

PART E

SPECIFICATIONS

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS, STANDARD DETAILS AND DRAWINGS

E1.1 *The City of Winnipeg Works and Operations Division Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.

E1.1.1 Division 2 - Standard Provisions, Provision CW 1100 of *The City of Winnipeg Works and Operations Division Standard Construction Specifications* shall apply to the Work.

E1.1.2 Further to GC:2.4(d), Specifications included in the Tender Package shall govern over *The City of Winnipeg Works and Operations Division Standard Construction Specifications*.

E1.2 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing</u>
LD-2918	Strathmillan Road – Assiniboine River to 50m S. of Portage Ave.
LD-2919	Strathmillan Road – 50m S. of Portage Ave. to 9m N. of Portage Ave.
LD-2920	Strathmillan Road – 9m N. of Portage Ave. to 160m N. of Portage Ave.
LD-2921	Strathmillan Road – 160m N. of Portage Ave. to 98m S. of Lodge Ave.
LD-2922	Strathmillan Road – 98m S. of Lodge Ave. to 34m N. of Lodge Ave.
LD-2923	Site Plan – Proposed Easements, Removals and Site Grading
LD-2924	Planting Plan
LD-2925	Planting Details

E2. SOILS INVESTIGATION REPORT

E2.1 Further to GC:3.1, Test Hole logs are provided in Appendix “A”, attached to this specification. The Test Hole logs are provided to supplement the Contractors evaluation of the site conditions within the work area. The information is considered accurate at the locations indicated and at the time of the investigation. However, considerable variations in the soil conditions may exist between test holes and fluctuations in groundwater levels can be expected seasonally.

E3. SITE ACCESS AND WORK AREA

E3.1 Description

E3.1.1 This specification shall cover site preparation and clean-up and other contractor-related tasks required as a portion of the Works for this Contract.

E3.1.2 The work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, and all things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified

E3.2 Construction Methods

E3.2.1 Site Access and Egress

- (a) Access and Egress to and from the work area shall be limited to the street right of way, the right-of-way south of Portage Avenue and the easements indicated on the drawings. The Contractor shall be responsible for the development, maintenance and protection of the access routes to facilitate construction, removal of access routes, and restoration of all surface areas disturbed by construction.

- (b) The Contractor and Contract Administrator shall jointly inspect access route areas prior to the site preparation phase of the works (i.e. removal of existing trees and shrubs as required). The scope, nature, and limits of the site preparation shall be clearly documented
- (c) At the completion of all works under this Contract, the Contractor shall restore all areas affected by site access and egress outside of the easements and construction easements defined on the Construction Drawings at no cost to the City.
- (d) Should damage occur to areas outside the designated areas (paved and unpaved) the damage shall be restored in a manner consistent with the existing surface conditions and/or restorative concepts associated with this contract at no cost to the City. The Contract Administrator shall determine the limits and nature of restorative required, if damage occurs, and the Contractor shall carry out these works at his own expense.

E3.2.2 Use of Public Roads, Right-of-Ways and Easements

- (a) Maintenance During Construction
 - (i) It shall be the responsibility of the Contractor to keep public roads and right-of-ways and easements used by their construction activities and traffic, clean and maintained during the construction period.
 - (ii) Earth, gravel, sand or other construction materials spilled from hauling equipment onto public roads and right-of-ways and easements shall be picked up promptly and continuously at the Contractor's expense.
 - (iii) Any damage to public roads and right-of-ways easements caused by the Contractor's construction activities shall be repaired at the Contractor's expense as directed by the Contract Administrator or the authority having jurisdiction.

E3.2.3 Work Area Constraints

- (a) The limits of the existing work area are designated on the construction drawings. The Contractor shall note that the Assiniboine Riverbank is an environmentally sensitive area. Disturbance outside of the designated work area is strictly prohibited. All aspects of the Contractor's operations shall be carried out in such a manner so as to preclude damage occurring to areas outside the designated work area.
- (b) Should damage occur to areas outside the designated work the areas shall be restored in a manner consistent with the restorative concepts associated with this contract at no cost to the City. The Contract Administrator shall determine the limits and nature of restorative required, if damage occurs, and the Contractor shall carry out these works at his own expense.

E3.2.4 Right-of-Way between 2394 and 2398 Portage Avenue

- (a) The right-of-way between 2394 and 2398 Portage Avenue shall only be used for foot traffic, hand tools/equipment and small power equipment (e.g. skid steer loaders) during winter work (frost in the ground).
- (b) The Contractor shall make every attempt to minimize damage to existing sod, including but not limited to hauling and placing snow to protect the existing sod.
 - (i) At the completion of the work or prior to thawing, whichever occurs first, additional snow and any construction related debris should be scraped and removed from the area.
 - (ii) If any construction related debris is present after the spring melt, the entire area shall cleaned by power brooms/rakes as soon as the weather permits.
- (c) In the spring (non-frost conditions), construction equipment shall be limited to foot traffic and hand tools/equipment

- (i) If small power equipment (e.g. skid steer loaders) is required, protective matting or plywood should be used in the easement to protect the existing sod.
- (d) The Contractor shall be responsible for all costs associated with the repair of construction related damage outside of the right-of-way.
 - (i) All repairs shall be done to satisfaction of the Contract Administrator.

E3.2.5 2398 and 2394 Portage Avenue

- (a) The Contractor shall limit travel construction activity on 2398 Portage Avenue to the permanent and construction easements indicated on the drawings.
- (b) The Contractor shall make every attempt to minimize damage to existing sod within the easements, including but not limited to hauling and placing snow to protect the existing sod.
 - (i) At the completion of the work or prior to thawing, whichever comes first, additional snow and any construction related debris should be scraped and removed from area
 - (ii) If any construction related debris is present after the spring melt, the entire area shall be cleaned by power brooms/rakes as soon as the weather permits.
- (c) In the spring (non-frost conditions), construction equipment shall be limited to foot traffic and hand tools/equipment
 - (i) If small power equipment (e.g. skid steer loaders) is required protective planking and/or plywood should be used to protect the existing sod.

E3.2.6 2400 Portage Avenue

- (a) The Contractor shall limit construction equipment travel on 2400 Portage Avenue to the construction easement indicated on the drawings.
 - (i) At no time shall parking stalls be blocked, except for the three stalls in the south east corner of the parking lot, within the construction easement.
 - (ii) The Contractor shall delineate the construction easement by installing traffic cones during working hours. The traffic cones shall be removed during non-working times.
- (b) The construction easement shall not be available for the Contractor's use on Sundays or during funeral services or special masses.
 - (i) The Contractor will be notified prior to funeral services and the construction easement shall not be available for the Contractor's use from two hours before funeral services or special masses, until one hour after.
- (c) The construction easement shall be kept free debris at all times.
- (d) The Contractor shall be responsible for snow clearing from the entire east parking lot during working hours.
- (e) The Contractor shall be responsible for removing snow stockpiles from snow clearing (by others) if the stockpiles affect the work or access and travel in the construction easements.
- (f) The construction easement shall only be used to transport equipment and materials between Portage Avenue and the construction easement on 2398 Portage Avenue.
- (g) No equipment or material shall be parked or stored on the construction easement or any other area of 2400 Portage Avenue at any time.
- (h) No equipment or material shall be parked or stored on Portage Avenue north of 2400 Portage Avenue at any time, signing in accordance with the "Manual of Temporary Traffic Control" excepted.

- (i) No tracked equipment shall be driven directly on the pavement surface within the construction easement. Only rubber tired equipment may be driven directly on the pavement surface.
- (j) The Contractor shall be responsible for all costs associated with the repair of construction related damage outside of the construction easement.
 - (i) All repairs shall be done to satisfaction of the Contract Administrator.

E3.2.7 Cofferdam (Working Platform) Requirements

- (a) Material deposited for cofferdam construction shall be placed in such a manner that it can be completely removed and disposed of subsequent to construction or remains part of the permanent works. The riverside face of the cofferdam shall be protected against erosion by placing a turbidity curtain or clean 75mm rock armour. Under no circumstances shall material be disposed of within the natural river channel. The Contractor shall take such steps as are necessary to ensure the river channel is returned to the elevation and condition it was in prior to construction.

E3.3 Method of Measurement and Basis of Payment

E3.3.1 Site Access and Work Area

- (a) There shall be no measurement for payment for any items of associated with the development and maintenance of site access and work area other than measurement and payment for sod and pavement restoration within the easements and right-of-way and the specified re-vegetation on the riverbank.
- (b) The Contractor shall be responsible for all costs associated with the repair of construction related damage outside of the easements.
 - (i) All repairs shall be done to satisfaction of the Contract Administrator.

E3.3.2 Cofferdam

- (a) Construction of the cofferdam shall be measured on a unit basis.
- (b) Payment shall be compensation in full for the supply of all materials and performing all operations to construct and remove the cofferdam as specified herein including items incidental to the Works.

E3.3.3 Protection of Trees

- (a) No measurement will be made for protection of trees. It shall be considered incidental to the work.

E4. EXCAVATION AND BACKFILL

E4.1 Disposal of Unsuitable or Surplus Excavated Material

- (a) If the Contractor has not arranged for an approved disposal site, the City shall provide an optional disposal site for all surplus clean clay from the construction site. The material is not to include any refuse, concrete, metals, wood, organics, construction waste or any other deleterious materials. Any surplus soil material not meeting these requirements shall not be considered clean clay and shall not be permitted.
- (b) The disposal location provided by the City will be at the Summit Road Landfill Site. The Contract Administrator will make arrangements with Colin Potter (986-4463) at the landfill site for the disposal of the surplus soil material.
- (c) There will be no tipping fees charged at the landfill sites to the Contractor for the disposal of surplus soil material meeting the requirements of clean clay as specified.
- (d) Surplus material not meeting the requirements of clean clay may be disposed of at the Brady Road Landfill Site although tipping fees will be charged.

- (e) There shall be no measurement of surplus soil material disposed of at any disposal site. No additional payment will be made for disposal of surplus soil materials. It shall be considered incidental to the cost of the Work.

E4.2 Foundation, Bedding and Backfill

- (a) Type 3 foundations shall be used in all shafts.
- (b) Type 3 bedding and initial backfill shall be used in place of sand in all shafts.
- (c) Shafts located within paved areas shall be backfilled with Class 1 backfill.
- (d) During winter construction, where frozen backfill is used and/or flood tamping is not possible, the cement stabilized fill portion of the Class 1 backfill shall extend to the pavement or ground surface.
 - (i) Cement stabilized fill placed during winter construction shall be completely removed and the remaining backfill shall be flooded, tamped and topped up prior to performing permanent pavement or boulevard restorations.
- (e) Class 1 Backfill shall be used on Portage Avenue in conjunction with permanent surface restorations.
- (f) Class 3 backfill shall be used in any shafts between station 0+986 and the south property line of Portage Avenue.
- (g) Class 4/5 backfill shall be used in the shaft for the CS/LDS interconnection at station 0+884 to 0+888, if required.

E5. DND FORCEMAIN

- E5.1 Use only products listed as Approved Products for Underground use in the City of Winnipeg.
 - (a) The valve box lids shall be marked with an "S" to indicate sewer valve.
- E5.2 Construction methods shall be in accordance with CW2110-R6.
 - (a) The tie-in to DND's forcemain will require coordination with DND and the operation of their sewage treatment plant.
 - (b) The Contractor shall provide a minimum of five (5) working days notice to the Contract Administrator before tying into the forcemain.
- E5.3 Forcemain installation shall be measured on unit basis and shall include all excavation, bedding and backfill, materials and operations, and paid at the contract unit rate for "Forcemain Connection". One unit shall be paid and shall be for the supply and installation of all materials, including valves, piping, connections, thrust blocks and restraints, as required to complete the work as indicated on the drawings.

E6. GRAVITY SEWERS

E6.1 Construction Methods

E6.1.1 Trenchless Construction

- (a) Construction of a 1350mm Storm Relief/Land Drainage Sewer and Outfall from the Assiniboine River to the public Lane north of Portage Avenue on Strathmillan Road or a projection thereof shall be by trenchless. Some or all of the trenchless construction will have to take place through adverse soil including silt (till), sand, gravel, cobbles and high groundwater conditions.
- (b) South of Portage Avenue, most of the sewer will be constructed within an existing 6.096m right-of way and no shafts will be permitted between station 0+855 and

0+986, except for at the CS/LDS interconnection at station 0+884 to 0+888, if required. Also, no shafts will be permitted between station 0+999 and 1+003.

- (c) Protection of the existing cottonwood tree at station 0+981 and existing trees and vegetation on the riverbank are critical to the overall success of the project.
- (d) Construction of a 1050mm Land Drainage Sewer on Strathmillan Road from the Public Lane north of Portage Avenue to Lodge Avenue by trenchless methods. Some or all of the trenchless construction will have to take place within adverse soil conditions, including silt (till) and sand, gravel and cobbles.
- (e) Prior to the commencement of construction, the Contractor will be responsible to prepare a submission on Construction Method for the review and approval of the Contract Administrator. Review and approval of the Contractor's proposed construction method shall in no way relieve the Contractor of responsibility for successful execution of the work in accordance with the Contract Documents.
- (f) The Contractor's submission on Construction Methodology must address the following minimum considerations:
 - (i) Proposed method of construction.
 - (ii) Operational controls to prevent damage occurring to adjacent properties.
 - (iii) Operational controls to prevent damage occurring to adjacent utilities.
 - (iv) Specialized equipment employed for use.
 - (v) Additional design considerations as a result of the Contractor's proposed construction method.
 - (vi) Any design revisions required to accommodate the Contractor's proposed construction method.
 - (vii) Water control considerations including details on the Contractor's proposed method of groundwater control (if applicable).
 - (viii) Other concerns that may be raised by the Contract Administrator in response to the Contractor's submission.
- (g) No work shall commence on this portion of the project until review and approval of the Contractor's Submission on Construction Methodology.

E6.1.2 Plugging and Abandoning Existing Sewers and Sewer Services

- (a) Abandonment of the existing 900 combined sewer outfall shall include construction of concrete plugs (Type B concrete as per CW2160-R5) 1000 thick.

E6.1.3 New Manhole Installation on Existing Sewers

- (a) Manholes installed on existing sewers or replacing existing manholes shall be done in accordance with CW2130-R7 Clause 3.9.

E6.1.4 Removal of Existing Comminuter and Junction Chambers

- (a) The existing comminuter and junction chambers shall be fully demolished and removed in accordance with CW2130-R7 Clause 3.2.
- (b) Record drawings for the existing chambers are in Appendix B of the Specifications.

E6.2 Measurement and Payment

E6.2.1 Connect to Existing Sewers

- (a) Connection to the existing sewers including pipe and couplings/collars will be included in the new manhole on existing sewer installations.

E6.2.2 Removal of Existing Comminuter and Junction Chambers

- (a) Measurement shall be on a unit basis. They shall be paid for at the Contract Unit Price per unit, measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

E7. OUTFALL WORKS

E7.1 Description

E7.1.1 Geotextile

- (a) Geotextile shall be a non-woven geotextile fabric, meeting of exceeding the following properties:

NON-WOVEN PROPERTIES			
	ASTM Test Method	Units	Minimum Average Roll Values
PHYSICAL			
Grab Tensile Strength	D-4632	N	890
Grab Tensile Elongation	D-4632	%	50
Mullen Burst	D-3786	kPa	2750
Puncture	D-4833	N	575
Trapezoidal Tear	D-4533	N	355
UV Resistance	D-4355	% @ hrs ¹	70/500
HYDRAULIC			
Apparent Opening Size	D-4751	mm	0.150
Permitivity	D-4491	sec ⁻¹	1.4
Flow Rate	D-4491	L/sec/m ²	54

¹ Percent grab tensile strength retained per hours of UV exposure following conditioning in accordance with ASTM D-4355.

E7.1.2 Riprap for Outfall Works

- (a) Rock for riprap shall be fieldstone as per Clause 5.2 of CW 3615-R2 or quarried limestone.
- (b) Limestone supplied as an equal to fieldstone for use as riprap must conform to the following physical requirements:
- (i) minimum bulk specific gravity of 2.6 (ASTM C127)
 - (ii) maximum Los Angeles abrasion loss of 35% (ASTM C131)
 - (iii) maximum soundness loss of 13% (ASTM C88)
- (c) Rock for use in random stone riprap (whether fieldstone or limestone) shall be well graded with rock ranging in size as follows:
- (i) below normal summer water level (NSWL), 100mm to 450mm diameter with at least 75% ranging from 250mm to 450mm in diameter
 - (ii) above normal summer water level, 75mm to 200mm diameter with at least 75% ranging from 150mm to 200mm in diameter

E7.1.3 Outfall Bar Screen and Pipe Restraints

- (a) Materials for the outfall bar screen and pipe restraints shall be as noted on the Construction Drawings. All materials shall be hot dip galvanized.

- E7.1.4 Galvanized Primer
- (a) Galvanized primer for repair of coating shall be zinc rich, ready mix to CGSB-1-GP-181M.
- E7.1.5 Geotextile Filter Fabric
- (a) Install geotextile under all riprap.
 - (b) Install geotextile filter fabric to encase all open trench excavations for pipe installation as indicated on the drawings. Install fabric between outer limits of excavation and granular bedding and backfill material. Ensure trench fully encased on top, bottom, sides, and at limits of excavation.
 - (c) Install long dimension of fabric perpendicular to trench overlapping joints a minimum of 600 mm.
- E7.2 Measurement and Payment
- E7.2.1 Geotextile Fabric
- (a) No measurement shall be made. It shall be incidental to the price paid for random stone riprap.
- E7.2.2 Outfall Bar Screen and Pipe Restraints
- (a) Measurement shall be on a lump sum basis. Construction of the outfall bar screen and pipe restraints shall be paid for at the Contract Lump Sum Price, measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.
- E7.2.3 Bevelled End Section
- (a) No measurement shall be made. It shall be incidental to the price paid for 1350 land drainage sewers

E8. WATERWAY BY-LAW

- E8.1 Description
- E8.1.1 This Specification covers activities relating to work within the Waterway By-Law jurisdiction.
- E8.2 Construction Procedures
- E8.2.1 The Contractor shall note that all works within 107 m (350 feet) of the riverbank are within the jurisdiction of the Waterway By-Law. The Waterways Permit for construction shall be provided to the Contractor. The Contractor shall adhere to restrictions imposed by the said permit.
- E8.2.2 Under no circumstances will stockpiling of any material be permitted on the riverbank areas. Stockpiling of materials at locations or quantities that could jeopardize bank stability shall not be permitted.

E9. ENVIRONMENTAL PROTECTION

- E9.1 The Contractor shall be aware that the Assiniboine Riverbank is an environmentally sensitive watershed and ecosystem. No contamination by fuel, chemicals, etc. shall be permitted at any time. Fuels or chemicals shall not be stored within 30 metres of the designated work area or in any area that would compromise the local ecosystem.

- E9.2 The Contractor shall plan and implement the Work of this Contract strictly in accordance with the requirements of the environmental protection measures proscribed by law and as specified herein.
- E9.3 The Contractor is advised that at least the following Acts, Regulations, and By-laws apply to the Work.
- E9.3.1 Federal
- (a) Canadian Environmental Protection Act, 1999
 - (b) Transportation of Dangerous Goods Act and Regulations, 1992
 - (c) Fisheries Act
- E9.3.2 Provincial
- (a) The Dangerous Goods Handling and Transportation Act D12
 - (b) The Endangered Species Act E111
 - (c) The Environment Act E125
 - (d) The Fire Prevention Act and Emergency Response F80
 - (e) The Nuisance Act N120
 - (f) The Public Health Act P210
 - (g) The Workplace Safety and Health Act W210
 - (h) And current applicable associated regulations.
- E9.4 The Contractor is advised that the following environmental protection measures apply to the Work.
- E9.4.1 Fuel Handling and Storage
- (a) The Contractor shall abide by the requirements of Manitoba Conservation for handling and storage of fuel products.
 - (b) All fuel handling and storage facilities shall comply with The Dangerous Goods and Transportation Act, Storage and Handling of Petroleum Products Regulation and any local land use permits.
 - (c) Fuels, lubricants, and other potentially hazardous materials as defined in The Dangerous Goods and Transportation Act shall be stored and handled within the approved storage areas.
 - (d) The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage.
 - (e) Products transferred from the fuel storage area(s) to specific work sites shall not exceed the daily usage requirement.
 - (f) When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheet of suitable material (such as HDPE) and size shall be spread on the ground to catch the fluid in the event of a leak or spill.
 - (g) Refueling of mobile equipment and vehicles shall take place at least 30 metres from a watercourse.
 - (h) The area around storage sites and fuel lines shall be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.
 - (i) A sufficient supply of materials, such as absorbent material and plastic oil booms, to clean up minor spills shall be stored nearby on-site. The Contractor shall ensure that additional material can be made available on short notice.

E9.4.2 Waste Handling and Disposal

- (a) The construction area shall be kept clean and orderly at all times during and at completion of construction.
- (b) At no time during construction shall personal or construction waste be permitted to accumulate for more than one day at any location on the construction site, other than at a dedicated storage area as may be approved by the Contract Administrator.
- (c) Indiscriminate dumping, littering, or abandonment shall not take place.
- (d) No on-site burning of waste is permitted.
- (e) Equipment shall not be cleaned near watercourses; contaminated water from onshore cleaning operations shall not be permitted to enter watercourses.

E9.4.3 Dangerous Goods/Hazardous Waste Handling and Disposal

- (a) Dangerous goods/hazardous waste are identified by, and shall be handled according to, The Dangerous Goods Handling and Transportation Act and Regulations.
- (b) The Contractor shall be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.

E9.4.4 Emergency Spill Response

- (a) The Contractor shall ensure that due care and caution is taken to prevent spills.
- (b) The Contractor shall report all major spills of petroleum products or other hazardous substances with the potential for impacting the environment and threat to human health and safety to the Contract Administrator and Manitoba Conservation, immediately after occurrence of the environmental accident, by calling the 24-hour emergency telephone number (204) 944-4888.
- (c) The Contractor shall designate a qualified supervisor as the on-site emergency response coordinator for the project. The emergency response coordinator shall have the authority to redirect manpower in order to respond in the event of a spill.
- (d) The following actions shall be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on-site emergency response coordinator:
 - (i) Notify emergency-response coordinator of the accident:
 - (ii) identify exact location and time of accident
 - (iii) indicate injuries, if any
 - (iv) request assistance as required by magnitude of accident (Manitoba Conservation 24-hour Spill Response Line (204) 944-4888, Police, Fire Department, Ambulance, company backup)
 - (v) Assess situation and gather information on the status of the situation, noting:
 - personnel on site
 - cause and effect of spill
 - estimated extent of damage
 - amount and type of material involved
 - proximity to waterways
 - (vi) If safe to do so, try to stop the dispersion or flow of spill material:
 - approach from upwind
 - stop or reduce leak if safe to do so
 - dyke spill material with dry, inert sorbent material or dry clay soil or sand
 - prevent spill material from entering waterways and utilities by dyking
 - prevent spill material from entering manholes and other openings by covering with rubber spill mats or dyking

- (vii) Resume any effective action to contain, clean up, or stop the flow of the spilled product.
- (e) The emergency response coordinator shall ensure that all environmental accidents involving contaminants shall be documented and reported to the Manitoba Conservation according to The Dangerous Goods Handling and Transportation Act Environmental Accident Report Regulation 439/87.

E10. TREE AND SHRUB REMOVALS, GRUBBING AND BUILDING MATERIAL RELOCATION

E10.1 Description

- E10.1.1 This Specification shall amend and supplement Standard Specification CW 3010-R4, "Clearing and Grubbing".

E10.2 Construction Methods

E10.2.1 Tree and Shrub Removals and Grubbing of Roots

- (a) Contractor shall remove all above ground plant structures grub roots where plant material is noted for removal on the Construction Drawings. Grubbing to be in accordance with CW 3010-R4 with the following provisions:
- (b) All woody material suitable for use as wood chips shall be removed from the site to be chipped for wood chip mulch.

E10.2.2 Building Material Relocation/Removal

- (a) Existing building materials within the designated work area shall be removed and/or relocated as per the direction of the Contract Administrator.

E10.2.3 Relocation of Bird Feeder

- (a) The Contractor shall take all care in removing and reinstalling the existing bird feeder to the final location as indicated on the Construction Drawings. Repair any damage caused in reinstalling the bird feeder.
- (b) Prior to the relocation the condition of the bird feeder will be documented by the Contractor and Contract Administrator.

E10.3 Method of Measurement and Basis of Payment

E10.3.1 Removal of Trees and Shrubs

- (a) Removal of trees and shrubs will be measured on a unit price basis for each tree and shrub removed in accordance with the Construction Drawings and these Specifications. There shall be no separate measurement for chipping.
- (b) Payment will made at the Contract Unit Prices bid for "Removal of Large Trees, including Stumps" and "Removal of Small Trees and Shrubs ", which payments shall be considered compensation in full for the supply of all materials and the performing of all operations necessary to complete the work as specified including any items incidental to the work.

E10.3.2 Relocation of Building Materials

- (a) Relocation of building materials will be measured on a lump sum basis for relocation of all material on or from the site in accordance with the Construction Drawings and these Specifications. There shall be no separate measurement for restoration.
- (b) Payment will made at the Contract lump sum price bid for "Relocation of Building Materials", which payment shall be considered compensation in full for the relocation/removal of all materials and the performing of all operations necessary to complete the work as specified including any items incidental to the work.

- E10.3.3 Relocation of Bird Feeder
- (a) Relocation of the existing bird feeder will be measured on a lump sum basis for complete removal of the existing bird feeder and reinstallation in the new location indicated on the Construction Drawings in accordance with these Specifications.
 - (b) Payment will be made at the Contract lump sum price bid for "Relocation of Bird Feeder", which payment shall be considered compensation in full for the provision of all materials and the performing of all operations necessary to complete the work as specified including any items incidental to the work.

E11. CLAY AND GRANULAR FILL CONSTRUCTION

E11.1 Description

- E11.1.1 This Specification shall amend and supplement CW 3110-R5 "Sub-grade, Sub-base and Base Course Construction" and shall provide for the supply and installation of granular fill material for the restoration of the existing outfall area, and base course for turfstone paving.

E11.2 Materials

E11.2.1 Clean Clay Fill

- (a) Use clean, non-frozen clay material free of concrete rubble, debris, large stones and large roots, or other deleterious materials.

E11.2.2 Granular Fill

- (a) Crushed stone material shall conform to CW 3110-R5 and the following:
 - (i) For riverbank restoration, gradation shall be 75mm clean crushed limestone.
 - (ii) For turfstone area use 50 mm down crushed limestone subbase.

E11.3 Construction Methods

E11.3.1 Clean Clay Fill

- (a) Install clean clay fill in location as specified on the Construction Drawings. Material placement and grading shall conform to CW3110-R5.
- (b) Compact clean clay fill to minimum 90% Standard Proctor Density prior to installation of topsoil.

E11.3.2 Riverbank Granular Fill Placement and Grading

- (a) Material placement and grading shall conform to CW 3110-R5. The finished grade at the top of the fill area will be as indicated on the Construction Drawings.

E11.3.3 Turfstone Granular Base Material Placement, Grading and Compaction

- (a) Install 150 mm of granular base under turfstone areas. Evenly grade base material to tolerance of 5 mm. Compact granular base to 98% Standard Proctor Density prior to installation of turfstone.

E11.4 Method of Measurement and Basis of Payment

E11.4.1 Installation of Fill Material

- (a) The construction of the clean clay fill and 75 mm crushed limestone fill on the riverbank will be measured on a volume basis as per Clause 12.6 of CW 3110-R5. There shall be no separate measurement for excavation, grading and compaction.
- (b) Payment will be made at the contract cubic metre price bid for "Clean Clay Fill" and "75 mm Crushed Limestone", which payment shall be considered compensation in full for

the supply of all materials and the performing of all operations necessary to complete the work as specified including any items incidental to the work.

E11.4.2 Granular Base for Turfstone

- (a) Construction of Turfstone granular base course will be incidental to the construction of "Turfstone complete with Granular Base, Topsoil and Seeding".

E12. FASCINES AND BRUSHMATTRES

E12.1 Description

- E12.1.1 This Specification shall cover all aspects of the contract related to supply and installation of willow fascines and brushmattress.

E12.2 Construction Methods

E12.2.1 General

- (a) The Contractor shall stake the location, supply, install and guarantee the growth of all fascines and brushmattress.

E12.2.2 Fascine and Brushmattress Construction

- (a) Source material is to be collected from approved locations. The Contractor shall identify sources for approval by the Contract Administrator as required. The Contractor must flag all proposed material for approval by the Contract Administrator prior to collection.
- (b) Acceptable species for fascines and brushmattress shall be *Salix* sp. as indicated on the Construction Drawings, particularly *Salix exigua*, *Salix discolor* and *Salix bebbiana*. The Contractor may request alternates and alternate source locations for approval of the Contract Administrator prior to construction. The Contractor is to assess source sites prior to commencement of construction.
- (c) The Contractor shall collect no more than forty percent (40%) of the willow source material from one site and/or each source plant.
- (d) The Contractor shall supply and install all fascines and brushmattress as per the plans and details noted on the Construction Drawings. Topsoil and scarification shall be as per E13 for the supply and installation of topsoil. Geotextile for use with brushmattress, only, shall be North American Green C125 or approved equal, installed to manufacturer's specifications.
- (e) All material shall be dormant when collected and shall be installed within eight hours of collection. All material shall be kept moist until installation and shall be watered in after topsoil installation. Live cuttings shall not be placed once they have broken bud.
- (f) Topsoil shall be installed around all fascines and brushmattress. No voids will be allowed. The Contractor shall return to the site within one week of initial installation and apply additional topsoil to fascines and brushmattress and water in as required to ensure no voids are left. The Contractor shall apply additional topsoil after any flooding, if required.

E12.3 Method of Measurement and Basis of Payment

E12.3.1 Fascines

- (a) The supply and installation of fascines will be measured on a length basis. Measurement will be made horizontally at grade along the centreline of the area designated for fascine installation. Payment will be made at the contract unit price bid per lineal metre for "Fascines", which payment shall be considered compensation in

full for the supply of all materials and the performing of all operations necessary to complete the work as specified including any items incidental to the work.

E12.3.2 Brushmatress

- (a) The supply and installation of brushmatress will be measured on an area basis. Payment will be made at the contract unit price bid per square metre for "Brushmatress", which payment shall be considered compensation in full for the supply of all materials and the performing of all operations necessary to complete the work as specified including any items incidental to the work. There will be no separate payment for geotextile netting used with brushmatress.

E13. TOPSOIL INSTALLATION

E13.1 Description

- E13.1.1 This Specification shall amend and supplement City of Winnipeg Standard Specification CW 3540-R2 Topsoil and Finish Grading and shall cover all phases of supply and installation of topsoil and finish grading.

E13.2 Quality Control

E13.2.1 Testing and Samples

- (a) Submit to the Contract Administrator analyses of imported topsoil obtained for at least three separate samples of the supplied topsoil. The analysis shall be carried out by a qualified soil testing laboratory and shall include the percentage of organic material by weight, as well as recommendations for fertilizers and/or other soil ameliorants.
- (b) Topsoil testing shall determine N, P, K, Na, Cl, Ca, Mg, organic matter, C.E.C., pH, bulk density and C/N ratio.

E13.2.2 Delivery and Storage

- (a) Deliver and store fertilizer in waterproof bags showing weight, analysis and name of manufacturer.

E13.3 Materials

E13.3.1 Imported topsoil and fertilizer

- (a) Imported topsoil and fertilizer shall conform to CW 3540-R2.

E13.3.2 Peatmoss

- (a) Peatmoss shall be derived from partially decomposed species of Sphagnum Mosses, elastic and homogenous, brown in colour; free of decomposed colloidal residue, wood, sulphur and iron or other deleterious material which could affect healthy plant growth; containing a minimum 60% organic matter by weight, and moisture content not exceeding 15%. Shredded particles may not exceed 5 mm in size. Minimum pH value of peat, 4.5; maximum, 7.0.

E13.3.3 Bonemeal

- (a) Bonemeal shall be raw bonemeal, finely ground with a minimum analysis of 3% nitrogen and 20% phosphoric acid.

E13.3.4 Sand

- (a) Sand shall be medium to coarse textured silica sand to CSA A82.56-M1976, well washed and free of impurities, chemical or organic matter.

- E13.3.5 Soil Mixture for Planting Trees, Shrubs, and Herbaceous Material in Planting Beds
- (a) For planting trees, shrubs, and herbaceous material, mix topsoil with 20% peatmoss loose by volume.
 - (b) Incorporate 20% sand, loose by volume, to improve soil texture.
 - (c) Incorporate bonemeal into planting soil at rate of 3 kg/m³ of soil mixture.
- E13.3.6 Erosion Control Blanket
- (a) Erosion Control Blanket shall be North American Green C350 Long-term Erosion Protection
- E13.4 Construction Methods
- E13.4.1 Preparation of Existing Grade
- (a) Rough grading shall be within 50 mm of the mud grade required prior to topsoil placement.
 - (b) Preparation of the existing grade shall conform to Clause 9.1 of CW 3540-R2 except that the areas to receive topsoil shall be cultivated to a minimum depth of 150 mm.
- E13.4.2 Planting Bed Locations
- (a) Final planting bed locations shall be laid out by the Contractor and approved by the Contract Administrator. The configuration may vary slightly from the locations noted on the Construction Drawings.
- E13.4.3 Placing of Planting Soil Mixture
- (a) Planting soil mixture shall be installed in all riverbank, shrub planting bed and garden areas.
 - (b) Planting soil mixture shall be raked smooth and rolled lightly, prior to installation of plantings.
- E13.4.4 Placing of Topsoil
- (a) Topsoil shall be installed to a 200 mm depth in brushmattress areas, and areas with erosion control blanket
 - (b) Topsoil under brushmattress and in areas with erosion control blanket shall be raked smooth and rolled. Topsoil finish for riverbank area shall be slightly undulating to create microclimates for the plant material.
- E13.4.5 Fertilizer
- (a) Fertilize trees. Use slow-release organic fertilizers (nitrates and phosphates).
 - (b) Apply fertilizer at rates determined by the soil analyses.
- E13.4.6 Erosion Control Blanket
- (a) The Contractor shall supply and install North American Green C350 Erosion Control Blanket or approved equal, in the riverbank planting areas and disturbed areas of the riverbank.
 - (b) Install erosion control blanket to manufacturer's specifications. The Contractor shall supply a sample to the Contract Administrator for approval prior to installation.
- E13.5 Method of Measurement
- E13.5.1 Preparation of Existing Grade
- (a) Preparation of the existing grade shall be measured on an area basis.

- (b) Payment will be made at the Contract Unit Price bid per square metre for "Rough Grading", which payment shall be considered compensation in full for the supply of all materials and the performing of all operations necessary to complete the work as specified including any items incidental to the work

E13.5.2 Planting Soil Mixture and Topsoil Placement

- (a) Planting soil mixture and topsoil placement shall be incidental to installation of sod; restoration seeding, and turfstone and seed.

E13.5.3 Erosion Control Blanket

- (a) The supply and installation of erosion control blanket shall be measured on an area basis.
- (b) Payment will be made at the Contract Unit Price bid per square metre for "Erosion Control Blanket", which payment shall be considered compensation in full for the supply of all materials and the performing of all operations necessary to complete the work as specified including any items incidental to the work.

E14. TREES, SHRUBS AND HERBACEOUS PLANTINGS

E14.1 Description

- E14.1.1 This Specification shall deal with the supply and installation of trees, shrubs, and herbaceous plantings in areas as indicated on the Construction Drawings, including: preparation, digging, transport and planting.

E14.2 General

E14.2.1 Nomenclature

- (a) Nomenclature of specified nursery stock and collected plantings shall conform to the International Code of Nomenclature for Cultivated Plants and shall be in accordance with the approved scientific names given in the latest edition of Standardized Plant Names. The names of varieties not named therein are generally in conformity with the names accepted in the nursery trade.

E14.2.2 Source Quality Control

- (a) All plant material specified within this project shall be either machine dug or containerized nursery stock and/or collected field potted native stock. All plants shall be from the riverbanks in the Winnipeg area in the Oak-Aspen Forest Ecoregion.
- (b) All nursery stock supplied shall be nursery grown and of species and sizes as indicated on the Construction Drawings. Stock shall be No. 1 Grade material in accordance with the current edition of Landscape Canada's "Guide Specifications for Nursery Stock".
- (c) All containerized whips and herbaceous plant material shall have a minimum of one full year's growth. Roots shall be healthy, reaching the sides of the container and be developed such that the root ball can be kept intact during transplanting. Roots shall not encircle each other to the extent of inhibiting plant growth.
- (d) Any nursery stock dug from native stands, wood lots, orchards, or neglected nurseries, which have not received proper cultural maintenance, shall be designated as "collected plants". Material sources are to be approved by Contract Administrator prior to ordering or collecting. The Contractor shall provide all of the necessary nursery certificates to ensure that the plant species comply with this specification.
- (e) Notify Contract Administrator of source of plant material at least 7 days in advance of shipment.

- (f) Acceptance of plant material at source does not prevent rejection of same plant material on site prior to or after planting operations.
- (g) The Contract Administrator retains the right to delete one or more specified of containerized/potted planting bed material to facilitate the completion of the contract. The total quantity of containerized/potted planting bed material will remain as indicated on the plans.

E14.2.3 Shipment and Pre-Planting Care

- (a) Coordinate shipping of plants and excavation of holes to ensure minimum time lapse between digging and planting.
- (b) 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, which would damage bark, break branches or destroy natural shape of plant. Give full support to root balls, especially of larger trees, during lifting.
- (c) Cover plant foliage with tarpaulin, and protect bare roots by means of dampened straw, peat, saw dust or other acceptable material to prevent loss of moisture during transit and storage.
- (d) Remove broken and damaged roots with sharp pruning shears. Make clean cut and cover cuts over 50 mm diameter with wound dressing.
- (e) Keep roots moist and protected from sun and wind. Heel-in trees and shrubs that cannot be planted immediately in shaded areas, and water well.

E14.2.4 Replacement

- (a) During the two-year period following completion of planting operations, the Contractor shall remove and replace from site any plants that have died or failed to grow satisfactorily, as determined by the Contract Administrator.

E14.3 Materials

E14.3.1 Water

- (a) Water shall be potable and free of minerals detrimental to plant growth.

E14.3.2 Fertilizer

- (a) Fertilizer shall be slow release organic. Fertilizer shall contain N-P-K in ratio as recommended by soil test results.

E14.3.3 Root Ball Burlap

- (a) Root ball burlap shall be 150 g Hessian burlap.

E14.3.4 Anti-Desiccant

- (a) Anti-desiccant shall be wax-like emulsion to provide film over plant surfaces reducing evaporation but permeable enough to permit transpiration.

E14.3.5 Wound Dressing

- (a) Wound dressing shall be horticulturally accepted non-toxic, non-hardening emulsion.

E14.3.6 Plant Material

- (a) Comply with "Guide Specification for Nursery Stock", Latest Edition of Canadian Nursery Trades Association (Landscape Canada), referring to quality, size and development of plant material and root ball.
- (b) All nursery stock shall be measured when branches are in their natural position. Height and spread dimensions specified in the Plant List on the Construction Drawings refer to the main body of the plant, and not from branch tip to root base or

from branch tip to branch tip. Where trees are measured by caliper (cal.), reference is made to the diameter of the trunk measured at 300 mm above ground as the tree stands properly planted in the nursery.

- (c) Use trees and herbaceous material of No. 1 grade.
- (d) All trees shall have one, only, sturdy, reasonably straight and vertical trunk, and a well-balanced crown with fully developed leader, unless designated "multi-stem".
- (e) Use trees and shrubs with structurally sound, strong fibrous root systems, and free of disease, insects, defects or injuries, including rodent damage, sun scald, frost cracks, abrasions or scars to the bark. Plants must have been root pruned regularly, but not later than one growing season prior to arrival on site.
- (f) All parts of the nursery stock shall be moist and show live, green cambium tissue when cut.
- (g) At least one (1) plant of each variety supplied shall bear a tag showing both the botanical and common name of the plant.
- (h) Additional Plant Material Qualifications:
 - (i) Cold Storage
Approval required for plant material that has been held in cold storage
 - (ii) Container-Grown Stock
Acceptable if containers large enough for root development. Trees and shrubs 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.
 - (iii) Balled and Burlapped
Deciduous trees in excess of 3 m height must have been dug with large firm ball. Root balls must include 75% of fibrous and feeder root system. This excludes use of native trees grown in light sandy or rocky soil. Secure root balls with burlap, heavy twine and rope. For large trees: wrap ball in double layer of burlap and drum lace with minimum 10 mm diameter rope. Protect root balls against sudden changes in temperature and exposure to heavy rainfall.
 - (iv) Tree Spade Dug Material
Dig plant material with mechanized digging equipment of hydraulic spade or clam-shell type. Dig root balls to satisfy CNTA (Landscape Canada) standards. Lift root ball from hole, place in wire basket designed for purpose, line with burlap. Tie basket to ball with heavy rope. Take care not to injure trunk of tree with wire basket ties or rope.
 - (v) Substitutions
Substitutions to plant material as indicated on the Plant List will not be permitted unless written approval has been obtained as to type, variety and size a minimum of 6 weeks prior to beginning of landscaping work. Plant substitutions must be of similar species and of equal size to those originally specified.
 - (vi) Native Plant Materials
Only native plant species typical of local riverbank environments will be accepted along the natural riverbank.

E14.4 Construction Methods

E14.4.1 Workmanship

- (a) Stake out location of trees, shrubs and planting beds as per the Construction Drawings. Obtain approval prior to excavating.
- (b) No excavation is to take place without the clearance of all utility components with respect to underground lines located in the areas to be excavated.
- (c) Apply anti-desiccant in accordance with material manufacturer's instructions.
- (d) Coordinate operations. Keep site clean and planting holes drained. Immediately remove soil or debris spilled onto pavement.

E14.4.2 Planting Time

- (a) Plant deciduous plant material during dormant period before buds have broken. Plant material noted for spring planting only, must be planted in dormant period.
- (b) When permission has been obtained to plant deciduous plant material after buds have broken, spray plants with anti-desiccant to slow down transpiration prior to transplanting.
- (c) When permission has been obtained, trees, shrubs and ground covers growing in containers may be planted throughout growing season.
- (d) Plant only under conditions that are conducive to health and physical conditions of plants.
- (e) Provide planting schedule. Extending planting operations over long period using limited crew will not be accepted.

E14.4.3 Excavations

- (a) Shrub beds: shall have a minimum depth of 200 mm, as indicated on the Construction Drawings. Individual shrubs to be in 500 mm deep holes backfilled with planting soil mixture.
- (b) Trees: excavate to depth of at least 200 mm deeper than height of root ball, with width of three times the diameter. Backfill with planting soil mixture.
- (c) Provide drainage for planting holes in heavy soil if natural drainage does not exist. Have method approved.
- (d) Protect bottom of excavations against freezing.
- (e) Remove water that enters excavations prior to planting. Ensure source of water is not ground water.

E14.4.4 Planting

- (a) Loosen bottom of planting hole to depth of 150 to 200 mm. Cover bottom of each excavation with minimum of 150 mm of planting soil mixture.
- (b) Plant trees and shrubs vertically, with roots placed straight out in hole. Orient plant material to give best appearance in relation to private residences.
- (c) Place plant material to depth equal to depth they were originally growing in nursery.
- (d) With ball and burlap root balls, loosen burlap and cut away minimum top 1/3 without disturbing root ball. Do not pull burlap or rope from under root ball. With container stock, remove entire container without disturbing root ball. Non-biodegradable wrappings must be removed.

- (e) Tree spade excavated materials:
 - (i) Ensure hole dug is upright as possible. Place in hole a mixture of 40 L of planting soil and fertilizer mixed with water to soupy consistency. This will be forced up sides of ball as root ball is placed in hole.
 - (ii) Pit preparation: Loosen bottom of planting hole to depth of 150 to 200 mm. Cover bottom of each excavation with minimum 150 mm topsoil mixture.
- (f) Tamp planting soil around root system in layers of 150 mm 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 been completely penetrated into soil, complete backfilling.
- (g) Build 100 mm deep saucer around outer edge of hole to assist with maintenance watering.
- (h) When planting is completed apply slow release organic fertilizer at minimum rate of 12 kg/100 sq.m. for shrub beds or 50 g/mm of caliper for trees, or as recommended by the soil analysis. Mix fertilizer thoroughly with top layer of planting soil and water in well.

E14.4.5 Pruning

- (a) Prune trees and shrubs after planting, as indicated. Postpone pruning of those trees where heavy bleeding may occur, until in full leaf. Employ clean sharp tools and make cuts flush with main branch, smooth and sloping as to prevent accumulation of water. Remove projecting stumps on trunks or main branches. Remove dead and injured branches and branches that rub causing damage to bark. Trim 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 50 mm diameter and damaged parts with application of wound dressing.

E14.5 Standards

- E14.5.1 All roots shall be cleanly cut; split roots not acceptable.
- E14.5.2 Branches and trunks shall be tied and protected; broken or abraded branches or trunks not acceptable.
- E14.5.3 Planting shall be protected from drying conditions; desiccated material not acceptable.
- E14.5.4 All plants to be free of insects and disease: galls, blight and other manifestations of insect infestation or disease not acceptable.

E14.6 Tree Staking

- E14.6.1 Consult planting details for the type and number of stakes required per tree.
- E14.6.2 Staking shall effectively prevent movement of the tree. Tops of all stakes shall be trimmed to remove splinters.

E14.7 Maintenance for Establishment

E14.7.1 Watering

- (a) Water plant material once a week for first four weeks following installation and once every second week, thereafter. Ensure adequate moisture in root zone at freeze-up.

E14.7.2 Weeding

- (a) Keep shrub beds and tree saucers free from weeds by manually removing weeds during the maintenance period.

- E14.7.3 Insects and Diseases
- (a) Spray plants to combat pests and diseases. Use organic chemicals approved by Agriculture Canada.
- E14.7.4 Adjustments
- (a) Make adjustments requested by the Contract Administrator, including straightening trees, tightening guy wires and removing tree stakes.
- E14.7.5 Maintenance Period for Establishment
- (a) Maintain plant material for a minimum period of two months following completion of planting operations, or until such time that live growth is evident.
- E14.8 Method of Measurement and Basis of Payment
- E14.8.1 Supply and Installation of Trees, Shrubs and Herbaceous Plant Material
- (a) Supply and installation of trees, shrubs and herbaceous plant material will be measured on a unit price basis for each tree, shrub or other plant listed on the Plant List, installed in accordance with this Specification and accepted by the Contract Administrator.
 - (b) Supply and installation of trees, shrubs and other plants will be paid for at the Contract Unit Price for each species and size shown on the Plant List, measured as specified herein, which price shall be payment in full for supply of all materials and performing all operations herein described and all other items incidental to the work included in this Specification.
- E14.8.2 Supply and installation of fertilizer for plant material will be incidental to the work of this Contract.
- E15. TURFSTONE**
- E15.1 Description
- (a) This Specification shall amend and supplement City of Winnipeg Standard Specification CW 3330 and shall deal with the supply and installation of turfstone ramping in accordance with the Construction Drawings and these Specifications.
- E15.2 Materials
- E15.2.1 Turfstone
- (a) Use Barkman Concrete Ltd. "Turfstone" Interlocking Concrete Surfacing as indicated on the Construction Drawings, or approved equal.
- E15.2.2 Topsoil
- (a) Topsoil shall be imported topsoil mixed 50% with peatmoss.
- E15.2.3 Seed Mix
- (a) Seed mix for turfstone ramp shall be as per E17.
- E15.3 Construction Methods
- E15.3.1 Turfstone
- (a) Installation of Turfstone shall conform to City of Winnipeg Standard Specification CW 3330-R3.

E15.4 Method of Measurement and Basis of Payment**E15.4.1 Excavation**

- (a) Excavation shall not be measured for payment.

E15.4.2 Turfstone

- (a) Turfstone will be measured as per CW 3330-R3, Clause 12.1.
- (b) Turfstone will be paid for as per CW 3330-R3, Clause 13.1, except that payment shall also be compensation in full for 150 mm thick compacted crushed limestone subbase, topsoil and seed mix.

E15.4.3 Crushed Limestone Subbase

- (a) No measurement will be made for the 150 mm thick (compacted thickness) crushed limestone subbase. It shall be considered incidental to the Contract Unit Price paid for Turfstone.

E16. SODDING**E16.1 Description**

- E16.1.1 This Specification shall amend and supplement the City of Winnipeg Standard Specification CW 3510-R7: Sodding and shall provide for the supply and installation of nursery sod.

E16.2 Materials**E16.2.1 Nursery Sod**

- (a) Nursery sod shall be mineral-based sod that has been sown and cultivated in nursery fields as a turf grass crop. Sod shall contain a minimum of 70% non-organic soil by weight.
- (b) Turf grass shall be in accordance with the following Grade Certified No. 1 seed mixtures:
- (c) Sod shall be Number One Turfgrass Nursery Sod grown from seed mixtures of cultivars of Kentucky Bluegrass and Victory Chewings fescue or Creeping Red fescue; containing not less than 60% Kentucky bluegrass cultivars, and not less than 30% Victory Chewings fescue or Creeping Red fescue hardy cultivars. Sod with on-site topsoil acceptable for use in all areas.
- (d) Acceptable cultivars of Kentucky bluegrass are:

Alpine	Amazon	America	Banff	Blacksberg	Cynthia	Enmundi
Glade	Huntsville	Jefferson	Mystic	Ram 1	Regent	Unique
Washington	Welcome					

E16.2.2 Verification of Sod

- (a) Prior to installation of any sod the Contractor shall provide sod test results from a testing laboratory acceptable to the Contract Administrator indicating that the sod used has a minimum of 70% non-organic soil by weight.
- (b) The cost of sod testing shall be borne by the Contractor.
- (c) The Contractor shall provide detailed information on the seed mixes used in cultivation of sod.

E17. SEEDING

E17.1 Description

E17.1.1 This specification shall amend and supplement CW 3520-R5 "Seeding" and shall provide for supply and installation of naturalized seed mix in areas to be restored and in areas within the shrubs beds to be determined by the Contract Administrator on site.

E17.2 Materials

E17.2.1 Seed Mix

(a) Seed mix for naturalization (by weight):

Proportion of Seed by Weight	Botanical Name	Common Name
20%	<i>Panicum virgatum</i>	Switch Grass
6%	<i>Spartina gracilis</i>	Alkali Cordgrass (Aline Cordgrass)
40%	<i>Agropyron trachycanlum</i>	Slender Wheatgrass
5%	<i>Beckmannia syzigachne</i>	Sloughgrass
3%	<i>Muhlenbergia glomerata</i>	Bog Muhly Grass
3%	<i>Muhlenbergia richardsonis</i>	Mat Muhly
3%	<i>Petalostemon candidum</i>	White Prairie Clover
3%	<i>Petalostemon purpureum</i>	Purple Prairie Clover
3%	<i>Aster hesperius</i>	Willow Aster
2%	<i>Amorpha fruticosa</i>	Indigo Bush Amorpha
2%	<i>Astragalus canadensis</i>	Canada Milkvetch
10%	<i>Deschampsia danthonoides</i>	Tufted Hair Grass

- (b) Seed mix to be free of disease, weed seeds and other foreign materials.
- (c) Seed mix for naturalization available from Prairie Habitats, P.O. Box 1, Argyle, Manitoba, Telephone (204) 467-9371, Fax (204) 467-5004.
- (d) For touch-up seeding use Certified seed free of disease, weed seeds or other foreign materials.
- (e) Seed mix for Restoration Areas Seeding adjacent to sod (by weight):
- (i) 60% Regent Kentucky bluegrass
 - (ii) 15% Park Kentucky bluegrass
 - (iii) 15% Franklin Creeping Red fescue
 - (iv) 10% Delaware Dwarf Perennial ryegrass.
- (f) Seed mix for restoration areas above the riverbank available from Brett Young Seeds Ltd. (Telephone 261-7932).
- (g) Provide the Contract Administrator with a detailed description of both seed mixes at least three (3) working days prior to commencing work.

E17.2.2 Herbicides and Insecticides

(a) Herbicides and insecticides shall be in accordance with CW3520-R5.

E17.3 Construction Procedures**E17.3.1 Areas to be seeded:**

- (a) Install topsoil and seed following completion of all touch-up grading and excavation work.
- (b) Seed with naturalization mix in riverbank naturalization area as directed by the Contract Administrator.
- (c) Seed and topdress in work areas to be restored with restoration seed mix as directed by Contract Administrator.

E17.3.2 Seed Bed Preparation

- (a) Rototill rough areas to a depth of 100 mm.
- (b) Maintain positive drainage.

E17.3.3 Seeding and Hydromulching

- (a) Sow seed into seed bed approved by the Contract Administrator at a rate of 1.0 kg per 100 square metres (90 lbs/Ac.).
- (b) Seed in accordance with CW 3520.

E17.3.4 Fertilizer

- (a) Apply 11-52-0 at a rate of 0.75 kg per 100 square metres.

E17.3.5 Maintenance for Establishment

- (a) Maintenance for establishment and acceptance conditions in accordance with CW 3520-R5.
- (b) Maintain seeded areas for growth establishment for a period of ninety days following completion of seeding and hydromulching operations.

E17.4 Method of Measurement and Basis of Payment

E17.4.1 Seeding will be measured on an areal basis for each square metre of seed mix supplied and installed in accordance with the construction drawings and this specification and accepted by the Contract Administrator, as computed by the Contract Administrator. Separate measurement will be made for each seed mix.

E17.4.2 Payment shall be at the Contract Unit Prices for "Native Grass Seed complete with Topsoil", "Restoration Topsoil and Seeding", which prices shall be payment in full for supplying all labour, equipment and materials and performing all operations herein described, and all other items incidental to the work included in this specification, including ninety day maintenance of seeded areas and supplying all water required for the proper establishment of all seeded areas during the Contractor's warranty period.

E17.4.3 There will be no separate measurement or payment for work required to rehabilitate areas damaged outside of the construction easements by the Contractor's operations.

E18. LONG TERM SCHEDULED MAINTENANCE**E18.1 Description**

E18.1.1 This Specification shall cover the long term scheduled maintenance of trees, shrubs and herbaceous material and seeded areas, and as well as general clean up and maintenance of site, for two years following completion of all Maintenance for Establishment purposes. An estimated period of scheduled maintenance for each year shall be from April 15 to October 15 (6 months).

E18.2 Materials

E18.2.1 The Contractor shall provide all necessary materials and equipment including: additional topsoil, soil amelioration, mulch, seed, fertilizers and pesticides, and tractors, mowers, hand mowers, trimmers, fertilizer spreaders pruning tools, water trucks, hoses, water metres and any other items necessary for the maintenance of the areas indicated in this Specification.

E18.3 Personnel

E18.3.1 The Contractor shall provide all necessary personnel for the ongoing scheduled maintenance operations.

E18.3.2 Personnel should have at least one year of experience in landscape maintenance and should be under the direction of a foreman, in all cases, with not less than five years of experience with similar maintenance operations.

E18.3.3 At a minimum, the maintenance foreman shall be familiar with native plantings and plant identification techniques.

E18.4 Timing

E18.4.1 Maintain plantings and seeded areas for a period of two (2) years from the completion of the Maintenance for Establishment period, as determined by the Contract Administrator.

E18.4.2 Provide the Contract Administrator a Schedule of Proposed Maintenance Activities for the two-year scheduled maintenance period, based on the requirements outlined herein. The scheduled maintenance period shall not commence until the maintenance schedule has been reviewed by the Contract Administrator.

E18.4.3 The Contractor shall provide a detailed maintenance log, including but not limited to the following: hours of labour undertaken, number of personnel and equipment used. The log will itemize watering, spraying and any other maintenance work. Contractor shall submit logs monthly at regularly scheduled meetings with the Contract Administrator. Maintenance log will be incidental to the maintenance work.

E18.5 Maintenance Methods

E18.5.1 Maintenance of Trees, Shrubs and Herbaceous Plant Material

(a) Maintenance is to include by not be limited to:

(i) Watering.

Contractor shall determine the need for watering by taking soil tests weekly with a one-inch auger. Take a test sample from both the planting soil and from the tree root balls by drilling to a minimum depth of 600 mm. The soil shall contain enough moisture to hold together when compressed in the hand, but shall not be muddy.

The installed plant material and riverbank landscaping shall not be allowed to dry out to the detriment of the viability of the plant material. Contractor shall monitor and submit logs to the Contract Administrator, monthly. Contractor shall water-in plant material and riverbank landscaping each fall during the scheduled maintenance period.

(ii) Fertilizing, Pruning and Spraying Deciduous Trees

A qualified local arborist shall undertake all fertilizing, pruning and spraying of trees and plant material.

(iii) Pruning

Contractor shall prune out damaged limbs or deadwood to standard nursery practices.

(iv) Cultivation/Weed Growth

Contractor shall cultivate only as required to reconstruct tree saucers, or to remove significant weed growth.

Contractor shall not cultivate around plants and riverbank landscaping works with a shovel or spade. Cultivate with a hoe or similar tool to a maximum depth of 50mm. Contractor shall maintain natural elevation of the surrounding area when cultivating and create a gentle saucer to contain water around the plant.

Hand weed a minimum of once per month, or as determined by the Contract Administrator, to remove competition for installed plant material/undesirable plant material. Dispose of undesirable material off-site. The Contractor shall be responsible for any fines or weed control notices issued for the planting areas. All notices shall be dealt with by the Contractor in a timely fashion. Copies of any fines and notices shall be provided to the Contract Administrator within five (5) working days of their receipt by the Contractor.

(v) Spraying

Contractor shall spot spray plant material to control insect pests and diseases, using horticultural compounds approved by Agriculture Canada which are specific for the problem to be contained.

The Contractor shall be responsible for obtaining any permits required for spraying in proximity to the Assiniboine River.

(vi) Guy Wires

Contractor shall tighten or remove turnbuckles or guy wires for trees as required or directed by the Contract Administrator. Girdled trees will be replaced at the Contractor's expense.

(vii) Straightening

Contractor shall straighten trees as required or as directed by the Contract Administrator.

(viii) Mulching

Contractor shall add mulch to tree saucers and planting beds as required to maintain a 50mm cover. Contractor shall hand weed mulch and lightly rake periodically.

E18.5.2 Maintenance of Seeded Areas

- (a) Repair and reseed dead or bare spots to the satisfaction of the Contract Administrator.
- (b) Eliminate weeds by hand or chemical means. Spot treat localized weedy areas, only, with Roundup.

- (c) Water only as required for turf establishment and turf maintenance in periods of severe drought.

E18.6 Acceptance Criteria

- E18.6.1 On an annual basis the Contractor and Contract Administrator shall inspect the works to determine plant material survival rates.
- E18.6.2 All plant material that does not survive or appear viable during the annual inspection will be replaced to meet the following standards on a bed by bed basis:
 - (a) All caliper material shall be warranted to an overall survival rate of 100 percent.
 - (b) All whips (1 litre) shall be guaranteed to an overall survival rate of 80 percent.
 - (c) All container plantings shall be guaranteed to an overall survival rate of 80 percent.
 - (d) All herbaceous material shall be guaranteed to an overall survival rate of 60 percent.
 - (e) All fascines shall be guaranteed to an overall survival rate of 50 percent, with growth continuous with no open spaces along the fascine greater than 600mm.
 - (f) All brushmattress shall be guaranteed to an overall survival rate of 50 percent.
- E18.6.3 Plant material which has died or which has failed to thrive will be promptly removed from the site following each annual inspection at the Contractor's expense. The Contractor will be responsible for the cost of replacing any non-viable/dead plant material in excess of the acceptance criteria.
- E18.6.4 The Contract Administrator shall have the discretion to add additional plant material at the appropriate Contract Unit Price.

E18.7 Method of Measurement and Basis of Payment

- E18.7.1 General Maintenance of Trees, Shrubs and Herbaceous Material and Seeded Areas
 - (a) General maintenance, including: watering, fertilizer, pruning, spraying, cultivation/weed control, tightening of guy wires, straightening, mulching for trees, shrubs and herbaceous plant material; and seeded areas will be measured on a monthly basis between April 15 and October 15, each year of the scheduled maintenance.
 - (b) General maintenance will be paid for at the Contract Unit Price for "General Plant Material Maintenance", which prices will include supply of all labour, equipment and materials and performing all operations herein described, and all other items incidental to the Work included in this specification.