

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 32 16 15 - Concrete Walks, Curbs and Gutters
- .4 Section 32 14 14 – Precast Concrete Retaining Wall

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C136-[01], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .2 ASTM C979-[99], Standard Specification for Pigments for Integrally Colored Concrete.
- .2 Canadian Standards Association (CSA International).
 - .1 CSA A23.1/A23.2-[00], Concrete Materials and Methods of Concrete Construction/Method of Test for Concrete.
 - .2 CSA A179-[94], Mortar and Grout for Unit Masonry.
 - .3 CSA-A231.2-[95], Precast Concrete Pavers.
 - .4 CSA A283-[00], Qualification Code for Concrete Testing Laboratories.

1.3 SUBMITTALS

- .1 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit full size sample of each type of pavers.

Part 2 Products

2.1 CONCRETE PAVERS

- .1 Granular Base: Crushed limestone to City of Winnipeg Specification Section CW 3110-R5

- .2 Bedding sand shall be fine aggregate conforming to the following grading requirements:

CDN Metric Sieve size	Percent of Total Dry Weight Passing Each Sieve
10 000	100
5 000	95-100
2 500	80-100
1 250	50-85
630	25-60
315	10-35
160	5-15
80	0-10

- .3 Joint sand shall have a maximum aggregate size of 3 mm.
- .4 Concrete pavers: to CSA-A231.2 and as follows:
- .1 Holland Stone Size: 209 mm x 105 mm x 60 mm height by Barkman Concrete.
 - .2 Holland Square Size: 209 mm x 209 mm x 60 mm height Barkman Concrete.
 - .3 Field Colour: Rustic Red, variations to homogenous pattern acceptable to Contract Administrator
 - .4 Border Colour: Charcoal, variations to homogenous pattern acceptable to Contract Administrator
- .5 Staff Patio Concrete Slabs: to CSA-A231.2 and as follows:
- .1 Dynasty Collection Slabs: Size: 400 mm x 400 mm x 45 mm height by Barkman Concrete.
 - .2 Type: Slate
 - .3 Colour: Sierra, variations to homogenous pattern acceptable to Contract Administrator
- .6 Uniform in material, colour, size and from one supplier
- .7 Pigment in concrete pavers: to ASTM C979.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 STRUCTURAL SURFACE

- .1 Verify that structural surfaces conform to levels and compaction required for installation of unit pavers. If discrepancies occur, notify Contract Administrator and do not commence work until instructed by Contract Administrator.
- .2 Verify that top of base does not exceed plus or minus 10mm of grade over 3 m straightedge.

- .3 Ensure that structural surface is not frozen or standing water is present during installation.

3.3 STRUCTURAL CURBS

- .1 Verify that structural curbs conform to elevations and alignments required for installation of unit pavers. If discrepancies occur, notify Contract Administrator and do not commence work until instructed by Contract Administrator.

3.4 PLACING OF BEDDING MATERIAL

- .1 Ensure bedding material is not saturated or frozen at all times until installation is complete.
- .2 Spread and screed material on structural surface to achieve 25 mm compacted thickness after vibrating pavers in place. Do not use joint sand for bedding sand.
- .3 Do not disturb screeded material. Do not use bedding material to fill depressions in structural surface.

3.5 INSTALLATION OF CONCRETE PAVERS

- .1 Lay pavers to patterns indicated. Joints between pavers: 2 to 5 mm wide, or as recommended by manufacturer.
- .2 Use appropriate end, edge and corner stones. Saw cut pavers to fit around obstructions and at abutting structures.
- .3 Use a low amplitude, high frequency plate compactor capable of at least 22 kN centrifugal compaction force to vibrate pavers into bedding sand.
- .4 Inspect, remove, and replace chipped, broken and damaged pavers.
- .5 Sweep dry joint sand material into joints.
- .6 Settle sand by vibrating pavers with plate compactor.
- .7 Continue application of joint material and vibrating of pavers until joints are full. Do not vibrate within 1 m of unrestrained edges of pavers.
- .8 Sweep off excess joint material when installation is complete.
- .9 Final surface elevations not to exceed plus or minus 10 mm under 3 m long straightedge.
- .10 Ensure conformance of final elevations.

3.6 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 23 23 - Backfilling
- .2 Section 32 91 21 - Topsoil Placement and Grading.
- .3 Section 32 14 13 – Precast Concrete Unit Paving

1.2 REFERENCES

- .1 Canadian General Standards Board
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .2 Canadian Standards Association
 - .1 CAN/CSA A23.1-M90, Concrete Materials and Methods of Construction, Section 5.3.2.
 - .2 CSA A179-94, Mortar and Grout for Unit Masonry.
 - .3 CSA-A231.1-72, Precast Concrete Paving Slabs.
 - .4 CSA-A231.2-95, Precast Concrete Pavers.
- .3 American Society for Testing and Materials
 - .1 ASTM C 117-90, Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 136-93, Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM C 902-93, Specification for Pedestrian and Light Traffic Paving Brick.
 - .4 ASTM C 1272-94, Specification for Heavy Vehicular Paving Brick.
 - .5 ASTM D 698-91, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft) (600 kN-m/m).
 - .6 ASTM D 1557-91, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft) (2,700 kN-m/m).
- .4 ASTM E 11-87, Specification for Wire-Cloth Sieves for Testing Purposes.

1.3 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00–Submittal Procedures.
- .2 Submit full size sample of each type of retaining wall unit.
- .3 Submit shop drawings completed by retaining wall manufacturer for approval prior to installation.

1.4 PROTECTION

- .1 Prevent damage to buildings, landscaping, curbs, sidewalks, trees, fences, roads and adjacent property. Make good any damage.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Precast Concrete Retaining Wall Units:
 - .1 Concrete wall units shall have minimum 28 day compressive strength of 3,000 psi in accordance with ASTM C-90. The concrete shall have adequate freeze-thaw protection with an average absorption rate of 5%.
 - .2 Exterior dimensions shall be uniform and consistent. Maximum dimensional deviations shall be 10 mm (not including textured face).
 - .3 Retaining wall units shall provide a minimum of 475 kg total weight per square metre of wall face area. Fill contained within the units may be considered 80% effective weight.
 - .4 Exterior face shall be textured.
 - .5 Lower Patio Retaining Walls:
 - .1 Colour: AB Manitoba Stone.
 - .2 Type: Aslar Blend including: AB Stone 6°, AB Jumbo, AB Lite and Half AB Lite by Allan Block,
 - .3 Cap: 18" Straight Cap by Allan Block
 - .6 Upper Patio Precast Concrete Walls:
 - .1 Colour: Courtyard Collection Desert Bloom
 - .2 Type: Courtyard Collection Dublin Block, York Block and Corner Block by Allan Block
 - .3 Cap: Courtyard Collection Wall Cap by Allan Block
- .2 Granular Base: To conform to the requirements of City of Winnipeg Specification Section CW 3110-R5.
- .3 Backfill: To conform to Section 31 23 23 – Backfilling
- .4 Drainage Medium: Free draining granular fill free of fines. 10 mm down with maximum 5% passing #200 sieve and less than 50% passing #4- sieve.
- .5 Tie Back System: Manufacturer's standard geosynthetic fabric system.
- .6 Drain Pipe: Perforated plastic pipe and fitting to CAN/CSA-B182.1. Size as indicated complete with geotextile sock.
- .7 Block Adhesive: "PL Premium Construction" or approved equal in accordance with Section 01 23 00 Alternates.

- .8 Concrete: To Section 03 30 00 - Cast-in-Place Concrete.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Rough grade to depth required for surface treatments as indicated on Drawings.

3.2 INSPECTION

- .1 Subgrade is to be unfrozen and free from snow or ice.
- .2 Check graded subgrade for conformity with elevations and sections before placing granular base materials.
- .3 Notify Contract Administrator of any unsatisfactory conditions.

3.3 GRANULAR BASE

- .1 Place granular base to compacted thickness as indicated.
- .2 Place in layers not exceeding 150 mm compacted thickness. Compact each layer to minimum 98% maximum dry density as determined by Standard Proctor Density.

3.4 PRECAST CONCRETE RETAINING WALLS

- .1 Place fine granular fill screeded to 20 mm compacted thickness.
- .2 Install units as indicated, true to grade and free of movement. Joints not to exceed 3 mm.
- .3 Where required, cut units with approved cutter or saw to fit accurately, neatly and without damaged edges.
- .4 Where railings and fences are to be installed on top of or behind the wall, coordinate work with related subtrades.
- .5 Replace rejected, damaged or defective units with sound units.
- .6 All coping pieces to be securely attached with block adhesive.

3.5 FINISH TOLERANCES

- .1 Finish surface to within 25 mm (1") of established grade but not uniformly high or low.
- .2 Correct irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.6 SURPLUS MATERIAL

- .1 Remove surplus material.
- .2 Remove material unsuitable for fill, grading or landscaping.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 23 16 – Excavating
- .2 Section 31 23 23 – Backfilling
- .3 Section 03 11 00 - Concrete Forming
- .4 Section 03 20 00 - Concrete Reinforcing
- .5 Section 03 30 00 - Cast-in-Place Concrete

1.2 REFERENCES

- .1 City of Winnipeg Standard Construction Specification CW 3325-R2 Portland Cement Concrete Sidewalk
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM D698-[91(1998)], Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.2-[98], Boiled Linseed Oil.
 - .2 CAN/CGSB-3.3-[99], Kerosene.
- .4 Canadian Standards Association (CSA)
- .5 CAN/CSA-A23.1/A23.2-[94], Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Concrete mixes and materials: to Section 03 30 00 - Cast-in-Place Concrete.
- .2 Concrete walkways: to City of Winnipeg Specification Section CW3325-R2 and CW3310-R6.
- .3 Reinforcing steel: to Section 03 20 00 - Concrete Reinforcing.
- .4 Joint filler and Curing Compound: to Section 03 30 00 - Cast-in-Place Concrete.
- .5 Granular base: to City of Winnipeg Standard Construction Specification CW 3110-R10
- .6 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water soluble soap.

- .7 Fill material: to Section 31 23 23 - Backfilling
- .8 Boiled linseed oil: to CAN/CGSB-1.2.
- .9 Kerosene: to CAN/CGSB-3.3.

PART 3 EXECUTION

3.1 GRADE PREPARATION

- .1 Do grade preparation work in accordance with Section 31 23 16 - Excavating, and Section 31 23 23 Backfilling.
- .2 Construct embankments using excavated material free from organic matter or other objectionable materials. Dispose of surplus and unsuitable excavated material in approved location off site.
- .3 Place fill in maximum 150 mm layers and compact to at least 95% of maximum density to ASTM D698.

3.2 GRANULAR BASE

- .1 Obtain Contract Administrator's approval of subgrade before placing granular base.
- .2 Place granular base material to lines, widths, and depths as indicated.
- .3 Compact granular base to at least 100% of maximum density to ASTM D698.

3.3 CONCRETE

- .1 Obtain Contract Administrator's 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 10 mm radius edging tool.

3.4 TOLERANCES

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

3.5 EXPANSION AND CONTRACTION JOINTS

- .1 Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals of 1.5 m. Install expansion joints at intervals of 6 m.
- .2 When sidewalk is adjacent to curb, make joints of curb, gutters and sidewalk coincide.

3.6 ISOLATION JOINTS

- .1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .2 Install joint filler in isolation joints in accordance with Section 03 30 00 - Cast-in-Place Concrete
- .3 Seal isolation joints with sealant approved by Contract Administrator.

3.7 CURING

- .1 Cure concrete by adding moisture continuously in accordance with CAN/CSA-A23.1 to exposed finished surfaces for at least 1 day after placing, or sealing moisture in by curing compound approved by Contract Administrator.
- .2 Where burlap is used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period.
- .3 Apply curing compound evenly to form continuous film. In accordance with manufacturer's requirements.

3.8 BACKFILL

- .1 Allow concrete to cure for 7 days prior to backfilling.
- .2 Backfill to designated elevations with material approved by Contract Administrator. Compact and shape to required contours as indicated or as directed by Contract Administrator.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 30 00 - Cast-in-Place Concrete.
- .3 Section 09 99 00 – Painting and Coating.

1.2 REFERENCES

- .1 Install chain link fence in accordance with CAN2-138.3-M80 unless otherwise specified.

Part 2 Products

2.1 MATERIALS

- .1 Concrete: 20 mm normal aggregate size, 20 MPa at 28 days.
- .2 Chain Link Fence Fabric: to CAN2-138.1-M80.
 - .1 Chain Link Fence: 2.4 m (8') height, 11 gauge, 50 mm (2") mesh, knuckled bottom and twisted selvedge at top.
- .3 Posts, Braces and Rails: To CAN/CGSB-138.2, galvanized steel pipe. Dimensions as indicated: gate posts schedule 40 pipe; end and corner posts .125 wall; line posts .100 wall.
- .4 Bottom Tension Wire: To CAN/CGSB-138.1, Table 2, single strand, galvanized steel wire, 5 mm ø.
- .5 Tie Wire Fasteners: To CAN/CGSB-138.1, Table 2 (steel wire), single strand, vinyl coated or galvanized conforming to requirements of fence fabric.
- .6 Tension Bar: To ASTM A 525M, 5x20 mm minimum galvanized steel.
- .7 Gates: To CAN/CGSB-138.4.
- .8 Gate Frames: To ASTM A 53, galvanized steel pipe, standard weight 45 mm outside ø pipe for outside frame, 35 mm outside ø pipe for interior bracing.
 - .1 Fabricate gates as indicated with electrically welded joints, and painted with zinc pigmented paint after welding.
 - .2 Fasten fence fabric to gate with twisted selvage at top.
 - .3 Furnish gates with galvanized malleable iron hinges, latch and latch catch with provision for padlock which can be attached and operated from either side of installed gate.

- .9 Fittings and Hardware: To CAN/CGSB-138.2, cast aluminum alloy, galvanized steel or malleable or ductile cast iron. Tension bar bands: 3x20 mm minimum galvanized steel or 5x20 mm minimum aluminum. Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail.
- .10 Organic Zinc Rich Coating: To CAN/CGSB-1.181.

2.2 FINISHES

- .1 Galvanizing:
 - .1 For chain link fabric: to CAN/CGSB-138.1 Grade2
 - .2 For pipe: 550 g/m² minimum to ASTM A90.
 - .3 For other fittings: to CAN/CSA-G164.

Part 3 Execution

3.1 GRADING

- .1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts.
 - .1 Provide clearance between bottom of fence and ground surface of 30 mm to 50 mm.

3.2 ERECTION OF FENCE

- .1 Erect fence along lines indicated and in accordance with CAN2-138.3-M80.
- .2 Excavate post holes to 1200 mm depth x 300 mm ø. Bulb bottom of holes for corner, end and gate posts and for intermediate posts at every 60.0 m along fence line. Typical line posts may be push installed to 1200 mm depth minimum, subject to approval of field conditions by Contract Administrator
- .3 Space line posts 3.0 m (10'-0") apart, measured parallel to ground surface.
- .4 Space straining posts at equal intervals not exceeding 150 m (450') if distance is greater than 150 m (450') between end or corner posts on straight continuous lengths of fence over reasonably smooth grade.
- .5 Install additional straining posts at sharp changes in grade and where directed by Contract Administrator
- .6 Install corner post where change in alignment exceeds 10 degrees..
- .7 Install end posts at end of fence and at buildings.
 - .1 Install gate posts on both sides of gate openings.
- .8 Place concrete in post holes then embed posts into concrete 825 mm depth.
 - .1 Extend concrete 50 mm above ground level and slope to drain away from posts.
 - .2 Brace to hold posts in plumb position and true to alignment and elevation until concrete has set.

- .9 Do not install fence fabric until concrete has cured minimum of 5 days.
- .10 Install brace between end and gate posts and nearest line post, [placed in centre of panel and parallel to ground surface.
 - .1 Install braces on both sides of corner and straining posts in similar manner.
- .11 Install overhang tops and caps.
- .12 Install top rail between posts and fasten securely to posts and secure waterproof caps and overhang tops.
- .13 Install bottom tension wire, stretch tightly and fasten securely to end, corner, gate and straining posts with turnbuckles and tension bar bands.
- .14 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end, corner, gate and straining posts with tension bar secured to post with tension bar bands spaced at 300 mm intervals.
 - .1 Knuckled selvedge at bottom.
 - .2 Twisted selvedge at top.
- .15 Secure fabric to top rails, line posts and bottom tension wire with tie wires at 450 mm (18") intervals.
 - .1 Give tie wires minimum two twists.

3.3 INSTALLATION OF GATES

- .1 Install gates in locations as indicated.
- .2 Level ground between gate posts and set gate bottom approximately 40 mm above ground surface.
- .3 Determine position of centre gate rest for double gate.
 - .1 Cast gate rest in concrete as directed.
 - .2 Dome concrete above ground level to shed water.
- .4 Install gate stops where indicated.

3.4 TOUCH UP

- .1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of organic zinc-rich paint to damaged areas in accordance with Section 09 91 13 - Exterior Painting.
 - .1 Pre-treat damaged surfaces according to manufacturers' instructions for zinc-rich paint.

3.5 CLEANING

- .1 Clean and trim areas disturbed by operations.
 - .1 Dispose of surplus material and replace damaged turf with sod as directed by Contract Administrator

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 10 - Closeout Submittals.

1.2 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures
- .2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures
- .3 Indicate dimensions, sizes, assembly, anchorage and installation details for each furnishing specified.
- .4 Provide maintenance data for care and cleaning of site furnishings for incorporation into manual specified in Section 01 78 10 - Closeout Submittals.

Part 2 Products

2.1 BENCH

- .1 Acceptable Material: [____].
 - .1 End pieces: [____].
 - .2 Seat: [____].
- .2 Dimensions: [____] .
 - .1 Height: [____].
 - .2 Length: [____].
 - .3 Depth: [____].
- .3 Finish: [____].
 - .1 End pieces: [____].
 - .2 Seat: [____].

2.2 TRASH CONTAINER

- .1 Acceptable Material: [____].
 - .1 Frame: [____].
 - .2 Liner: [____].
 - .3 Lid: [____].
- .2 Dimensions: [____].
 - .1 Height: [____].
 - .2 Length: [____].
 - .3 Depth: [____].

- .3 Finish: [____].
 - .1 Frame: [____].
 - .2 Liner: [____].
 - .3 Lid: [____].

2.3 ASH URNS

- .1 Acceptable Material: [____].
 - .1 Frame: [____].
 - .2 Liner: [____].
- .2 Dimensions: [____].
 - .1 Height: [____].
 - .2 Length: [____].
 - .3 Depth: [____].
- .3 Finish: [____].
 - .1 Frame: [____].
 - .2 Liner: [____].

2.4 PATIO TABLES

- .1 Acceptable Material: [____].
 - .1 Frame: [____].
 - .2 Liner: [____].
- .2 Dimensions: [____].
 - .1 Height: [____].
 - .2 Length: [____].
 - .3 Depth: [____].
- .3 Finish: [____].
 - .1 Frame: [____].
 - .2 Liner: [____].

2.5 PATIO CHAIRS

- .1 Acceptable Material: [____].
 - .1 Frame: [____].
 - .2 Liner: [____].
- .2 Dimensions: [____].
 - .1 Height: [____].
 - .2 Length: [____].
 - .3 Depth: [____].
- .3 Finish: [____].
 - .1 Frame: [____].

.2 Liner: [____].

2.6 BICYCLE RACK

.1 Acceptable Material: [____].

.1 Frame: [____].

.2 Dimensions: [____].

.1 Height: [____].

.2 Circle Width: [____].

.3 Frame: [____].

.3 Finish: [____].

2.7 FLAG POLE

.1 Flagpole, bases and anchorage devices to resist minimum wind velocity of 145km/h unflagged, 100 km/h flagged.

.2 Description:

.1 Model: Ewing Architectural Flagpole: Tapered aluminum flagpole, model #SCA-30 or approved equal in accordance with Section 01 23 00 Alternates

.2 Exposed Height: 9.144m pole height (30')

.3 Butt Diameter: 127 mm. (5")

.4 Top Diameter: 76 mm. (3")

.5 Wall Thickness: 0.396 mm. (.156").

.6 Options and Accessories: Econoline internal halyard system.

.7 Anchor Base: Type B5 fixed anchor base, complete with all anchoring devices necessary for surface mounting.

.8 Flag Size: 1143 mm x 2286 mm (3'9" x 7'6"). Flags to be supplied by City.

.3 Install flagpoles, base assemblies and fittings to shop drawings and manufacturer's instructions.

.4 Install on Cast-in-place concrete base as indicated on Drawings and Structural Specifications.

.5 Check and adjust installed fittings for smooth operation of halyards.

2.8 PRECAST CONCRETE PLANTERS

.1 Acceptable Material: [____].

.1 Frame: [____].

.2 Dimensions: [____].

.1 Height: [____].

.2 Circle Width: [____].

.3 Frame: [____].

.3 Finish: [____].

Part 3 Execution

3.1 INSTALLATION

- .1 Assemble furnishings in accordance with manufacturer's instructions.
- .2 Install furnishing true, plumb, Anchor all benches, trash cans, ash urns and bicycle racks. Patio furnishings not to be fastened down.

3.2 TOUCH-UPS AND MANUALS

- .1 Touch-up all damaged surfaces and finishes as recommended by manufacturers to approval of Contract Administrator.
- .2 Provide the City with site furnishings information manual complete with make, model number and supplier contact information for all exterior site furnishings.
- .3 Total Performance will not be awarded until all touch-ups have been completed and site furnishing information manual has been submitted to the City.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 32 92 20 – Mechanical Seeding
- .2 Section 32 92 23 – Sodding.
- .3 Section 32 93 10 – Trees, Shrubs and Groundcover Planting.

1.2 REFERENCES

- .1 City of Winnipeg Standard Construction Specification CW 3540-R5 Topsoil and Finish Grading or newer.

1.3 SCHEDULING OF WORK

- .1 Schedule placing of topsoil to permit immediate planting operations.

1.4 SAMPLES

- .1 Provide 3, 1 litre samples each of topsoil and planting mix proposed for use on this project for testing in accordance with Section 01001, a minimum of 3 weeks prior to construction. Do not move soils to site prior to confirmation of test results. Samples must be fairly representative of soils to be used on site.

1.5 DELIVERY AND STORAGE

- .1 Deliver and store fertilizer in waterproof bags accompanied in writing by weight, analysis and name of manufacturer.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

PART 2 PRODUCTS

2.1 TOPSOIL

- .1 Topsoil for sodded, seeded areas, and planting beds: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth. Topsoil stripped on site may be used but must be tested for appropriate soil characteristics.
 - .1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70% sand, minimum 7% clay, and contain 2 to 10% organic matter by weight.
 - .2 Contain no toxic elements or growth inhibiting materials.

- .3 Finished surface free from:
 - .1 Debris and stones over 50 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
- .4 Consistence: friable when moist.

2.2 SOIL AMENDMENTS

- .1 Fertilizer:
 - .1 Fertility: major soil nutrients present in following amounts:
 - .1 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
 - .2 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
 - .3 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
 - .4 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
 - .5 Ph value: 6.5 to 8.0.
 - .2 Peatmoss:
 - .1 Derived from partially decomposed species of Sphagnum Mosses.
 - .2 Elastic and homogeneous, brown in colour.
 - .3 Free of wood and deleterious material which could prohibit growth.
 - .4 Shredded particle minimum size: 5 mm.
 - .3 Sand: washed coarse silica sand, medium to course textured.
 - .4 Organic matter: compost Category A, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.
 - .5 Limestone:
 - .1 Ground agricultural limestone.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
 - .6 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

2.3 SOURCE QUALITY CONTROL

- .1 Advise Contract Administrator of sources of topsoil to be utilized with sufficient lead time for testing.
- .2 Contractor is responsible for supplying materials necessary to amend topsoil to specified characteristics.
- .3 Soil will be tested for PH, P and K, and organic matter.
- .4 Testing of topsoil will be carried out by Norwest Labs, 1357 Dugald Road, Winnipeg, Manitoba, phone (204) 982-8630. Soil sampling, testing and analysis to be in accordance with Provincial standards. Cost of soil tests to be borne by Contractor.

PART 3 EXECUTION

3.1 STRIPPING OF TOPSOIL

- .1 Obtain Contract Administrator's approval of clearing and grubbing, and site grading prior to commencing work in this section.

3.2 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct. If discrepancies occur, notify Contract Administrator and do not commence work until instructed by Contract Administrator.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes more than 75 mm above surface. Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 150 mm. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING OF TOPSOIL / PLANTING SOIL

- .1 Place topsoil after Contract Administrator has accepted sub-grade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm to depths indicated on drawings or in corresponding specifications sections.
- .3 Apply topsoil to the following minimum compacted depths: 25 mm minimum for sod on stripped turf areas and 100 mm for sodded areas on new fill. Depths for shrub and flower beds and around all tree root balls as per planting details.
- .4 Remove stones, roots, grass, weeds, construction materials, debris and foreign non-organic objects from topsoil.

- .5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.4 APPLICATION OF FERTILIZER

- .1 Spread fertilizer over entire area of topsoil at rate and ratio determined by soil testing.
- .2 Mix fertilizer thoroughly into upper 50 mm of topsoil.

3.5 FINISH GRADING

- .1 Fine grade entire topsoiled area to contours and elevations as indicated. Eliminate rough spots and low areas to ensure positive drainage.
- .2 Prepare loose friable bed by means of roto-tilling and subsequent raking. Roll lightly and rake wherever topsoil is too loose.
- .3 Roll topsoil with 50 kg roller, minimum 900 mm wide, to compact and retain surface.
- .4 Leave surface smooth, uniform, firm against deep foot printing, with a fine loose texture.

3.6 ACCEPTANCE

- .1 Contract Administrator will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.7 SURPLUS MATERIAL

- .1 Dispose of materials except topsoil not required off site.
- .2 It may be possible to relocate excess topsoil to storage area on site. The City to confirm during construction.

3.8 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 32 91 21 – Topsoil Placement and Grading.
- .3 Section 32 92 23 – Sodding.

1.2 REFERENCES

- .1 City of Winnipeg Specification CW 3520 R7

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Provide product data for:
 - .1 Seed.
 - .2 Fertilizer.

1.4 QUALITY ASSURANCE

- .1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Conduct a pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazards.

PART 2 PRODUCTS

2.1 GRASS SEED

- .1 Canada "Certified" seed, "Canada No. 1 Lawn Grass Mixture". All seed is to be Certified Canada No. 1 in accordance with Government of Canada "Seeds Act" and "Seeds Regulations", having minimum purity of 97%, free of disease, weed seeds, or other foreign materials, Seeding ratio of 2 kg/100 sq.m.
- .2 Seed mix shall consist of deep rooting grasses and legumes, suited for wet areas. Acceptable mixes include the "Lower Dike Mix" supplied by Brett Young Seeds Ltd. (phone 261-9732), "Lowlands Mix" supplied by Pickseed Canada Inc., (phone 633-0088). Substitutions in accordance with Section 01 23 00 Alternates.

- .3 In packages individually labelled in accordance with "Seeds Regulations" and indicating name of supplier and date bagged.

2.2 WATER

- .1 Free of impurities that would inhibit germination and growth.

2.3 HERBICIDES

- .1 Herbicides shall be standard commercial products registered for sale and use in Canada under the Pest Control Products Act.

2.4 FERTILIZER

- .1 Refer to Section 32 91 21 - Topsoil Placement and Grading.
- .2 To Canada "Fertilizers Act" and "Fertilizers Regulations".
- .3 Complete synthetic fertilizer with guaranteed minimum analysis as specified.

2.5 EQUIPMENT

- .1 All equipment shall be of a type approved by the Contract Administrator for various portions of the site. Ensure equipment will not damage existing vegetation designated for protection.

PART 3 EXECUTION

3.1 REQUIREMENTS

- .1 Obtain approval of clearing and grubbing, earthwork and related work, site grading, tree and shrub protection, topsoil placement and grading, and sodding completed by others under separate contract prior to commencing work in this section.

3.2 QUALITY OF WORK

- .1 Do not perform work under adverse field conditions such as frozen soil, excessively wet or dry soil covered with snow, ice or standing water.
- .2 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site to a licensed contaminated soils disposal site in location as directed by Contract Administrator.

3.3 SEED BED PREPARATION

- .1 Test existing topsoil at least one month prior to seeding operations. Forward test results to Contract Administrator.
- .2 Verify that grades are correct. If discrepancies occur, notify Contract Administrator and do not commence work until instructed by Contract Administrator.

- .3 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated on Drawings, and to tolerance of ± 15 mm, surface draining naturally.
- .4 Cultivate finished grade of topsoil approved by Contract Administrator to 25 mm depth immediately prior to seeding.

3.4 FERTILIZING PROGRAM

- .1 Fertilize two (2) weeks or less prior to seeding with starter fertilizer as determined by the soil analysis test and as recommended by manufacturer.

3.5 SEED PLACEMENT

- .1 The Contractor shall not commence seeding operations until the finished surface is inspected and approved by the Contract Administrator.
- .2 The Contract Administrator shall be notified minimum twenty-four (24) hours prior to commencing seeding, and will conduct a site visit during seeding operations. The Contractor is not to proceed with any Work under this section until the Contract Administrator is present on site.
- .3 Sow all seed using “**brillion**” type mechanical landscape seeder which accurately places seed at specified depth and rate and rolls in single operation. Sow half the seed in rows parallel to the slope and the other half in rows at 45°. Sow seed uniformly and at rate as indicated.
- .4 Blend seed into existing adjacent grass areas where directed by the Contract Administrator to form uniform surfaces.
- .5 Immediately after seeding, consolidate seeded areas by rolling area to form a uniform even surface, level with adjoining curbs, sidewalks or sod, using equipment approved by the Contract Administrator.
- .6 Seeding operations shall be completed within a two day (48 hour) period after the commencement of operation.

3.6 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of installation until acceptance.
- .2 Water seeded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
- .3 Cut grass to 50 mm when or prior to it reaching height of 75 mm. Remove clippings which will smother grassed areas as directed by Contract Administrator.
- .4 Maintain seeded areas 95% weed free.
- .5 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

3.7 FINAL ACCEPTANCE

- .1 Seeded areas will be accepted for the purpose of issuance of Certificate of Substantial Performance following completion of all seeding to the satisfaction of the Contract Administrator.
- .2 Seeded areas will be accepted upon completion of a maintenance period that meets the following requirements:
 - .1 Seeded areas meet the seed mixture requirements specified.
 - .2 Seeded areas are properly established and turf is free of rutted, eroded, bare or dead spots and free of weeds.
 - .3 The stand shows signs of growth to the satisfaction of the Contract Administrator.
 - .4 Areas have been cut at least twice.
 - .5 Areas have been fertilized.

3.8 CLEAN UP

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers off site as directed by Contract Administrator.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 45 00 – Quality Control.
- .3 Section 32 91 21 – Topsoil Placement and Grading.

1.2 REFERENCES

- .1 City of Winnipeg Standard Construction Specification CW 3510-R9 Sodding or newer.

1.3 SUBMITTALS

- .1 Samples.
 - .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Submit:
 - .1 Install one 3 x 3 m mock-up and maintain in accordance with maintenance requirements during establishment period.
 - .3 Obtain approval of sample by Contract Administrator.

1.4 QUALITY ASSURANCE

- .1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Conduct a pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.5 SCHEDULING

- .1 Schedule sod laying to coincide with preparation of soil surface.
- .2 Schedule sod installation when frost is not present in ground.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 **Nursery mineral sod:** quality and source to comply with standards outlined in "Guide Specification for Nursery Stock", most recent edition, published by Canadian Nursery Trades Association.

- .1 **Number 1 Kentucky bluegrass sod:** grown from minimum mixture of 3 Kentucky Bluegrass cultivars.
- .2 Sod grown on mineral soil base. Peat sod will not be accepted.
- .2 **Wooden pegs:** 19 x 19 x 200 mm or approved 200 mm long steel staples.
- .3 **Water:** potable. Arrange for and pay for water required for sod establishment and maintenance.
- .4 **Herbicides:** standard commercial herbicide products registered for sale and use in Canada under the Pest Control Products Act.
- .5 **Fertilizer:** complete synthetic slow release fertilizer with maximum 35% water soluble nitrogen. Rate and ratio as recommended by soil test results (Section 32 91 21–Topsoil Placement and Grading).

PART 3 EXECUTION

3.1 PREPARATION

- .1 Obtain approval of clearing and grubbing, earthwork and related work, site grading, and tree and shrub protection completed by others under separate contract prior to commencing work in this section.
- .2 Verify that grades are correct and prepared in accordance with Section 32 91 21 - Topsoil Placement and Grading. If discrepancies occur, notify Contract Administrator and do not commence work until instructed by Contract Administrator.
- .3 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
- .4 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated, to tolerance of plus or minus 8 mm, for Turf Grass Nursery Sod, surface to drain naturally.
- .5 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site.

3.2 SOD PLACEMENT

- .1 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.
- .2 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .3 Lay a full row of sod not less than 300 mm in width along the perimeter of sodded areas and parallel to walkways.

- .4 Roll sod. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted. Re-roll as directed by Contract Administrator if necessary.
- .5 Water sod immediately after laying to obtain moisture penetration into top 100 mm of topsoil.
- .6 Provide adequate protection of sodded areas against erosion and mechanical damage. Remove protection after lawn areas have been accepted.

3.3 SOD PLACEMENT ON SLOPES AND PEGGING

- .1 Peg sod on slopes steeper than 3 horizontal to 1 vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:
 - .1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.
 - .2 Not less than 3-6 pegs per square metre.
 - .3 Not less than 6-9 pegs per square metre in drainage structures. Adjust pattern as directed by Contract Administrator.
 - .4 Drive pegs to 20 mm above soil surface of sod sections.

3.4 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Maintain sod in accordance with Section 32 93 45–Landscape Maintenance

3.5 FINAL ACCEPTANCE

- .1 Turf Grass Nursery Sod areas will be accepted by Contract Administrator provided that:
 - .1 Sodded areas are properly established.
 - .2 Sod is free of bare and dead spots.
 - .3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.
 - .4 Sodded areas have been cut minimum 2 times prior to acceptance.
- .2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.6 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 45 00 – Quality Control.
- .3 Section 32 91 21 – Topsoil Placement and Grading.
- .4 Section 32 92 23 – Sodding.

1.2 REFERENCES

- .1 Agriculture and Agri-Food Canada (AAFC)
 - .1 Plant Hardiness Zones in Canada-2000.
- .2 Canadian Nursery Landscape Association (CNLA)
 - .1 Canadian Standards for Nursery Stock-2001.

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit product data for:
 - .1 Fertilizer.
 - .2 Anti-desiccant.
 - .3 Guying assembly including clamps, collar, guying wire, anchors and wire tightener.
 - .4 Wood Chip Mulch.
- .3 Submit samples for:
 - .1 Wood Chip Mulch. 2 litre sample

1.4 STORAGE AND PROTECTION

- .1 Protect plant material from frost, excessive heat, wind and sun during delivery.
- .2 Immediately store and protect plant material which will not be installed within four (4) hours after arrival at site in storage location approved by Contract Administrator.
- .3 Protect plant material from damage during transportation. Tie branches of trees and shrubs securely and protect plant material against abrasion, exposure and extreme temperature change during transit. Avoid binding of planting stock with rope or wire that would damage bark, break branches or destroy natural shape of plant. Give full support to rootball of large trees during lifting:

- .1 When delivery distance is less than 30 km and vehicle travels at speeds under 80 km/h, tie tarpaulins around plants or over vehicle box.
- .2 When delivery distance exceeds 30 km or vehicle travels at speeds over 80 km/h, use enclosed vehicle where practical.
- .3 Protect foliage and rootballs using anti-desiccants and tarpaulins, where use of enclosed vehicle is impractical due to size and weight of plant material.
- .4 Protect stored plant material from frost, wind and sun and as follows:
 - .1 For bare root plant material, preserve moisture around roots by heeling-in or burying roots in topsoil and watering to full depth of root zone.
 - .2 For pots and containers, maintain moisture level in containers.
 - .3 For balled and burlapped and wire basket rootballs, place to protect branches from damage. Maintain moisture level in root zones.

1.5 SCHEDULING

- .1 Obtain approval of species alternatives prior to ordering plant material.
- .2 Order plant material as soon as possible after award of contract to ensure plant availability. Plants should be ordered at least one full growing season prior to anticipated planting date.
- .3 Coordinate shipping of plants and excavation of holes to ensure minimum time lapse between digging and planting.

1.6 WARRANTY

- .1 The Contractor hereby warrants that plant material as itemized in Section 32 93 11 Plant Specification List, will remain free of defects in accordance with General Conditions, for a period of two (2) years from the date of the Final Certificate of Completion for all deciduous trees over 75mm (3") calliper and for one (1) year for all other nursery stock.
- .2 The Contractor agrees and guarantees to replace and preplant any nursery stock found dead and/or in poor condition one year from the recognized completion date, without cost to the City. "Poor Condition: shall be interpreted as meaning nursery stock on which branches are dead or dying, or have not shown satisfactory growth in leaves. Nursery stock damaged by accidental causes or vandalism shall be replaced at the cost of the City.
- .3 End-of-warranty inspection will be conducted by Contract Administrator.
- .4 Contract Administrator reserves the right to extend Contractor's warranty responsibilities for an additional one (1) year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

1.7 REPLACEMENTS

- .1 During warranty period, remove from site any plant material that has died or failed to grow satisfactorily as determined by Contract Administrator.
- .2 Replace any plant material in the next planting season.
- .3 Extend warranty on replacement plant material for a period equal to the original warranty period.
- .4 Continue such replacement and warranty until plant material is acceptable.
- .5 All required replacements shall be by plants of at least the same size and species as specified, and shall be supplied and planted in accordance with the original Drawings and Specifications, and the replaced material shall carry an additional one (1) year guarantee. Should the replaced plant material not survive, the Contractor will be responsible to replace it a third time and guarantee it for one (1) year unless it is determined that unique site conditions or inadequate maintenance causes the death of plants.

PART 2 PRODUCTS

2.1 PLANT MATERIAL

- .1 Type of root preparation, sizing, grading and quality: comply to Canadian Standards for Nursery Stock. Measure plant material and rootball. Measure plants when branches are in their natural position. Height and spread dimensions refer to main body of plant and not from branch tip to branch tip. Measure calliper 150 mm above grade for trees up to 100 mm, and 300 mm above grade for trees larger than 100 mm. For fruit trees caliper shall be taken 50 mm above the bud union.
 - .1 Source of plant material: grown in Zone 3a in accordance with Plant Hardiness Zones in Canada.
 - .2 Plant material must be planted in zone indicated as appropriate for its species. Plant material obtained from areas with milder climatic conditions from those of site acceptable only when moved to site prior to the breaking of buds in their original location and heeled-in in a protected area until conditions are suitable for planting.
- .2 Plant Material: free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.
- .3 Plant species, cultivars and sizes as indicated on the drawings.
- .4 Trees: with straight trunks, well and characteristically branched for species except where specified otherwise. Plants must have been root pruned regularly, but not later than one growing season prior to arrival on site.
- .5 Plant material that has come out of dormant stage and is too far advanced will not be accepted unless prior approval is obtained.

- .6 **Cold storage:** approval required for plant material which has been held in cold storage.
- .7 **Container grown stock:** acceptable if containers large enough for root development. Trees must have grown in container for minimum of one growing season but not longer than two. Root system must be able to "hold" soil when removed from container. Plants that have become root bound are not acceptable. Container stock must have been fertilized with slow releasing fertilizer.
- .8 **Balled and burlapped:** coniferous and broad leaf evergreens over 20" (500 mm) tall must be dug with soil ball. Deciduous trees in excess of 10' (3m) height must have been dug with large firm ball. Rootballs must include 75% of fibrous and feeder root system. This excludes use of native trees grown in light sandy or rocky soil. Secure rootballs with burlap, heavy twine and rope. For large trees: wrap ball in double layer of burlap and drum lace with minimum 10 mm diameter rope. Protect rootballs against sudden changes in temperature and exposure to heavy rainfall.
- .9 **Tree spade dug material:** dig plant material with mechanized digging equipment of hydraulic spade or clam-shell type. Rootballs to satisfy CNTA standards. Lift rootball from hole, place in wire basket designed for purpose and line with burlap. Replace rootball and tie basket to ball with heavy rope. Take care not to injure trunk of tree with wire basket ties or rope.
- .10 **Collected or native plant material:** will NOT be accepted.
- .11 **Substitutions:** substitutions to plant material as indicated on planting plan not permitted unless written approval has been obtained as to type, variety and size. Plant substitutions must be of similar species and of equal size as those originally specified.
- .12 Refer to Plant Specification List, Section 32 93 11, for species/quality and size of plants.

2.2 PLANTING MIX

- .1 Planting Mix: as specified in Section 32 91 21 - Topsoil Placement and Grading.

2.3 WATER

- .1 Free of impurities that would inhibit plant growth.

2.4 STAKES

- .1 T-bar: steel stakes, 38 x 38 x 5 x 2400 mm. Primed with 1 coat black zinc rich paint

2.5 WIRE TIGHTENER

- .1 PG wire tightener.

2.6 GUYING WIRE

- .1 galvanized 9 gauge, flexible, non-corrosive strand wire.

2.7 CLAMPS

- .1 U-bolt: galvanized, 13 mm \varnothing , c/w curved retaining bar and hex nuts.

2.8 ANCHORS

- .1 Drive-in Type: 13 mm \varnothing x 100 mm long, aluminum.

2.9 ROOTBAL BURLAP

- .1 150 g Hessian burlap.

2.10 TREE PROTECTION

- .1 Plastic, 13 mm \varnothing , nylon reinforced garden hose over guy wire.

2.11 TRUNK COLLAR

- .1 150 mm \varnothing corrugated plastic pipe, 300 mm height.

2.12 ANTI-DESICCANT

- .1 Wax-like emulsion to provide film over surfaces reducing evaporation but permeable enough to permit transpiration.

2.13 WOUND DRESSING

- .1 horticulturally accepted non-toxic, non-hardening emulsion.

2.14 FLAGGING TAPE

- .1 Fluorescent, orange or red colour.

2.15 MULCH

- .1 Wood Chip Mulch, chips from hardwood trees varying in size from 50 mm to 75 mm and 5 to 20 mm thick, free of bark, debris, soil and friable material.. Woodchip mulched on site will be accepted if it meets the required consistency and is found to be free of contaminants and disease. Submit sample for approval prior to shipping to site.

2.16 FERTILIZER

- .1 Horticultural bonemeal: raw bonemeal, finely ground with minimum analysis of 3% nitrogen and 10% phosphoric acid.

PART 3 EXECUTION

3.1 RELATED WORK

- .1 Obtain approval of tree preservation and aeration, clearing and grubbing, earthwork and related work, site grading, and tree and shrub protection completed by others under separate contract prior to commencing work in this section.

3.2 PRE-PLANTING PREPARATION

- .1 Ensure plant material acceptable to Contract Administrator.
- .2 Remove damaged roots and branches from plant material.
- .3 Apply anti-desiccant to conifers and deciduous trees in leaf in accordance with manufacturer's instructions.

3.3 EXCAVATION AND PREPARATION OF PLANTING BEDS

- .1 Preparation of planting beds is specified in Section 32 91 21 - Topsoil Placement and Grading. Layout plants in pots on beds for Contract Administrator approval prior to installation.
- .2 For individual planting holes:
 - .1 Stake out location and obtain approval from Contract Administrator prior to excavating planting holes.
 - .2 Excavate to depth and width as indicated.
 - .3 Remove rocks, roots, debris and toxic material from excavated material that will be used as planting soil for trees and individual shrubs. Dispose of excess material.
 - .4 Scarify sides of planting hole.
 - .5 Remove water which enters excavations prior to planting. Notify Contract Administrator if water source is groundwater.

3.4 PLANTING

- .1 For jute burlapped rootballs, cut away top one third of wrapping and wire basket without damaging rootball. Do not pull burlap or rope from under rootball.
- .2 For container stock or rootballs in non-degradable wrapping, remove entire container or wrapping without damaging rootball.
- .3 Plant vertically in locations as indicated. Orient plant material to give best appearance in relation to structure, roads and walks.
- .4 For trees and shrubs:
 - .1 Backfill soil in 150 mm (6") lifts. Tamp each lift 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.

- .2 Form watering saucer as indicated.
- .5 For groundcovers, backfill soil evenly to finish grade and tamp to eliminate air pockets.
- .6 Water plant material thoroughly. Use deep root feeders for trees.
- .7 After soil settlement has occurred, fill with soil to finish grade.
- .8 Dispose of burlap, wire and container material off site.

3.5 TRUNK PROTECTION

- .1 Install trunk protection on deciduous trees as indicated.
- .2 Install trunk protection prior to installation of tree supports when used.

3.6 TREE SUPPORTS

- .1 Install tree supports as indicated.
- .2 Use double stake tree support for deciduous trees.
 - .1 Place stake on prevailing wind side and 150 mm from trunk.
 - .2 Drive stake minimum 150 mm into undisturbed soil beneath roots. Ensure stake is secure, vertical and unsplit.
 - .3 Install 150 mm long guying collar 1500 mm above grade.
 - .4 Thread Type 1 guying wire through guying collar tube. Twist wire to form collar and secure firmly to stake. Cut off excess wire.
- .3 Use three (3) guy wires and anchors for coniferous trees.
 - .1 Install guying collars above branch to prevent slipping at approximately two thirds height for evergreens and half height for deciduous trees. Collar mounting height not to exceed 2.5 m above grade.
 - .2 Guying collars to be of sufficient length to encircle tree plus 50 mm 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°.
 - .3 Install anchors at equal intervals about tree and away from trunk so that guy wire will form 30° 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 installing clamps.
 - .5 Install wire tightener ensuring that guys are secure and leave room for slight movement of tree.
 - .6 Install flagging tape to guys as indicated.

- .4 After tree supports have been installed prune as directed by Contract Administrator. Pruning to be completed by a Certified Arborist.

3.7 MULCHING

- .1 Wood Chip Mulch:
 - .1 Obtain approval of planting before mulching material is applied.
 - .2 Ensure soil settlement has been corrected prior to mulching with wood chip mulch.
 - .3 Spread wood chip mulch as indicated on Drawings.
 - .4 Loosen soil in planting beds and pits and remove debris and weeds. Spread mulch to minimum thickness of 75 mm. Mulch material susceptible to blowing must be moistened and mixed with topsoil before applying. When mulching is placed in fall, place immediately after planting. When mulch is placed in spring, wait until soil has warmed up.

3.8 MAINTENANCE

- .1 Maintain plant material for 30 – 40 days after installation, including:
 - .1 Watering (minimum every second day).
 - .2 Fertilizing.
 - .3 Weeding.
 - .4 Pruning.

3.9 ACCEPTANCE

- .1 Trees, shrubs and groundcovers will be inspected immediately after 30 day maintenance period is complete on the most recent areas of planting.
- .2 Planting areas completed earlier must be maintained until the time noted in 1.8.1.
- .3 A certificate of total performance for planting will be issued at the end of maintenance inspection and the completion of associated replacements / adjustments.
- .4 The date of certificate of total performance will mark the beginning of the 1 year warranty period.
- .5 Trees, shrubs and ground covers will be inspected at the end of the warranty period:
 - .1 Trees will be accepted by Contract Administrator provided that:
 - .1 Trees are showing vigorous new growth and no signs of disease or pests.
 - .2 Trees are straight and securely anchored.
 - .3 Crossing branches have been cleanly pruned.
 - .2 Shrubs and groundcovers will be accepted by Contract Administrator provided that:

- .1 Shrubs and groundcovers are showing vigorous well rounded new growth.
 - .2 Shrubs and groundcovers are free of disease or pests.
 - .3 Shrubs and groundcovers show no signs of malnutrition or stress.
- .6 The Contractor shall replace trees, shrubs and groundcovers that do not meet the standards in 1.9.5 with new plant material as originally specified. All replacement plants shall be subject to a 30 day maintenance period and one year warranty period from the date of replacement.

END OF SECTION

Coniferous Trees

Quantity	Botanical Name / Common Name	Size / Remarks
49	<i>Picea pungens</i> / Colorado Spruce	25 @ 3.0 m (8') ht. 24 @ 3.5 m (10') ht. Evenly branched, full bushy trees, no broken leaders, well branched to grade. B & B or tree mover, wire basket. Guy wire.

Deciduous Trees

Quantity	Botanical Name / Common Name	Size / Remarks
19	<i>Acer saccharinum</i> / Silver Maple	Multi-stemmed, 75 mm (3") cal., 4.5 to 5.0 m (15' to 17') ht., 13 major branches 2 m (7') above grade
60	<i>Fraxinus pennsylvanica</i> var. <i>subintegerrima</i> 'Patmore' / Patmore Green Ash	75 mm (3") cal., 4.5 to 5.0 m (15' to 17') ht., 13 major branches 2 m (7') above grade
2	<i>Malus x adstringens</i> 'Thunderchild' / Thunderchild Rosybloom Crabapple	60 mm (2-1/2") cal., 3.5 to 4.0 m (12' - 14') ht., 11 major branches 2 m (7') above grade
10	<i>Tilia americana</i> / American Basswood	75 mm (3") cal., 4.5 to 5.0 m (15' to 17') ht., 13 major branches 2 m (7') above grade

Coniferous Shrubs

Quantity	Botanical Name / Common Name	Size / Remarks
87	<i>Juniperus sabina</i> / Savin Juniper	600 mm \emptyset (24" \emptyset) well formed, even growth. Container stock.
12	<i>Juniperus sabina</i> 'Skandia' / Skandia Juniper	450 mm \emptyset (18" \emptyset) well formed, even growth. Container stock.

Deciduous Shrubs

Quantity	Botanical Name / Common Name	Size / Remarks
114	<i>Caragana aborescens</i> / Common Caragana	600 - 800 mm (24-30") ht. Min. 5 major basal branches Well formed bush plants. Container Stock.
14	<i>Cornus alba</i> 'Argenteo- marginata' / Silver Variegated Dogwood	500 - 600 mm (20-24") ht. Min. 5 major basal branches Well formed bush plants. Container Stock.
195	<i>Cotoneaster lucidus</i> / Hedge Cotoneaster	500 - 600 mm (20-24") ht. Min. 5 major basal branches Well formed bush plants. Container Stock.
29	<i>Physocarpus opulifolius</i> 'Nanus' / Drawf Ninebark	400 - 500 mm (16-20") ht. Min. 4 major basal branches Well formed bush plants. Container Stock.
6	<i>Rhus typhina</i> / Staghorn Sumac	750 - 900 mm (30-36") ht. Min. 5 major basal branches Well formed bush plants. Container Stock.
12	<i>Sorbaria sorbifolia</i> / False Spirea	500 - 600 mm (20-24") ht. Min. 5 major basal branches Well formed bush plants. Container Stock.
19	<i>Spiraea x bumalda</i> 'Froebelli' / Froebelli Spirea	400 - 500 mm (16-20") ht. Min. 4 major basal branches Well formed bush plants. Container Stock.
19	<i>Spiraea x bumalda</i> 'Goldflame' / Goldflame Spirea	400 - 500 mm (16-20") ht. Min. 4 major basal branches Well formed bush plants. Container Stock.
20	<i>Spiraea x bumalda</i> 'Anthony Waterer' / Anthony Waterer Spirea	400 - 500 mm (16-20") ht. Min. 4 major basal branches Well formed bush plants. Container Stock.
10	<i>Spiraea trilobata</i> /	400 - 500 mm (16-20") ht.

Quantity	Botanical Name / Common Name	Size / Remarks
	Threelobe Spirea	Min. 4 major basal branches Well formed bush plants. Container Stock.
117	<i>Syringa meyeri</i> / Meyer Lilac	600 - 800 mm (24-30") ht. Min. 5 major basal branches Well formed bush plants. Container Stock.
	<i>Rosa</i> sp. 'Scarlet Pavement' / Scarlet Pavement Rose	300 - 400 mm (12-15") ht. Min. 4 major basal branches Well formed bush plants. Container Stock.
<u>Vines</u>		
2	<i>Lonicera x brownii</i> 'Dropmore Scarlet Trumpet' / Scarlet Trumpet Honeysuckle Vine	2 yr. plants from division. No. 1 grade, well branched, with not less than 3 runners, 18" and up and vigorous, well developed root system. 6" ø pot. Stake.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 329310 – Tree, Shrub and Groundcover Planting.
- .2 Section 329223 - Sodding.

1.2 DESCRIPTION

- .1 This Specification shall cover the maintenance of trees, shrubs, sod, and mulch, which have been installed under this contract.
- .2 In general, work shall include:
 - .1 Spring cleaning.
 - .2 Fertilizing.
 - .3 Watering.
 - .4 Mowing.
 - .5 Weed control.
 - .6 Pest and disease control.
 - .7 Cultivating.
 - .8 Tree support repair and adjustment.
 - .9 Pruning.
 - .10 Winter preparation.

1.3 MAINTENANCE PERIOD

- .1 Provide maintenance up to the date of Certificate of Substantial Performance **and** as follows:
 - .1 Maintain sodded areas for a minimum period of 30 days after completion of installation and until areas are fully established and accepted in accordance with Section 329223 - Sodding.
 - .2 Maintain trees, shrubs and groundcovers for a minimum period of 40 days following acceptance of installation by Contract Administrator.

1.4 SCHEDULING AND MONITORING

- .1 Monitor the site and advise Contract Administrator of conditions which might void the Contractor's warranty responsibilities.
- .2 Contractor shall maintain a log noting times, dates, equipment used, and quantity of materials used and areas treated for each maintenance application.

1.5 WATER SUPPLY

- .1 Arrange and pay for supply of water suitable for irrigation.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Materials to conform to the requirements of related specification sections.
- .2 Herbicide: (for control of weed flushes) "Round-up" or approved equal.

2.2 EQUIPMENT

- .1 Provide all equipment to properly execute work and maintain such equipment in a workable, safe condition during use of this project.
- .2 Obtain approval by Contract Administrator of equipment to be used to execute work.
- .3 Use only approved equipment.

PART 3 EXECUTION

3.1 EXECUTION

- .1 Program timing of operations to growth, weather conditions and use of site.
- .2 Do each operation continuously and complete within reasonable time period.
- .3 Store equipment and materials off site.
- .4 Collect and dispose of debris or excess material on daily basis.

3.2 SPRING CLEANING

- .1 Lawns:
 - .1 Rake lawn areas and remove dead vegetation, leaves and debris. Do heavy raking with flexible grass rake on areas with "snow mould".
 - .2 Roll lightly areas where grass plants have lifted due to frost action.
- .2 Planting Beds:
 - .1 Clean mulch in planting beds of debris and dead plant material. Loosen and cultivate soil lightly without disturbing roots below surfaces.
 - .2 Trim grass edges around planting beds neatly in lines as in original layout.

3.3 FERTILIZING

- .1 Spread fertilizer evenly at frequency, ratio and rates as recommended by soil test analysis. Use approved mechanical spreading equipment. Check calibration to ensure specified rate is spread evenly. Water immediately after fertilizing. Rectify uneven spreading as soon as it becomes apparent.

3.4 WATERING

- .1 Apply water as required to supplement rainfall and to maintain optimum growing conditions. In general, water once a week to achieve rates as indicated. Allow soil to adequately dry between watering to prevent over saturation without creating water stress.
- .2 Sodded Areas:
 - .1 During establishment period, water as required to maintain moisture penetration of 150 mm. In general, water daily for first week and three times per week for next six weeks. Adjust to suit climatic conditions.
 - .2 Thereafter, water as required to replenish available moisture to a depth of 150 mm (approximately 25 mm precipitation per week).
 - .3 Ensure minimum moisture penetration of 150 mm for each application.
- .3 Trees in Lawns and Tree Wells:
 - .1 Water every other day for first month and every third day for second month after planting. Thereafter, water once per week.
 - .2 Apply 40 litres of water per 25 mm calliper per application using deep root feeder.
 - .3 Apply water in soft spray to avoid packing of soil. Move sprinklers or adjust irrigation system as required to avoid running of water and return to those areas until moisture penetration has been reached. Do not impede use of sidewalk and other paved areas.

3.5 MOWING OF LAWN AREAS

- .1 Mow at regular intervals to maintain grass to a height of 40 mm. Cut grass before it reaches 75 mm height. Do not remove grass clippings from lawn unless volume is such as to be harmful to lawn or unsightly. Hand trim or use edger for grass adjacent to buildings, pavement, trees, fences. Trim grass edges around planting beds neatly in lines as in original layout.
- .2 Lawn cutting operations include picking up and disposal of paper and refuse accumulated on landscaped areas prior to mowing.

3.6 WEED CONTROL

- .1 Maintain site free of weeds. Do not allow weeds to establish for a period longer than one (1) week.
- .2 Apply herbicide when it will not cause damage to new grass or other plants. Avoid use of dicamba and picloram solutions near trees and shrubs.

3.7 PEST AND DISEASE CONTROL

- .1 Control pests and disease through pruning or application of pesticides. Use species specific pesticides where possible. Use only pesticides of low mammalian toxicity. Strictly follow manufacturer's written instructions.

3.8 TREE PITS AND PLANTING BEDS

- .1 Cultivate surface of soil areas around trees.
- .2 Remove weeds including their roots.
- .3 Collect and dispose of paper and refuse. Remove dead plants, leaves, branches, dead flowers and seed pods.
- .4 Clean, by hand, areas that are covered with mulch. Loosen top layer of mulch without mixing it with soil underneath.
- .5 Add mulch as required to maintain specified thickness.

3.9 TREE SUPPORTS AND WRAPPING

- .1 Maintain tree supports and wrappings in proper repair.

3.10 WINTER PREPARATION

- .1 Rake and assemble leaves after they have been shed by trees. Remove from site.
- .2 Clean out mulch beds and planters. Remove debris from site.
- .3 Protect trees from rodent damage using fine wire mesh or approved plastic protector beyond snow line or by applying rodent repellent sprays. Use spray to protect shrubs as required.
- .4 Ensure adequate moisture in root zones of plant material prior to freeze-up.
- .5 Apply anti-desiccant to evergreen trees and shrubs susceptible to winter desiccation.

3.11 FINAL ACCEPTANCE

- .1 Areas will be accepted by the Contract Administrator provided that:
 - .1 Sodded areas are established to the requirements of Section 329223.
 - .2 Trees and shrubs are well established and rooted, properly pruned and showing growth and vigour satisfactory to the Contract Administrator.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 31 22 13– Rough Grading
- .2 Section 32 16 15 –Concrete Curbs, Walks and Gutters.
- .3 Section 09 90 00–Painting and Finishing.

1.2 QUALITY ASSURANCE

- .1 Identify lumber by official grade mark continuing symbol of grading agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which grade and conditions of seasoning at time of manufacture.
- .2 For products treated with preservation by pressure impregnation, submit following information certified by authorized signing officer of treatment plant:
 - .1 Information listed in AWP.A.M2 and revisions specified in CAN/CSA-080 Series, Supplementary Requirement to AWPW Standard M2 applicable to specified treatment.
 - .2 Moisture content after drying following treatment with water-borne preservative.
 - .3 Acceptable types of paint, stain and clear finishes that may be used over treated materials to be finished after treatment.

1.3 SHOP DRAWINGS

- .1 Provide shop drawings of miscellaneous metal fittings and components in accordance with Section 01 33 00 Submittal Procedures

1.4 ENVIRONMENTAL PROTECTION

- .1 Collect and remove from site all waste pieces and sawdust from pressure treated wood materials.

Part 2 Products

2.1 MATERIALS

- .1 Pressure Treated Timbers, Dimension Lumber and Poles: To CSA-080, **non-incised**, ACQ-C treatment. Minimum moisture content at treatment in accordance with CSA-080. Minimum retention for above ground use 4.0 kg/m³ and for ground contact 6.4 kg/m³. All wood to be free of defects, any warped, checked or bent materials will be rejected.
- .2 Fence Members: Construction grade SSS mill run, square edge, pressure treated sawn timbers.

- .3 Trellis Members: Cedar - Grade 2 and better, sound both face, no bark, rot or wane. Moisture content 17% or less. Wood to be free of defects. Any warped, checked or bent materials will be rejected.
- .4 Nails and Spikes: to CSA B111, galvanized for exterior works and for treated lumber. Use spiral thread nails except where noted elsewhere.
- .5 Hardware: Bolts, nuts, washers, lag screws, to be hot dipped galvanized, sizes to suite application
- .6 Preservative: **Clear type** to CSA 080.

Part 3 Execution

3.1 PREPARATION

- .1 Obtain Contract Administrator's approval of rough grades prior to construction.

3.2 HANDLING AND USE OF TREATED TIMBER

- .1 Handle and use treated material in a manner which will avoid damage or field fabrication causing alternation in original treatment.
- .2 Treat in field, cuts and damages to surface of treated material with an appropriate, clear preservative as described in CSA 080.1974. Ensure that damaged areas such as abrasions, nail and spike holes, are thoroughly saturated with field treatment solutions as per CSA 080.1974

3.3 WORKMANSHIP

- .1 Construct all work to details, using adequate fastening methods to ensure solid durable finished work suitable for the purpose intended.
- .2 Do all nailing and fastening neatly, evenly and thoroughly.
- .3 Install all members true to line, levels and elevations. Set plumb and space uniformly.
- .4 Use timbers of the longest possible length to minimize joints.

END OF SECTION