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 Department 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 D3203-2011, Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.

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.

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 Transportation And Public Works, 2012 revision.

.6 The minimum density acceptable shall 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.

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.

1.2 RELATED WORK

.1 Section 01 35 43 Environmental Procedures

.2 Section 31 23 13 Rough Grading

.3 Section 32 11 23 Granular Base

1.3 REFERENCES

.1 ASTM C150/C150M-12 Standard Specification for Portland Cement

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

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

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

.5 CGSB 51-GP-51M Polyethylene Sheet for Use in Building Construction

.6 CSA A23.1-09(2014) – Concrete Materials and Methods of Concrete Construction.

.7 CSA A23.2-09(2014) – Methods of Test for Concrete, Includes Update No.1 (2011).

.8 CSA G30.18-09 Carbon Steel Bars for Concrete Reinforcement

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

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

.11 CSA B651-12 Accessible Design For the Built Environment

1.4 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.

1.5 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

1.6 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.

1.7 SUBMITTALS

.1 Prepare 1500 x 1500 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 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 A 23.1 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 Bar Supports and Spacers: to CSA-A23.1.

.3 Smooth plain round bars: to CAN/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.

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 CGSB 51-GP-51M.

.4 Expansion Joint Material: fibrous, compressible, tar impregnated flexible board – 12mm thick,. Flexcell or equivalent.

.5

2.5 JOINTS

.1 Expansion Joint: Place expansion joint material continuous between concrete slab/curb and all rigid vertical surfaces.

.2 Crack Control Joint:

.1 Sidewalk: Sawcut ¼ the thickness of the concrete slab. 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.

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 Review graded Subgrade surface by proof rolling or other method to approval of Departmental Representative prior to placing granular base material:

.1 Check for unstable areas.

.2 Check for areas requiring additional compaction.

.4 Notify Departmental Representative of unsatisfactory Subgrade conditions.

.5 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.

.6 Provide 24 hours notice prior to placing of concrete.

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

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

3.2 GRADE PREPARATION

.1 Refer to Section 31 23 13 – Rough Grading.

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 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.

3.5 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.

3.6 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.

3.7 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.

3.8 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. 2000mm o.c.

.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.

3.9 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.

3.10 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.

3.11 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.

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

END OF SECTION

PART 1 - GENERAL

1.01 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM C 117-2013, Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
.2 ASTM C 136-2014, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.3 ASTM D 698-12e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600 kN-m/m^3).

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-3.3-99(March 2004), Kerosene, Amend. No. 1, National Standard of Canada.
.2 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.3 Canadian Standards Association (CSA International)
.1 CSA-A23.1-04/A23.2-2014, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data: submit WHMIS MSDS in accordance with 01 33 00.

.3 Inform Departmental Representative of proposed source of materials and provide access for sampling at least two (2) weeks prior to commencing work.

.4 If materials have been tested by accredited testing laboratory approved by Departmental Representative within previous two (2) months and have passed tests equal to requirements of this specification, submit test certificates from testing laboratory showing suitability of materials for this project.

PART 2 - PRODUCTS

2.01 MATERIALS

.1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.

.2 Reinforcing steel: in accordance with Section 03 20 00 - Concrete Reinforcing.

.3 Joint filler or Curing Compound: in accordance with Section 03 30 00 - Cast-in-Place Concrete.

.4 Granular base: material to Section 32 11 23 - Granular Base.

.5 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water-soluble soap.

.6 Fill material: to Section 31 23 13 - Rough Grading.

PART 3 - EXECUTION

3.01 GRADE PREPARATION

.1 Do grade preparation work in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.

.2 Construct embankments using excavated material free from organic matter or other objectionable materials.
.1 Dispose of surplus and unsuitable excavated material in approved location on site off site.

.3 Place fill in maximum 300 mm layers and compact to at least 95% of maximum dry density to ASTM D 698.

3.02 GRANULAR BASE

.1 Obtain the Departmental Representative's approval of subgrade before placing granular base.

.2 Place granular base material to lines, widths, and depths as indicated.

.3 Compact granular base in maximum 150 mm layers to at least 95% of maximum density to ASTM D 698.

3.03 CONCRETE

.1 Obtain Departmental Representative approval of granular base and reinforcing steel prior to placing concrete.

.2 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.

.3 Immediately after floating, give sidewalk surface uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom in direction normal to centre line.

.4 Provide edging as indicated with 6 mm radius edging tool.

.5 Slip-form pavers equipped with string line system for line and grade control may be used if quality of work acceptable to Departmental Representative can be demonstrated. Hand finish surfaces when directed by Departmental Representative.

3.04 TOLERANCES

.1 Finish surfaces to within 3 mm in 3 m as measured with 3 m straightedge placed on surface.

3.05 EXPANSION AND CONTRACTION JOINTS

.1 Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals of equal to the width of the walk.

.2 Install expansion joints as directed by Departmental Representative as indicated.

.3 When sidewalk is adjacent to curb, make joints of curb, gutters and sidewalk coincide.

3.06 ISOLATION JOINTS

.1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, asphalt driveways, buildings, or permanent structure.

.2 Install joint filler in isolation joints in accordance with Section 03 30 00 - Cast-in-Place Concrete as indicated.

3.07 CURING

.1 Cure concrete by adding moisture continuously in accordance with CSA-A23.1/A23.2 to exposed finished surfaces for at least one (1) day after placing, or sealing moisture in by curing compound as directed by Departmental Representative.

.2 Apply curing compound evenly to form continuous film, in accordance with manufacturer's requirements.

3.08 BACKFILL

.1 Allow concrete to cure for seven (7) days prior to backfilling.

.2 Backfill to designated elevations with material as directed by the Departmental Representative.
.1 Compact and shape to required contours as indicated.

3.09 LINSEED OIL TREATMENT

.1 Apply two (2) coats of linseed oil mixture uniformly to surfaces of curbs, walks and gutters, after concrete has cured for specified curing time and when surface of concrete is clean and dry.

.2 Linseed oil mixture to consist of 50% boiled linseed oil and 50% mineral spirits by volume.

.3 Apply treatment when air temperature above 10 degrees C.

.4 Apply first coat at 135 mL/m².

.5 Apply second coat at 90 mL/m² when first coat has dried.

3.10 CLEANING

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

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 Construction of timber and wood work:

.1 Temporary wood steps, ramp and porch for new gift shop.

.2 New and reinstatement of crusher dust walkways.

.3 River stone drainage strip.

1.2 RELATED WORK

.1 Section 01 35 43 Environmental Procedures

.2 Section 31 23 10 Excavating and Trenching

.3 Section 32 11 23 Granular Base

.4 Section 32 13 13 Sitework Concrete

1.3 REFERENCE STANDARDS

.1 CSA O86 (2009) Engineering Design in Wood

.2 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples

.3 ASTM A325-09ae1 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

.4 ASTM D1761 - 12 Standard Test Methods for Mechanical Fasteners in Wood

.5 ASTM F1667 – 11ae1 Standard Specification for Driven Fasteners: Nails, Spikes, and Staples

.6 ASTM A325-04b Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

.7 AWPA M4-11, American Wood Preserver’s Association – Standard for the Care of Preservation – Treated Wood Products.

.8 CAN/CSA 080 Series-15 - Wood Preservation

.9 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber 200 Edition.

.10 ASTM D698-07e1 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)

1.4 ALLOWABLE TOLERANCES

.1 Finish work within 12mm of specified lengths and dimensions and location.

1.5 WARRANTY

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

1.6 SUBMITTALS

.1 Submit information for deck and step work, including connectors.

2 PRODUCTS

2.1 WOOD AND TIMBER

.1 Pressure-treated Wood: pressure-treated with water-borne inorganic preservatives, conforming to CSA 080. Use for all bumper rail and posts.

.1 CSA 080.18 using ACA or ACQ water borne preservative treatment.

.2 Use preservative to a net retention of 2.8kg/m3 of timber to approval of Departmental Representative.

.3 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.

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

.2 Fasteners: All fasteners to be appropriate for the wood and wood treatment for which they are used.

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

.2 Wood to CSA B35.4.

.3 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.

.3 Wood Stain: Alkyd-type water repellant exterior stain and sealant. Semi-transparent. Colour: To approval of Departmental Representative. Apply 2 coats. Standard of Acceptance: Benjamin Moore Premium Exterior Stain.

2.2 GRANULARS

.1 Granular Base Course: Type 1 Granular as specified.

.2 Crusher Dust: 6mm crushed stone screenings and crusher dust free from clay lumps, cementation, organic or frozen material, and other deleterious materials.

2.3 GENERAL

.1 Concrete Deck Block: Precast concrete deck block sized for post dimensions.

.2 River Rock Stone: 25-75mm washed, natural, hard, rounded river rock. Mixed light brown colour.

.3 Geotextile: Geotextile to be non-woven fabric composed of polypropylene fibers inert to biological degradation and resistant to naturally encountered chemicals, alkalis, and acids.

3 EXECUTION

3.1 WOOD AND TIMBER - GENERAL

.1 Do work in accordance with CSA O86 except where specified otherwise.

.2 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.

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

.4 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.

.5 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.

.6 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.

.7 Place concrete deck block on compacted Type 1 granular in accordance with Section 32 13 13 and set posts plumb within 12mm in 3000mm.

.8 Select fasteners to suit size and nature of components being joined and in compliance with National Building Code of Canada.

.9 Pre-drill fastener holes within 150mm of end grain to avoid splitting.

.10 Finish bottoms, edges, tops, projections and cutouts above and below sight lines as specified for surrounding surfaces.

.11 For handrails and steps: Sand exposed edges of work.

.12 Provide minimum of one bearing support for each board.

.13 For timbers to be stained:

.1 Prepare and clean surfaces prior to and between coatings as per manufacturer’s instructions.

.2 Liberally coat all wood surfaces with brush application of exterior stain. Provide minimum 2 brush coats, applying second coat after first coat has completely dried.

3.2 CRUSHER DUST 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 3000mm 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.

3.3 RIVER STONE DRAINAGE STRIP

.1 Complete installation of new catchbasin.

.2 Place geotextile continuous over prepared Subgrade.

.3 Place river stone to specified depth. Do not dislodge geotextile.

3.4 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.

1.2 RELATED WORK

.1 Section 01 35 43 Environmental Procedures

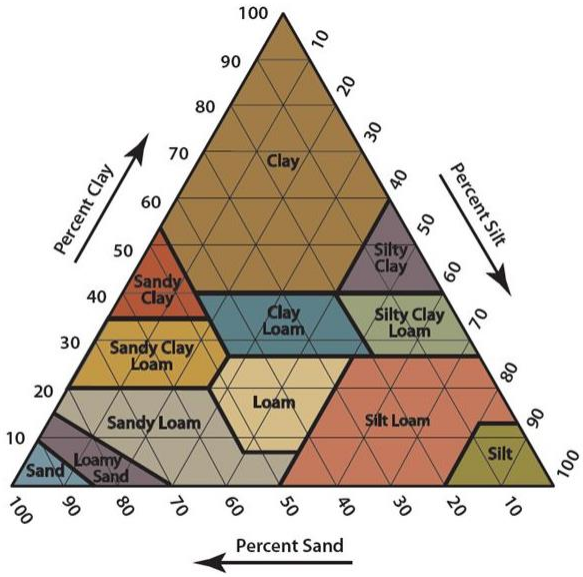
.2 Section 31 23 10 Excavating and Backfilling

.3 Section 31 23 13 Rough Grading

.4 Section 32 92 23 Sodding

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 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.

1.5 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.

1.6 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.

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 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

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.

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

.1 Establish subgrade for lawn areas and planting beds and request review by Departmental Representative:

.1 150mm depth for sodded lawn areas.

3.4 SPREADING OF TOPSOIL AND FINISH GRADING

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

.1 125mm for sodded areas.

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

.4 Roll topsoil with 45 kg. roller, min. 915mm wide to consolidate topsoil.

3.5 SURPLUS MATERIALS

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

3.6 EROSION CONTROL

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

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 after Substantial Performance.

1.2 RELATED WORK

.1 Section 01 35 43 Environmental Procedures

.2 Section 02 41 10 Sitework Demolition and Removals

.3 Section 32 91 21 Topsoil and Finish Grading

1.3 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.

1.4 SCHEDULING

.1 Schedule sod laying to coincide with topsoil operations.

1.5 WARRANTY

.1 The Contractor hereby warrants that sodding will be maintained to remain healthy and free of defects for **6 months** 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 metres.

.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