PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 31 05 16 – Aggregate Materials.

1.2 REFERENCES

.1 ASTM International
- .1 ASTM C 117-13, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
- .2 ASTM C 131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .3 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .4 ASTM D 1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
- .5 ASTM D 4318-10e1, 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.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 31 05 16 – Aggregate Materials.

.2 Storage and Handling Requirements:
- .1 Stockpile minimum 50% of total aggregate required prior to beginning operation.
- .2 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .3 Replace defective or damaged materials with new.
- .4 Store cement in weathertight 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 16 - Aggregate Materials and following requirements:

.1 Crushed stone or gravel.

.2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.2.

.1 Gradation Method #2 to: OPSS 1010 except that percentage finer than 0.075 mm not to exceed 8%.

.2 Liquid limit: to ASTM D 4318, maximum 25

.3 Plasticity index: to ASTM D 4318, maximum 6.

.4 Los Angeles degradation: to ASTM C 131. Max. % loss by weight: 45

.5 Crushed particles: at least 60% of particles by mass within each of following sieve designation ranges to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C 136.

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

.6 Soaked CBR: to ASTM D 1883, minimum 100, when compacted to 100% of ASTM D 155.

PART 3 - EXECUTION

3.1 PREPARATION ..... .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 requirements of authorities having jurisdiction.

.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 PLACEMENT AND INSTALLATION .1 Place granular base after sub-base surface is inspected and approved in writing by Departmental Representative.

.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 Place material using methods which do not lead to segregation or degradation of aggregate.

.5 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.

.1 Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.

.6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
.7 Remove and replace that portion of layer in which material becomes segregated during spreading.

.3 Compaction Equipment:
.1 Ensure compaction equipment is capable of obtaining required material densities.
.2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from Departmental Representative before use.
.3 Equipped with device that records hours of actual work, not motor running hours.

.4 Compacting:
.1 Compact to density not less than 100% corrected maximum dry density.
.2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
.3 Apply water as necessary during compacting to obtain specified density.
.4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by Departmental Representative.
.5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 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.

3.4 CLEANING .1 Progress 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 Waste Management: separate waste materials for reuse and recycling.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
.2 Divert unused granular material from landfill to local facility approved by Departmental Representative.

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

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 03 30 00 - Cast in Place Concrete.

.2 Section 03 20 00 - Concrete Reinforcing.

.3 Section 31 05 16 - Aggregate Materials.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM).
- .1 ASTM C 117-13, Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
- .2 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .3 ASTM D 698-12e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600 kN-m/m^3).

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 Canadian Standards Association (CSA International)
- .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data: submit WHMIS MSDS

.3 Inform Departmental Representative of proposed source of materials and provide access for sampling at least 4 weeks prior to commencing work.

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

1.4 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 47 21 - Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 MATERIALS

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

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

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

.4 Granular base: material to Section 31 05 16 - Aggregate Materials and following requirements:
- .1 Type 1, 2 or 3 fill.
- .2 Crushed stone or gravel.
- .3 Gradations: within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.2.

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

PART 3 - EXECUTION

3.1 GRANULAR BASE

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

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

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

3.2 CONCRETE

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

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

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

.4 Provide edging as indicated with 10 mm radius edging tool.

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

3.3 TOLERANCES

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

3.4 EXPANSION AND CONTRACTION JOINTS

.1 Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals of 2 m.

.2 Install expansion joints at intervals of 6 m.

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

3.5 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 Departmental Representative.

3.6 CURING

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

.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.

3.7 BACKFILL

.1 Allow concrete to cure for 7 days prior to backfilling.

.2 Backfill to designated elevations with material as directed by Departmental Representative.

.1 Compact and shape to required contours as directed by Departmental Representative.

3.8 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for chain link fences and gates.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

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

.3 Section 05 50 00 – Metal Fabrication.

1.3 MEASUREMENT PROCEDURES

.1 Measure supply and erection of chain link fence in metres erected including gates.

.2 Measure supply and erection of chain link fence gates as units of each size erected.

.3 Coordinate fence location, clearances and access gate with Enbridge.

1.4 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
- .1 ASTM A 53/A53M-Latest Edition, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A 90/A90M-Latest Edition, Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
- .3 ASTM A 121-Latest Edition, Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
- .4 A653/A653M-Latest Edition, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-138.1-Latest Edition, Fabric for Chain Link Fence.
- .2 CAN/CGSB-138.2-Latest Edition, Steel Framework for Chain Link Fence.
- .3 CAN/CGSB-138.3-Latest Edition, Installation of Chain Link Fence.
- .4 CAN/CGSB-138.4-Latest Edition, Gates for Chain Link Fence.

.3 Canadian Standards Association (CSA International).
- .1 CAN/CSA-A23.1/A23.2-Latest Edition, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
- .2 CAN/CSA-G164-M92-Latest Edition, Hot Dip Galvanizing of Irregularly Shaped Articles.

.4 Barbed wire installation shall comply with PWGSC and local regulations.

1.5 SUBMITTALS

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

.2 Coordinate submittal requirements and provide submittals.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete and CAN/CSA-A23.1.
- .1 Compressive strength: 20 MPa minimum at 28 days.

.2 Chain-link fence fabric: to CAN/CGSB-138.1.
- .1 Ho dipped galvanized and vinyl coated (black) 3.97 mm in 25 mm mesh.
- .2 Height of fabric: as indicated.

.3 Posts, braces and rails: to CAN/CGSB-138.2, galvanized steel pipe vinyl coated (black). Dimensions: Schedule 40 pipe.

.4 Top and bottom tension wire: to CAN/CGSB-138.2, single strand, hot dipped galvanized vinyl coated (black) steel wire.
- .1 5 mm

.5 Tie wire fasteners: steel wire vinyl coated.

.6 Tension bar: to ASTM A 653/A653M, 5 x 20 mm minimum galvanized steel, vinyl coated (black).

.7 Gates: to CAN/CGSB-138.4.

.8 Gate frames: to ASTM A 53/A53M, galvanized steel pipe, vinyl coated (black) standard weight 45 outside diameter pipe for outside frame, 35 mm outside diameter pipe for interior bracing.
- .1 Fabricate gates as indicated with electrically welded joints, and hot-dip galvanized after welding; vinyl coated..
- .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.
- .4 Furnish double gates with chain hook to hold gates open and centre rest with drop bolt for closed position.

.9 Fittings and hardware: to CAN/CGSB-138.2, galvanized steel.
- .1 Tension bar bands: 3 x 20 mm minimum galvanized steel, vinyl coated.
- .2 Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail.
- .3 Overhang tops to provide waterproof fit, to hold top rails and to hold barbed wire.
- .5 Turnbuckles to be drop forged.

.10 Barbed wire: to ASTM A 121 2 mm diameter galvanized steel wire 4 point barbs as indicated.

2.3 FINISHES

.1 Galvanizing:
- .1 For chain link fabric: to CAN/CGSB-138.1 Grade 2.
- .2 For pipe: 550 g/m² minimum to ASTM A 90.
- .3 For barbed wire: to ASTM A 121, Class 2 CAN/CGSB-138.2.
- .4 For other fittings: to CAN/CSA-G164.

.2 Vinyl coating: to ASTM F 1664.
.1 0.045 mm dry film thickness minimum.

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.

3.2 ERECTION OF FENCE

.1 Erect fence along lines as indicated and to CAN/CGSB-138.3.

.2 Excavate post holes to dimensions indicated 1600 mm depth x 400 mm diameter

.3 Install end posts at end of fence and at buildings.
.1 Install gate posts on both sides of gate openings.

.4 Place concrete in post holes then embed posts into concrete to minimum 1200 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.

.5 Do not install fence fabric until concrete has cured minimum of 5 days.

.6 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.

.7 Install overhang tops and caps.

.8 Install top rail between posts and fasten securely to posts and secure waterproof caps and overhang tops.

.9 Install bottom tension wire, stretch tightly and fasten securely to end, corner, gate and straining posts with turnbuckles and tension bar bands.

.10 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.

.11 Secure fabric to top rails, line posts and bottom tension wire with tie wires at 450 mm intervals.
.1 Give tie wires minimum two twists.

.12 Install barbed wire strands and clip securely to lugs of each projection.

.13 Install grounding rods as indicated.

3.3 INSTALLATION OF GATES

.1 Install gates in locationsas indicated.

.2 Level ground between gate posts and set gate bottom approximately 50 mm above ground surface.

.3 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.

3.5 CLEANING

.1 Clean and trim areas disturbed by operations.

.1 Dispose of surplus material and replace damaged turf with sod.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 32 91 21 - Topsoil Placement and Grading.

1.2 SCHEDULING

.1 Schedule sod laying to coincide with preparation of soil surface.

.2 Schedule sod installation when frost is not present in ground.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.

- .1 Turf Grass Nursery Sod types:
  - .1 Number One Kentucky Bluegrass Sod - Fescue Sod: Nursery Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass and Chewing Fescue or Creeping Red Fescue, containing not less than 40% Kentucky Bluegrass cultivars and 30% Chewing Fescue or Creeping Red Fescue cultivar[s].
- .2 Turf Grass Nursery Sod quality:
  - .1 Not more than 2 broadleaf weeds or 10 other weeds per 40 square metres.
  - .2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.
  - .3 Mowing height limit: 35 to 65 mm.
  - .4 Soil portion of sod: 6 to 15 mm in thickness.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Verify that grades are correct and prepared in accordance with Section 32 91 21 - Topsoil Placement and Grading. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

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

.3 Fine grade surface free of humps and hollows to smooth, even grade, to tolerance of plus or minus 8 mm.

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

3.3 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following operations from time of installation until acceptance.

.2 Water sodded 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.

.4 Maintain sodded areas weed free 95%.

3.4 ACCEPTANCE

.1 Turf Grass Nursery Sod areas will be accepted by Departmental Representative 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.

3.5 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform following operations from time of acceptance until end of 12 month warranty period:

.1 Water sodded Turf Grass Nursery Sod areas at weekly intervals to obtain optimum soil moisture conditions to depth of 100 mm.

.2 Repair and resod dead or bare spots to satisfaction of Departmental Representative.

.3 Cut grass and remove clippings to height as follows:

.1 Turf Grass Nursery Sod:
.1 50 mm during normal growing conditions.
.2 Cut grass at 2 week intervals.
.3 Eliminate weeds by mechanical means to extent acceptable to Departmental Representative.

3.6 CLEANING

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

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 04 05 12 Masonry Mortar and Grout

.2 Section 04 05 19 Masonry Anchorage and Reinforcing

.3 Section 04 22 00 Concrete Unit Masonry

1.1 SUMMARY

.1 Section Includes:
- .1 Materials and installation for plant material, accessories, mulch, planting, tree support, mulching and maintenance.

.2 Related Sections:
- .1 Section 01 33 00 - Submittal Procedures.
- ..2 Section 32 91 21 - Topsoil Placement and Grading.

1.2 REFERENCES

.1 Agriculture and Agri-Food Canada (AAFC).
- .1 Plant Hardiness Zones in Canada-Latest Edition.

.2 Canadian Nursery Landscape Association (CNLA).
- .1 Canadian Standards for Nursery Stock-Latest Edition.

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1.3 DEFINITIONS

.1 Mycorrhiza: association between fungus and roots of plants. This symbiosis, enhances plant establishment in newly landscaped and imported soils.

1.4 SUBMITTALS

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

.2 Submit product data for:
- .1 Fertilizer.
- .2 Mycorrhiza.
- .3 Anti-desiccant.
- .4 Guying assembly including clamps, collar, guying wire, anchors and wire tightener.
- .5 Mulch.

.3 Submit WHMIS MSDS.

.4 Submit samples for:
- .1 Mulch.
- .2 Mycorrhiza.

1.5 QUALITY ASSURANCE

.1 Health and Safety:
- .1 Do construction occupational health and safety in accordance with Section 01 35 30 - Health and Safety Requirements.

1.6 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 1 hour after arrival at site in storage location approved by Departmental Representative.

.3 Protect plant material from damage during transportation:
- .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 root balls 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 sand or topsoil and watering to full depth of root zone.
- .2 For pots and containers, maintain moisture level in containers. Heel-in fibre pots.
- .3 For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain moisture level in root zones.

1.7 SCHEDULING

.1 Obtain approval from Departmental Representative of schedule 7 days in advance of shipment of plant material.

.2 Schedule to include:
- .1 Quantity and type of plant material.
- .2 Shipping dates.
- .3 Arrival dates on site.
- .4 Planting Dates.

1.8 WARRANTY

.1 For plant material over 75 mm caliper provide the 12 months warranty period..

.2 The Contractor hereby warrants that plant material will remain free of defects in accordance with General Conditions (GC) - CCDC GC 12.3, but for 1 full growing season, providing adequate maintenance has been provided.

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

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

PART 2 - PRODUCTS

2.1 PLANT MATERIAL .1 Type of root preparation, sizing, grading and quality: comply to Canadian Standards for Nursery Stock.
- .1 Source of plant material: in accordance with Plant Hardiness Zones in Canada.
- .2 Plant material must be planted in zone indicated as appropriate for its species.
- .3 Plant material in location appropriate for its species.

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

.3 Trees: with straight trunks, well and characteristically branched for species except where specified otherwise.

.4 Bare root stock: nursery grown, in dormant stage, not balled and burlapped or container grown.

.5 Collected stock: maximum 40 mm in caliper, with well developed crowns and characteristically branched; no more than 40% of overall height may be free of branches.

2.2 WATER .1 Free of impurities that would inhibit plant growth.

2.3 STAKES .1 40 x 40 x 5 x 2440 mm, pointed one end,

2.4 TRUNK PROTECTION .1 Plastic: perforated spiralled strip.

.2 Burlap: clean, minimum 2.5 kg/m² mass and 150 mm wide, and twine fastener.

2.5 MULCH .1 Bark chip: varying in size from 25 to 50 mm in diameter, from bark of coniferous trees.

2.6 ANTI-DESICCANT .1 Wax-like emulsion.

2.7 SOURCE QUALITY CONTROL .1 Obtain approval from Departmental Representative of plant material prior to planting.

.2 Imported plant material must be accompanied with necessary permits and import licenses. Conform to Federal, Provincial or Territorial regulations.

PART 3 - EXECUTION

3.1 PRE-PLANTING PREPARATION

.1 Do construction occupational health and safety in accordance with Section 01 35 30 - Health and Safety Requirements.

.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.

3.2 EXCAVATION AND PREPARATION OF PLANTING BEDS

..1 Preparation of planting beds is specified in Section 32 91 21 - Topsoil Placement and Grading.

.2 For individual planting holes:

.1 Stake out location and obtain approval from Departmental Representative.

.2 Excavate to depth and width as indicated.

.3 Remove subsoil, 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.

3.3 PLANTING

.1 For bare root stock, place 50 mm backfill soil in bottom of hole. Plant trees and shrubs with roots placed straight out in hole.

.2 For jute burlapped root balls, cut away top one third of wrapping and wire basket without damaging root ball. Do not pull burlap or rope from under root ball.

.3 For container stock or root balls in non-degradable wrapping, remove entire container or wrapping without damaging root ball.

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

.5 For trees and shrubs:

.1 Backfill soil in 150 mm 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.

.6 For ground covers, backfill soil evenly to finish grade and tamp to eliminate air pockets.

.7 Water plant material thoroughly.

.8 After soil settlement has occurred, fill with soil to finish grade.

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

3.4 TRUNK PROTECTION

.1 Install trunk protection on deciduous trees as indicated.

.2 Install trunk protection prior to installation of tree supports when used.

3.5 TREE SUPPORTS

.1 Install tree supports as indicated.

.2 Use single stake tree support for deciduous trees less than 3 m and evergreens less than 2 m.

- .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.

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

3.6 MULCHING

.1 Ensure soil settlement has been corrected prior to mulching.

.2 Spread mulch as indicated.

3.7 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following maintenance operations from time of planting to acceptance by Departmental Representative.

- .1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
  - .1 For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.
  - .2 Remove weeds monthly.
  - .3 Replace or respread damaged, missing or disturbed mulch.
  - .4 For non-mulched areas, cultivate as required to keep top layer of soil friable.
  - .5 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Departmental Representative.
  - .6 Remove dead or broken branches from plant material.
  - .7 Keep trunk protection and guy wires in proper repair and adjustment.
  - .8 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

3.8 MAINTENANCE DURING WARRANTY PERIOD

.1 From time of acceptance by Departmental Representative to end of warranty period, perform following maintenance operations.

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

.2 Reform damaged watering saucers.

.3 Remove weeds monthly.

.4 Replace or respread damaged, missing or disturbed mulch.

.5 Remove dead, broken or hazardous branches from plant material.

.6 Keep trunk protection and tree supports in proper repair and adjustment.

.7 Remove trunk protection, tree supports and level watering saucers at end of warranty period.

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

END