Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075mm Sieve in Mineral Aggregates by Washing.
.2 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
.3 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.4 ASTM D422-63(1998), Standard Test Method for Particle Size Analysis of Soils.
.5 ASTM D699 00(a), Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3, 600 kN-m/m^3).
.6 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN./CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

Part 2 Products

2.1 MATERIALS

.1 Granular sub-base material: in accordance with the following requirements:

.1 Crushed, pit run or screened stone, gravel or sand.
.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.

.3 Table

Sieve Designation	% Passing
75 mm	100
25 mm	55-100
4.75 mm	25-100
2.00 mm	15-80
0.425 mm	4-50
0.075 mm	0-8

.4 Other Properties as follows:

.1 Liquid Limit: to ASTM D4318, Maximum 25.
.2 Plasticity Index: to ASTM D4318, Maximum 6.

.3 Los Angeles degradation: to ASTM C131. Max % Loss by mass: 40.
.4 Particles smaller than 0.02 mm: to ASTM D422, Maximum 3%.

Part 3 Execution

3.1 PLACING

.1 Place granular sub-base after subgrade is inspected and approved by Contract Administrator.

.2 Construct granular sub-base to depth and grade in areas indicated.

.3 Ensure no frozen material is placed.

.4 Place material only on clean unfrozen surface, free from snow or ice.

.5 Begin spreading sub-base material on crown line or high side of one-way slope.

.6 Place granular sub-base materials using methods which do not lead to segregation or degradation.

.7 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.

.8 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Contract Administrator may authorize thicker lifts (layers) if specified compaction can be achieved.

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

.10 Remove and replace portion of layer in which material has become segregated during spreading.

3.2 COMPACTION

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Compact to density of not less than 98% standard maximum dry density in accordance with ASTM D698 00(a).

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.

.4 Apply water as necessary during compaction to obtain specified density.

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

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

3.3 PROOF ROLLING

.1 For proof rolling, use standard roller of 45,400 kg gross mass with four pneumatic tires each carrying 11,350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm maximum.

.2 Obtain approval from Contract Administrator to use non-standard proof rolling equipment.

.3 Proof roll at level in sub-base as indicated. If non-standard proof rolling equipment is approved, Contract Administrator to determine level of proof rolling.

.4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.

.5 Where proof rolling reveals areas of defective subgrade:

.1 Remove sub-base and subgrade material to depth and extent as directed by Contract Administrator.
.2 Backfill excavated subgrade with sub-base material and compact in accordance with this section.
.3 Replace sub-base material and compact.

.6 Where proof rolling reveals areas of defective sub-base, remove and replace in accordance with this section at no extra cost.

3.4 SITE TOLERANCES

.1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.5 PROTECTION

.1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Contract Administrator.

END OF SECTION.

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
.2 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
.3 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.4 ASTM 698 00(a).
.5 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.2 DELIVERY, STORAGE AND HANDLING

.1 Deliver and stockpile aggregates in accordance with Section 31 05 17 – Aggregate Materials. Stockpile minimum 50% of total aggregate required prior to beginning operation.

.2 Store cement in weather-tight bins or silos that provide protection from dampness and easy access for inspection and identification of each shipment.

Part 2 Products

2.1 MATERIALS

.1 Granular base: material in accordance with Section 31 05 17 – Aggregate Materials and following requirements:

.1 Crushed stone or gravel.
.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.
. 1. Gradation to:

Sieve Designation	% Passing
25 mm	100
12.5 mm	65-100
4.75 mm	35-60
2.00 mm	22-45
0.425 mm	10-25
0.075 mm	3-8

.2 Liquid limit: to ASTM D4318, maximum 25.
.3 Plasticity index: to ASTM D4318. maximum 6

.4 Los Angeles degradation: to ASTM C131. Max % loss by weight: 45.
.5 Crushed particles: at least 60^ of particles by mass within each of the following sieve designation ranges to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C136.

Passing		Retained on
25 mm	to	19.0 mm
19.0 mm	to	4.75 mm

Part 3 Execution

3.1 SEQUENCE OF OPERATION

.1 Place granular base after sub-base surface is inspected and approved by Contract Administrator. See 01 29 83 Payment Procedures for Testing Laboratory Services.

.2 Placing:

.1 Construct granular base to depth and grade in areas indicated.
.2 Ensure no frozen material is placed.
.3 Place material only on clean unfrozen surface, free from snow and ice.
.4 Begin spreading base material on crown line or on high side of one-way slope.
.5 Place material using methods which do not lead to segregation or degradation of aggregate.
.6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
.7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Contract Administrator may authorize thicker lifts (layers) if specified compaction can be achieved.
.8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
.9 Remove and replace that portion of layer in which material becomes segregated during spreading.

.3 Compaction Equipment:

.1 Compaction equipment to be capable of obtaining required material densities.

.4 Compacting:

.1 Compact to density not less than 100% standard maximum dry density ASTM D698-00(a)

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

.3 Apply water as necessary during compacting to obtain specified density.

.4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Contract Administrator.

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

.5 Proof Rolling

.1 For proof rolling use standard roller of 45,400 kg gross mass with four pneumatic tires each carrying 11,350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm.

.2 Obtain approval from Contract Administrator to use non-standard proof rolling equipment.

.3 Proof roll at level in granular base as indicated. If use of non-standard proof rolling equipment is approved, Contract Administrator to determine level of proof rolling.

.4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.

.5 Where proof rolling reveals areas of defective subgrade:

.1 Remove base, sub-base and subgrade material to depth and extent as directed by Contract Administrator.
.2 Backfill excavated subgrade with sub-base material and compact in accordance with Section 32 11 19 – Granular Sub-Base.
.3 Replace sub-base material and compact in accordance with Section 32 11 19 – Granular Sub-Base.

.4 Replace base material and compact in accordance with this Section.

.6 Where proof rolling reveals defective base or sub=base, remove defective materials to depth and extent as directed by Contract Administrator and replace with new materials in accordance with Section 32 11 19 – Granular Sub-Base and this section at no extra cost.

3.2 SITE TOLERANCES

.1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.3 PROTECTION

.1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Contract Administrator.

END OF SECTION.

Part 1 GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for asphalt concrete paving for roads and airport runways.

1.2 REFERENCES

.1 American Association of State Highway and Transportation Officials (AASHTO)

- .1 AASHTO M320-02, Standard Specification for Performance Graded Asphalt Binder.
- .2 AASHTO R29-02, Standard Specification for Grading or Verifying the Performance Graded of an Asphalt Binder.
- .3 AASHTO T245-97(2001), Resistance to Plastic flow of Bituminous Mixtures Using Marshall Apparatus.

.2 Asphalt Institute (AI)

- .1 AI MS2-1994, Mix Design Methods for Asphalt Concrete

.3 American Society for Testing and Materials International, (ASTM)

- .1 ASTM C88-99a, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
- .2 ASTM C117-95, Standard Test Method for Material Finer Than 0.075mm (No.200) Sieve in Mineral Aggregates by Washing.
- .3 ASTM C123-98, Standard Test Method for Lightweight Particles in Aggregate.
- .4 ASTM C127-01, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
- .5 ASTM C128-01, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.
- .6 ASTM C131-01, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .7 ASTM C136-01, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
- .8 ASTM D995--95b(2002), Standard Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
- .9 ASTM D2419-02, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
- .10 ASTM D3203-94(2000), Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.
- .11 ASTM D4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.4 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-8.1-88, Sieves Testing, Woven Wire, Inch Series.
- .2 CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.
- .3 CAN/CGSB-16.3-M90, Asphalt Cements for Road Purposes.

.5 City of Winnipeg Standard Construction Specifications.

1.3 PRODUCT DATA

.1 Submit asphalt concrete mix design and trial mix test results to Contract Administrator for review at least 4 weeks prior to beginning Work.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver and stockpile aggregates to a minimum 50 % of total amount of aggregate required before beginning asphalt mixing operation.

.2 When necessary to blend aggregates from one or more sources to produce required gradation, do not blend in stockpiles.

.3 Stockpile fine aggregate separately from coarse aggregate, although separate stockpiles for more than two mix components are permitted.

.4 Provide approved storage, heating tanks and pumping facilities for asphalt cement.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material for recycling.

.4 Divert unused aggregate materials from landfill to facility for reuse.

.5 Divert unused asphalt from landfill to facility capable of recycling materials.

.6 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 MATERIALS

2.1 PLANT AND MIXING REQUIREMENTS

.1 Asphalt pavement: materials to conform to requirements of the City of Winnipeg Standard Construction Specifications CW 3410.

Part 3 EXECUTION

3.1 PREPARATION

.1 Shape or regrade granular base course as necessary to meet design grades.

.2 Obtain approval of aggregate base course installations prior to proceeding with asphalt installation.

.3 Apply prime coat and tack coat.

.4 Prior to laying mix, clean surfaces of loose and foreign material.

3.2 ASPHALT

.1 Supply, place, and compact asphalt in accordance with City of Winnipeg Standard Construction Specifications CW 3410

.2 Typical Asphalt Paving Sections:

.1 Heavy Duty Asphalt: driveways, parking lot drive lanes, fire truck access area and approach

.1 100mm asphalt, 375mm granular base

.2 Compact subgrade to 95% St. proctor and base to 98% St. proctor.

.3 Geotextile where necessary sue to silt or soft spots.

.2 Light Duty Asphalt: parking stalls, walkways/paths as indicated on drawings

.1 50mm asphalt, 200mm granular base

.2 Compact subgrade to 95% St. proctor and base to 98% St. proctor.

.3 Geotextile where necessary sue to silt or soft spots.

3.3 JOINTS

.1 General:

.1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.

.2 Construct joints between asphalt concrete pavement and Portland cement concrete pavement as indicated.

.3 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.

.2 Transverse joints:

.1 Offset transverse joint in succeeding lifts by at least 600 mm.

.2 Cut back to full depth vertical face and tack face with thin coat of hot asphalt prior to continuing paving.

.3 Compact transverse joints to provide smooth riding surface. Use methods to prevent rounding of compacted surface at joints.

.3 Longitudinal joints:

.1 Offset longitudinal joints in succeeding lifts by at least 150 mm.

.2 Cold joint is defined as joint where asphalt mix is placed, compacted and left to cool below 100 degrees C prior to paving of adjacent lane.

.1 For airfield runway paving, avoid cold joint construction in mid 30 m of runway.

.2 If cold joint cannot be avoided, cut back by saw cutting previously laid lane, by at least 150 mm, to full depth vertical face, and tack face with thin coat of hot asphalt of adjacent lane.

.3 Overlap previously laid strip with spreader by 50 mm.

.4 Before rolling, carefully remove and discard coarse aggregate in material overlapping joint with lute or rake.

.5 Roll longitudinal joints directly behind paving operation.

.6 When rolling with static or vibratory rollers, have most of drum width ride on newly placed lane with remaining 150 mm extending onto previously placed and compacted lane.

.4 Construct feather joints so that thinner portion of joint contains fine graded material obtained by changed mix design or by raking out coarse aggregate in mix. Place and

compact joint so that joint is smooth and without visible breaks in grade. Location of feather joints as indicated.

.5 Construct butt joints as indicated.

3.4 TRAFFIC MARKINGS

.1 Paint to CGSB1-GP-74M, alkyd traffic paint. White CGSB1-GP-12C, white 513-301.

.2 Parking space divisions to be applied via an approved pressure type mobile distributor capable of applying paint in single, double and dashed lines. Applicator to be capable of applying marking components uniformly, to dimensions indicated, and to have positive shut-off.

.3 Lines to be 4” wide of uniform colour and density with sharply defined edges.

.4 Symbols and letters to conform to dimensions indicated. Universal access symbols to conform to ADA standards.

.5 Use paint thinner to CAN/CGSB-1.5 in accordance with manufacturer’s requirements.

.6 Apply traffic paint only when wind speed is less than 60 km/h and no rain is forecast within next 12 hours.

.7 Markings to be plus or minus within 6mm of dimensions indicated, straight and true and aligned with fixed features such as curbs, sidewalks and walls.

.8 Remove incorrect marking and re-apply at no extra cost to the Contact Administrator.

3.5 FINISH TOLERANCES

.1 Finished asphalt surface to be within 6 mm of design elevation but not uniformly high or low.

.2 Finished asphalt surface not to have irregularities exceeding 6 mm when checked with 4.5 m straight edge placed in any direction.

3.6 PROTECTION

.1 Immediately after placement, protect pavement from mechanical injury for 3 days or until surface temperature is less than 60 degrees Celsius.

3.7 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 true and even surface and compact immediately to specified density.

.2 Repair areas showing checking, rippling, or segregation.

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

END OF SECTION.

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 74 19 – Construction Waste Management and Disposal.

.2 Section 03 30 00 – Cast-in-Place Concrete

.3 Section 31 23 10 – Excavating, Trenching and Backfilling

.4 Section 32 12 16 – Asphalt Paving

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D698-00(a), Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3)

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.2[98], Boiled Linseed Oil.
.2 CAN/CGSB-3.3[99], Kerosene.

.3 Canadian Standards Association (CSA)

.1 CAN/CSA-A23.1/A23.2-[94], Concrete Materials and Methods of Concrete Construction/Methods of Testing for Concrete.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 – Construction/Demolition Waste Management and Disposal.

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

.3 Ensure emptied containers are sealed and stored safely.

Part 2 Products

2.1 MATERIALS

.1 Concrete mixes and materials: to Section 03 30 00 – Cast-in-Place Conrete.

.2 Granular base: to Section 31 23 10 – Excavating, Trenching and Backfilling.

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

.4 Fill material: to Section 31 23 10 – Excavating, Trenching and Backfilling.

.5 Boiled linseed oil: to CAN/CGSB-1.2.

.6 Kerosene: to CAN/CGSB-3.3.

Part 3 Execution

3.1 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. Dispose of surplus and unsuitable excavated materials in approved location on site and off site.

.3 Place fill in maximum 150mm 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 materials to lines, widths and depths as indicated.

.3 Compact granular base to at least 98% of maximum standard density to ASTM D698 00{a).

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 Conrete.

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

.4 Provide edging as indicated with 10mm 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 Contract Administrator can be demonstrated. Hand finish surfaces when directed by Contract Administrator.

3.4 TOLERANCES

.1 Finish surfaces to within 3mm in 3m as measured with 3m straight edge 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 specified by the Contract Administrator. Install expansion joints ad indicated, as directed by Contract Administrator.

.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 Conrete.

.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 23.1 to exposed finished surfaces for at lest 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.

1. GENERAL

1.1. RELATED REQUIREMENTS

.1 Section 03 30 00 – Cast-in-Place Concrete
.2 Section 31 00 00 – Earthwork
.3 Section 32 12 16 – Asphalt Paving

1.2. REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
  .1 ASTM-A82 Cold Drawn steel wire , Plain, for Concrete Reinforcement
  .2 ASTM-A185 Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
  .3 A123/A123M-02 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  .4 ASTM A 90, Test Method for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
  .5 F626 Standard Specification for Fence Fittings
  .6 F1083 Pipe, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence structures
  .7 B 6 (1987) Standard Specification for Zinc
  .8 F 900 (1984) Standard Specification for industrial and commercial swing gates.
  .9 F 1043-11A Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework
  .10 A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .11 F2919 Standard Specification for Welded Wire Mesh Fence Fabric (Metallic-Coated or Polymer Coated) with Variable Mesh Patterns or Meshes Greater than 6 sq. in. [3871 mm2] in Panels
.2 Canadian Standards Association (CSA International).
  .1 CAN/CSA-G164-[M92], Hot Galvanization of irregular objects.
  .2 CAN/CGSB-138.1-[M80], Steel Meshes for fence
  .3 CAN/CGSB-138.2-[M80], Steel mounting galvanized for fence.
  .4 CAN/CGSB-138.3-[M80], Installation of the latticed fences.
  .5 CAN/CGSB-138.4-[M82], Gates for fences.
  .6 CAN/CGSB-1.181-[92], Rich zinc coating, organic, prepared.
.3 City of Winnipeg Standard Construction Specifications CW 3550 – Chain Link Fencing
.4 City of Winnipeg Standard Construction Specifications CW 2160 – Concrete Underground Structures and Works

1.3. ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.2 Product Data: Material descriptions, construction details, dimension of individual components and profiles, and finishes for the following:
  .1 Fence and gate posts, rails, and fittings.
  .2 Gates and hardware.

1.4. DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
.3 Storage and Handling Requirements:
  .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  .2 Store and protect furnishings from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

2. PRODUCTS

2.1. MATERIALS

.1 In accordance with City of Winnipeg Standard Construction Specifications CW 3550 – Chain Link Fencing.

.2 Concrete mixes and materials: in accordance with Section 03 30 00 Cat-in-place Concrete and City of Winnipeg Standard Construction Specifications CW 2160 – Concrete Underground Structures and Works.

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 30-50mm.

3.2. INSTALLATION GENERAL

.1 Install in accordance with City of Winnipeg Standard Construction Specifications CW 3550 – Chain Link Fencing.

.2 Posts shall be plumbed to give correct alignment, bending of posts for alignment is not acceptable.

.3 Straining posts shall be installed at all sharp changes in grade where directed by the Contract Administrator.

END OF SECTION.

1. GENERAL

1.1. RELATED REQUIREMENTS

.1 Section 03 30 00 – Cast-in-Place Concrete
.2 Section 31 00 00 – Earthwork

1.2. ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.2 Product Data:
  .1 Submit manufacturer's instructions, printed product literature and data sheets for furniture and include product characteristics, performance criteria, physical size, finish and limitations.
.3 Shop Drawings:
  .1 Submit shop drawings indicating dimensions, sizes, assembly, anchorage and installation details for each furnishing specified.

1.3. CLOSEOUT SUBMITTALS

.1 Submit maintenance data for care and cleaning of site furnishings for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4. DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
.3 Storage and Handling Requirements:
  .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  .2 Store and protect furnishings from nicks, scratches, and blemishes.
  .3 Replace defective or damaged materials with new.

2. PRODUCTS

2.1. BICYCLE RACK

.1 Product: R-8224-SS Steel Bike Rack
.2 Manufacturer: Reliance Foundry Co. Ltd.
.3 Material: Stainless Steel
.4 Dimensions: 35 3/8”W x 31 1/2"H x 2 3/8”D
.5 Weight: 33 lbs.
.6 Embedded in-ground mounting.
.7 See Drawings for locations.

3. EXECUTION

3.1. EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for exterior site furnishing installation in accordance with manufacturer's written instructions.
  .1 Inform Contract Administrator of unacceptable conditions immediately upon discovery.
  .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Contract Administrator.

3.2. PREPARATION

.1 Locate and protect utility lines.
.2 Notify and acquire written acknowledgment from utility authorities before beginning installation Work

3.3. INSTALLATION

.1 Assemble furnishings in accordance with manufacturers written recommendations.
.2 Install furnishing true, plumb, anchored as indicated by Contract Administrator
.3 Touch-up damaged finishes to approval of Contract Administrator

3.4. CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.
.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.5. PROTECTION

.1 Protect installed products and components from damage during construction.
.2 Repair damage to adjacent materials caused by site furnishings installation.

END OF SECTION.

1. GENERAL

1.1. RELATED REQUIREMENTS

.1 Section 31 00 00 – Earthwork

.2 Section 32 93 10 – Trees, Shrubs & Ground

1.2. REFERENCES

.1 Agriculture and Agri-Food Canada

.1 The Canadian System of Soil Classification, Third Edition, 1998.

.2 Canadian Council of Ministers of the Environment

.1 PN1340-2005, Guidelines for Compost Quality.

.3 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3. DEFINITIONS

.1 Compost

.1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.

.2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.

.3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25) (50)), and contain no toxic or growth inhibiting contaminates.

.4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A)(B).

1.4. SUBMITTALS

.1 Quality control submittals:

.1 Soil Testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5. WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Contract Administrator.

.3 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.

2. PRODUCTS

All materials shall conform to requirements of the City of Winnipeg Standard Construction Specifications CW 3540.

2.1. TOPSOIL

.1 Topsoil as component of sod and planting mix for sodded areas and planting beds: mixture of particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth.

.1 Soil texture based on The Canadian System of Soil Classification, to consist of screened clay-textured or loam textured dark topsoil, a fertile, friable material neither of heavy clay nor of very light sandy nature containing by volume, a minimum of four (4%) percent for clay loams and two (2%) percent for sandy loams to maximum twenty five (25%) percent organic matter (peatmoss, rotted manure or composted material) and capable of sustaining vigorous plant growth.
.2 Contain no toxic elements or growth inhibiting materials.
.3 Finished surface shall be free from:
  .1 Debris and stones over 25 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 AMMENDMENTS

.1 Fertilizer shall be standard commercial brands meeting the requirements of the Canada Fertilizer Act and the Canadian Fertilizer Quality Assurance Program. All fertilizers shall be granular, pelletized or pill form, and shall be dry and free flowing.
  .1 Nitrogen (N): 48kg of actual N per hectare of topsoil.
  .2 Phosphorus (P): 96kg of actual P per hectare of topsoil.
  .3 Potassium (K): 48kg of actual K per hectare 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: 6.0 to 8.0
  .6 Conductivity: maximum 2.5 dS/m.
.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: 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.

2.3. SOD & PLANTING MIX

.1 General purpose, four way mix composed of: 45% topsoil, 35% peat moss, 15% sandy loam and 5% manure by volume.

2.4. SOURCE QUALITY CONTROL

.1 Advise Contract Administrator of sources of topsoil and amendments to be used with sufficient lead time for testing.
.2 Contractor is responsible for amendments to supply topsoil as specified.
.3 Soil testing by recognized testing facility for pH, N, P and K, electro-conductivity and organic matter.
.4 Testing will be carried out by testing laboratory designated by Contract Administrator.

.5 If soils are deemed deficient from testing, ensure lab provides soil amendment recommendations.
.6 Soil sampling, testing and analysis to be in accordance with the City of Winnipeg standards. Contractor will pay for cost of tests and apply for reimbursement from Cash Allowances.

3. EXECUTION

3.1. TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2. PREPARATION OF EXISTING GRADE

.1 Verify that grades are correct. If discrepancies occur, notify the Contract Administrator and do not commence work until instructed by the 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.
    .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
    .2 Remove debris which protrudes more than 75 mm above surface.
    .3 Dispose of removed material off site to a facility approved by the Contract Administrator.
    .4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3. PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

.1 Place soil after the Contract Administrator has accepted subgrade.
.2 Spread soil in uniform layers not exceeding 150 mm.
.3 For sodded areas keep soil 15 mm below finished grade. Spread topsoil/planting soil to the following minimum depths after settlement:
    .1 100 mm for sodded areas.
    .2 200 mm for annual beds.
    .3 300 mm for shrub beds.
    .4 Manually spread soil around trees, shrubs and obstacles.

3.4. FINISH GRADING

.1 Grade to eliminate rough spots and low areas and ensure positive drainage.
    .1 Prepare loose friable bed by means of cultivation and subsequent raking.
.2 Consolidate topsoil to required bulk density using equipment approved by the Contract Administrator.

END OF SECTION

1. GENERAL

1.1. RELATED REQUIREMENTS

.1 Section 31 00 00 – Earthwork
.2 Section 32 91 19 – Topsoil & Finish Grading
.3 Section 32 93 10 – Trees, Shrubs & Ground

1.2. QUALITY ASSURANCE

.1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
.2 Pre-Installation Meetings: Conduct pre-installation meetings to verify project requirements, installation instructions and warranty requirements.
.3 Schedule sod laying to immediately follow topsoil and finish grading work.
    .1 Schedule sod installation to occur when frost in ground is not present.

1.3. WARRANTY

.1 The Landscape Contractor shall warranty sod work of this Section for a period of one (1) year with a full growing season after the Date of Substantial Performance. The Contractor shall replace dead sod material or that in poor condition within two (2) weeks after being notified during this guarantee period, without cost to the City. Poor condition meaning the sod has yellowed or died out.
.2 Sod replacement shall be of the same quality as originally specified. Such replacement material shall also be subject to full one (1) year warranty.

1.4. WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Contract Administrator.
.3 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.

2. MATERIALS

.1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop as per the requirements of the City of Winnipeg Standard Construction Specifications CW 3510.
    .1 Number One Kentucky Bluegrass Sod type: nursery sod grown solely from seed mixture of cultivars of Kentucky Bluegrass, containing no less than three (3) named dwarf varieties.
    .2 Quality:
        .1 Not more than two (2) broadleaf weeds or 10 other weeds per 40 square meters
        .2 Density of sod sufficient so that no soil is visible from height of 1550mm when mown to height of 50 mm
        .3 Mowing height limit: 35 to 65 mm
        .4 Soil partition of sod: 6 to 15mm in thickness
.2 Water supplied by Contract Administrator at designated source
.3 Fertilizer:
    .1 To Canada “Fertilizers Act” and “Fertilizers Regulations”
    .2 Complete, synthetic, slow release with 65% nitrogen content in water-insoluble form.

3. EXECUTION

3.1. PREPARATION OF EXISTING GRADE

.1 Verify that grades are correct. If discrepancies occur, notify the Contract Administrator and do not commence work until instructed by the Contract Administrator

.2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or covered with snow, ice or standing water.

.3 Fine grade surface free of humps and hollows to smooth and even grade and to tolerance of +/- 8mm for sod surface to drain naturally.

3.2. SOD PLACEMENT

.1 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees Celsius.

.2 Lay sod sections in rows, joints staggered, butt sections closely without overlapping or gaps. Cut out irregular or thin sections with sharp implements.

.3 Lightly roll sod as directed by the Contract Administrator to provide close contact between sod and soil. The use of heavy rollers to correct irregularities in grade is not permitted.

3.3. FERTILIZING PROGRAM

.1 Fertilize during establishment and warranty periods and provide written records.

3.4. MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform the following operations from time of install until acceptance.

- .1 Water sodded areas in sufficient quantities and at frequency to maintain optimum soil moisture content to depth 75-100mm.
- .2 Cut grass to 50mm height when or prior to reaching 75mm height. Remove clippings which will smother grassed areas.
- .3 Maintain sodded areas weed free for 95% of surface area.
- .4 Fertilize areas in accordance with a fertilizing program. Spread half of required amount of fertilizer in one direction and spread remainder at right angles and water in well.

3.5. ACCEPTANCE

.1 Turf Grass Nursery Sod areas will be accepted provided:

- .1 Sodded areas are properly established.
- .2 Sod is free of bare and dead spots.
- .3 No surface soil is visible from height of 1500mm when grass is cut to 50mm height.
- .4 Sodded areas have been cut a minimum of two times prior to acceptance.

.2 Areas sodded in the fall will be reviewed in the following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.6. MAINTENANCE FOLLOWING SODDING ACCEPTANCE

.1 Perform maintenance operations for sod for one month period following Sodding Acceptance as specified in Section 32 93 11 Landscape Maintenance.

END OF SECTION.

1. GENERAL

1.1. RELATED REQUIREMENTS

.1 Section 03 30 00 – Cast-in-Place Concrete
.2 Section 31 00 00 – Earthwork

1.2. SOURCE QUALITY CONTROL

.1 Obtain approval of plant material at source.
.2 Notify the Contract Administrator of source of material at least seven (7) days in advance of shipment. No work under this section is to proceed without approval.
.3 Acceptance of plant material at its source does not prevent rejection on site prior to or after planting operation.
.4 Imported plant material must be accompanied with necessary permits and import licenses. Conform to federal and provincial regulations.
.5 Source of plant material: grown in Zone 3 in accordance with Agriculture Canada Plant Hardiness Zone Map.

1.3. SHIPMENT AND PRE-PLANTING CARE

.1 Coordinate shipping of plants and excavation of holes to ensure minimum time lapse between digging and planting.
.2 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.
.3 Cover plant foliage with tarpaulin and protect bare roots by means of dampened straw, peatmoss, saw dust or other acceptable material to prevent loss of moisture during transit and storage.
.4 Remove broken and damaged roots with sharp pruning shears.
.5 Keep roots moist and protect from sun and wind. Heel-in trees and shrubs that cannot be planted immediately in shaded areas and water well.

1.4. GUARANTEE OF NURSERY STOCK

.1 Provide a written guarantee, stating that the plant material as itemized on plant list is guaranteed against defects for a period of two (2) years from the date of the Final Certificate of Completion for all deciduous trees over 75 mm (3”) caliper and all coniferous trees over 3 m (10’) height and for one (1) year for all other nursery stock.
.2 The Contractor agrees and guarantees to replace and replant any nursery stock found dead and/or in poor condition one (1) year from the recognized completion date, without cost to the Contract Administrator. "Poor Condition" shall be interpreted as meaning nursery stock on which branches are dead or dying, or have not shown satisfactory growth in leaves. Exempted is nursery stock damaged by accidental causes or vandalism, which stock shall be replaced at the cost of the Contract Administrator
.3 End-of-Warranty inspection will be conducted.
.4 The Contract Administrator reserves the right to extend the Contractor's warranty responsibilities for an additional one (1) year if, at the end of the initial warranty period, leaf development and growth is not sufficient to ensure future survival.

1.5. REPLACEMENTS

.1 During warranty period, remove from site any plant material that has died or

failed to grow satisfactorily as determined by the 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 accepted.

.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.

2. PRODUCTS

2.1. PLANT MATERIAL

.1 Quality and source: comply with Guide Specifications for Nursery Stock, latest edition of Canadian Nursery Trades Association referring to size and development of plant and rootball. 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 caliper for trees minimum 300 mm (12”) above grade for trees 100 mm (4”) caliper and larger and 150 mm (6”) above grade for trees up to 100 mm (4”) caliper.

.2 Bare root planting:

.1 Bare root plants are acceptable only when moved to site prior to the breaking of buds and heeled-in in a protected area until conditions are suitable for planting.

.2 Plant material that has come out of dormant stage and is too far advanced will not be accepted for bare root planting unless prior approval is obtained.

.3 Use trees with strong fibrous root system free of disease, insects, defects or injuries and structurally sound. Use trees with straight trunks, well and characteristically branched for species. Trees must have been root pruned regularly, but not later than one growing season prior to arrival on site.

.3 Cold storage: approval is required for plant material that has been held in cold storage.

.4 Container grown stock: acceptable if containers are 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.

.5 Balled and burlapped: coniferous and broad leaf evergreens over 500 mm (1’-8”) tall and deciduous trees in excess of 3 m (10’) 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. Dig and lift rootball from hole, place in wire basket lined with burlap. Secure rootball with burlap and tie basket to rootball with heavy rope. Take care not to injure trunk of tree with wire basket ties or rope. For large trees wrap rootball in double layer of burlap and drum lace with minimum 10 mm (1/2”) diameter rope. Protect rootball against sudden changes in temperature and exposure to heavy rainfall.

.6 Tree spade dug material (tree mover): dig plant material with mechanized digging equipment of hydraulic spade or clam-shell type. Diameter of spade to suit rootball size and satisfy CNTA standards. Lift rootball from hole, transport to planting location and place into spade dug prepared planting hole with scarified bottom and sides.

.7 Collected native plant material: use only native trees indigenous to area into which they are to be transplanted. Select trees from reasonably open stands. Trees must have well-developed crown and must be characteristically branched. Not more than 40% of overall tree height may be free of branches. Collect and plant only during dormant season.

.8 Substitutions to plant material as indicated on planting plan are 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.

.9 Refer to Plant Specification List on the Drawings for species, quantities, size and quality of plant materials.

2.2. OTHER MATERIALS

.1 Water: potable and free of minerals which may be detrimental to plant growth.

.2 Backfill mix as specified in Section 32 91 19 – Topsoil and Finish Grading.

.3 Tree anchors: underground 100 mm diameter steel disc tree anchors, screw in type.

.4 Guy wires: malleable, galvanized 9 gauge strand wire to CSA G4-M1977.

.5 Tree rings: fabricated from 3 mm galvanized wire encased in 13 mm diameter, 2 ply reinforced rubber hose or equivalent.

.6 Stakes: T-bar steel stakes 40 x 40 x 5 mm length as required, primed with 1 coat black approved primer.

.7 Wire tighteners: "P.G. Wire Tightener" or approved equal.

.8 Rootball burlap: 150 g Hessian burlap, biodegradable.

.9 Anti-desiccant: wax-like emulsion to provide film over surfaces reducing evaporation but permeable enough to permit transpiration.

.10 Fertilizer: For Shrubs and Perennials: Horticultural bonemeal: raw bonemeal finely ground with minimum analysis of 3% nitrogen and 10% phosphoric acid. For Trees: Organic 10-6-4 applied at rate of 40-50 g/mm caliper of tree. To be mixed thoroughly with top layer of planting soil and watered in well.

.11 Drainage medium: 15-38 mm (1/2” - 1-1/2”) diameter pit run gravel.

.12 Trunk collar: 100 mm (4”) diameter corrugated high density polyethylene pipe, 400 mm (16”) height.

.13 Mulch: Provide sample for approval prior to installation.

.1 Bark mulch: Natural dark brown in colour, varying in size from 25 - 75mm +/- in length, 12 - 25mm thick from bark of coniferous trees. Bark shall be clean, free of debris, needles, twigs, leaves, soil and friable material. Submit sample for approval by the Contract Administrator 14 days prior to shipping to site.

.2 Stone: clean round river bottom stone, 25 – 50 mm ø. Submit sample for approval by the Contract Administrator 14 days prior to shipping to site.

.14 Filter fabric: non-woven polypropylene or polyester synthetic fibre fabric. Acceptable products: Propex 4553, Layfield LP 8, Mirafi 180N or approved equal.

3. EXECUTION

3.1. GENERAL

.1 Refer to site plan for mulch and stone groundcover locations.

3.2. PLANTING TIME AND WORKMANSHIP

.1 When planting deciduous plant material after buds have broken, spray plants with antidesiccant to slow down transpiration prior to transplanting.
.2 Trees, shrubs and groundcovers growing in containers may be planted throughout growing season.
.3 Plant only under conditions that are conducive to good health and safe physical conditions of plants.
.4 Provide planting schedule. Extending planting operations over long period using limited crew will not be accepted.

3.3. EXCAVATION

.1 Shrub beds: excavate to minimum depth of 300 mm (12”).
.2 Trees: excavate holes to depth and width to accommodate rootball and shown on Drawings.
.3 Provide drainage for planting holes in heavy soil if natural drainage does not exist. Have method approved.
.4 Protect bottom of excavations against freezing.
.5 Remove water that enters excavations prior to planting. Ensure source of water is not groundwater.

3.4. PLANTING

.1 Loosen bottom of planting hole to depth of 150 mm (6”). Cover bottom of each excavation with bonemeal in amount recommended by manufacturer.
.2 Plant trees and shrubs vertically with roots placed straight out in hole. Orient plant material to give best appearance in relation to structure, roads and walks.
.3 Place plant material to depth equal to depth they were originally growing in nursery.
.4 With balled and burlapped rootballs, loosen burlap and cut away top 1/3 without disturbing rootball. Do not pull burlap or rope from under rootball. With container stock, remove entire container without disturbing rootball. Non-biodegradable wrappings must be removed.
.5 Tamp planting soil around root system in layers of 150 mm (6”) eliminating air voids. Frozen or saturated planting soil is unacceptable. When 2/3 of planting soil has been placed, fill hole with water. After water has completely penetrated into soil, complete backfilling.
.6 With frozen ball material, mulch planting pit to prevent freezing.
.7 Build 100 mm (4”) depth saucer around outer edge of hole to assist with maintenance watering.
.8 When planting is completed, give surface of planting tree saucer dressing of slow release 12:36:15 fertilizer at rate recommended by manufacturer, or approved equal. Mix fertilizer thoroughly with top layer of planting soil and water in well.

3.5. MULCHING

.1 Obtain approval of planting before mulching material is applied. Loosen soil in planting beds and pits and remove debris and weeds. Spread mulch to minimum thickness of 75 mm (3”) or as indicated on drawing. 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.
.2 Provide sample of mulch for approval before installation. Lay mulch to depth of

75 mm, as indicated on Drawings.

3.6. MAINTENANCE

.1 Maintain plant material from date of planting to one year following Certificate of Substantial Completion. Refer to Section 32 93 11 – Landscape Maintenance.

END OF SECTION.

1. GENERAL

1.1. RELATED REQUIREMENTS

.1 Section 32 91 19 – Topsoil and Finish Grading.
.2 Section 32 92 20 – Sodding
.3 Section 32 93 10 – Tree, Shrubs and Ground Covers

1.2. DESCRIPTION

.1 This Specification shall cover the maintenance of planted and sodded areas, which have been installed under this Contract. In general, work shall include:
  .1 Spring cleaning
  .2 Fertilizing
  .3 Watering
  .4 Mowing
  .5 Weed control
  .6 Pest and disease control
  .7 Fall Clean-up and 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 thirty (30) days after completion of installation and until areas are fully established and accepted in accordance with Section 32 92 20 - Sodding.
  .2 Maintain Tree and shrub plantings for a minimum period of thirty (30) days after completion of installation and until areas are fully established and accepted in accordance with Section 32 93 10 – Tree, Shrub and Ground Cover Planting.
  .3 Continue maintenance after the date of Certificate of Substantial Performance until acceptance conditions are fulfilled to the satisfaction of the Contract Administrator.

1.4. SCHEDULE 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. Forms shall be provided by the Contract Administrator.

1.5. WATER SUPPLY

.1 Supplied by the Contract Administrator at designated source.

2. PRODUCTS

2.1. MATERIALS

.1 Materials to conform to the requirements of related Specification sections.

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.

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 on a weekly 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 mold".
  .2 Roll lightly areas where grass plants have lifted due to frost action.

.2 Planting Beds:
  .1 Clean shrub beds and planters of debris and dead plant material.
  .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 (3) times per week for next six (6) weeks. Adjust to suit climatic conditions.
- .2 Thereafter, water as required to re-plenish 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.
- .2 Apply 9 gal. (40 liters) of water per 25 mm caliper per application using deep root feeder.
- .4 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 50 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 and 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 two (2) weeks.

.2 Apply herbicide when it will not cause damage to new grass or other plants. Avoid use of dicambal 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. WINTER PREPARATION

- .1 Rake and assemble leaves after they have been shed by trees and shrubs. Remove from site.
- .2 Ensure adequate moisture in root zones of plant material prior to freeze-up.

3.9. FINAL ACCEPTANCE

.1 Areas will be accepted by the Contract Administrator provided that:

.1 Sodded areas are established to the requirements of Section 32 92 20 - Sodding.

.2 Trees, shrubs and groundcovers are showing growth and vigor satisfactory to the Contract Administrator and to the standards specified in Section 32 93 10 – Trees, Shrubs and Groundcovers.

END OF SECTION.