Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 74 19 - Waste Management And Disposal.

1.2 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made under this Section.

.2 Measure cleaning pavement surfaces in square metres of pavement surface cleaned.

.3 Measure removal of pavement markings metres of solid lines or painted length of broken lines removed.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Waste Management And Disposal and Section 01 35 20 – LEED Sustainability Requirements.

.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 in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Place materials defined as hazardous or toxic in designated containers.

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

.6 Do not dispose of unused solvent materials into landfill. Divert materials to municipal hazardous materials depot as approved by Contract Administrator.

Part 2 Products

2.1 MATERIALS

.1 Abrasives and solvents used for removal of paint, oil, grease, rubber deposits: proprietary products specially designed for pavement cleaning, subject to approval by Contract Administrator.

Part 3 Execution

3.1 REMOVING PAVEMENT MARKINGS

.1 Remove rubber tire deposits and paint markings, in areas designated by Contract Administrator, by sand blasting, rotary grinding, heater planing or other method approved by Contract Administrator.

.2 Exercise care to avoid dislodging of coarse aggregate particles, excessive removal of fines, damage to bituminous binder or damage to joint and crack sealers.

.3 Do not heat pavement surfaces above 120^{o}C, when using heater planning equipment.

3.2 PAVEMENT SURFACE CLEANING

.1 Remove sealing compound which has protruded excessively, where directed by Contract Administrator. Dispose of removed material as directed by Contract Administrator.

.2 Remove dust, contaminants, loose and foreign materials, oil and grease, in areas designated and by method approved by Contract Administrator.

.3 Use rotary power brooms and vacuum sweepers as needed supplemented by hand brooming.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 – Cast-In-Place Concrete

.2 Section 03 30 01 – Site Works CIP Concrete

.3 Section 31 22 13 – Rough Grading

.4 Section 32 12 16 – Asphalt Paving

1.2 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 D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft3) (600kN-m/m3).

.5 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft3) (2,700kN-m/m3).

.6 ASTM D1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

.7 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-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Metric.

.3 City of Winnipeg Standard Construction Specifications.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver and stockpile aggregates in locations that are accessible to construction, but will not damage existing structures or landscape designated to remain. Stockpile minimum 50% of total aggregate required prior to beginning operations.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate metal, plastic, wood and corrugated cardboard packing and place in designated areas for disposal or recycling in accordance with Section 01 74 19 – Waste Management And Disposal and Section 01 35 20 – LEED Sustainability Requirements.

Part 2 Products

2.1 GRANULAR BASE MATERIAL

.1 Class ‘A’ and Class ‘B’ aggregate in accordance with The City of Winnipeg Standard Construction Specifications (CW 3110).

Part 3 Execution

3.1 PLACING

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

.2 Construct granular base to depth and grade in areas indicated on drawings.

.3 Ensure no frozen material is placed.

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

.5 Place granular base materials using methods which do not lead to segregation or degradation.

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

.7 Place material to full width in uniform layers not exceeding 150mm 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.

3.2 COMPACTION

.1 Compact to density of not less than 98% 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 by Contract Administrator.

.5 Compaction along building edges, curb faces, and around utilities to be completed with vibratory rammer (jumping jack).

.6 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 10 mm of elevation as indicated, but not uniformly high or low.

3.4 CLEANING

.1 Perform cleaning after aggregate base course installation to remove construction and accumulated environmental dirt. Remove surplus materials, excess materials, rubbish, tools and equipment.

3.5 ACCEPTANCE

.1 Obtain final approval of aggregate base courses via site inspection with the Contract Administrator.

3.6 PROTECTION

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

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Provide all labour, materials, methods, equipment and accessories for the construction of asphalt paving for parking lots.

1.2 RELATED SECTIONS

.1 Section 32 11 23 – Aggregate Base Courses

1.3 REFERENCES

.1 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.

.4 City of Winnipeg Standard Construction Specifications.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate metal, plastic, wood and corrugated cardboard packing and place in designated areas for disposal or recycling in accordance with Section 01 74 19 – Waste Management And Disposal and Section 01 35 20 – LEED Sustainability Requirements.

Part 2 Products

2.1 MATERIALS

.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 the *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 due to silt or soft spots.

.2 Light Duty Asphalt: Parking Stalls, Zamboni Travel Lane, Pedestrian Plaza and Walkways/Paths designated 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 due 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 600mm (2').

.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 industry standard methods to prevent rounding of compacted surface at joints.

.3 Longitudinal Joints:

.1 Offset longitudinal joints in succeeding lifts by at least 150mm (6").

.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 If cold joint can not be avoided, cut back by saw cutting previously laid lane, by at least 150mm (6"), 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 50mm (2").

.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 150mm (6") extending onto previously placed and compacted lane.

3.4 FINISH TOLLERANCES

.1 Finished asphalt surface to be within 6mm (1/4") of design elevation, but not uniformly high or low.

.2 Finished asphalt surface not to have irregularities exceeding 6mm (1/4") when checked with 4.88m (16') straight edge placed in any direction.

3.5 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 32 12 16 – Asphalt Paving.

1.2 REFERENCES

.1 CAN/CGSB-1.5-M91, Low Flash Petroleum Spirits Thinner.

.2 CGSB1-GP-12c-68, Standard Paint Colours.

.3 CGSB1-GP-71-83, Method, of Testing Paints and Pigments.

.4 CGSB1-GP-74M-79, Paint, Traffic, Alkyd.

1.3 SUBMITTALS

.1 Provide all necessary data in accordance with LEED requirements.

.2 Proof of Non-Toxic Composition:

.1 Product data confirming chemical composition for traffic paint conforms to the latest health and environmental standards.

1.4 SAMPLES

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

.2 Submit to the Contract Administrator following material sample quantities at least two (2) weeks prior to commencing work.

.1 One painted sample of each type of paint.

.2 Sampling to CGSB1-GP-71.

.3 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, CGSB specification number and formulation number and batch number.

PART 2 Products

2.1 MATERIALS

.1 Paint:

.1 To CGSB1-GP-74M, alkyd traffic paint.

.2 Colour:

.1 White CGSBI – GP – 12C, white 513-301.

.2 Blue: Pride Enterprises, Handicap Blue 15813 or approved equal.

.3 Yellow: City of Winnipeg Standard roadway Yellow 505-308, or approved equal.

.3 Thinner: to CAN/CGSB-1.5.

PART 3 Execution

3.1 EQUIPMENT REQUIREMENTS

.1 Paint applicator to be 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, at rates specified, and to dimensions as indicated, and to have positive shut-off.

3.2 CONDITION OF SURFACES

.1 Pavement surface to be dry, free from ponding water, frost, ice, dust, oil, grease and other foreign materials. Clean paved areas as necessary to achieve acceptable surface preparation.

3.3 TRAFFIC CONTROL

.1 Barricade areas to be painted to all vehicular traffic during installation and for four (4) hours after installation.

3.4 APPLICATION

.1 Lay out pavement lines, zones and symbols as indicated on the drawings. Obtain Contract Administrator's approval prior to painting.

.2 Unless otherwise approved by Contract Administrator, apply paint only when air temperature is 10˚C, wind speed is less than 60 km/h and no rain is forecast within the next 8 hours.

.3 Apply traffic paint evenly at rate of 3 sq.m per litre. Do not thin paint unless approved by Contract Administrator.

.4 Symbols and letters to conform to dimensions indicated. Universal access symbols to conform to ADA Standards (Americans with Disabilities Act).

.5 Paint lines to be 100mm wide, of uniform colour and density with sharply defined edges.

.6 Thoroughly clean distributor tank before refilling with paint of different colour.

3.5 TOLERANCE

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

.2 Remove incorrect markings and re-apply at no extra cost to the Contract Administrator.

.3 Remove incorrect markings in accordance with Section 32 01 11 - Pavement Cleaning and Marking Removal.

3.6 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 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management And Disposal, and 01 35 20 - LEED Sustainability Requirements.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION OF COMPLETED WORK

.1 Protect pavement markings until dry.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation BarriersCompliance Board's "Americans With Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines.

.2 City of Winnipeg 2010 Accessibility Design Standards

.3 City of Winnipeg Standard Construction Specification CW 3326 – Detectable Tactile Warning Surfaces.

.4 ASTM International (American Society for Testing and Materials):

- .1 ASTM B 117: Standard Practice for Operating Salt Spray (Fog) Apparatus.
- .2 ASTM C 501: Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser.
- .3 ASTM C 1028: Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
- .4 ASTM D 570: Standard Test Method for Water Absorption of Plastics.
- .5 ASTM D 638: Standard Test Method for Tensile Properties of Plastics.
- .6 ASTM D 695: Standard Test Method Compressive Properties of Rigid Plastics.
- .7 ASTM D 790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- .8 ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.
- .9 ASTM G 26: Standard Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials.
- .10 ASTM G 155: Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

.5 Canada Green Building Council (CaGBC)

- .1 LEED Canada Reference Guide for Green Building Design and Construction 2009

1.2 SUBMITTALS

.1 Product Data:

- .1 In accordance with Section 01 33 00 – Submittal Procedures.
- .2 For each type of product indicated. Include technical data and tested physical and performance properties.

.2 Shop Drawings: Show layout and placement of tactile warning surface panel joints and fasteners.

.3 Samples for Initial Selection: Manufacturer's full range of colors and patterns for tactile warning surfaces, for selection by Contract Administrator.

.1 Minimum Number of Colors for Selection: Four.

.4 Samples for Verification: 6 inch by 6 inch sample, for each color and type of tactile warning surface.

.5 Maintenance Data:

.1 Submit copies of manufacturer's specified installation and maintenance practices for each type of Detectable Warning Tile and accessories as required.

.2 In accordance with Section 01 78 00 – Closeout Submittals.

1.3 QUALITY ASSURANCE

.1 Installer Qualifications: A qualified installer who employs Workers for this Project that are trained and approved by manufacturer.

.2 Fire-Test-Response Characteristics: Provide products identical to those tested for fire-exposure behavior per test method indicated by testing and inspecting agency acceptable to Authorities Having Jurisdiction.

.3 Regulatory Requirements: Comply with requirements for tactile warning surfaces as per the following:

.1 2010 National Building Code of Canada inclusive of Province of Manitoba amendments.

.2 2010 City of Winnipeg Accessibility Design Standards

.3 City of Winnipeg Standard Construction Specification CW 3326 – Detectable Tactile Warning Surfaces.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Surface Applied Detectable/Tactile Warning Surface Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings and tile type shall be identified by part number.

.2 Surface Applied Detectable/Tactile Warning Surface Tiles shall be delivered to location at building Site for storage prior to installation.

.3 Store panels on flat surfaces.

1.5 SITE CONDITIONS

.1 Environmental Conditions and Protection: Maintain minimum temperature of 4.4°C (40°F) in spaces to receive Surface Applied Detectable/Tactile Warning Surface Tiles for at least 24 hours prior to installation, during installation, and for not less than 24 hours after installation.

.2 The use of water for Work, cleaning or dust control, etc. shall be contained and controlled and shall not be allowed to come into contact with the general public. Provide barricades or screens to protect the general public.

1.6 COORDINATION

.1 Coordinate installation of cast-in-place tactile warning surface panels with placement of Site concrete as specified in Section 03 30 01 – Site Works CIP Concrete

.2 Verify concrete slump range is within limits as recommended in writing by manufacturer of tactile warning surface cast-in-place panels.

1.7 EXTRA STOCK

.1 Deliver extra stock to storage area designated by Contract Administrator. Furnish new materials from same manufactured lot as materials installed and enclose in protective packaging with appropriate identification for cast-in-place tactile panels. Furnish not less than two (2)% of the supplied materials for each type, color and pattern installed.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 – 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 for disposal away for public.

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

1.9 WARRANTY

.1 Surface Applied Detectable/Tactile Warning Surface Tiles shall be guaranteed in writing for a period of five (5) years from date of final completion. The guarantee includes defective Work, breakage, deformation, fading and loosening of tiles.

Part 2 Products

2.1 TACTILE WARNING SURFACES – GENERAL

.1 General: Manufacturer's detectable warning system consisting of prefabricated panels with raised truncated dome pattern and non-slip surface field area to provide warning and directional assistance to visually impaired pedestrians.

.2 Truncated Dome Profile Dimensions:

.1 Base Diameter: 0.9 inch.
.2 Diameter at Top of Truncated Dome: 0.45 inch.
.3 Dome Height: 0.2 inch.
.4 Dome Pattern: In-line square pattern.
.5 Dome Spacing: 1.67 inches center to center, both ways.

2.2 TACTILE WARNING SURFACES - CAST-IN-PLACE PANELS

.1 General: Manufacturer's prefabricated polymer or glass and carbon-reinforced composite panels with raised truncated dome pattern; designed for installation by casting embedment flanges with mechanical keyways on backside of panel into wet (e.g. uncured) concrete substrate; homogeneous color and pattern throughout thickness of material; waterproof and nonabsorbent; ultraviolet light-stable

.2 Panel Dimensions:

.1 610 x 1220mm (2'x 4') Cast in Place

.2 300 x 300mm (1'x1') Cast in Place

.3 Face Thickness: 1/8 to 3/16 inches.

.4 Panel Depth (Including Embedment Flanges): 1-3/8 to 1-1/2 inches.

.5 Colour: Federal Yellow (USA) or Safety Yellow (Canada). Colour shall be homogeneous throughout the tile.

.6 Physical Properties:

.1 Detectable Warning Surface Tile (SMC) shall be made of glass and carbon reinforced polyester based Sheet Moulded Compound.

.1 Compressive Strength: Not less than 25,000 psi, per ASTM D 695.

.2 Slip Resistance: Not less than 0.80 static coefficient of friction for wet surfaces, per ASTM C 1028.

.3 Tensile Strength: Not less than 10,000 psi, per ASTM D 638.

.4 Flexural Strength: Not less than 25,000 psi, per ASTM D 790.

.5 Abrasion Resistance: 300 minimum, per ASTM C501.

.6 Water Absorption: 0.13 percent maximum, per ASTM D 570.

.7 Accelerated Weathering: $\Delta E<5.0$ at 2,000 hrs. No fading, per ASTM G155.

.8 Flame Spread: 15 or less, per ASTM E 84.

.9 Salt and Spray Performance: No deterioration or other effects after 200 hours of exposure, per ASTM B 117.

.2 Detectable Warning Surface Tile (VPC) shall be made of vitrified polymer compoSite.

.1 Compressive Strength: Not less than 28,000 psi, per ASTM D 695.

.2 Slip Resistance: Not less than 0.80 static coefficient of friction for wet surfaces, per ASTM C 1028.

.3 Tensile Strength: Not less than 19,000 psi, per ASTM D 638.

.4 Flexural Strength: Not less than 25,000 psi, per ASTM D 790.

.5 Abrasion Resistance: 500 minimum, per ASTM C501.

.6 Accelerated Weathering: $\Delta E<4.5$ at 3,000 hrs. No fading, per ASTM G155.

.7 Salt and Spray Performance: No deterioration or other effects after 100 hours of exposure, per ASTM B 117.

.8 Freeze/Thaw: No deterioration or other effects after 200 hours of exposure, per ASTM D 1037.

2.3 ACCEPTABLE MANUFACTURERS AND PRODUCTS

.1 Manufacturer

.1 Engineering Plastics, Inc. 300 International Drive Suite 100 Williamsville, NY 14221 Phone: 1-800-682-2525 (or approved equal in accordance with B7).

.2 Products

.1 Armor-Tile (or approved equal in accordance with B7).

2.4 SUBSTITUTIONS

.1 Refer to Section B7 – Substitutes of Bid Opportunity 748-2013.

Part 3 Execution

3.1 EXAMINATION

.1 Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content and other conditions affecting performance.

.2 Do not begin installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Prepare substrates according to manufacturer's written recommendations to ensure adhesion of tactile warning surface panels.

.2 At areas to receive surface-applied tactile warning panels, verify that substrates are dry and free of curing compounds, sealers, loose material, dust, oils, grease, and other foreign materials that might impair adhesive bond.

.3 Prior to installation, clean backside of surface-applied tactile

3.3 INSTALLATION, GENERAL

.1 General: Install tactile warning surface in accordance with manufacturer's written instructions and the City of Winnipeg Standard Construction Specification CW 3326 – Detectable Tactile Warning Surfaces.

.2 Lay out tactile warning surface panels in accordance with the City of Winnipeg Standard Construction Specification CW 3326 – Detectable Tactile Warning Surfaces.

.3 If not indicated otherwise, lay out panels from center marks established at end points, so panels at oppoSite ends of run are of equal width. Adjust as necessary to avoid using cut widths equal to less than one-half of a panel width at ends.

.4 Maintain correct orientation of each panel, so as to maintain correct alignment of truncated domes from panel to panel.

.5 Set panels true and square to adjacent curbs, ramps and paving edges.

.6 Install adjacent panels in accordance with manufacturer's written instructions to maintain correct spacing and alignment of truncated domes from panel to panel.

.7 Where cut widths are necessary, cut and fit panels along a clean, straight line.

.8 Where occurring adjacent to vertical

3.4 INSTALLATION - CAST-IN-PLACE TACTILE WARNING SURFACE PANELS

.1 Refer to Section 03 30 01 – Site Works CIP Concrete for placement and finishing of concrete paved substrate at areas to receive cast-in-place tactile warning surfaces.

.2 Upon placement and finishing of concrete substrates, verify proper lines and levels have been achieved.

.3 Protect finished face of tactile warning surface panel from wet concrete with manufacturer's plastic sheeting or other means of protection.

.4 Place cast-in-place tactile warning surface panels into fresh concrete and tamp into place as required to eliminate all air voids below each panel and fully encase all embedment flanges and keyway holes with concrete.

.1 Surface of panel field (e.g. base of truncated dome) is to be flush with adjacent paving surface.

.2 Maintain flush alignment of panel field surface of adjacent panels.

.3 Place weights on panels as recommended in writing by manufacturer to maintain solid embedment of panels in concrete with no air voids.

.4 Finish adjacent concrete as specified in Section 03 30 01 – Site Works CIP Concrete

3.5 PROTECTION

.1 Do not allow traffic on tactile warning panels until the following conditions have been met:

.1 Surface-Applied Panels: Sufficient time has been allowed for adhesive to set as per written instructions of manufacturer.

.2 Cast-in-Place Panels: Underlying concrete has fully cured.

.2 Once conditions have been met for allowing traffic over tactile warning panels, do not move heavy or sharp objects directly over surfaces. Place plywood or hardboard sheets over tactile warning surfaces and under objects while objects are being moved. Slide or roll objects over protective sheets without moving sheets.

3.6 CLEANING

.1 Remove adhesive and other surface blemishes using cleaner recommended by tactile surface manufacturer.

.2 Clean tactile warning surfaces in accordance with manufacturer's written instructions.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM).

- .1 ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A90/A90M, Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
- .3 ASTM A121, Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
- .4 A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.

.2 Canadian General Standards Board (CGSB).

- .1 CAN/CGSB-138.1, Fabric for Chain Link Fence.
- .2 CAN/CGSB-138.2, Steel Framework for Chain Link Fence.
- .3 CAN/CGSB-138.3, Installation of Chain Link Fence.
- .4 CAN/CGSB-138.4,Gates for Chain Link Fence.
- .5 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.

.3 Canadian Standards Association (CSA).

- .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
- .2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN/CSA-A3000, Cementitious Materials Compendium. Includes:
  - .1 CAN/CSA-A23.5, Supplementary Cementing Materials.

.4 City of Winnipeg Standard Construction Specification CW 3550 – Chain Link Fencing

.5 City of Winnipeg Standard Construction Specification CW 2160 – Concrete Underground Structures and Works.

.6 Canada Green Building Council (CaGBC)

- .1 LEED Canada Reference Guide for Green Building Design and Construction 2009

1.2 SUBMITTALS

.1 Submit WHMIS MSDS – Material Safety Data Sheets.

.2 Submit manufacturer’s data sheets including:

- .1 Fence fabric gauge and finish.
- .2 Post and rail dimension and finish.
- .3 Gate frame dimension and finish.
- .4 Required fittings and hardware.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 – 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 for disposal away for public.

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

Part 2 Products

2.1 MATERIALS

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

.2 Concrete mixes and materials: in accordance with Section 03 30 01 – Site Works Cast-in-Place Concrete and City of Winnipeg Standard Construction Specification CW 2160 – Concrete Underground Structures and Works..

.1 Where concrete piles are specified for post installation, the concrete shall conform to CW 2160 and be sulphate resistant type 50, minimum compressive strength of 25 MPa at 28 days, air content of 4% - 7%, maximum slump of 80 mm and a maximum size of course aggregate of 40 mm.

.3 Chain-link fence fabric: All materials shall conform to this Specification and the Canadian General Standards Board (CGSB) Specifications CAN/CGSB-138.1, CAN/CGSB-138.2 and CAN/CGSB-138.4. Where any contradictions occur, Specification CW 3550 shall take precedence over CGSB Specifications.

.1 Type 1, Class A, medium style.

.2 Height of fabric: as indicated.

.4 Terminal Posts:

.1 Terminal posts, comprising of end, gate, corner and straining posts shall be standard seamless, continuous weld, schedule 40 hot dip galvanized steel pipe weighing 11.28 kg per lineal metre. Posts shall be supplied with weatherproof caps. Tubing, conduit or open seam material will not be accepted.

.2 End, gate, corner and straining posts shall be of the lengths and dimensions shown in following Table 1 in CW3550.

.5 Line Posts:

.1 Line posts shall be standard seamless, continuous weld, schedule 40 hot dip galvanized steel pipe weighing 5.43 kg per lineal metre. Line posts for fence fabric that is to be 3660 mm and higher shall weigh 8.63 kg per lineal metre. Tubing, conduit or open seam pipe will not be accepted.

.2 Line posts shall be supplied with weatherproof eye top caps to accommodate continuous horizontal top rail and shall be of the lengths and dimensions shown in the following Table 2 in CW3550.

.6 Top and bottom rails:

.1 Top and bottom rail sleeve couplings shall be schedule 40, hot dip galvanized steel pipe, 171 mm long and 45 mm inside diameter to accommodate a 43 mm outside diameter top rail and manufactured specifically as a top/bottom rail sleeve coupling for chain link fencing.

.7 Fabric:

.1 Fabric shall be No. 9 gauge steel wire woven into a uniform 50 mm (2") diamond pattern mesh or as specified. Size of mesh shall be determined by measuring the minimum clear distance between the wires forming the parallel sides of the mesh. Permissible variation in size of mesh shall be 3 mm (1/8"). Diameter of wire shall be no less than 3.68 mm (0.145"). The top and bottom selvage shall be knuckled.

.2 Fabric shall be zinc coated before weaving by the hot dip process to an average mass per unit area of not less than 490 g/m2.

.3 Mesh fabric shall not be excessively rough, or have blisters, sal ammoniac spots, bruises or flaking.

.4 Chain link fabric shall have a minimum tensile strength of 415 MPa.

.8 Bottom tension wire:

.1 Bottom tension wire shall be No. 6 gauge single strand galvanized steel wire.

.9 Turnbuckles

.1 Where turnbuckles are specified, they shall be drop forged steel and be hot dip galvanized. The average overall length shall be approximately 300 mm, with ends in the closed position. Bolt diameter shall be 10 mm and shall be capable of taking up a minimum of 150 mm slack.

.10 Braces

.1 Braces, shall be schedule 40 hot dip galvanized steel pipe, not less than 43 mm outside diameter and weigh 3.38 kg per lineal metre.

.11 Fittings and Accessories

.1 Tension bars shall be 5 x 19 mm galvanized flat steel and not less than 50 mm shorter than the height of the fabric with which they are to be used.

.2 Tension bands shall be 3 x 19 mm galvanized flat steel c/w 8 x 32 mm galvanized carriage bolts and nuts.

.3 Brace bands shall be 3 x 19 mm galvanized flat steel c/w 8 x 32 mm galvanized carriage bolts and nuts to fasten top rail receptacles to terminal posts.

.4 Cut ends of tension bars shall be ground smooth to remove all sharp edges and burrs. Fabric clips shall be No. 9 gauge aluminum alloy wire.

.5 Weatherproof post tops/caps, receptacles, and fittings shall be of adequate strength and may be of aluminum alloy, malleable steel or pressed steel. All ferrous metals shall be hot dip galvanized.

.6 Tie wire fasteners: to CAN/CGSB-138.1, Table 2 (steel wire), single strand, galvanized steel wire confirming to requirements of fence fabric, 5 mm diameter.

.12 Gates: to CAN/CGSB-138.4.

.13 Gate frames: to ASTM A53/A53M, galvanized steel pipe, standard weight 45 mm outside diameter pipe for outside frame, 35mm outside diameter pipe for interior bracing.

.1 Fabricate gates as indicated with electrically welded joints, and hot-dip galvanized 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.

.4 Furnish double gates with chain hook to hold gates open and centre rest with drop bolt for closed position.

.14 Organic zinc rich coating: to CAN/CGSB-1.181.

.15 Grounding rod: 16 mm diameter copper well rod, 3 m long.

2.2 FINISHES

.1 Galvanizing:

.1 For chain link fabric: to CAN/CGSB-138.1, Grade2.

.2 For pipe: 550 g/m^2 minimum to ASTM A90.

.3 For other fittings: to CAN/CSA-G164.

Part 3 Execution

3.1 GENERAL REQUIREMENTS

.1 The Contractor shall install chain link fence in accordance with the Canadian General Standards Board Specification CAN/CGSB-138.3. Where any contradictions occur, Specification CW 3550 shall take precedence over CGSB Specifications.

.2 Survey bars and control monuments must be protected during construction.

3.2 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.

3.3 INSTALLATION OF POSTS

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

.2 Terminal and line posts, except where otherwise specified, shall be installed to a depth equal to the difference between the proposed fence height and the specified pipe length shown as described above. Use hydraulic equipment to push or pound posts into the existing ground.

.3 Where concrete piles are specified for post installation, they shall be of the lengths and dimensions as described above. Posts shall be set in the centre of the concrete pile. Tops of concrete piles shall be crowned or domed to shed water and be installed 100mm below the finished grade. Concrete piles shall be constructed in accordance with Section 03 30 01 – Site Works Cast-in-Place Concrete and CW 2160.

.4 Interior posts at mezzanine shall be thru-bolted to composite deck and mechanically fastened to underside of roof structure.

.5 Posts shall be plumbed and set to give correct alignment. Bending of posts to give correct alignment is not acceptable.

.6 Weatherproof post tops/caps shall be securely attached to eliminate removal by hand. Eye top caps shall allow for the insertion of a top rail in a horizontal position.

.7 Maximum spacing between centerline of posts shall not exceed 3050 mm.

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

3.4 INSTALLATION OF FABRIC

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

.2 Fabric shall be stretched taut to the correct tension as specified by the manufacturer and to the Contract Administrator's satisfaction. Where posts have been installed in concrete piles, fence fabric shall not be installed until piles have cured for a period of not less than five (5) days. Fabric shall be installed on the outside of the fence unless requirement for installation on the inside of the fence is specified.

.3 Clearance between bottom of fabric mesh and ground surface shall be no less than 40 mm or more than 50 mm unless otherwise indicated on the drawing or approved by the Contract Administrator.

.4 Fabric clips shall be used to fasten the fabric to the top rail at 450 mm spacing and to line posts at 380 mm maximum spacing. Wires ties on the top rail and bottom rail or tension wire shall have a minimum of two twists around mesh.

.5 Tension bars, bands and bolts shall be used to fasten the fabric to terminal posts. Maximum spacing for tension bands and bolts shall be 380 mm. Top of tension bars shall not protrude above the bottom of the top rail.

.6 The bottom tension wire shall be stretched taut along the bottom of the fabric and securely attached to all terminal and line posts and attached to the bottom edge of the fabric at 450 mm maximum spacing using hog rings.

3.5 INSTALLATION OF TURNBUCKLES

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

.2 Where turnbuckles are specified for installation, they shall be used to stretch the bottom tension wire taut and be able to take up a minimum of 150 mm slack.

3.6 INSTALLATION OF BRACES

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

.2 Braces, where specified only, shall be placed either horizontally or diagonally from the terminal post to the first adjacent line post. Braces shall be secured to posts in accordance with construction drawing details and/or to the satisfaction of the Contract Administrator.

.3 Corner and straining posts shall have braces on both sides.

3.7 INSTALLATION OF MID RAILS

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

.2 Mid rails for 4880 mm high fences shall be installed at a height of 2440 mm above the finished grade in accordance with construction drawing details and/or to the satisfaction of the Contract Administrator.

3.8 INSTALLATION OF GATES

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

.2 Gate frames shall be made from schedule 40 hot dip galvanized steel pipe; not less than 43 mm outside diameter, electrically welded at all joints with ample bracing to provide a rigid frame free from sag or twist.

.3 Gate height shall match the height of the fence unless otherwise specified.

.4 No. 9 gauge chain link fabric as specified in Clause 5.6 herein shall be attached to gate panels as described above. Top and bottom fabric selvage shall be knuckled.

.5 Gates shall be supplied and installed complete with hot dip galvanized malleable iron hinges, latches, chain holdbacks, and a gate latch suitable for padlock, which is accessible from either side. Gates 3000 mm or more in width shall have three hinges per section.

.6 Hinges shall permit the gate to swing back 180° degrees in line with the fence and shall be installed so as not to permit easy removal of the gate.

.7 If requested by the Contract Administrator, the Contractor shall supply shop drawings of all gates to be supplied prior to manufacture for the Contract Administrator's approval.

3.9 ZINC COATING REPAIRS

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

.2 All abraded and damaged galvanized surfaces shall be cleaned and painted. Damaged surface areas shall be thoroughly grinded or wire brushed and all loose and cracked zinc coating removed, after which the cleaned area shall be painted with two coats of a zinc pigmented paint approved by the Contract Administrator for these purpose.

3.10 CLEANING

.1 Clean and trim areas disturbed by operations. Dispose of surplus material as directed by Contract Administrator.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation of standard manufactured catalogue items such as bike racks, bollards, parking wheel stops, waste receptacles, tables, and benches.

1.2 RELATED SECTIONS

.1 Section 32 12 16 – Asphalt Paving

.2 Section 02 09 45 – Site Carpentry

.3 Section 03 30 01 – Site Works CIP Concrete

1.3 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.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management And Disposal and Section 01 35 20 – LEED Sustainability Requirements.

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

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

Part 2 Products

2.1 TABLE (NIC)

.1 MLPT401W, .92m wide, surface mounted, silver powdercoat finish as supplied by Maglin, - Maglin Site Furniture, Calgary, Alberta, phone 1-888-271-8666, www.maglin.com or approved equal.

2.2 BENCH (NIC)

.1 MLB700W, 1.78m long, surface mounted, silver powdercoat finish as supplied by Maglin, - Maglin Site Furniture, Calgary, Alberta, phone 1-888-271-8666, www.maglin.com or approved equal.

2.3 WASTE RECEPTACLE (NIC)

.1 MMLWR700-32-ST 32 gallon, flat lid, powdercoat finish as supplied by Maglin, - Maglin Site Furniture, Calgary, Alberta, phone 1-888-271-8666, www.maglin.com or approved equal.

2.4 BICYCLE RACK

.1 R-8240 SS 7 bicycle capacity (1.6m long) surface mount, stainless steel, galvanized finish as supplied by Reliance Foundry Co. Ltd., - Reliance Foundry Co. Ltd., Surrey, B.C., phone 1-888-735 5680, www.reliance-foundry.com or approved equal.

2.5 BOLLARDS

.1 R-8410-RA Fixed bollard, 35.5” high x 4.5” ø wide, powdercoat finish as supplied by Reliance Foundry Co. Ltd., Unit 207, 6450 – 148 Street Surrey, B.C., phone 1-888-735-5680, www.reliance-foundry.com, or approved equal.

.2 R-8412-RA Removable bollard, 35.5” high x 4.5” ø wide, powdercoat finish as supplied by Reliance Foundry Co. Ltd., Unit 207, 6450 – 148 Street Surrey, B.C., phone 1-888-735-5680, www.reliance-foundry.com, or approved equal.

2.6 PARKING BUMPER CURB

.1 Parking Bumper Curb as supplied by Barkman Concrete Ltd., phone Wayne Wiebe at (204) 667-3310 ext. 12, or approved equal.

.1 Dimensions:

- .1 Height: 5.5”
- .2 Width: 8”
- .3 Length: 96”
- .4 Finish: smooth

2.7 SCHEDULE OF FURNISHINGS

Item	Name	Quantity	Mounting
2.1 TABLE (NIC)	MLPT401W, Maglin Site Furniture, or approved equal.	3	Surface Mount
2.2 BENCH (NIC)	MLB700W, Maglin Site Furniture or approved equal.	3	Surface Mount
2.3 WASTE RECEPTACLE (NIC)	MLWR700W-32, Maglin Site Furniture, or approved equal.	3	Surface Mount
2.4 BICYCLE RACK	R-8240-SS, 7 bicycle capacity, Reliance Foundry Co. Ltd., or approved equal.	3	Surface Mount
2.5 BOLLARDS	R-8410-RA, Fixed bollard, Reliance Foundry Co. Ltd., or approved equal R-8412-RA, Removable bollard, Reliance Foundry Co. Ltd., or approved equal	6 1	Embedded Embedded
2.6 PARKING BUMPER CURB	Composite, Barkman Concrete Ltd., or approved equal	28	Pinned in place and glued with construction adhesive

Part 3 Execution

3.1 INSTALLATION

.1 Assemble furnishings in accordance with manufacturer's instructions.

.2 Install furnishings true, plumb, anchored and firmly supported.

.3 Touch-up damaged finishes to approval of the Contract Administrator.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 03 30 01 – Site Works CIP Concrete.

.2 Section 32 12 16 – Asphalt Paving.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
- .1 ASTMB209M-92a, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .2 ASTMB210M-92a, Specification for Aluminum-Alloy Drawn Seamless Tubes.
- .3 ASTMB211M-92a, Specification for Aluminum and Aluminum-Alloy Bar, Rods and Wire.

.2 Canadian Standard Association (CSA)
- .1 CAN/CSA-G40.21-M92, Structural Quality Steels.
- .2 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSAW47.2-M1987, Certification of Companies for Fusion Welding of Aluminum.

.3 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.94-M89, Xylene Thinner (Xylol).
- .2 CAN/CGSB-1.99-92, Exterior and Marine Phenolic Resin Varnish.
- .3 CAN/CGSB-1.104-M91, Semigloss Alkyd Air Drying and Baking Enamel.
- .4 CAN/CGSB-1.132-M90, Zinc Chromate Primer, Low Moisture Sensitivity.
- .5 CGSB1-GP-12c-65, Standard Paint Colours.
- .6 CGSB31-GP-3M-88, Corrosion Preventive Compound, Cold Application, Soft Film.
- .7 CGSB31-GP-101Ma-89, Chemical Conversion Films for Aluminum and Aluminum Alloys.

1.3 SUBMITTALS

.1 Samples:
- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit samples as described in Part 3 - Execution.

.2 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Fabrication and Installer: trained and qualified fabricators, fully certified to produce high quality, custom signage with a minimum of ten (10) years experience.

.2 All workmanship and all materials furnished and supplied under this Specification shall be of the highest standards and are subject to close and systematic inspection and testing by the Contract Administrator including all operations, from the selection of materials, through to final acceptance of the work. Strict conformance to the Specification will be enforced. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance the requirements of this Specification.

Part 2 Products

2.1 REFLECTIVE METAL SIGNS

.1 Aluminum Metal Panel: 0.80 thick metal plate, sign grade, aluminum panel 5052 H36 or H38, size and shape as indicated on signage schedule.

.2 Sheeting: 3M Brand Scotchlite Series 3200 Engineering Grade Reflective Sheeting, or equivalent, complete with permanent pressure sensitive adhesive backing. Sheeting to comply with ASTM D4956-90.

.3 Inks: Matched, UV stable, waterproof transparent inks as required. 3M Scotchlite 700 series, enamel baked ink system or approved equal.

.4 Artwork: standard and custom signs as per sign schedule.

.5 Mounting Hardware:
- .1 Schedule 40, 50 mm diameter steel posts conform to the Standard Specification for Hot Rolled Carbon Sheet Steel, structural quality. ASTM designation A570-79. Hot dipped galvanized sign posts.
- .2 Hot-dipped galvanized thru bolts capable of securely fixing signage in place. Sizes as noted on Drawings.
- .3 Anchor base matched to sign post for use in turf & concrete.

Part 3 Execution

3.1 REFLECTIVE METAL SIGNS FABRICATION AND INSTALLATION

.1 Send proofs of sign graphics and letters at 1:1 for Contract Administrator’s approval prior to fabrication.

.2 Debur, degrease, & etch edges of sign plates to accept reflective sheeting decals in accordance with decal manufacturer’s recommendations.

.3 Apply sheeting in accordance with manufacturer's written specifications. Decals shall be centred precisely on base plate. Trim sheeting to form clean, smooth edge along perimeter of base plates.

.4 Friction drive posts into compacted fill to depth recommended by manufacturer. If signs are to be installed along roadway they are to be located in adjacent concrete. See drawings for details.

.5 Mount to concrete with approved anchor system in accordance with manufacturers written instruction.

.6 Fasten signage with approved hardware. Confirm sign orientation and height on site with Contract Administrator.

3.2 TOUCH UP AND CLEAN-UP

.1 Clean any damaged surfaces with wire brush and coat with clear exterior zinc rich sealant.

.2 Dispose of surplus materials off site. Leave construction area clean and tidy.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 31 22 13 – Rough Grading

.2 Section 32 92 20 – Sodding.

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 Canadian Green Building Council (CaGBC)

.1 LEED Canada-NC Version 1.0-December 2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System For New Construction and Major Renovations.

.4 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 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 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 19 - Waste Management And Disposal and Section 01 35 20 – LEED Sustainability Requirements.

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

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

Part 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 **FERTILIZER**

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**.**

2.2 SOIL AMENDMENTS

.1 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.

.2 Sand: washed sand, medium to coarse textured.

.3 Organic matter: unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.

.4 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 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 utilized in preparing manufactured topsoil 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 of topsoil will be carried out by testing laboratory designated by Contract Adminsitrator.

.1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

.5 If soils are deemed deficient from testing, ensure that testing 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.

Part 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 SOIL AMENDMENTS

.1 For planting beds, seeding and sod : apply and thoroughly mix soil amendments into full specified depth of topsoil at the applicable rates determined by soil test.

3.5 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.

3.6 ACCEPTANCE

.1 The 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 not required off site as directed by the Contract Administrator.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 31 22 13 – Rough Grading

.2 Section 32 91 19 – Topsoil and Finish Grading

1.2 SCHEDULE OF WORK

.1 Coordinate the removal of weeds by herbicide application, cultivation of soil prior to commencing seeding operations.

.2 Schedule seeding for best results prior to June 1st or between August 25th and September 15th.

.3 Cultivate area to be seeded a minimum of 5 days and a maximum of 15 days after herbicide application has been completed.

.4 Seed after recommended number of days following the herbicide application (usually 15-30).

.5 Schedule work to be completed in one area before proceeding to next area.

1.3 PRODUCT DATA

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

.2 Provide product data for:
- .1 Seed

Part 2 Products

2.1 GRASS SEED

.1 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, and meeting the standard mix blend listed below. Seeding ratio rate of 1 kg/100 sq.m., as per the City of Winnipeg Standard Specification, CW 3520.
- .1 Seed Type 1 – all seeded areas
  - .1 85% Kentucky Bluegrass (100% Class 1 cultivars, 3 named cultivars in equal proportion) / Poa pratensis
  - .2 15% Perennial Rye Grass / Lolium perenne

Note: Substitutions for above must be approved by the Contract Administrator.

.2 In packages individually labeled in accordance with “Seeds Regulations” and indicating name of supplier and date bagged.

.3 Product data for seed:
- .1 Seed Analysis
  - .1 % of pure seed by weight.
  - .2 % of germination or % of pure living seed.
  - .3 Year of seed production.
- .2 Seed Tags Stating
  - .1 Date when tagged.
  - .2 Location.
  - .3 Weight.
  - .4 Name and address of distributor.
  - .5 % of seed variety by weight in seed mixture.

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 To Canada "Fertilizers Act" and "Fertilizers Regulations".

.2 Synthetic or organic slow release starter fertilizer with N-P-K analysis of ration 24-25-4, applied in an amount as recommended by written manufacturer's instructions.

2.5 EQUIPMENT

.1 All equipment shall be of a type approved by the Contract Administrator and shall be kept in good working order.

Part 3 Execution

3.1 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 as directed by the Contract Administrator.

3.2 FERTILIZING PROGRAM

.1 Fertilize areas to be seeded two (2) weeks or less, prior to seeding operations with starter fertilizer.

3.3 SEED BED PREPARATION

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

.2 Fine grade surface free of humps and hollows to smooth, even grade, to elevations indicated to tolerance of plus or minus 15 mm, with finished surface draining naturally.

.3 Cultivate and roll seeding bed prior to seeding.

3.4 SEED PLACEMENT

.1 The Contractor shall not commence seeding operations until the finished topsoil surface is reviewed and approved by the Contract Administrator.

.2 The Contract Administrator shall be notified minimum thirty-six (36) hours prior to commencing seeding, and will provide periodic monitoring of seeding operations. The Contractor is not to proceed with any Work under this section without the Contract Administrator's representative present on site.

.1 Sow all seed types using a "Brillion" type mechanical landscape seeder which accurately places seed at specified depth and rate and rolls in a single operation.

.3 Blend applications into existing adjacent grass areas to form uniform surfaces.

.4 Sow half of required amount of seed in one direction and remainder at right angles as applicable.

.5 Incorporate seed by light raking in cross directions.

.6 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.

.7 Seeding operations shall be completed within a 3-day (72 hour) period after the commencement of seeding operation.

.8 Provide temporary fencing, to protect seeded areas against damage. Remove this protection as directed by the Contract Administrator once seed has germinated and established.

3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following operations from time of installation until seeded area is ready for acceptance by the Contract Administrator.

.1 Water seeded area in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.

.2 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.

.3 Cut grass to 60 mm whenever it reaches height of 75 mm. Do not remove clippings.

3.6 FINAL ACCEPTANCE

.1 Acceptance of seeded areas is performance, not time-based. Areas will be amended or re-seeded until they meet the minimum standards in clause 3.6.2.

.2 Seeded areas will be accepted by Contract Administrator upon completion of the maintenance during establishment period, subject to the following requirements:

.1 Areas are uniformly established and turf is free of rutted, eroded, bare or dead spots and free of weeds.

.2 Areas have grown to full height and are filling in.

.3 Areas have been fertilized.

3.7 SITE CLEAN-UP

.1 All sidewalks, streets, approaches and driveways in the vicinity of the seeding operations shall be kept clean at all times by the Contractor.

.2 All excess material and debris shall be removed from the site immediately upon completion of the job.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 32 91 19 – Topsoil & Finish Grading

1.2 QUALITY ASSURANCE

.1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

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

.3 Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.3 SCHEDULING

.1 Schedule sod laying to follow immediately after completion of topsoil and finish grading.

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

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Divert unused fertilizer from landfill to official hazardous material collections site approved by the Contract Administrator, in accordance with Section 01 74 19 – Waste Management And Disposal and Section 01 35 20 – LEED Sustainability Requirements.

.2 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.

1.5 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 Contract Administrator. "Poor Condition” means sod that has yellowed or died out. The Contractor shall repair sod areas that are not in a satisfactory state of growth at the end of the warranty period to the satisfaction of, and without cost to the Contract Administrator.

.2 The Contractor will not be responsible for sod destroyed by vandalism or damaged by the work of other Contractors.

.3 Sod replacement shall be of the same quality as originally specified, and shall be supplied and planted in accordance with the drawings and specifications. Such replacement material shall also be subject to a full one (1) year warranty period.

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 as per the City of Winnipeg Standard Construction Specification, CW 3510.

.1 Turf Grass Nursery Sod types:

.1 Number One Kentucky Bluegrass Sod: Nursery Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass, containing no less than three (3) named dwarf varieties.

.2 Turf Grass Nursery Sod quality:

.1 Not more than two (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.

.2 Water:

.1 Supplied by the Contract Administrator at designated source.

.3 Fertilizer:

.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".

.2 Complete, synthetic, slow release with 65% of nitrogen content in water-insoluble form.

2.2 SOURCE QUALITY CONTROL

.1 Obtain approval from the Contract Administrator of sod quality at source.

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

Part 3 Execution

3.1 PREPARATION

.1 Verify that grades are correct and prepared in accordance with Section 32 91 19 - Topsoil & Finish Grading. 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 soil covered with snow, ice, or standing water.

.3 Fine grade surface free of humps and hollows to smooth, even grade, to elevations indicated on drawings, and to tolerance of plus or minus 8 mm for Turf Grass Nursery Sod, surface to drain naturally.

.4 Remove and dispose of weeds, debris, and stones 50mm in diameter and larger. Soil contaminated by oil, gasoline and other deleterious materials shall be removed off site.

3.2 SOD PLACEMENT

.1 Lay sod within 24 hours of being lifted if air temperature exceeds 20º 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 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 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 100mm.

.3 Cut grass to 50mm height when or prior to reaching 75mm height. Remove clippings which will smother grassed areas.

.4 Maintain sodded areas weed free for 95% of surface area.

.5 Fertilize areas in accordance with a fertilizing program. Spread half of required amount of fertilizer in one direction and spread the remainder at right angles and water in well.

3.5 ACCEPTANCE

.1 Turf Grass Nursery Sod areas will be accepted 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 a minimum of two (2) times prior to acceptance.

.2 Areas sodded in the fall will be reviewed in the following spring, one (1) month after start of growing season provided acceptance conditions are fulfilled.

3.6 MAINTENANCE FOLLOWING SODDING ACCEPTANCE

.1 Perform maintenance operations of sod for duration of one (1) month landscape maintenance period following Sodding Acceptance to the expiration of the maintenance period, as Specified in Section 32 93 11 Landscape Maintenance.

3.7 WARRANTY

.1 Provide a one (1) year warranty against deterioration, bare spots or damage from faulty materials or workmanship.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Supply and installation of trees, shrubs and groundcovers.

1.2 RELATED SECTIONS

.1 Section 32 91 19 –Topsoil and Finish Grading

.2 Section 32 93 11 – Landscape Maintenance

1.3 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.

1.4 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.

1.5 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.

1.6 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.

Part 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.

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

Part 3 Execution

3.1 PLANTING TIME AND WORKMANSHIP

.1 When planting deciduous plant material after buds have broken, spray plants with anti-desiccant 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.

3.2 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.

3.3 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.

3.4 TREE SUPPORT

.1 Support trees as shown on planting details.

.2 Staking for trees up to 3 m (10’) and evergreens up to 2 m (6.5’) in height: backfill planting hole 2/3, drive T-rail stake 900 mm (3’) into bottom of pit, taking care not to damage main roots. Place stake or anchor 150 mm (6”) away from trunk on side of prevailing wind. Fasten trunk to stake or anchor with tree-ring. Different methods of fastening tree trunk to stake or anchor are acceptable if no damage to bark of tree will occur. Obtain approval prior to using other methods.

.3 Guy wires for trees up to 150 mm (6”) calliper:

.1 For deciduous trees taller than 3 m (10’) and evergreen taller than 2 m (6.5’), fasten three wires to tree where a branch will prevent slipping down. Use tree rings to prevent abrasion of bark.

.2 Fasten wires to anchors at distance from tree base equal to height of where wire is attached to trunk. Install wire tighteners and tighten slightly.

.3 Where guy wires are used close to pedestrian traffic ways, fasten metal flags to wires to make them clearly visible.

.4 Use sufficient number of guy wires to support large shrubs.

3.5 PRUNING

.1 Prune trees after planting, as indicated, to compensate for loss of roots suffered during transplanting. Postpone pruning of those trees where heavy bleeding may occur, until in full leaf. Employ clean sharp tools and make cut flush with main branch, smooth and sloping as to prevent accumulation of water. Remove projecting stumps on trunks or main branches and branches that rub causing damage to bark. Trim out crown of trees and shrubs without changing their natural shape. Do not damage lead branches or remove smaller twigs along main branches. Treat cuts in excess of 20 mm (3/4”) diameter and damaged parts with application of wound dressing.

3.6 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.

3.7 MAINTENANCE

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 32 91 19 – Topsoil and Finish Grading.

.2 Section 32 92 20 – Sodding.

.3 Section 32 93 10 – Tree, Shrub and Groundcover Planting.

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 23 - 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 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. Forms shall be provided by the Contract Administrator.

1.5 WATER SUPPLY

.1 Supplied by the Contract Administrator at designated source.

Part 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.

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 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 mould".

.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 litres) of water per 25 mm calliper 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 vigour satisfactory to the Contract Administrator and to the standards specified in Section 32 93 10 – Trees, Shrubs and Groundcovers.

END OF SECTION