: 3.2mm

2.4 GENERAL

.1 Pre-moulded Joint Filler: to ASTM D1752, 12.5mm preformed, non-extruding, resilient, closed cell, polyvinyl chloride foam.

.2 Joint sealer: cold applied to ASTM C920, Type M, Grade P Class 25.

.3 Polyethylene film: 6 mil to CAN/CGSB 51.34.

.4 Insulation: 50mm thick rigid SM-type foam insulation. Minimum compressive strength: 30 psi (2.1097 kg/cm).

2.5 JOINTS

.1 Expansion Joints: fibrous, compressible, tar impregnated flexible board – 12mm thick, continuous between concrete slab/curb and all rigid vertical surfaces. Flexcell or equivalent.

.2 Crack Control Joint:

.1 Sidewalk: Sawcut ¼ the thickness of the concrete slab. Minimum 25mm deep.

.2 Curbs and Gutters: Minimum 25mm deep.

.3 Construction Joint/Cold Joint: Doweled with smooth bars and expansion joint material as detailed. Tool edges of joint to approval of Departmental Representative.

2.6 DETECTABLE WARNING PLATE

.1 Cast-iron plates meeting CSA B651, capable of being molded together. Standard of acceptance: Neenah Foundry Bolted Detectable Warning Plates (www.nfco.com)

3 EXECUTION

3.1 GENERAL

.1 Do concrete work to CSA A23.1 and as herein specified.

.2 Check graded Subgrade for conformity with elevations and sections and obtain approval of Departmental Representative before placing granular base material.

.3 Proof roll graded Subgrade surface with weight and type of roller to approval of Departmental Representative:

.1 Check for unstable areas.

.2 Check for areas requiring additional compaction.

.4 Notify Departmental Representative of unsatisfactory conditions.

.5 Obtain approval of completed granular base preparation and formwork and before proceeding with placement of concrete.

.6 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken. Submit records to Departmental Representative as directed.

.7 Provide 24 hour notice prior to placing of concrete.

.8 Prior to placing of concrete, obtain Departmental Representative's approval of proposed method for protection of concrete during placement and curing.

.9 Provide hot weather and cold weather protection in accordance with CSA A23.1.

.10 Concrete delivery trucks are not to wash chutes or other equipment within the confines of the National Park except as allowed by Departmental Representative. Failure to abide by this requirement could result in charges under the National Parks Act.

3.2 GRADE PREPARATION

.1 Refer to Section 31 23 11 Excavation, Trenching and Backfilling.

3.3 GRANULAR BASE

.1 Place granular base over Subgrade to min. compacted thickness as indicated on Drawings.

.2 Compact each layer to 100% Standard Proctor Density.

.3 Place insulation for 1200mm in all directions beyond extents of door openings as shown on Drawings.

.4 Obtain approval of completed granular base preparation before proceeding with placement of concrete.

3.4 FORMS

.1 Formwork to CSA A23.1/A23.2 and CAN/CSA S269.3

.2 Obtain approval of Departmental Representative for forms and boxouts before placing concrete.

.3 In General:

.1 Construct forms for unsupported concrete edges, to provide straight lines and smooth flowing curved lines as indicated.

.2 Ensure forms are cleaned of all adhering substances.

.3 Form vertical surfaces to full depth using forming material that will not deform under loading by plastic concrete.

.4 Securely position forms to required lines and grades. Do not use rock, boulders or stone to brace formwork.

.5 Coat forms with form release agent.

.6 Form separate boxouts where slabs meet drains and columns.

3.5 CURBS

.1 Form curbs to profiles indicated on Drawings. Form drop curbs to meet code requirements for barrier-free access.

.2 At the option of the Contractor and with the approval of the Departmental Representative, slip-form equipment may be used for the construction of concrete curbs.

.3 Slip-form equipment shall be provided with traveling side and top forms of suitable dimensions, shapes, and strength to support the concrete for a sufficient length of time during placement to produce curb and gutter of the required cross section. The equipment shall spread, consolidate, and screed the freshly placed concrete to provide a dense and homogeneous product.

.4 The slip-form equipment shall have automatic sensor controls which operate from an offset control line. The line and grade of the slip-form equipment shall be automatically controlled.

.5 Provide shop drawing of slip form profile for approval of Departmental Representative.

3.6 REINFORCING

.1 To CSA A23.1/A23.2.

.2 In General:

.1 Clean reinforcing of rust build-up, mill scale or other coatings that may prevent or reduce bond before placement of concrete.

.2 Place and support reinforcing in position as indicated on Drawings using bar supports and side form spaces to ensure cover, spacing and location. Ensure reinforcement and inserts are not disturbed during concrete placement.

.3 Keep reinforcing 75mm back from edges and joints.

.4 Obtain Departmental Representative's approval of reinforcing steel and placing prior to placing concrete.

3.7 CONCRETE

.1 Place concrete to CSA A23.1/A23.2.

.2 In General:

.1 Obtain Departmental Representative's approval of granular base, formwork and reinforcing prior to placing concrete.

.2 Convey concrete from mixer to forms by methods that will maintain specified slump and prevent segregation.

.3 Place concrete in continuous operation, starting from lowest point in form, in lifts not greater than 450mm.

.4 Dampen Subgrade just before placing concrete.

.5 Do not add water to mixer or to mix at point of delivery to increase workability. Maintain specified water/cement ratio.

.6 Vibrate or tamp each layer to obtain dense homogeneous structure free of cold joints, fill planes, voids and honeycombing. For vertical installation vibrate at least 150mm into previously placed layers. Concrete to be well bonded to all reinforcing steel, anchors and other embedded parts.

.7 Do not permit workers to stand on or finish slabs until bleed water dissipates. Do not spread dry cement on surface of fresh concrete.

3.8 FINISHING

.1 Finish concrete to CSA A23.1/A23.2.

.2 Natural (broom) finish surfaces:

.1 Finish visible surfaces of walks and other concrete specified as natural finish by texturing with a stiff wire or fibre broom drawn across setting concrete to form a uniform textured finish.

.2 Finished surface to be free from projecting ridges greater than 3mm high.

.3 Float and darby finish concrete surface using wood float to ensure all aggregate is forced uniformly just below final surface.

.4 Use minimum force when float finishing concrete being careful not to push `waves' of concrete ahead of float. Excessive pushing of float tends to segregate aggregate from paste causing a prominent mark in finished surface when washed.

.5 The surface shall have a uniform even textural appearance the same as approved sample panels.

.6 Install dowelled construction joints at all cold joints in sidewalks.

3.9 DETECTABLE WARNING PLATES

.1 Install as per manufacturer’s instructions.

.2 Generally:

.1 Place concrete for sidewalk.

.2 Bolt panels together to achieve required width.

.3 Use lifting springs to lift plates into position.

.4 Set plates into wet concrete at final position.

.5 Remove lifting springs and press assembly into final elevation with frame flush with adjacent concrete.

.6 Remove any wet concrete from plate surface.

3.10 EXPANSION AND CONTRACTION JOINTS

.1 Install joints to CSA A23.1/A23.2.

.2 Install expansion joints in walkways where surfaces abut walls, catchbasins, drain boxouts, curbing and at all other permanent vertical surfaces and between adjacent cold pours of concrete. Seal joints with approved sealant.

.3 Control Joints: Saw cut to min. 6mm width and to minimum depth of 30mm and/or as indicated on Drawings as soon as concrete can be sawn without dislodging aggregate particles. Saw cuts are to be made within 4 - 18 hours of finishing concrete.

.1 For Sidewalks: Equally spaced at max. 1800mm o.c.

.2 For curbs: 3000mm o.c. and where possible to coincide with adjacent sections of sidewalks.

.4 Make joints of adjacent sections of sidewalk and curbs coincide.

.5 All joints to be straight, true and at 90 degrees to one another and to intersecting vertical surfaces unless otherwise shown on Drawings.

3.11 CURING

.1 Cure and protect concrete in accordance with to CSA A23.1/A23.2.

.2 Cure at temperature of 10° C. or greater for each of 7 days after placement.

.3 Provide protection for concrete during curing period as detailed in CSA A23.1/A23.2, particularly when air temperatures may drop below 10° C or rise above 27° C.

.4 Air cure concrete for 30 days prior to first freeze. Protect concrete if freezing conditions occur within 30 days of placement.

3.12 FOUNDATIONS

.1 Construct poured concrete foundations for signage and all other site elements where indicated on drawings.

.2 Coordinate foundation placement to lines, elevations and other specific requirements of these installations.

.3 Place minimum 300mm of concrete in post holes before embedding posts. Extend concrete 50mm above finish grade. Slope top of foundations away from posts and finish smooth.

3.13 BACKFILL

.1 Backfill area behind concrete work to be free from debris and water.

.2 Allow concrete to cure for 7 days prior to backfilling. Backfill to designated elevations with specified materials, compact and shape to required contours as indicated on Drawings.

.3 Place backfill material in uniform layers not exceeding 150mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.4 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

3.14 CLEAN-UP

.1 Remove excess concrete and ridges in excess of 6mm on horizontal and vertical faces of post and pole foundations.

3.15 DEFECTIVE WORK

.1 Concrete is defective when:

.1 Concrete contains excessive honeycombing or embedded debris.

.2 Concrete is damaged by freezing or is unsatisfactory due to placement at too high temperature.

.3 28-day strength in any defined area is less than 95% of the specified strength.

.4 Finished surface does not match approved sample panel.

.5 Finished surface does not meet specified surface dimensional tolerances.

.6 Concrete is cracked, sidewalk panels or curbs are cracked.

.2 Cut back to nearest joints, remove and replace entire panel(s) that are defective.

END OF SECTION

1 GENERAL

1.1 WORK INCLUDED

.1 To complete unit paving as shown, specified or required including:

.1 Supply and installation of heavy duty unit paving cross-section on grade – including base granulars, setting bed, soldier courses and restraining edging and geotextile where indicated.

.2 Supply and installation of precast concrete permeable unit paving including base granulars, geotextile, joint granulars and drainage piping where indicated.

1.2 RELATED WORK

.1 Section 01 35 43 Environmental Procedures

.2 Section 31 23 11 Excavation, Trenching and Backfilling

1.3 REFERENCES

.1 CSA A23.1-14 Concrete Materials and Methods of Concrete Construction

.2 CSA A231.1-14/A231.2-14 Precast Concrete Paving Slabs/Precast Concrete Pavers

.3 ASTM C144-11 Standard Specification for Aggregate for Masonry Mortar

.4 ASTM D698-12e2 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3))

.5 ASTM D1751-04(2013)e1 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

.6 ASTM D3776 / D3776M - 09a (2013) Standard Test Methods for Mass Per Unit Area (Weight) of Fabric

.7 ASTM D3786 / D3786M - 13 Standard Test Method for Bursting Strength of Textile Fabrics—Diaphragm Bursting Strength Tester Method

.8 ASTM D4355-14 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus

.9 ASTM D4632/D4632M-15a Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

.10 ASTM D4751 - 16 Standard Test Method for Determining Apparent Opening Size of a Geotextile

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Seal emptied containers and store safely for disposal.

.4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

1.5 LEED DOCUMENTATION

.1 Submit a LEED material submittal form as specified in Section 01 35 21 – LEED Requirements, to identify recycled and/or regional content of materials for inclusion by the Owner/Consultant in a submission for LEED certification.

.2 Conform to the requirements outlined in Section 01 74 21 – Construction Waste Management.

1.6 PROTECTION

.1 Prevent damage to buildings, landscaping, roads, and adjacent property and all other items designated to remain.

1.7 ALLOWABLE TOLERANCES

.1 Grade base courses with surfaces within 12mm of established elevations and within a tolerance of 12mm when checked under 3000mm long straightedge.

.2 Finish pavers with surfaces within 12mm of specified elevations and locations, within 6mm of other surfaces at

junctions, and within a tolerance of 6mm when measured under a 3000mm long straightedge.

.3 Minimum paver dimensions after cutting to be 25mm. Maximum gap between adjacent pavers along curves to be 12mm.

1.8 SUBMITTALS

.1 Paver Manufacturer to supply letter that states the products meet conformance to CSA A231.2.

.2 Submit four representative full-size samples of each paver type, thickness and colour that indicate the range of colour variation and texture expected in the finished installation. Accepted samples become the standard of acceptance for the work.

.3 Submit sieve analysis of bedding granulars.

.4 Submit sieve analysis of permeable paver area bedding granular.

.5 Submit product information and sample colour for polymeric joint granulars.

1.9 WARRANTY

.1 Guarantee paver work for a period of 1 year after date of Substantial Completion of contract against workmanship, heaving, or settlement and cracking, spalling or other product failure.

2 PRODUCTS

2.1 UNIT PAVERS

.1 Precast concrete pavers: to CSA A231.2 in the following dimensions and types:

.1 Heavy-duty paver cross-section:

.1 Main Field - Standard of acceptance - Uniloc Windermere; Colour: Cliffside Gray; 70mm paver; Pattern A.

.2 Soldier Course – Standard of Acceptance – Uniloc Thornbury; Colour: Granite; 70mm paver.

.2 Permeable Unit Pavers:

.1 Standard of acceptance. Oaks Pavers, Enviro Midori; Colour: Champagne; 80mm paver; Pattern: Random.

2.2 GRANULARS

.1 For Heavy Duty Paver Areas:

.1 Base Course: PEI DOTIE Class A as specified

.2 Setting Bed: Crusher dust, 6mm crushed stone screenings and crusher dust free from clay lumps, cementation, organic or frozen material, and other deleterious materials conforming to grading requirements of CSA A23.1-FA1 with modifications as noted:

Grading Requirements for Setting Bed
CSA A23.1-FA1

Sieve Size	Percent Passing
10mm	100
5mm	95 to 100
2.5mm	80 to 100
1.25mm	50 to 90
0.63mm	25 to 65
0.315mm	10 to 35
0.160mm	2 to 10
0.075mm	0 to 1

Contractor to provide sample and analysis of bedding granulars for review.

.3 Joint granulars: Polymeric Joint Granulars to ASTM C144. Standard of acceptance – Techniseal RG+ (www.techniseal.com) or approved equivalent. Colour to approval of Departmental Representative.

.2 For Permeable Pavers:

.1 Sub-Base Drainage: PEI DOTIE – Class D.

.2 Bedding and Joint Material: 6mm washed crushed stone to approval of Departmental Representative.

2.3 GEOTEXTILE:

.1 Non-woven geotextile fabric composed of polypropylene fibres inert to biological degradation and resistant to naturally encountered chemicals, alkalis, and acids and

conform to minimum physical properties listed below. Standard of acceptance: Propex Geotex 701:

.1 Weight (ASTM D3776): 255g/m^2

.2 Grab Tensile (ASTM D4632): 800N minimum.

.3 Mullen Burst (ASTM D3786): 2000 kPa minimum.

.4 Filtration Opening Size (ASTM D4751): 75-115 um.

.5 Hydraulic Conductivity: 0.01 cm/sec.

.6 UV Resistance (ASTM D4355): 70% strength retained.

2.4 DRAINAGE PIPE

.1 Single wall, corrugated, perforated 100mm HDPE. Standard of Acceptance: ADS-Heavy Duty.

2.5 EXPANSION JOINT MATERIAL

.1 Fibre joint material: 6mm thick to ASTM D1751.

3 EXECUTION

3.1 GRADE PREPARATION

.1 Ensure grading and backfilling has been completed in accordance with Section 31 23 11 as indicated on Drawings before commencing Work of this Section. Notify Departmental Representative of unsatisfactory conditions.

.2 Prepare Subgrade to depths and layout as shown on Drawings. Ensure positive drainage. Departmental Representative to review Subgrade prior to placement of geotextile and granulars.

.3 For permeable pavers: Install geotextile continuous over prepared Subgrade under areas to receive drainage granulars. Overlap geotextiles a minimum of 300mm in all directions.

.4 Place perforated drainage piping as shown on Drawings. Do not damage during installation. Immediately replace damaged material.

3.2 GRANULAR BASES – HEAVY DUTY AREAS

.1 Spread and compact specified crushed stone granular base course to bring prepared Subgrade up to levels required and

as shown on Drawings. Spread in uniform layers not exceeding 150mm compacted thickness.

.2 Compaction Density in accordance with ASTM D698:

.1 Solid Unit Paving: to a density of not less than 100% Standard Proctor Density.

.2 Permeable Unit Paving: to a density of not less than 80% Standard Proctor Density.

.3 Shape and roll alternately to obtain a smooth, even and uniformly compacted granular base and ensure conformity of grades with finish surface.

.4 Apply water as necessary during compaction to obtain specified density. If granular base is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.

.5 In areas not accessible to rolling equipment, compact to specified density with approved mechanical tampers.

.6 Place geotextile fabric over granular base under setting bed in all areas.

3.3 UNIT PAVING INSTALLATION

.1 Generally:

.1 Do not install pavers during heavy rain or snowfall, or over frozen or saturated setting bed material.

.2 Finish pavement surfaces to elevations indicated.

.3 Maintain accuracy of elevations to within specified tolerances.

.4 As required, cut units accurately without damaging edges.

.5 Place setting bed only for pavers to be laid the same day. Ensure setting bed is not disturbed by foot traffic or other causes.

.6 Ensure that drainage is effected from all areas without the formation of puddles.

.7 Ensure granular laying course is dry (4-8% moisture content) prior to placement of unit pavers.

.8 Install fibre joint material against all vertical surfaces abutting paving including building walls.

.9 Refer to clause 1.5.3 for minimum size of cut pavers and maximum gaps.

.10 Do not compact closer than 1000mm from edge of unrestrained pavers.

.11 Install pavers with butt joints to pattern and orientation as indicated on Drawings. The paving stones shall be installed such that spaces between joints do not exceed 6mm.

.12 Tamp down and level pavers with mechanical plate vibrator on minimum 12mm thick plywood or rubber sheet until pavers are true to grade and free of movement. Fill spaces between pavers by sweeping in specified granulars.

.1 Spread bedding granulars evenly over the base course and screed to a nominal 25mm compacted thickness, not exceeding 35mm thickness.

.2 Do **NOT** correct deficiencies in base course with additional bedding granulars.

.3 Do not disturb screeded granulars.

.13 Only screed an area that can be finished with unit pavers by day's end. Screeded areas left overnight are to be rescreeded.

.14 Obtain Departmental Representative's approval of bedding granulars prior to placement of pavers.

.15 Pass mechanical plate vibrator on granulars cushion over surface to achieve compaction of granulars in joints.

.16 Sweep surface course clean.

3.4 JOINT GRANULARS

.1 Install specified joint granulars as per manufacturer's instructions until joints are full from setting bed to bottom of paver chamfer.

.2 In general:

.1 Ensure pavers are dry prior to spreading of joint granulars.

.2 Spread product uniformly over the surface of the pavers.

.3 Sweep product to fill joints.

.4 Clean up residual joint granulars.

.3 For Polymeric Joint Sand

.1 Avoid sweeping over long distances to preserve the integrity of the mix.

.2 Run compactor over the surface of the pavers as required to firm up the joints.

.3 Clean surface of pavers of excess polymeric joint granulars.

.4 Wet joint granulars as per manufacturer’s instructions.

.4 Permeable pavers: one month after installation, apply additional joint granulars to top of settlement.

.5 Polymeric Joint Granulars: one month after installation, reapply as required to repair gaps in joints.

3.5 PROTECTION

.1 Protect and maintain work of this Section including accessories, until acceptance of project Work.

3.6 ADJUSTMENT AND CLEANING

.1 Replace entire paver units that are defective. Immediately remove from site damaged materials. Replace, repair, re-finish, or otherwise make good to Departmental Representative's approval.

.2 The surface elevation of pavers shall be 3mm to 6mm above adjacent drainage inlets collars or channels.

.3 Lippage: No greater than 3mm difference in height between adjacent pavers.

END OF SECTION

1 GENERAL

1.1 WORK INCLUDED

.1 To supply and construct precast concrete unit block walls as shown, specified, or required, and summarized, but not restricted to:

.1 Unit block retaining wall units, including base granular, geotextile and footing drains.

1.2 RELATED WORK

.1 Section 01 35 43 Environmental Procedures

.2 Section 31 23 11 Excavation, Trenching and Backfilling

1.3 REFERENCE STANDARDS

.1 ASTM C140/C140M-17 Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units

.2 ASTM D698-12e2 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 (600 kN-m/m^3))

.3 ASTM D3776/D3776M-09a(2013) Standard Test Methods for Mass Per Unit Area (Weight) of Fabric

.4 ASTM D3786/D3786M-13 Standard Test Method for Bursting Strength of Textile Fabrics—Diaphragm Bursting Strength Tester Method

.5 ASTM D4355/D4355M-14 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus

.6 ASTM D4632/D4632M-15a Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

.7 ASTM D4833/D4833M-07(2013)e1 Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Seal emptied containers and store safely for disposal.

.4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

1.5 LEED DOCUMENTATION

.1 Submit a LEED material submittal form as specified in Section 01 35 21 – LEED Requirements, to identify recycled and/or regional content of materials for inclusion by the Owner/Consultant in a submission for LEED certification.

.2 Conform to the requirements outlined in Section 01 74 21 – Construction Waste Management.

1.6 PROTECTION

.1 Prevent damage to buildings, landscaping, fences, roads, and adjacent property and all other items designated to remain.

1.7 DELIVERY AND STORAGE

.1 Check materials upon delivery to assure proper material has been received.

.2 Prevent excessive mud, wet cement, and like material from coming in contact with the materials.

.3 Protect materials from damage. Do not incorporate damaged materials into the project. Promptly remove damaged units from the site.

1.8 ALLOWABLE TOLERANCES

.1 Finish top of wall surfaces to within 2.5cm of specified elevations and locations.

.2 Guarantee walls for a period of one year after Substantial Completion against workmanship, heaving, or settlement and cracking, spalling or other product failure.

1.9 SHOP DRAWINGS

.1 Provide Shop Drawings of wall cross sections indicating depth of burial, placement of geo-grid and other items required for terraced wall construction with slopes above wall as indicated on Drawings.

.2 Shop drawings to meet manufacturer’s specifications and be signed by an Engineer licensed to practice in Nova Scotia.

.3 Departmental Representative to approve sample of finished product before progressing with work.

2 PRODUCTS

2.1 NATURAL LOOK – PRECAST WALL UNITS

.1 Wall units shall be Rosetta Hardscapes® as produced by a licensed manufacturer.

.2 Wall units shall have Rosetta Hardscapes® block specifications and be made from wet cast concrete in accordance with the following chart:

Climate (Weathering Regions per ASTM C33)	Air Content	28 Day Compressive Strength *psi (MPa)*	Slump * *(cm)*	Min. Concrete Temp. at Placement
Negligible	1½%-4½%	4000 (27.6)	7.6 to 10.2	10°*C*
Moderate	3%-6%	4000 (27.6)	7.6 to 10.2	10°*C*
Severe	4½%-7½%	4000 (27.6)	7.6 to 10.2	10°*C*

.3 Exterior block dimensions, as measured in accordance with ASTM C140, shall be uniform and consistent. Maximum dimensional deviations shall be 0.125 inch (3.2 mm) or 2%, whichever is less, excluding the architectural surface. Maximum width (face to back) deviation including the architectural surface shall be 2.5 cm.

.4 Exposed faces shall have a textured finish. Other surfaces to be smooth form type. Dime-size bug holes on the block face may be patched and/or shake-on color stain can be used to blend into the remainder of the block face.

.5 Shear heels shall be intact and free from cracks or other defects.

2.2 GENERAL

.1 Filter Fabric: Non-woven geotextile fabric composed of polypropylene fibres inert to biological degradation and resistant to naturally encountered chemicals, alkalis, and acids and conform to minimum physical properties listed below:

.1 Weight (ASTM D3776): 136g/m2

.2 Grab Tensile (ASTM D4632): 400N minimum.

.3 Grab Elongation (ASTM D4632): 45-100%

.4 Puncture Resistance (ASTM D4833): 200N minimum.

.5 Mullen Burst (ASTM D3786): 1350 kPa minimum.

.6 UV Resistance (ASTM D4355): 70% strength retained.

.2 Drainage Pipe: 10cm dia. rigid perforated PVC pipe.

.1 Granular material: As specified in Section 31 23 11 Excavation, Trenching and Backfilling

3 EXECUTION

3.1 INSTALLATION

.1 Ensure all base material work has been completed before commencing Work of this Section. Notify Departmental Representative of unsatisfactory conditions.

.2 Install wall to manufacturer's specifications and/or as shown on Drawings.

.3 Bench base course of wall into existing embankment as per manufacturer's specifications.

3.2 PRECAST CONCRETE UNIT MASONRY WALL INSTALLATION

.1 Generally:

.1 Construct walls to lines and elevations indicated on Drawings.

.2 Maintain accuracy of elevations to within specified tolerances.

.3 Where required, cut units accurately without damaging edges.

.4 Ensure that drainage is affected from all areas of wall construction without the formation of puddles during construction.

.2 Place first course of unit blocks on compacted base material as specified. Install adjacent blocks tightly as shown on Drawings. Check units for level and alignment as they are placed.

.3 Install PVC drainage pipe and place filter fabric as per manufacturer specifications.

.4 Place clear run granular material as indicated on Drawings.

.5 Install filter fabric material continuous between common backfill and granular backfill as—shown on Drawings.

.6 Lay each subsequent course in a like manner.

3.3 NATURAL LOOK PRECAST STONE WALL CONSTRUCTION

.1 Leveling pad placement

.1 Leveling Pad shall be placed as shown on the construction drawings.

.2 Leveling Pad shall be placed on undisturbed native soils or suitable replacements fills as directed by the geotechnical engineer.

.3 Leveling Pad shall be compacted to 95% of standard proctor or 90% of modified proctor to ensure a level, hard surface on which to place the first course blocks. Pad shall be constructed to the proper elevation to ensure the final elevation shown on the plans.

.4 Leveling Pad shall have a 15cm minimum depth or deeper as designed by the Professional Engineer responsible for the wall. Pad dimensions shall extend beyond the blocks in all directions to a distance at least equal to the depth of the pad or as designed by the Engineer.

.2 Unit Installation

.1 The first course of wall units shall be placed on the prepared Leveling Pad with the aesthetic surface facing out and the back edges tight together. All units shall be checked for level and alignment as they are placed. Rosetta blocks shall be placed with the back of the blocks offset from the back of wall reference line based on their unit height. A 15.0cm high Rosetta block shall be offset 11cm) from the reference line, a 30cm) high Rosetta block shall be offset 7.5 cm) from the reference line, a 45cm high Rosetta block shall be offset 4cm from the reference line, and a 60cm high Rosetta block shall be set with the back of the block flush with the reference line.

.2 Ensure that units are in full contact with Leveling Pad. Proper care shall be taken to develop straight lines and smooth curves on base course as per wall layout.

.3 The backfill in front and back of entire base row shall be placed and compacted to firmly lock them in place. Check all units again for level and alignment. All excess material shall be swept from top of units.

.4 Install next course of wall units on top of base row. Position blocks to be offset from seams of blocks below. Blocks shall be placed fully forward so shear heels and back of lower block are engaged. Check each block for proper alignment and level. Backfill to a 30.5cm width behind the block with Free Draining Backfill. Spread backfill in uniform lifts not exceeding 20cm. Employ methods using lightweight compaction equipment that will not disrupt the stability or batter of the wall. Hand-operated plate compaction equipment shall be used around the block and within 1m of the wall to achieve consolidation. Compact backfill to 95% of standard proctor (ASTM D 698) density within 2% of its optimum moisture content.

.5 Install each subsequent course in like manner. Repeat procedure to the extent of wall height.

.6 Allowable construction tolerance at the wall face is 2 degrees vertically, 7.5 cm maximum, and 2.5 cm in 300cm horizontally.

.7 All walls shall be installed in accordance with local building codes and requirements.

3.4 PROTECTION

.1 Protect and maintain work of this Section including accessories, until acceptance of project work.

3.5 ADJUSTMENT AND CLEANING

.1 Replace entire masonry units that are defective. Immediately remove from site damaged materials. Replace, repair, re-finish, or otherwise make good to Departmental Representative’s approval.

END OF SECTION

1 GENERAL

1.1 WORK INCLUDED

.1 To complete miscellaneous sitework construction as shown, specified or required, and summarized but not restricted, to:

- .1 Supply and installation of pressure treated timber bollards.
- .2 Supply and installation of bike racks.
- .3 Construction of new ornamental wooden fences to replicate existing
- .4 Construction of stone wall extension and new wooden fencing.
- .5 Construction of granular pathways.
- .6 Installation of new and salvaged precast concrete bumper stops.

1.2 RELATED WORK

.1 Section 01 35 43 Environmental Procedures

.2 Section 31 23 11 Excavation, Trenching and Backfilling

.3 Section 32 13 13 Sitework Concrete

1.3 REFERENCE STANDARDS

.1 ASTM D698-12e2 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)

.2 CAN/CSA O80 Series-15 Wood Preservation

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Seal emptied containers and store safely for disposal.

.4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

1.5 LEED DOCUMENTATION

.1 Submit a LEED material submittal form as specified in Section 01 35 21 – LEED Requirements, to identify recycled and/or regional content of materials for inclusion by the Owner/Consultant in a submission for LEED certification.

.2 Conform to the requirements outlined in Section 01 74 21 – Construction Waste Management.

1.6 WARRANTY

.1 Guarantee work for a period of one year after installation against workmanship, heaving, settlement and other product failure.

1.7 DELIVERY AND STORAGE

.1 Check materials upon delivery to assure proper material has been received.

.2 Prevent excessive mud, mortar, and like material from coming in contact with the materials.

.3 Protect materials from damage. Do not damage coatings. Do not incorporate damaged materials into the project. Promptly remove damaged material from the site.

.4 Store materials only in designated areas.

.5 Access within site for undertaking work only where designated on Drawings.

.6 Maintain protection of this Work from time of installation until final finishes are applied.

.7 Protect prime painted and galvanized surfaces from damage.

1.8 ALLOWABLE TOLERANCES

.1 Finish work within 12mm of specified elevations and locations.

1.9 SUBMITTALS

.1 Bike Racks: Submit shop drawing for materials, installation and warranty.

.2 Walkway Granulars: Submit sample of granulars for review and approval.

.3 Precast Concrete Bumper Stops: Submit product information for bumper stops.

2 PRODUCTS

2.1 TIMBER BOLLARDS

.1 Round pressure treated timber bollards to match existing. Pressure treated ACQ to conform with CSA 080 Series "Wood Preservation" UC4.2.

2.2 BIKE RACKS

.1 Bicycle Racks: Inverted "U" Bike Rack. 48mm (1.90") O.D., galvanized with powder coating. Colours: To be determined (red/blue/green/etc.). Surface mounted to concrete. Standard of Acceptance: Madrax – "U" Bike Rack. www.madrax.com. Quantity as shown on Drawings.

2.3 ORNAMENTAL WOODEN FENCE

.1 Pressure treated wooden timbers to match existing fencing. Dimensions to match existing. Painted white.

.2 Fasteners suitable for pressure treated wood.

2.4 STONE WALL EXTENSION AND TIMBER FENCING

.1 Stone work: To match existing in size and finish.

.2 Pressure-treated Wood: pressure-treated with water-borne inorganic preservatives, conforming to CSA 080. Use for all timber fencing work and bumper rail.

.1 Treated wood shall be kiln-dried to average moisture content of 12%, maximum 15%, minimum 10%.

.2 Timber for fencing to be S-P-F #2 or better

.3 CSA 080.18 using ACA or ACQ water borne preservative treatment. Use preservative to a net retention of 2.8kg/m3 of timber to approval of consultant.

.4 Use only one preservative for all pressure-treated wood in order to maintain colour uniformity. Use liquid form of clear preservative to treat cut ends of

lumber and timber sections. DO NOT USE green Pentox or other similar green or brown dyed preservative for this purpose. Acceptable products: "Wolmanized" or "Sunwood" clear preservative.

.3 Fasteners:

.1 Bolts, nuts, washers: to ASTM A325.

.2 Wood to CSA B35.4.

.3 Nails and spikes: to CSA B111 with spiral shank.

.4 Galvanizing: steel fasteners to be hot dip galvanized after manufacture with 40 g minimum weight of zinc coating, to CSA G164.

2.5 WALKWAY GRANULARS

.1 Locally sourced 12mm minus crushed rigid angular stone material to match existing granular walkways.

2.6 PRECAST CONCRETE BUMPER STOPS

.1 Precast concrete bumper stops to match size and style of existing. Typically 1800mm long x 200mm wide.

.2 Pins: 10M rebar, 450mm long.

3 EXECUTION

3.1 TIMBER BOLLARDS

.1 General:

.1 Obtain approval by Departmental Representative of layout of bollards.

.2 Install bollards true and plumb.

.3 Treat cut ends of timbers with coloured clear preservative to match colouring of timber.

3.2 BIKE RACKS

.1 Submit Shop Drawing for bike racks, including instaslaltion.

.2 Install bike racks in locations indicated on Drawings.

.3 Mark out proposed locations for review and approval of Departmental Representative prior to installation.

.4 Surface mount bike racks to concrete.

.5 Protect surfaces of bike racks during installation and from damage during other construction activities.

.6 Repair any damage to bike racks to approval of Departmental Representative. Replace any bike racks not capable of repair as determined by the Departmental Representative.

3.3 WOODEN FENCING

.1 Intent of work is to construct new ornamental painted wooden fencing to replicate existing fencing to remain. Use pressure treated timbers and appropriate fasteners. Provide material list and construction details for review by Departmental Representative.

3.4 STONE WALL EXTENSION AND TIMBER FENCING

.1 Extend top of existing stone wall with similar materials, and grouting to match appearance of existing construction.

.2 Fabricated new timber fencing and rails behind wall. Do not disturb wall during post hole excavation.

.3 Build work square, straight, plumb and level, accurately aligned and fitted with tight joints and connections, rigid, securely fastened to prevent movement. Use single piece full-length lumber pieces of longest practical length.

.4 Set posts plumb within 12mm in 3000mm.

.5 All exposed surfaces to be smooth, free of splinters and sharp edges. Exposed edges to be rounded or chamfered as shown on Drawings.

.6 Liberally coat all wood surfaces exposed by cutting, trimming, notching, and boring with brush application of concentrated solution of clear preservative before installation. Provide minimum 2 brush coats, applying second coat after first coat has completely dried. **Do NOT use green Pentox** or any other similar dyed product for this purpose.

.7 Prepare and clean surfaces prior to and between coatings. Surfaces to be dry, sound and free from contamination and

other defects detrimental to appearance and durability of finish.

.8 All nails to penetrate material by minimum 2 times thickness of top board. All spikes to penetrate material by minimum 1.5 times thickness of top timber.

.9 Construct concrete post foundations in accordance with Section 32 12 16 and set posts plumb within ½" in 10'.

3.5 GRANULAR WALKWAYS

.1 Verify that grading and backfilling has been completed in accordance with the Specifications and Drawings before commencing construction of new pathways. Notify Departmental Representative of unsatisfactory conditions.

.2 Provide additional excavation and trimming of existing pathway edges as required to construct new pathways to widths and layouts as indicated on Drawings.

.3 Spread and compact specified crushed stone granular base course to bring prepared subgrade up to levels required and as shown on Drawings. Spread in uniform layers not exceeding 150mm compacted thickness.

.4 Compact to a density of not less than 100% Standard Proctor Density in accordance with ASTM D698.

.5 Shape and roll alternately to obtain a smooth, even and uniformly compacted granular base and ensure conformity of grades with finish surface.

.6 Apply water as necessary during compaction to obtain specified density. If granular base is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.

.7 In areas not accessible to rolling equipment, compact to specified density with approved mechanical tampers.

.8 Ensure top of granular base does not exceed plus or minus 12 mm when measured under a 3m long straightedge of finished grade less combined thickness of granular laying course plus surface course.

.9 Place specified pathway surface material to compacted thickness indicated.

.10 Finish grade/slope of pathway to be installed to allow natural surface drainage to a minimum 2% slope – cross slope and/or longitudinally.

.11 Ensure that drainage is effected from all areas without the formation of puddles.

.12 Protect and maintain work of this Section including accessories, until acceptance of project work.

3.6 PRECAST CONCRETE BUMPER STOPS

.1 Layout new and salvage bumper stops on asphalt paving to match spacing of existing bumper stops. Departmental Representative to review layout prior to installation.

.2 Secure bumper stops in place with two 10M rebar pins – Min. 450mm long. Top of installed pin to be 25mm below top of precast curb.

3.7 PROTECTION

.1 Protect and maintain work of this Section including accessories, until acceptance of project work.

.2 Immediately remove from the site damaged furnishings and accessories. Replace, repair, re-finish, or otherwise make good to the approval of Departmental Representative.

END OF SECTION

1 GENERAL

1.1 WORK INCLUDED

.1 To complete topsoil and finish grading to contours and elevations as shown on Drawings, as specified, or as required, and summarized but not restricted to:

.1 Preparation of Subgrade, provision, placement and fine grading of topsoil for sodded lawn areas, swales and embankments.

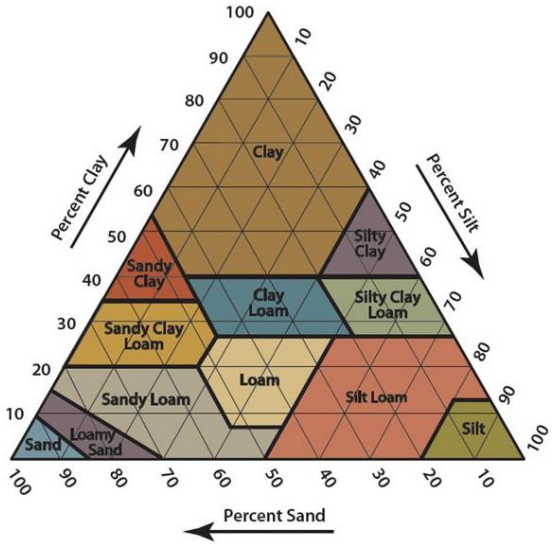
.2 Preparation of Subgrade, provision and placement of planting soil mixture for planting beds and individual planting pits.

1.2 RELATED WORK

.1	Section 01 35 43	Environmental Procedures
.2	Section 31 23 11	Excavation, Trenching and Backfilling
.3	Section 32 92 19.16	Hydraulic Seeding
.4	Section 32 92 23	Sodding
.5	Section 32 93 10	Planting of Trees, Shrubs and Groundcover

1.3 REFERENCES

.1 Standard Topsoil Triangle



.2 PEI Department of Transportation & Public Works – Topsoil - Section 212.02

.3 ASTM D698-12e1 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3))

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Seal emptied containers and store safely for disposal.

.4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

1.5 LEED DOCUMENTATION

.1 Submit a LEED material submittal form as specified in Section 01 35 21 – LEED Requirements, to identify recycled and/or regional content of materials for inclusion by the Owner/Consultant in a submission for LEED certification.

.2 Conform to the requirements outlined in Section 01 74 21 – Construction Waste Management.

1.6 SOURCE QUALITY CONTROL

.1 The Contractor shall submit representative samples of topsoil, and samples of any stockpiled topsoil that is to be used on the project to a Soil Plant Testing Laboratory acceptable to the Departmental Representative. Prior to using these materials on site they must meet the requirements as indicated in the project specifications. Information to be obtained from testing includes the following:

.1 Soil type classification.

.2 Percent organic matter.

.3 Chemical soil test.

.4 Recommendation for soil amendments and fertilizers.

.2 Contractor to pay for costs of testing.

.3 Perform pH test to determine required treatment to bring pH value of soil to 6.0 to 7.5 level

.4 Submit two copies of soil analysis and recommendations for corrections to the Departmental Representative.

1.7 SCHEDULING

.1 No topsoil is to be placed before soil testing results have been provided by Contractor and approved by the Departmental Representative.

.2 Schedule placing of topsoil and finish grading to permit sodding operations under optimum conditions.

1.8 PROTECTION

.1 Prevent damage to trees, landscaping, natural features, bench marks, existing buildings, windows, existing pavement, culverts, and utility lines which are to remain. Make good any damage.

.2 Protect newly graded and filled areas from washouts and settlements caused by rain and water drainage. Fill and grade settled or washed out areas to required levels and slopes under Work of this Section.

1.9 DEFINITIONS

.1 Invasive Plant Species – Vegetative material not native to nor currently found within the project site and which aggressively spreads, is fast growing and/or is difficult to eradicate, such as Japanese knotweed; purple loosestrife; goutweed, Glossy Buckthorn, Scotch Pine, garlic mustard, etc.

2 PRODUCTS

2.1 TOPSOIL

.1 Imported topsoil shall conform to the following characteristics unless otherwise specified. Be natural, fertile, friable and classified as either a loam or sandy loam texture. Contain not less than 3%, or more than 8%, by weight of decayed organic matter (humus). All materials

shall be taken from a well-drained, arable site, free from subsoil, debris, vegetation, toxic materials, and stones and roots over 25mm max. dimension. Topsoil shall be free of grassy weeds such as quack grass and noxious weeds. Material shall have a pH of between 6.0 and 7.5. Topsoil to be rated to Standard Topsoil Triangle, latest revision, rating: Sandy Loam. If material does not meet minimum specifications it must be amended with an approved material and tested at the expense of the Contractor.

2.2 PEAT MOSS

.1 Derived from partially decomposed fibrous or cellular stems and leaves of sphagnum mosses. Elastic and homogeneous, brown in colour.

.2 Free of wood and deleterious material which could inhibit growth.

.3 Shredded particle minimum size 6mm.

2.3 BONEMEAL

.1 Raw bonemeal, finely ground with a minimum analysis of 2% nitrogen and 20% phosphoric acid.

2.4 FERTILIZER:

.1 Complete non-toxic, no-burning, organic, slow-release fertilizer.

2.5 LIMESTONE

.1 Ground agricultural limestone containing minimum 85% of total carbonates.

2.6 GRADATION REQUIREMENTS:

.1 Percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

2.7 PLANTING SOIL MIXTURE FOR TREES, SHRUBS AND GROUND COVERS

.1 Mechanically mix: 6 parts topsoil, with 1 part well-rotted manure, and 3 parts peat moss. Premixed planting soil can be used to approval of Departmental Representative.

.1 Incorporate bonemeal at rate of 2.75 kg per cu. meter

.2 Incorporate fertilizer at rate determined by soil sample test.

3 EXECUTION

3.1 GENERAL

.1 Where required, establish Subgrade with Select Backfill as defined, deposit in layers not exceeding 200mm. Consolidate each layer to minimum 95% Standard Proctor Density.

.2 Install and maintain erosion controls as required and to prevent erosion of topsoil.

.3 Imported topsoil shall be free of Invasive Plant Species. Source of topsoil is to be inspected prior to arrival on site so as to permit inspector to see species growing in soil.

3.2 PREPARATION OF SUBGRADE

.1 Grade Subgrade, eliminating uneven areas and low spots, ensuring positive drainage. Remove soil contaminated with toxic materials. Dispose of removed materials from site as required by the Prince Edward Island Department of Environment.

.2 Cultivate entire area that is to receive topsoil to depth of 100mm. Repeat cultivation in those areas where equipment used for hauling and spreading has compacted soil.

.3 Remove surface debris, roots, vegetation, branches and stones in excess of 25mm dimension.

3.3 PREPARATION OF LAWN AREAS AND PLANTING BEDS

.1 Confirm Subgrade for lawn areas, planting beds and planting pits has been completed. Notify Departmental Representative of any discrepancies. Grade to following minimum depths:

.1 150mm depth for sodded lawn areas.

.2 125mm depth for hydraulically seeded areas.

.3 600mm min. depth for all planting beds.

.4 600mm deep and 1500mm diameter for all individual tree planting pits to ensure min. 600mm planting soil around root ball.

.2 Place and compact 50% planting soil and 50% existing soil mixture in bottom of tree pits to support tree in position, as indicated on Drawings.

.3 Departmental Representative to review and approve Subgrade prior to placement of topsoil or planting soil mix.

3.4 SPREADING OF TOPSOIL AND FINISH GRADING

.1 Spread topsoil to the following minimum depths after the Departmental Representative has inspected and approved Subgrade:

.1 125mm for areas to be sodded.

.2 125mm for areas to be hydroseeded.

.2 Spread topsoil with adequate moisture in uniform layers over approved, unfrozen subgrade where sodding is indicated.

.3 Fine grade entire topsoil area to contours and elevations indicated on Drawings +/- 25mm or as directed. Eliminate rough spots and low areas as directed.

3.5 TESTING OF TOPSOIL

.1 After topsoil has been placed undertake additional testing.

.2 As directed by the Departmental Representative, prepare one sample for every 400 m^2 of topsoil. Contractor to pay for costs of testing.

3.6 SOIL AMMENDMENTS

.1 Apply lime or other soil amendments as specified at rate determined from soil sample test.

.2 Mix soil amendment well into full depth of topsoil prior to fertilizer application.

3.7 FERTILIZER

.1 Fertilizer type to be determined from soil sample text and approved by Departmental Representative.

.2 Spread fertilizer required by soil sample test uniformly over entire area of topsoil at rate determined on basis of soil sample text.

3.8 PREPARATION OF PLANTING BEDS AND TREE PITS.

.1 Apply planting soil mixture to following min. depths:

.1 600mm for shrub beds.

.2 600mm for individual plant pits (as outlined above, in Section 32 93 10 – Planting of Trees, Shrubs and Ground Covers, and as shown on Drawings.

3.9 SURPLUS MATERIALS

.1 Dispose of surplus topsoil not required for fine grading and landscaping off-site.

3.10 EROSION CONTROL

.1 Install and maintain erosion controls to prevent erosion of topsoil.

END OF SECTION

1 GENERAL

1.1 WORK INCLUDED

.1 Establishment of turf and /or vegetative cover by means of hydraulic seeding as shown or required and as specified herein, including:

.1 Application of hydroseed mixture (and reapplications as necessary).

.2 Maintenance and warranty for one year from date of Substantial Completion of Contract.

1.2 RELATED WORK

.1 Section 01 35 43 Environmental Procedures

.2 Section 32 91 19.13 Topsoil Placement and Finish Grading

.3 Section 32 92 23 Sodding

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Seal emptied containers and store safely for disposal.

.4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

1.4 LEED DOCUMENTATION

.1 Submit a LEED material submittal form as specified in Section 01 35 21 – LEED Requirements, to identify recycled and/or regional content of materials for inclusion by the Owner/Consultant in a submission for LEED certification.

.2 Conform to the requirements outlined in Section 01 74 21 – Construction Waste Management.

1.5 PRODUCT DATA

.1 Provide product data for:

.1 Seed.

.2 Mulch.

.3 Tackifier.

.4 Fertilizer.

1.6 SCHEDULING

.1 Schedule hydroseeding to coincide with topsoil operations.

1.7 WARRANTY

.1 The Contractor hereby warrants that hydroseeded lawn areas will remain free of defects in accordance with conditions outlined in this specification for one full year from date of Substantial Completion.

2 PRODUCTS

2.1 MATERIALS

.1 Grass seed: Common No. 1 Grade to Government of Canada, Seeds Regulations.

.2 Mulch:

.1 Fibre: wood or wood-cellulose fibres free of germination or growth-inhibiting ingredients and forming blotter like ground cover allowing absorption and percolation of water.

.2 Capable of dispersing in water to form homogeneous slurry.

.3 Capable of forming an absorptive mat ground cover allowing water percolation.

.3 Tackifier: water diluted liquid dispersion containing polyvinyl acetate terpolymer emulsion.

.4 Water: potable, free of impurities that would inhibit germination.

.5 Fertilizer:

.1 Type 1: complete synthetic, slow release fertilizer with minimum 65% water soluble nitrogen – Ratio: 1:4:4.

.2 Type 2: complete synthetic, slow release fertilizer with maximum 35% water soluble nitrogen – Ratio: 2:1:1.

2.2 GRASS SEED MIXTURE

.1 Spread seed mixture at 160 kg per hectare minimum. Seed mix to consist of:

.1 40% Kentucky Bluegrass.

.2 40% Creeping Red Fescue.

.3 20% Arctic Green Perennial Rye Grass.

2.3 EQUIPMENT

.1 Truck:

.1 Slurry tank: approved commercial hydraulic equipment.

.2 Pumps capable of maintaining continuous non-fluctuating flow of solution.

3 EXECUTION

3.1 WORKMANSHIP

.1 Take reasonable care to prevent spraying items such as structures, signs, guide rails, fences, plant material and utilities.

.2 Where contamination occurs remove seeding slurry to satisfaction of, and by means approved by Departmental Representative.

.3 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water, or temperatures which will inhibit seed germination.

3.2 PREPARATION OF SURFACES

.1 General:

.1 Cultivate areas to be seeded to a depth of 50mm.

.2 Ensure areas are moist to depth of 150mm before seeding. Fine grade free of humps and hollows and free of deleterious and refuse material.

.3 Obtain Departmental Representative's approval of topsoil grade and depth before starting seeding.

.4 Grade to finish elevations indicated +/- 25mm.

.5 Remove stones greater than 25mm diameter within top 100mm of finish Subgrade.

.6 Supply and place 100mm of topsoil – See Section 32 91 19 – Topsoil Placement and Grading.

3.3 SEEDING

.1 Seed areas to within 2 weeks of freeze-up.

.2 Apply seed slurry uniformly and when winds are less than 10 km/hr.

.3 Slurry mixture applied per acre, based on tank size of 10,000 L:

.1 Seed (mixture as spec'd): 57 kg.

.2 Mulch: 400 kg.

.3 Tackifier: 115 kg.

.4 Fertilizer, Type 1: 180 kg.

.5 Water: as required to form slurry in accordance with manufacturer's recommendations.

.4 Blend applications into adjacent sodded areas and previous applications to form uniform surfaces.

.5 Re-shoot areas where application is not uniform.

.6 Remove slurry from items and areas not designated to be sprayed.

3.4 ACCEPTANCE OF HYDROSEED APPLICATION FOR PAYMENT

.1 Hydro-seeded areas will be accepted for payment provided:

.1 Seeded areas are uniformly established and turf is free of rutted, eroded, bare or dead spots and 98% free of weeds.

.2 No surface soil is visible when grass has been cut to 75mm height.

.3 Seeded areas have been cut at least twice.

.2 Areas seeded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.5 MAINTENANCE - GENERAL

.1 Commence maintenance immediately following acceptance of hydroseed application and continue it for 1 year (the guarantee period) following Substantial Completion of the Contract.

.2 Maintain hydroseeded areas to ensure vigorous and healthy growth. Maintenance shall consist of, but not be limited to:

.1 Water seeded area as required to ensure germination and continued growth of grass.

.2 Cut grass to height of 75mm whenever it reaches a height of 100mm. Remove clippings which will smother grass.

.3 Fertilize seeded areas in Spring after threat of final frost has past. Use Type 2 fertilizer, ratio 2:1:1, at rate of 445 kg. per hectare. Postpone fertilizing until following spring if application falls within four week period prior to expected end of growing season.

.4 Repair dead or bare spots to allow establishment prior to acceptance.

.5 Eliminate weeds in excess of 10% of coverage.

.3 This maintenance will be the sole source of maintenance of the Work during this period and wholly the Contractor's responsibility.

.4 Notify Departmental Representative upon completion of maintenance period to arrange inspection and transfer maintenance responsibility to Owner.

.5 Include the cost of lawn maintenance in the Total Tender Price in the Form of Tender.

3.6 ACCEPTANCE AT END OF MAINTENANCE PERIOD

.1 Notify Departmental Representative upon completion of maintenance period to arrange inspection and transfer maintenance responsibility to Owner.

.2 Hydroseeded lawn areas will be accepted at end of maintenance period by Departmental Representative provided:

.1 Seeded areas are uniformly established and plant material turf is free of rutted, eroded, and bare or dead spots.

.2 Turf is free of bare and dead spots and with maximum 5% weed coverage.

.3 No surface soil is visible when grass has been cut to height of 50 mm.

END OF SECTION

1 GENERAL

1.1 WORK INCLUDED

.1 To complete sodding as shown, specified or required, and summarized but not restricted to:

.1 Sodding of lawn areas indicated within contract limits and all soil surfaces disturbed by construction not noted for other reinstatement.

.2 Maintenance and warranty up to 6 months of grass cutting after Substantial Performance.

1.2 RELATED WORK

.1 Section 01 35 43 Environmental Procedures

.2 Section 02 41 13 Sitework Demolition

.3 Section 32 91 19.13 Topsoil Placement and Finish Grading

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Seal emptied containers and store safely for disposal.

.4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

1.4 LEED DOCUMENTATION

.1 Submit a LEED material submittal form as specified in Section 01 35 21 – LEED Requirements, to identify recycled and/or regional content of materials for inclusion by the Owner/Consultant in a submission for LEED certification.

.2 Conform to the requirements outlined in Section 01 74 21 – Construction Waste Management.

1.5 SOURCE QUALITY CONTROL

.1 Obtain approval from Departmental Representative of sod source.

.2 When proposed source of sod is approved, use no other source without written authorization.

.3 Sod shall be machine cut and harvested at a uniform thickness or 25mm plus or minus 6mm. Measurement of thickness shall exclude top growth and thatch.

1.6 SCHEDULING

.1 Schedule sod laying to coincide with topsoil operations.

1.7 WARRANTY

.1 The Contractor hereby warrants that sodding will be maintained to remain healthy and free of defects for one (1) year from date of Substantial Completion of contract.

.2 End-of-warranty inspection will be conducted by Departmental Representative.

.3 Departmental Representative reserves the right to extend Contractor's warranty responsibilities for an additional one year if, at end of initial warranty period, turf growth is not sufficient to ensure future survival.

2 PRODUCTS

2.1 NURSERY SOD

.1 Quality and source to comply with standards outlined in Canadian Nursery Trends Association - Canadian Standards for Nursery Stock – current edition.

.1 Number One Kentucky Bluegrass / Fescue Sod: sod grown from minimum 40% Kentucky Bluegrass, 30% Creeping Red Fescue, or approved equal.

.2 Broken, dry, discoloured pieces will be rejected by Departmental Representative.

.3 Sod to be rectangular strips measuring 300mm or 400mm in width and from 1200mm to 1500mm in length.

.4 All sod to be harvested, delivered and transplanted within a period of twenty-four hours.

2.2 WATER

.1 Free of impurities that would inhibit establishment and growth.

2.3 SODDING STAKES

.1 300mm x 300mm x 200mm long wooden pegs or approved 200mm long steel staples.

2.4 FERTILIZER

.1 Complete, synthetic, slow release with maximum 35% water soluble nitrogen.

.1 Ratio for turf establishment treatment: 18-24-2 (60% SCU) at the rate of 2.3 kgs/100 square meters.

.2 Ratio for Spring sodding: 1:2:2.

.3 Ratio for Year 1 maintenance applications:

.4 May: 30:0 July: 3:1:3 Sept. 1:2:3

.5 Rates: prior to seeding at not less than 165 kg. phosphorus per hectare.

.6 Herbicide: type, rate, and method of application subject to approval by Departmental Representative.

3 EXECUTION

3.1 WORKMANSHIP

.1 Keep site well drained.

.2 Clean up immediately soil or debris spilled onto pavement and dispose of deleterious materials.

3.2 LAYING OF SOD

.1 Prior to sodding, obtain approval from Departmental Representative that finished grade and depth of topsoil are satisfactory.

.2 Apply fertilizer at rate for turf establishment and as recommended by soil sample test.

.3 Cultivate topsoil as required to alleviate compaction during placement and to provide a slightly roughened surface to accept sodding application.

.4 Ensure topsoil is moist to a depth of 100mm prior to sodding.

.5 Lay sod within 24 hours after cutting to ensure proper establishment.

.6 Sodding during excessively wet conditions, at freezing temperatures or over frozen soil is subject to approval.

.7 Lay sod in rows, parallel with contours, smooth and flush with adjoining areas, and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Butt sections against curbs and walkways flush with top of concrete, ensure topsoil is well-compacted beside concrete. Cut out irregular or thin sections with a sharp knife, edger or equivalent. Where sod abuts concrete curb, compact soil behind curb and lay top of sod flush with top of curb.

.8 Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

.9 Water sod immediately after laying to obtain moisture penetration through sod into top 100mm of topsoil.

.10 Sodded areas to be inspected by Departmental Representative prior to commencement of maintenance period.

3.3 PROTECTION

.1 Provide adequate protection of sodded areas against erosion and pedestrian, vehicular, and mechanical damage. Remove protection after lawn areas have been accepted.

3.4 ACCEPTANCE AT COMPLETION OF INSTALLATION

.1 Sodded areas will be accepted after installation provided that:

.1 Sodded areas are properly established.

.2 Sod is free of bare and dead spots and without weeds.

.3 No surface soil is visible when grass has been cut to height of 75mm.

.4 Sodded areas have been cut minimum 2 times.

.2 Lawns sodded in late fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.5 MAINTENANCE

.1 Commence maintenance immediately following installation of sodding and continue it for the guarantee period following Substantial Completion of Contract.

.2 Maintain sodded lawn areas to ensure vigorous and healthy growth. Maintenance consists of, but is not limited to: mowing, removal of heavy clippings, edging, clipping, weed control, repair of erosion, watering, fertilizing, re-sodding to maintain uniform growth, and maintaining barricades to prevent damage by traffic.

.3 Watering: Water grass daily and if necessary continuously during the normal 8 hour working day to achieve moisture penetration to a depth of 100mm The Contractor is responsible for supplying all equipment, hoses, connections, etc. for watering during the guarantee period.

.4 Cut grass to 65mm – 75mm when it reaches height of 80mm – 100mm. Remove clippings which will smother sodded areas. Maintain sodded areas weed free.

.5 Fertilize sodded areas one month after sodding with 2:1:1 ratio fertilizer and as specified in sub-section 2.1.5. Spread evenly at rate of .45 kg of actual nitrogen / 93 square metres and water in well. Postpone fertilizing until next spring if application falls within four week period prior to expected end of growth season.

.6 This maintenance will be the sole source of maintenance of the Work during this period and is wholly the Contractor's responsibility.

.7 Notify Departmental Representative upon completion of maintenance period to arrange inspection and transfer of maintenance responsibility.

.8 Include the cost of lawn maintenance in the Submitted price.

3.6 ACCEPTANCE AT END OF WARRANTY PERIOD

.1 Sodded areas will be accepted at the end of the warranty period provided that:

.1 Sodded areas are properly established.

.2 Sod is free of bare and dead spots and with maximum 5% weed coverage.

.3 No surface soil is visible when grass has been cut to height of 60mm.

END OF SECTION

1 GENERAL

1.1 WORK INCLUDED

.1 To complete planting of trees, shrubs, and ground covers as shown, specified, or required, and summarized, but not restricted to:

.1 Supply and placement of planting soil mix.

.2 Supply and planting of trees, shrubs, and ground cover, complete with all related components and accessories.

.3 Maintenance and warranty.

1.2 RELATED WORK

.1 Section 01 35 43 Environmental Procedures

.2 Section 31 23 11 Excavation,Trenching & Backfilling

.3 Section 32 91 19.13 Topsoil Placement and Finish Grading

1.3 REFERENCE STANDARDS

.1 Perform planting of trees, shrubs and ground covers work in accordance with the Canadian Nursery Trades Association Canadian Standards (CNTA) for Nursery Stock – latest edition except where specified otherwise.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Seal emptied containers and store safely for disposal.

.4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

1.5 LEED DOCUMENTATION

.1 Submit a LEED material submittal form as specified in Section 01 35 21 – LEED Requirements, to identify recycled and/or regional content of materials for inclusion by the Owner/Consultant in a submission for LEED certification.

.2 Conform to the requirements outlined in Section 01 74 21 – Construction Waste Management

1.6 DELIVERY, STORAGE & PROTECTION

.1 Protect plant material from damage during transportation.

1.7 WARRANTY

.1 The Contractor hereby warrants that transplanted tree will be maintained to remain healthy and free of defects for 2 years from date of Substantial Performance.

2 PRODUCTS

2.1 PLANT MATERIAL

.1 Type of root preparation, sizing, grading and quality: comply with Canadian Nursery Trades Association Canadian Standards for Nursery Stock – latest edition.

.2 Plant material: free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.

.3 Plant material: root pruned regularly.

.4 Trees: to CNTA Standards, with straight trunks, well and characteristically branched for species except where specified otherwise.

.5 Bare root stock: not acceptable.

.6 Collected (native) stock: not acceptable.

.7 Substitutions to plant material indicated on planting plan is not permitted unless written permission has been obtained as to size, type, variety, and quantity. Substitutions must be of similar species as originally specified.

2.2 WATER

.1 Free of impurities that would inhibit plant growth.

2.1 TREE STAKES

.1 Round, wooden stakes, 75mm to 100mm dia., pointed one end, 3m long.

2.2 GUYING WIRE

.1 Galvanized steel, 3mm wire or 3mm diameter multi-wire steel cable.

2.3 GUYING COLLAR

.1 Tube: plastic, 12mm diameter, nylon reinforced.

2.4 TURNBUCKLE

.1 Galvanized steel, 10 mm diameter with 250 mm open length. Painted fluorescent orange.

2.5 ANCHORS

.1 Wood: 38 mm x 38 mm x 610 mm long.

.2 Steel: T-bar, 500 mm long.

2.6 FERTILIZER

.1 Commercial type, as determined by soil sample test. Organic product acceptable substitute, provided it will supply the nutrient requirements determined by soil sample test.

2.7 ANTI-DESICCANT

.1 Wax-like emulsion to approval of Consultant.

2.8 MULCH

.1 Double grinded bark mulch: varying in size from 25mm to 75mm in length, from coniferous trees.

3 EXECUTION

3.1 PRE-PLANTING OPERATIONS

.1 Ensure plant material acceptable to Consultant.

.2 Remove damaged roots and branches from plant material.

.3 Request nursery to apply anti-desiccant to conifers and deciduous trees in leaf in accordance with manufacturer's instructions.

3.2 EXCAVATION AND PREPARATION OF PLANTING BEDS

.1 Ensure Subgrade for planting beds meets requirements as outlined in this specification, and is approved by Consultant.

.2 Preparation of planting beds is specified in Section 32 91 19 – Topsoil Placement and Grading.

.3 For individual planting holes:

.1 Stake out location and obtain approval from Consultant prior to excavating.

.2 Excavate to depth and width indicated.

.3 Remove subsoil, rocks, roots, debris and toxic materials from excavated material that will not be used as planting soil. Dispose of excess material.

.4 Scarify sides of planting hole.

.5 Remove water which enters excavations prior to planting. Notify Consultant if water source is ground water.

3.3 PLANTING

.1 For container stock or root balls in non-degradable wrapping, water plants before removing container. Remove container or wrapping without damaging root ball.

.2 Plant vertically in locations as indicated. Orient plant material to give best appearance in relation to structure, roads and walks.

.3 For trees and shrubs:

.1 Backfill soil in 150mm lifts. Lightly tamp each lift and water to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has penetrated into soil, backfill to finish grade.

.4 Water plant material thoroughly after planting operations are complete. After soil settlement has occurred, fill with soil to finish grade.

.5 Dispose of burlap, wire, and container material off site.

3.4 TREE SUPPORTS

.1 Install tree supports as indicated on drawings.

.2 Use double stake tree support for deciduous trees.

.1 Place one stake on prevailing wind side of tree and second opposite or as directed by Project Manager. Both stakes should be 300mm minimum from trunk and should be placed on either side of root ball. Where trees are planted next to driveways or walkways, place one stake between tree trunk and driveway or walkway.

.2 Drive stakes minimum 300mm into undisturbed soil beneath rootball. Ensure stakes are secure, vertical and unsplit.

.3 Install 2 guying collars above lowest branch crotch a minimum 1.5m above grade.

.4 Thread guying wire through collar tube. Twist wire to form collar and secure firmly to stake. Cut off excess wire. Ensure collar is minimum 25mm diameter larger than tree.

.3 After tree supports have been installed, remove broken branches with clean, sharp tools.

.4 Use three (3) guy wires and anchors for evergreen trees greater than 1000mm in height.

.1 Install guying collars above branch to prevent slipping at approximately 2/3 height for evergreens. Collar mounting height not to exceed 915 mm above grade.

.2 Guying collars to be of sufficient length to encircle tree plus 50mm space for trunk clearance. Thread guy wire through collar encircling tree trunk and secure to lead wire by clamp or multi- wraps; cut wire ends close to wrap. Spread lead wires equally proportioned about trunk at 120 degrees.

.3 Install anchors at equal intervals about tree and away from trunk so that guy wire will form 45 degree angle with ground. Install anchor at angle to achieve maximum resistance for guy wire.

.4 Attach guy wire to anchors. Tension wire and secure by multi-wraps.

.5 Install wire tightener ensuring that guys are secure and leave room for slight movements of tree.

.6 Saw tops off anchors which extend in excess of100 mm above grade or as directed.

3.5 MULCHING

.1 Ensure soil settlement has been corrected and weeds removed prior to mulching.

.2 Water plant material thoroughly prior to mulching.

.3 Spread mulch to a minimum depth of 75mm.

3.6 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following maintenance operations from time of planting to preliminary acceptance at substantial completion review by Consultant.

.1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.

.2 For evergreen plant material: water thoroughly in late fall prior to freeze-up to saturate soil around root system.

.3 Remove weeds monthly.

.4 Replace or re-spread damaged, missing or disturbed mulch.

.5 Apply pesticides only in accordance with all Federal, Provincial, and Municipal regulations as and when required to control insects, fungus, and disease. Obtain product approval from Consultant prior to application.

.6 Remove dead or broken branches from plant material.

.7 Keep stakes and guy wires in proper repair and adjustment.

.8 Apply fertilizer in early spring at manufacturer's suggested rate and as required by plant material.

.9 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

.10 Remove trunk protection, tree supports and level watering saucers at end of first growing season.

3.7 PRELIMINARY ACCEPTANCE

.1 Plant material to be inspected by Consultant at Substantial Completion review. Plant material shall be accepted provided that plant material exhibits healthy growing condition and is free from disease, insects and fungal organisms.

.2 Plant material installed in Fall will be accepted in following spring, one month after start of growing season, provided acceptance conditions outlined in 1 above, are fulfilled.

.3 Warranty period will commence from date of Substantial Completion.

3.8 MAINTENANCE DURING WARRANTY PERIOD

.1 Commence maintenance immediately following installation of Work and continue it until 1 year (the guarantee period) following Substantial Completion of Contract. Except for trees which shall be guaranteed for 2 years following Substantial Completion of Contract.

.2 This maintenance will be the sole source of maintenance of the work during this period and is wholly the Contractor's responsibility.

.3 From time of acceptance by Consultant to end of warranty period, perform following maintenance operations.

.1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.

.2 For evergreen plant material: water thoroughly in late fall prior to freeze-up to saturate soil around root system.

.3 Reform damaged watering saucers.

.4 Remove weeds monthly.

.5 Replace or re-spread damaged, missing or disturbed mulch.

.6 Apply pesticides only in accordance with all Federal, Provincial, and Municipal regulations as and when required to control insects, fungus, and disease. Obtain product approval from Consultant prior to application.

.7 Apply fertilizer in early spring at manufacturer's suggested rate and as required by plant material.

.8 Remove broken or hazardous branches from plant material.

.9 Keep stakes in proper repair and adjustment.

.4 Notify Consultant when maintenance period is completed to arrange final inspection and transfer of maintenance responsibility to Owner.

.5 Replace plants deemed to be unacceptable by Consultant. Extend warranty period for one year from date of replacement.

.6 Include the cost of maintenance in the Total Tender Price in the Form of Tender.

3.9 CLEAN-UP

.1 Remove materials which have spilled onto adjacent surfaces during Work of this Contract.

END OF SECTION