Part 1 General

1.1 Summary

.1 Drip Irrigation System and Parking Posts

1.2 References

.1 City of Winnipeg Standard Construction Specifications CW 3530

1.3 Submittals

.1 Drip Irrigation and Parking Posts:

.1 Product Data: Required. Submit manufacturer's product data in accordance with Section 01330 - Submittal Procedures.

.2 Shop Drawings: Required. Submit shop drawings in accordance with Section 01330 - Submittal Procedures.

.1 Provide mounting details for parking plugs and cable.

1.4 Design and Performance Criteria

.1 Drip Irrigation:

.1 Design Requirements: provide low-pressure drip irrigation system to maintain adequate moisture for healthy plant growth in the root zone in planting beds as indicated on the Construction Drawings.

.1 Provide complete commercial grade system complete with backflow preventer, solenoid valves,cabling and controller

.2 Parking Posts:

.1 Design Requirements: provide parking posts suitable for mounting plug-in receptacles.

1.5 Waste Management and Disposal

.1 Separate and recycle waste materials.

1.6 Warranty

.1 Irrigation system: warranty drip irrigation system for two growing seasons.

1.7 Maintenance Service

.1 Maintain irrigation system, including flushing, seasonal blow out and adjustment. Continue until termination of warranty period.

Part 2 Products

2.1 Drip Irrigation Line

.1 PVC pipe for drip irrigation system

.2 Solvent weld fittings for PVC pipe

.3 Automatic flush end caps

2.2 Emitters and Boxes

.1 Drip irrigation emitters spaced 305 mm or 457 mm

.2 Emitter boxes complete with bug caps.

2.3 Programmable Controller and Valves

.1 Automatic irrigation timer: 110 volt controller

.2 Valves: two 24 volt solenoid valves with valve control wires.

.3 Valve boxes: complete with electric valves, Y-strainers and pressure regulators as required.

2.4 Water Service Connection

.1 Supply all required materials and labour required for a water service connection for drip irrigation system.

.2 Backflow preventer to City of Winnipeg CW 3530

2.5 Parking Posts

.1 Pressure-treated wood posts:

.1 Material: pressure treated pine posts

.2 Size: 200mm x 200mm x 2200mm

.3 Finish: Silvertone

Part 3 Execution

3.1 General

.1 Provide full drip irrigation system in planting beds as shown on the Construction Drawings, complete with PVC pipe and emitters optimally spaced for irrigation of proposed plantings.

.2 Coordinate installation of the drip irrigation system with construction of planting beds and installation of plant material. Install at depth below the surface of planting beds as recommended by the irrigation supplier.

3.2 Controller

.1 Locate controller as indicated on the Construction Drawings.

.2 Provide electrical plug-in receptacle for drip irrigation controller.

.3 Provide electrical connections to valves.

.4 Program controller as instructed by the Contract Administrator.

3.3 Water Service for Drip Irrigation

.1 Provide water service for drip irrigation system.

.2 Install backflow preventer to CW 3530 in order to isolate drip line from building water system.

3.4 Backfill

.1 Following installation of drip line pipe and emitters, install topsoil to required elevations in the planting beds.

.2 Place and topsoil in continuous layers.

.3 Slope grade away from building.

3.5 Parking Posts

.1 Installation:

.1 Install as shown on the construction drawings.
.2 Set posts plumb and level with same top elevation in rows.
.3 Backfill around posts with thoroughly tamped 20mm down crushed limestone.
.4 Securely anchor cabling and mount parking plugs.
.5 Install adjacent paving snug with the posts.

3.6 Quality Control

.1 Field Tests: Required for drip irrigation system.

.2 Field Inspection: Required.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01330 - Submittal Procedures.

.2 Section 02311 - Site Grading.

.3 Section 02315 - Excavating, Trenching and Backfilling.

.4 Section 02723 - Granular Sub-base

1.2 REFERENCES

.1 City of Winnipeg Standard Construction Specifications CW 3130 “Supply and Installation of Geotextile Fabrics”

1.3 SUBMITTALS

.1 Submit samples in accordance with Section 01330.

1.4 DELIVERY, STORAGE AND HANDLING

.1 During delivery and storage, protect geotextile from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

Part 2 Products

2.1 MATERIAL

.1 Geotextile: separation/ reinforcement fabric in accordance with CW 3130.

Part 3 Execution

3.1 INSTALLATION

.1 Place geotextile material in accordance with the Construction Drawings and CW 3130.

3.2 PROTECTION

.1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Demolition of Structures: methods and procedures for demolition of structures & parts of structures,

1.2 RELATED SECTIONS

.1 Section 01330 - Submittal Procedures.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980 (R1998), Code of Practice for Safety in Demolition of Structures.

1.4 SITE CONDITIONS

.1 Review designated substance report and take precautions to protect environment.

.2 Should material resembling spray or trowel-applied asbestos or other hazardous substance be encountered, stop work, take preventative measures, and notify Contract Administrator.

.1 Do not proceed until written instructions have been received from Contract Administrator.

.3 Notify Contract Administrator before disrupting building access or services.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 PROTECTION

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and parts of building to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

3.2 DEMOLITION SALVAGE AND DISPOSAL

.1 Remove designated parts of existing building to permit new construction. Sort materials into appropriate piles for reuse and recycling.

.2 Refer to demolition drawings and specifications for items to be salvaged for reuse.

.3 Remove items to be reused, store as directed by Contract Administrator, and re-install under appropriate section of specification.

.4 Trim edges of partially demolished building elements to tolerances as defined by Contract Administrator to suit future use.

.5 Dispose of removed materials, to appropriate recycling facilities except where specified otherwise, in accordance with authority having jurisdiction.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes.

.1 Methods and procedures for demolishing, salvaging, recycling and removing sitework items designated to be removed in whole or in part, and for backfilling resulting trenches and excavations.

.2 Related Sections.

.1 Section 01330 - Submittal Procedures.
.2 Section 01450 - Quality Control
.3 Section 01561 - Environmental Protection
.4 Section 01705 - Health and Safety
.5 Section 02315 - Excavating, Trenching and Backfilling

1.2 REFERENCES

.1 Department of Justice Canada (Jus).

.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
.2 Canadian Environmental Protection Act, 1999 (CEPA), c. 33.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.3 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

1.3 DEFINITIONS

.1 Demolition: rapid destruction of building following removal of hazardous materials.

.2 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01330 - Submittal Procedures

.2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets

.3 Shop drawings:

.1

.2 Submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning, where required by authorities having jurisdiction.

.4 Hazardous Materials: provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial regulations.

.2 Site Meetings.

.1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building sub-trades.

.4 Review manufacturer's installation instructions and warranty requirements.

.2 Arrange for site visit with Contract Administrator to examine existing site conditions adjacent to demolition work, prior to start of Work.

.3 Hold project meetings every week.

.4 Ensure site supervisor and subcontractor representatives attend.

.5 Contract Administrator will provide written (email) notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

.3 Health and Safety.

.1 Do construction occupational health and safety in accordance with Section 01705 - Health and Safety.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Perform Work in accordance with Section 01561 - Environmental Protection.

.2 Storage and Protection.

.1 Protect in accordance with Section 02315 - Excavating, Trenching and Backfilling.

.2 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Contract Administrator and at no cost to the City.

.3 Remove and store materials to be salvaged, in manner to prevent damage.

.4 Store and protect in accordance with requirements for maximum preservation of material.

.5 Handle salvaged materials as new materials.

.3 Waste Management and Disposal

.1 Separate materials for reuse and recycling

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

.3 Handle and dispose of hazardous materials in accordance with Provincial regulations.

.4 Label location of salvaged material's storage areas and provide barriers and security devices.

.5 Ensure emptied containers are sealed and stored safely.

.6 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities.

1.7 SITE CONDITIONS

.1 Site Environmental Requirements

.1 Perform work in accordance with Section 01561 - Environmental Protection.

.2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

.1 Ensure proper disposal procedures are maintained throughout the project.

.4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.

.6 Protect trees, plants and foliage on site and adjacent properties where indicated.

.2 Existing Conditions

1. Remove contaminated or hazardous materials from site, prior to start of demolition Work, and dispose of in safe manner in accordance with TDGA and other applicable regulatory requirements.

1.8 SCHEDULING

.1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.

.1 Notify Contract Administrator in writing when unforeseen delays occur.

Part 2 Products

2.1 EQUIPMENT

.1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 PREPARATION

.1 Inspect site with Contract Administrator and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

.4 Disconnect and Cap Designated Underground Services.

.1 Underground Services: remove and dispose of as indicated on the Construction Drawings and as directed by Contract Administrator.

3.2 REMOVAL OF HAZARDOUS WASTES

.1 Remove contaminated or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

3.3 REMOVAL OPERATIONS

.1 Remove items as indicated.

.2 Do not disturb items designated to remain in place.

.3 Removal of Pavements, Curbs and Gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Contract Administrator.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials.

.4 Prevent contamination with base course aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving,

.5 Excavate at least 300 mm below pipe invert, when removing pipes under existing or future pavement area.

.6 Remove only designated trees during demolition.

.1 Obtain written approval of Contract Administrator prior to removal of trees not designated.

.2 Grind, chip, or shred trees other than elm and other vegetation for mulching and composting.

.7 Stockpile topsoil for final grading and landscaping.

.1 Provide erosion control and seeding if not immediately used.

.8 Salvage.

.1 Dismantle items containing materials for salvage and stockpile salvaged materials at locations approved by the Contract Administrator.

.9 Disposal of Material.

.1 Dispose of materials not designated for salvage or reuse on site

.10 Backfill.

.1 Backfill in areas as indicated and in accordance with Section 02315 - Excavating, Trenching and Backfilling.

3.4 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.

.4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.5 REMOVAL FROM SITE

.1 Remove stockpiled material as directed by Contract Administrator, when it interferes with operations of project.

.2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

.3 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.6 RESTORATION

.1 Restore areas and existing works outside areas of demolition to conditions matching condition of adjacent, undisturbed areas.

.2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.7 CLEANING

.1 Remove debris, trim surfaces and leave work site clean, upon completion of Work

.2 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

END OF SECTION

Part 1 General

1.1 Related Sections

.1 Section 02901 – Tree and Shrub Preservation

.2 Section 02906 – Planting of Trees, Shrubs and Ground Covers

1.2 References

.1 Canadian Nursery Landscape Association (CNLA).

1.3 Qualifications

.1 Staff to possess Manitoba Arborist tree pruning certification.

1.4 Field Sample

.1 Do sample pruning acceptable to Contract Administrator to identify:

- .1 Knowledge of target areas including branch bark ridge and branch collars.
- .2 Technique for selection process and pruning used to establish desired form and shape for each species.

.2 Acceptance of Work will be determined by Contract Administrator from field sample.

1.5 Waste Management and Disposal

.1 Separate and recycle waste materials.

.2 Dispose of unused disinfectant at official hazardous material collections site approved by Contract Administrator.

.3 Do not dispose of unused disinfectant into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

1.6 Maintenance

.1 Tool maintenance:

- .1 Ensure that tools are clean and sharp throughout pruning operation. Do not use tools which crush or tear bark.
- .2 Disinfect tools before each tree is pruned.
- .3 On diseased plant material disinfect tools before each cut.

Part 2 Products

2.1 Disinfectant

.1 20% solution of sodium hypochlorite or 70% solution of ethyl alcohol.

Part 3 Execution

3.1 General

.1 Prune in accordance with Pruning Ornamentals, and as directed by Contract Administrator. Where discrepancies occur between standard and specifications, specifications govern.

.2 Notify immediately Contract Administrator conditions detrimental to health of plant material or operations.

.3 Prune during plant dormant period or after leaves have matured. Avoid pruning during leaf formation, at time of leaf fall, or when seasonal temperature drops below minus 10^{o}C.

.4 Prune each species when in full leaf.

.5 Retain natural form and shape of plant species.

.6 Do not:

- .1 Flush cut branches
- .2 Crush or tear bark
- .3 Cut behind branch bark ridge
- .4 Damage branch collars
- .5 Damage branches to remain

3.2 Pruning

.1 Remove dead, dying, diseased and weak growth from plant material designated by Contract Administrator in order to promote healthy growth.

.2 Remove live branches that:

- .1 Interfere with healthy development and structural strength including branches crossed or rubbing more important branches.
- .2 Are of weak structure including narrow crotches.
- .3 Obstruct development of more important branches.
- .4 Are broken.

.3 Remove live branches to re-establish natural species form including:

- .1 One or more developing leaders.
- .2 Multiple growth due to previous topping.
- .3 Branches extending outward from natural form.
- .4 Undesirable sucker growth.

.4 Remove loose branches, twigs and other debris lodged in tree.

.5 Remove vines.

.6 For branches under 50 mm in diameter:

.1 Locate branch bark ridge and make cuts smooth and flush with outer edge of branch collar to ensure retention of branch collar. Cut target area to bottom of branch collar at angle equal to that formed by line opposite to branch bark ridge.

.2 Make cuts on dead branches smooth and flush with swollen callus collar. Do not injure or remove callus collar.

.3 Do not cut lead branches unless directed by Contractor Administrator.

.7 For branches greater than 50 mm in diameter:

.1 Make first cut on lower side of branch 300 mm from trunk, one third diameter of branch.

.2 Make second cut on upper side of branch 500 mm from trunk until branch falls off.

.3 Make final cut adjacent to and outside branch collar.

.8 Ensure that trunk bark and branch collar are not damaged or torn during limb removal. Repair areas which are damaged, or remove damaged area back to next branch collar.

.9 Remove additional growth designated by Contract Administrator.

3.3 Root Girdling

.1 For girdling roots one-quarter size of trunk diameter or larger, V-cut girdling root one-half way through at point where root is crossing.

.2 Remove exposed portion of girdling root as directed by Contract Administrator after cleanly cutting root flush with grade on each side of parent root. Do not injure bark or parent root.

3.4 Care of Wounds

.1 Shape bark around wound to oblong configuration ensuring minimal increase in wound size. Retain peninsulas of existing live bark.

3.5 Clean-up

.1 Collect pruned material daily and remove from site.

END OF SECTION

Part 1 General

1.1 Related Sections

.1 Section 01293 - Payment Procedures: Testing Laboratory Services.

.2 Section 01450 – Quality Control

.3 Section 02315 - Excavation, Trenching and Backfilling

.4 Section 02901 - Tree and Shrub Preservation

.5 Section 02911 – Topsoil and Finish Grading

1.2 References

.1 City of Winnipeg Standard Construction Specifications CW 3110 “Sub-grade, Sub-base and Base Course Construction”

1.3 Existing Conditions

.1 Examine subsurface investigation report, which is an Appendix to this document.

.2 Known underground and surface utility lines and buried objects are indicated on site plan for general information only. Site plan should not be relied on for locations of underground services and utilities.

.3 Obtain clearances for all underground services and utilities prior to start of work.

1.4 Protection

.1 Protect existing fencing, trees, landscaping, bench marks, buildings, pavement surfaces and underground services and utility lines which are to remain. Obtain approval of methods from Contract Administrator. If damaged, restore to original or better condition unless directed otherwise.

.2 Maintain access roads to prevent accumulation of construction related debris on roads.

Part 2 Products

2.1 Materials

.1 Fill material: in accordance with of Section 02315 - Excavating, Trenching and Backfilling.

Part 3 Execution

3.1 Stripping of Topsoil

.1 Strip topsoil in accordance with Section 02911- Topsoil and Finish Grading.

3.2 Grading

.1 Rough grade to levels, profiles and contours shown on the Construction Drawings allowing for surface treatment as indicated.

.2 Rough grade to following depths below finish grades:

- .1 100 mm for sod areas
- .2 350 mm for shrub beds
- .3 525 mm for asphalt paving, including granular base and sub-base
- .4 275 mm for asphalt walkways
- .5 290 mm for pre-cast concrete paving units
- .6 700 mm for concrete approach with asphalt overlay

.3 Slope rough grade away from building.

.4 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

.5 Compact filled and disturbed areas to corrected maximum dry density to ASTM D698, as follows:

- .1 85% to 95% under landscaped areas
- .2 98 % to 100% under paved areas

.6 Minimize soil disturbance within branch spread of trees or shrubs to remain.

3.3 Testing

.1 Inspection and testing of soil compaction will be carried out by testing laboratory designated by the Contract Administrator. Costs of tests will be paid under a Cash Allowance by Owner. Refer to Sections 01293 - Payment Procedures and 01450 - Quality Control.

3.4 Surplus Material

.1 Remove and legally dispose of surplus material and material unsuitable for fill, grading or landscaping.

END OF SECTION

Part 1 General

1.1 Related Sections

.1 Section 01330 - Submittal Procedures.

.2 Section 01560 - Temporary Barriers and Enclosures.

.3 Section 01561 - Environmental Protection.

.4 Section 02072 - Geotextiles.

.5 Section 02221 - Demolition of Structures.

.6 Section 02311 - Site Grading.

.7 Section 02511 - Water Mains.

.8 Section 02622 - Foundation and Underslab Drainage.

.9 Section 02701 - Aggregates: General.

.10 Section 02702 - Corrected Maximum Dry Density.

.11 Section 02901 - Tree and Shrub Preservation.

1.2 References

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C117-95, Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422-98, Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m^3).

.5 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

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

.3 Canadian Standards Association (CSA)

.1 CSA-A3001, Portland Cement.

.2 CSA-A23.1-04, Concrete Materials and Methods of Concrete Construction.

.4 City of Winnipeg Standard Construction Specifications – CW3170 Earthwork and Grading.

1.3 Definitions

.1 Excavation classes: two classes of excavation will be recognized; common excavation and borrow excavation, defined as per CW3170.

.2 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.4 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.5 Unsuitable materials:

.1 Weak and compressible materials under excavated areas.

.2 Frost susceptible materials under excavated areas.

.3 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.

.2 Table

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 – 100
0.02 mm	10 – 80
0.005 mm	0 – 45

.3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

.4 As per CW3170.

.6 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

.7 Removal of existing pavement: as per CW3170.

1.4 Submittals

.1 Samples:

.1 Submit samples in accordance with Section 01330 - Submittal Procedures.

.2 Inform Contract Administrator at least 4 weeks prior to commencing Work, of proposed source of fill, unshrinkable fill materials and provide access for sampling.

.3 Submit 70 kg samples of type of fill, unshrinkable fill specified including representative samples of excavated material.

.4 Ship samples prepaid to Contract Administrator, in tightly closed containers to prevent contamination.

1.5 Quality Assurance

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

.2 Where Consultant/Engineer is employee of Contractor, submit proof that Work by Consultant/Engineer is included in Contractor's insurance coverage.

.3 Submit design and supporting data at least 2 weeks prior to commencing Work.

.4 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in the Province of Manitoba, Canada.

.5 Keep design and supporting data on site.

.6 Engage services of qualified professional Engineer who is registered or licensed in the Provinces of Manitoba, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.

1.6 Waste Management and Disposal

.1 Separate and recycle waste materials.

1.7 Protection of Existing Features

.1 Protect existing features in accordance with Section 01560 - Temporary Barriers and Enclosures and applicable local regulations.

.2 Existing buried utilities and structures:

.1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.2 Prior to commencing excavation Work, notify applicable Owner or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Owners or authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.

.3 Confirm locations of buried utilities by careful test excavations.

.4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.

.5 Where utility lines or structures exist in area of excavation, obtain direction of Contract Administrator before removing, re-routing. Costs for such Work to be paid by Owner.

.6 Record location of maintained, re-routed and abandoned underground lines.

.7 Confirm locations of recent excavations adjacent to area of excavation.

.3 Existing buildings and surface features:

.1 Conduct, with Contract Administrator, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair to approval of Contract Administrator.

.3 Where required for excavation, cut roots or branches as approved by Contract Administrator in accordance with Section 02901 - Tree and Shrub Preservation.

Part 2 Products

2.1 Materials

.1 Type 1 and Type 2 fill: properties to Section 02701 - Aggregates: General and the following requirements:

.1 Crushed, pit run or screened stone, gravel or sand.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.

.3 Table

Sieve Designation	% Passing	
	Type 1	Type 2
75 mm	-	100
50 mm	-	-
37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-
9.5 mm	50-100	-
4.75 mm	30-70	22-85
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
0.075 mm	3-8	0-10

.2 Type 3 fill: selected material from excavation or other sources, approved by Contract Administrator for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

.3 Unshrinkable fill: proportioned and mixed to provide:

.1 Maximum compressive strength of 0.4 MPa at 28 days.

.2 Maximum Portland cement content of 25 kg/m ^{3} with 40% fly ash replacement: to CSA-A3001, Type HS.

.3 Minimum strength of 0.07 MPa at 24 h.

.4 Concrete aggregates: to CAN/CSA-A23.1.

.5 Portland cement: Type HS.

.6 Slump: 160 to 200 mm.

.4 Shearmat: honeycomb type bio-degradable cardboard 150 mm thick, treated to provide sufficient structural support for poured concrete until concrete cured.

.5 Geotextiles: to Section 02072 - Geotextiles.

Part 3 Execution

3.1 Site Preparation

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.2 Stockpiling

.1 Stockpile fill materials in areas designated by Contract Administrator. Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

3.3 Shoring, Bracing and Underpinning

.1 Construct temporary Works to depths, heights and locations as accepted by Contract Administrator.

.2 During backfill operation:

.1 Unless otherwise as indicated or as directed by Contract Administrator, remove sheeting and shoring from excavations.

.2 Do not remove bracing until backfilling has reached respective levels of such bracing.

.3 Pull sheeting in increments that will ensure compacted backfill is maintained at an elevation at least 500 mm above toe of sheeting.

.3 When sheeting is required to remain in place, cut off tops at elevations as indicated.

.4 Upon completion of substructure construction:

.1 Remove cofferdams, shoring and bracing.

.2 Remove excess materials from site and restore water courses as indicated and as directed by Contract Administrator.

3.4 Dewatering and Heave Prevention

.1 Keep excavations free of water while Work is in progress.

.2 Submit for Contract Administrator’s review details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in [accordance with Section [01561 - Environmental Protection] and in] manner not detrimental to public and private property, or any portion of Work completed or under construction.

3.5 Excavation

.1 Excavate to lines, grades, elevations and dimensions as indicated.

.2 Remove concrete, masonry, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation.

.3 Excavation must not interfere with bearing capacity of adjacent foundations.

.4 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.5 For trench excavation, unless otherwise authorized by Contract Administrator in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.

.6 Keep excavated and stockpiled materials a safe distance away from edge of trench.

.7 Restrict vehicle operations directly adjacent to open trenches.

.8 Legally dispose of surplus and unsuitable excavated material off site.

.9 Do not obstruct flow of surface drainage or natural watercourses.

.10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.11 Notify Contract Administrator when bottom of excavation is reached.

.12 Obtain Contract Administrator’s approval of completed excavation.

.13 Remove unsuitable material from trench bottom to extent and depth as directed by Contract Administrator.

.14 Correct unauthorized over-excavation as follows:

.1 Fill under bearing surfaces and footings with concrete specified for footings.

.2 Fill under other areas with Type 2 fill compacted to not less than 95% of corrected maximum dry density.

.15 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Contract Administrator.

.16 Install geotextiles in accordance with Section 02072 - Geotextiles.

3.6 Fill Types and Compaction

.1 Use fill of types as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698 in accordance with Section 02702 - Corrected Maximum Dry Density.

.1 Exterior side of perimeter walls: use Type 3 fill to subgrade level. Compact to 95%.

.2 Within building area: use Type 2 to underside of crawl space. Compact to 95%.

.3 Under concrete slabs: provide 150 mm compacted thickness base course of Type 1 fill to underside of slab. Compact base course to 100%.

.4 Retaining walls: use Type 2 fill to subgrade level on high side for minimum 500mm from wall and compact to 95%. For remaining portion, use Type 3 fill compacted to 95%.

.5 Place unshrinkable fill in areas as indicated.

3.7 Bedding and Surround of Underground Services

.1 Place and compact granular material for bedding and surround of underground services as indicated in Section 02511 - Water Mains.

.2 Place bedding and surround material in unfrozen condition.

3.8 Backfilling

.1 Do not proceed with backfilling operations until Contract Administrator has inspected and approved installations.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations.

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 72 hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 0.150 m.

.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Contract Administrator or:

.2 If approved by contract Administrator, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Contract Administrator.

.6 Place unshrinkable fill in areas as indicated.

.7 Consolidate and level unshrinkable fill with internal vibrators.

.8 Install drainage system in backfill as indicated.

3.9 Restoration

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01355 - Waste Management and Disposal, trim slopes, and correct defects as directed by Contract Administrator.

.2 Replace topsoil as indicated.

.3 Reinstate lawns to elevation which existed before excavation.

.4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.

.5 Clean and reinstate areas affected by Work as directed by Contract Administrator.

.6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.

END OF SECTION

Part 1 General

1.1 Related Sections

.1 N/A.

1.2 Delivery, Storage and Handling

.1 Protect piles from damage due to excessive bending stresses, impact, abrasion or other causes during delivery, storage and handling.

.2 Replace damaged piles as directed by Contract Administrator.

1.3 Waste Management and Disposal

.1 Separate and recycle waste materials.

.2 Divert unused, or cut off concrete materials from landfill to local facility as approved by Contract Administrator.

1.4 Existing Conditions

.1 Sub-surface investigation report is available for inspection at UMA Engineering Ltd.

.2 Notify Contract Administrator in writing if subsurface conditions at site differ from those indicated and await further instructions from Contract Administrator.

1.5 Scheduling

.1 Drive piles commencing at Grid Line B. Then work north to existing building, after that south from Grid Line B.

.2 Submit schedule of planned sequence of driving to Contract Administrator for review, not less than two weeks prior to commencement of pile driving.

Part 2 Products

2.1 Materials

.1 Material requirements for piles are specified in Section 02468.

.2 Supply or fabricate full length piles as indicated and provide equipment to handle full length piles without cutting and splicing.

.3 Do not splice piles without written approval of Contract Administrator. When permitted, provide details for Contract Administrator review. Design details of splice to bear dated signature stamp of professional engineer registered or licensed in Province of Manitoba, Canada.

Part 3 Execution

3.1 Equipment

.1 Prior to pile installation, submit to Contract Administrator for review, details of equipment for installation of piles.

.1 Impact hammers: provide manufacturer's name, type, rated energy per blow at normal working rate, mass of striking parts of hammer, mass of driving cap and type and elastic properties of hammer and pile cushions.

.2 Non-impact methods of installation such as augering, or other means: provide full details of characteristics necessary to evaluate performance.

.2 Hammer:

.1 Hammers to be selected on basis of driveability analysis, performed to show that piles can be driven to capacities indicated.

.2 Precast concrete piles are to be driven to the refusal criteria in Table 01 with a pile driving hammer with a minimum rated energy of 40 kJ per blow.

Table 01: Refusal Criteria for Driven Precast Concrete Piles

Pile Diameter (mm)	Maximum Allowable Capacity (kN)	Final Refusal (blows/25 mm)
300	450	5
350	625	8
400	800	12

.3 Submit driveability analysis to Contract Administrator for approval of hammers.

.4 When required criteria can not be achieved with the proposed hammer, use larger hammer and take other measures as required.

.3 Leads:

.1 Construct pile driver leads to provide free movement of hammer. Hold leads in position at top and bottom, with guys, stiff braces, or other means reviewed by Contract Administrator, to ensure support to pile while being driven. Inclined leads to be used for battered piles.

.2 Length: provide sufficient length of leads to ensure that use of follower is unnecessary.

.3 Swing leads:

.1 Not permitted.

.4 Followers:

.1 Obtain approval from Contract Administrator prior to using followers. Provide followers of such size, shape, length and mass to permit driving pile in desired location to required depth and resistance. Provide followers with socket or hood carefully fitted to top of pile to minimize loss of energy and prevent damage to pile.

3.2 Preparation

.1 Ensure that ground conditions at pile locations are adequate to support pile driving operation and load testing operation. Make provision for access and support of piling equipment during performance of Work.

.2 Do not drive piles until excavation has been completed.

.3 Pre-boring of holes required to facilitate pile alignment and vibration control.

3.3 Building Vibration Analysis

.1 All piles shall be pre-bored, to aid in pile alignment, reduce pile heave while driving adjacent piles, and to minimize potential effects of driving on the adjacent building. The pre-bore shall be drilled to the top of the sand layer as a minimum. The pre-bore diameter should be a maximum of 50 mm greater than the pile diameter out to out of opposing flat faces.

.2 The Contract Administrator will monitor the existing building for vibrations during pile driving. Pile driving shall be suspended if vibration levels exceed the threshold for potential damage to the building. Pile driving procedures shall be reviewed to assess potential modifications to pile installation methods to minimize the potential for damage to the building. This may include but not be limited to reducing driving energy and pile capacity, adding additional piles at reduced capacity, or modifying pile type. Should modifications be required closer to the existing building, the Contractor will be permitted to drive piles further from the building where the affect on the existing building is acceptable, while the modifications closer to the existing building are determined. A pile driving analyser will be used on the partially driven piles where changes are required to determine the modifications needed.

3.4 Field Measurement

.1 Maintain accurate records of driving for each pile, including:

- .1 Type and make of hammer, stroke or related energy.
- .2 Other driving equipment including driving cap, cushion.
- .3 Pile size and length, location of pile in pile group, location or designation of pile group.
- .4 Sequence of driving piles in group.
- .5 Number of blows per metre for entire length of pile and number of blows per 25 mm for last 300 mm.
- .6 Final tip and cut-off elevations.
- .7 Other pertinent information such as interruption of continuous driving, pile damage.
- .8 Record elevation taken on adjacent piles during, before and after driving of each pile.

.2 Provide Contract Administrator with three copies of records.

3.5 Driving

.1 Drive precast piles only when concrete has attained strength of 35 MPa.

.2 Use driving caps and cushions to protect piles. Piles with damaged heads as determined by Contract Administrator will be rejected.

.3 Hold piles securely and accurately in position while driving.

.4 Deliver hammer blows along axis of pile.

.5 When driving precast concrete piles, adjust hammer, as required, to deliver reduced impact so that reflected tensile stress in pile is never greater than 2.9 kPa.

.6 Do not drive piles within 30 m of masonry or concrete which has been in place less than 3 days.

.7 Ensure no contact between pile and structure takes place when driving batter piles adjacent to existing structures.

.8 Restrike already driven piles lifted during driving of adjacent piles to confirm set.

.9 Remove loose and displaced material from around piles after completion of driving, and leave clean, solid surfaces to receive foundation concrete.

.10 Use of water jet:

.1 Not permitted.

.11 Cut off piles neatly and squarely at elevations as indicated. Provide sufficient length above cut-off elevation so that part damaged during driving is cut off. Do not cut tendons or other reinforcement which will be used to tie pile caps to pile.

.12 Remove cut-off lengths from site on completion of work.

3.6 Design Load Capacity

.1 Allowable design load capacity of pile as indicated on drawings.

.2 Installation of each pile will be subject to review of Contract Administrator.

.1 Contract Administrator will be sole judge of acceptability of each pile with respect to final driving resistance, depth of penetration or other criteria used to determine load capacity.

.2 Contract Administrator to review final driving of all piles prior to removal of pile driving rig from site.

.3 Drive each pile to final driving resistance measured in blows per 25 mm of penetration for last 300 mm of penetration.

.1 Prior to final set drive piles without interruption for a sufficient interval to break or prevent development of freeze.

.4 Drive each pile to practical refusal.

.1 Do not overdrive to cause damage to piles.

3.7 Driving Tolerances

.1 Pile heads to be within 75 mm of locations as indicated.

.2 Piles not to be more than 2% of length out of vertical alignment.

3.8 Obstructions

.1 Where obstruction is encountered that causes sudden unexpected change in penetration resistance or deviation from specified tolerances, remove obstruction.

3.9 Repair/ Restoration

.1 Leave rejected pile in place, place adjacent pile and modify pile cap as directed by Contract Administrator.

.2 No extra compensation will be made for removing and replacing or other work made necessary through rejection of defective piles.

3.10 Protection

.1 Protect adjacent structures, services and work of other sections from hazards due to pile driving operations.

.2 Arrange sequencing of pile driving operations and methods to avoid damages to adjacent existing structures (see Section 1.5.1 of this specification). The adjacent building will be monitored and pile installation procedures adjusted as required (see Section 3.3 of this specification). Any damage to the existing building due to vibrations from pile driving will be restored at Owner's expense. Any damage to the existing building due to other causes will be restored to original or better condition at Contractor's own expense.

END OF SECTION

Part 1 General

1.1 Related Sections

.1 Section 01330 - Submittal Procedures.

.2 Section 02451 - Pile Foundations, General.

.3 Section 03300 - Cast-in-Place Concrete.

.4 Section 03410 - Plant-Precast Structural Concrete.

1.2 References

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C618-00, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

.2 Canadian Standards Association (CSA)

.1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.

.2 CAN/CSA-A3001, Cementitious Materials Compendium.

1.3 Shop Drawings

.1 Submit shop drawings in accordance with Section 01330 - Submittal Procedures.

.2 Each drawing submitted shall bear the signature and stamp of qualified professional engineer registered or licensed in Province of Manitoba, Canada.

.3 Indicate the following items:

.1 Lifting point details and locations.
.2 Storage support point locations.
.3 Connector details complete with calculations.
.4 Concrete strength.
.5 Steel grades.
.6 Reinforcing details.
.7 Type and grade of steel.

1.4 Certificates

.1 Piles delivered to site to be certified by manufacturer that each batch of piles to have strength of 35 MPa.

1.5 Waste Management and Disposal

.1 Separate and recycle waste materials.

.2 Divert unused or broken concrete materials from landfill to local facility as approved by Contract Administrator.

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

Part 2 Products

2.1 Materials

.1 Concrete mixes and materials: in accordance with Section 03410 – Plant-Precast Structural Concrete.

.2 Reinforcing steel: to CSA-A23.1, CSA-A23.2.

.3 Pile connections: capable of providing positive means to hold pieces together, maintaining alignment for full depth and transmitting full design load.

2.2 Concrete Mixes

.1 Proportion normal density concrete to CSA-A23.1, Alternative 1, to give following properties: for all concrete.

- .1 Use type HS cement.
- .2 Minimum compressive strength at 56 days: 35 MPa.
- .3 Maximum water-to-cementing materials ratio 0:40.
- .4 Class of exposure: S1.
- .5 Nominal size of coarse aggregate: 20 mm.
- .6 Slump at point of discharge: 2 mm.
- .7 Air content: 4 to 7%.
- .8 Chemical admixtures: type to CSA-A23.1.

Part 3 Execution

3.1 Fabrication

.1 Fabricate precast concrete piles as indicated.

.2 Fabricate piles to following finish tolerances:

- .1 Length: plus or minus 3 mm/m of length.
- .2 Cross section:
  - .1 Solid sections: minus 5 to plus 10 mm.
- .3 Deviation from straight line: not more than 3 mm/m of length, 10 mm in full length.
- .4 Pile head: 10 mm/m from true right angle plane. Surface irregularities 3 mm.
- .5 Location of reinforcing steel main reinforcing cover: minus 3 to plus 5 mm; spiral: 10 mm.

.3 Prestress piles in accordance with Section 03410 - Plant-Precast Structural Concrete. Measure strand elongation to determine stressing force and measure hydraulic pressure at jack. Stressing force as measured by both methods to be within 5%.

.4 De-tension in manner to keep eccentricity to minimum. Release prestress prior to cutting prestress strands.

.5 Quality and dimensions of piles will be determined by Contract Administrator. Remove rejected piles from site.

3.2 Handling

.1 Ensure handling and installation stresses are within safe limits.

3.3 Installation

.1 Install piles in accordance with Section 02451 - Pile Foundations, General.

.2 Cut off piles at required elevation. Prevent spalling of pile concrete below cut-off elevation.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for watermains.

1.2 RELATED SECTIONS

.1 Section 01330 - Submittal Procedures.

.2 Section 02315 - Excavating, Trenching and Backfilling.

.3 Section 02701 - Aggregates: General.

1.3 References

.1 City of Winnipeg Standard Construction Specifications CW 2110 “Watermains”.

.2 City of Winnipeg Standard Construction Specifications CW 2030 “Excavation Bedding and Backfill”.

1.4 Submittals

.1 Submit shop drawings in accordance with Section 01330 - Submittal Procedures.

.2 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work. Include manufacturer's drawings, information and shop drawings where pertinent.

1.5 Waste Management and Disposal

.1 Separate and recycle waste materials.

.2 Disposal of Unsuitable or Surplus Excavated Material:

.1 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.

.2 The disposal location provided by the City will be at the Summit Road Landfill Site. The Contract Administrator will make arrangements with Mark Kinsley (986-4463) at the landfill site for the disposal of the surplus soil material.

.3 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.

1.6 Scheduling of Work

.1 Schedule watermain work in the vicinity of the building to occur after pile installation.

Part 2 Products

2.1 Materials

.1 All materials used in the construction of watermains shall conform to City of Winnipeg Specification CW 2110.

Part 3 Execution

2.2 Excavation and Backfill

.1 Excavate and backfill in accordance with City of Winnipeg Specification CW 2030 and CW 2110.

.1 Class B type 3 bedding and class 3 backfill shall be used for all watermain installation as per City of Winnipeg Standard Detail SD-001 and SD-002.

2.3 Installation of Watermains

.1 Installation of watermains and all associated work shall conform to City of Winnipeg Specification CW 2110.

.2 All watermains shall be installed in a trench.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for foundation and underslab drainage.

1.2 RELATED SECTIONS

.1 Section 02072 - Geotextiles.

.2 Section 02315 - Excavating, Trenching and Backfilling.

.3 Section 02701 - Aggregates: General.

1.3 REFERENCES

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

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

.2 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.

.2 CSA B1800-02, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).

.1 CSA B182.2-02, PVC Sewer Pipe and Fittings (PSM Type).

.3 CSA-G401-01, Corrugated Steel Pipe Products.

.3 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA)

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.2 Divert unused concrete materials from landfill to local facility.

.3 Divert unused aggregate materials from landfill to facility for reuse as approved by Contract Administrator.

.4 Divert unused metal materials from landfill to metal recycling facility for disposal approved by Contract Administrator.

.5 Divert unused geotextiles from landfill to plastic recycling facility for disposal approved by Contract Administrator.

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

.7 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

1.5 SITE CONDITIONS

.1 Examine sub-surface investigation report which is available for inspection at UMA Engineering Ltd.

.2 Known underground utility lines and buried objects are as indicated on plans.

Part 2 Products

2.1 BEDDING AND SURROUND MATERIALS

.1 Coarse filter aggregate: to CSA-A23.1/A23.2, Group 1 20-5 mm in accordance with Section 02701 - Aggregates: General.

.2 Fine filter aggregate: to CSA-A23.1/A23.2 in accordance with Section 02701 - Aggregates: General.

.3 Flexible plastic tubing and fittings. Corrugated, perforated nominal inside diameter 100mm.

.4 Rigid plastic pipe and fittings: to CSA-B182.1, size NPS 2, 3, 4, 5, 6, complete with fittings.

.5 Perforated and non-perforated, corrugated steel pipe, couplers and fittings: to CSA-G401, with asphalt, polymeric coating, inside diameter 100 mm.

.6 Geotextile filter: see Section 02072 - Geotextiles.

.7 Cleanouts.

2.2 BACKFILL MATERIAL

.1 Type 2, in accordance with Section 02315 - Excavating, Trenching and Backfilling as indicated.

.2 Excavated or graded material existing on site may be suitable to use if approved by Contract Administrator.

Part 3 Execution

3.1 EXAMINATION

.1 Ensure graded subgrade conforms with required drainage pattern before placing bedding material.

.2 Ensure improper slopes, unstable areas, areas requiring additional compaction or other unsatisfactory conditions are corrected to approval of Contract Administrator.

.3 Ensure grade beam and rigid insulation have been installed and approved by Contract Administrator before placing bedding material.

3.2 BEDDING PREPARATION

.1 Cut trenches in subgrade and place bedding materials in uniform layers not exceeding 150 mm compacted thickness to depth as indicated.

.2 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.

.3 Shape transverse depressions, as required, to suit joints.

.4 Compact each layer full width of bed to at least 95% maximum density to ASTM D698.

.5 Fill excavation below design elevation of bottom of specified bedding with compacted bedding material.

3.3 PIPE OR TUBING INSTALLATION

.1 Ensure pipe interior and coupling surfaces are clean before laying.

.2 Lay perforated pipe minimum to slope of 1:100. For pipe face perforations and coupling slots downward.

.3 Lay non-perforated pipe to slope of 1:50 from perforated pipe to disposal area. Make joints watertight.

.4 Grade bedding to establish pipe slope.

.5 Install end plugs at ends of collector drains to protect pipe ends from damage and ingress of foreign material.

.6 Connect non-perforated pipe to storm sewer by appropriate adapters manufactured for this purpose.

.7 Provide cleanouts on non-perforated pipe at changes of pipe direction and in runs greater than 15 m.

.8 Provide flush cleanouts where directed by Contract Administrator.

.9 Connect drainage system to building storm sewers, as indicated.

3.4 PIPE OR TUBING SURROUND MATERIAL

.1 Upon completion of pipe laying and after Contract Administrator has inspected Work in place, surround and cover pipe and install geotextile filter as indicated.

.2 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness, as indicated. Do not drop material within 1 m of pipe.

.3 Place layers uniformly and simultaneously on each side of pipe.

.4 Compact each layer from pipe invert to mid-height of pipe to at least 95% of corrected maximum dry density 95% maximum density to ASTM D698.

.5 Compact each layer from mid-height of pipe to underside of backfill to at least 90% maximum density to ASTM D698.

3.5 BACKFILL MATERIAL

.1 Place backfill material above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.

.2 Under paving and walks, compact backfill to at least 95% maximum density to ASTM D698. In other areas, compact to at least 90% maximum density to ASTM D698.

END OF SECTION

Part 1 General

1.1 Section Includes

.1 Materials and installation for constructing manholes, catchbasins and gravity sewers.

1.2 Related Sections

.1 Section 01330 - Submittal Procedures.

.2 Section 02315 - Excavation, Trenching and Backfilling.

.3 Section 02701 - Aggregates: General.

1.3 References

.1 City of Winnipeg Standard Construction Specifications CW 2130 “Gravity Sewers”.

.2 City of Winnipeg Standard Construction Specifications CW 2030 “Excavation Bedding and Backfill”.

1.4 Submittals

.1 Submittals in accordance with Section 01330 - Submittal Procedures.

.2 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work. Include manufacturer's drawings, information and shop drawings where pertinent.

1.5 Waste Management and Disposal

.1 Separate and recycle waste materials.

.2 Disposal of Unsuitable or Surplus Excavated Material:

.1 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.

.2 The disposal location provided by the City will be at the Summit Road Landfill Site. The Contract Administrator will make arrangements with Mark Kinsley (986-4463) at the landfill site for the disposal of the surplus soil material.

.3 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.

1.6 Scheduling of Work

.1 Schedule sewer work in the vicinity of the existing building and proposed expansions to occur after pile installation.

Part 2 Products

2.1 Materials

.1 All materials used in the construction of gravity sewers shall conform to City of Winnipeg Specification CW 2130.

Part 3 Execution

3.1 Excavation and Backfill

.1 Excavate and backfill in accordance with City of Winnipeg Specification CW 2030 and CW 2130.

.1 Class B type 3 bedding and class 3 backfill shall be used for all sewer installation as per City of Winnipeg Standard Detail SD-001 and SD-002.

3.2 Installation of Gravity Sewers, Manholes and Catch Basins

.1 Installation of gravity sewers, manholes, catch basins and all associated work shall conform to City of Winnipeg Specification CW 2130.

.2 Further to City of Winnipeg Standard Specification CW 2130, manholes shall be adjusted by one of the following methods in accordance to:

.1 Installation of cast iron ring inserts or

.2 Installation of concrete riser sections.

.3 All gravity sewers shall be installed in a trench.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01330 - Submittal Procedures.

.2 Section 02315 - Excavation, Trenching and Backfilling

.3 Section 02721 - Granular Base

.4 Section 02723 - Granular Sub-base

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate

1.3 SAMPLES

.1 Submit samples in accordance with Section 01330 - Submittal Procedures.

.2 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Divert unused granular materials from landfill to local facility as approved by Contract Administrator.

Part 2 Products

2.1 MATERIALS

.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.

.2 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:

.1 Natural sand.

.2 Screenings produced in crushing of quarried rock, boulders, gravel or slag.

.3 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:

.1 Crushed rock.

.2 Gravel and crushed gravel composed of naturally formed particles of stone.

.3 Crushed concrete.

2.2 SOURCE QUALITY CONTROL

.1 Inform Contract Administrator of proposed source of aggregates and provide samples of each type of aggregate specified at least 4 weeks prior to commencing production.

.2 If, in opinion of Contract Administrator, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.

.3 Advise Contract Administrator 4 weeks in advance of proposed change of material source.

.4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

Part 3 Execution

3.1 PREPARATION

.1 Processing

.1 Process aggregate uniformly, using methods that prevent contamination, segregation and degradation.

.2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified.

.3 Wash aggregates, if required to meet specifications.

.2 Handling

.1 Handle and transport aggregates to avoid segregation, contamination and degradation.

.3 Stockpiling

.1 Stockpile aggregates on site in locations as directed by Contract Administrator. Do not stockpile on completed pavement surfaces.

.2 Stockpile aggregates in sufficient quantities to meet Project schedules.

.3 Stockpiling sites to be level, well-drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.4 Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.

.5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.

.6 Do not use intermixed or contaminated materials. Remove and legally dispose of rejected materials within 48 h of rejection.

.7 Stockpile materials in uniform layers of thickness:

.1 Max 1.5 m

.8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

.9 Do not cone piles or spill material over edges of piles.

.10 Do not use conveying stackers.

.11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.2 CLEANING

.1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

.2 Leave any unused aggregates in neat compact stockpiles as directed by Contract Administrator.

END OF SECTION

Part 1 General

1.1 Summary

.1 This Section defines correction to maximum dry density to take into account aggregate particles larger than 19 mm.

1.2 References

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C127-88(2001), Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.

.2 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m^3).

1.3 Definitions

.1 Corrected maximum dry density is defined as:

.1 D =D1xD2/(F1 x D2) + (F2 x D1)

.2 Where: D = corrected maximum dry density kg/m^3.

.1 F1 = fraction (decimal) of total field sample passing 19 mm sieve

.2 F2 = fraction (decimal) of total field sample retained on 19 mm sieve (equal to 1.00 - F1)

.3 D1 = maximum dry density, kg/$m^3$of material passing 19 mm sieve determined in accordance with Method A of ASTM D698.

.4 D2 = bulk density, kg/m^3, of material retained on 19 mm sieve, equal to 1000G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127.

Part 2 Products

2.1 Not Used

.1 Not Used.

Part 3 Execution

3.1 Not Used

.1 Not Used.

END OF SECTION

Part 1 General

1.1 Related Sections

.1 Section 02723 - Granular Sub-base.

1.2 References

.1 City of Winnipeg Standard Construction Specifications CW 3110 “Sub-grade, Sub-base and Base Course Construction”.

Part 2 Products

2.1 Materials

.1 Granular base: material in accordance with CW 3110, crushed limestone or crushed concrete base course material.

Part 3 Execution

3.1 Sequence of Operation

.1 Place and compact granular base in accordance with the Construction Drawings and CW 3110.

3.2 Site Tolerances

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

3.3 Protection

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

END OF SECTION

Part 1 General

1.1 Related Sections

.1 Section 02761 - Painted Traffic Lines and Markings

1.2 Waste Management and Disposal

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

.2 Do not dispose of unused solvent materials into landfill. Divert materials to municipal hazardous materials depot.

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 where existing asphaltic concrete surfacing is shown on the Construction Drawings as to remain: by sand, water 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. Legally dispose removed material.

.2 Remove dust, contaminants, loose and foreign materials, oil and grease

END OF SECTION

Part 1 General

1.1 Related Sections

.1 Section 02701 – Aggregates

.2 Section 02721 – Granular Base

1.2 References

.1 City of Winnipeg Standard Construction Specifications CW 3110 “Sub-grade, Sub-base and Base Course Construction”.

Part 2 Products

2.1 Materials

.1 Granular sub-base material: in accordance with CW 3110, crushed sub-base material.

Part 3 Execution

3.1 Placing

.1 Place and compact granular sub-base in accordance with the Construction Drawings and CW 3110.

3.2 Site Tolerances

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

3.3 Protection

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01330 - Submittal Procedures

.2 Section 02311 – Site Grading

.3 Section 02721 – Granular Base

.4 Section 02723 – Granular Sub-base

.5 Section 02072 – Geotextiles

1.2 References

.1 City of Winnipeg Standard Construction Specifications CW 3410 “Asphaltic Concrete Pavement Works”.

1.3 SAMPLES

.1 Submit samples in accordance with Section 01330 - Submittal Procedures.

.2 Submit to Contract Administrator, samples of material for sieve analysis at least 2 weeks before beginning Work.

Part 2 Products

2.1 MATERIALS

.1 Prime coat: in accordance with CW 3410.

.2 Tack coat: in accordance with CW 3410.

.3 Asphalt cement: in accordance with CW 3410.

.4 Asphalt concrete: in accordance with CW3410, Type 1A.

Part 3 Execution

3.1 FOUNDATIONS

.1 Foundations – granular base and sub-base with geotextile - shall be constructed as shown on the Construction Drawings and specified in .

3.2 PAVEMENT THICKNESS

.1 Pavements for parking lots:

.1 75 mm Type 1A.

.2 Pavements for walkways:

.1 75 mm Type 1A

3.3 PAVEMENT CONSTRUCTION

.1 Asphalt pavement to be constructed in accordance with the Construction Drawings and CW 3410.

END OF SECTION

Part 1 General

1.1 Related Sections

.1 Section 01330 - Submittal Procedures.

.2 Section 01450 - Quality Control.

.3 Section 02770 - Concrete Curbs and Gutters:

.4 Section 02072 - Geotextiles

1.2 References

.1 City of Winnipeg Standard Construction Specifications CW 3330 “Installation of Interlocking Paving Stones” and CW 3335 “Installation of Interlocking Paving Stones on a Lean Concrete Base”

1.3 References

.1 Canadian Standards Association (CSA)

- .1 CSA A23.1/A23.2-94, Concrete Materials and Methods of Concrete Construction/Method of Test for Concrete.
- .2 CSA A179-94, Mortar and Grout for Unit Masonry.
- .3 CSA-A231.2-95, Pre-cast Concrete Pavers.
- .4 CSA A283-00, Qualification Code for Concrete Testing Laboratories.

1.4 Shop Drawings

.1 Submit shop drawings in accordance with Section 01330 - Submittal Procedures.

.2 Indicate layout, pattern and relationship of paving joints to fixtures and project formed details.

1.5 Product Data

.1 Submit product data in accordance with Section 01330 - Submittal Procedures.

.2 Submit following sampling and testing data:

- .1 Sieve analysis for gradation of bedding and joint material.
- .2 Unit paver sampling and testing.
- .3 Evaluation of cleaning and sealing compound.

1.6 Samples

.1 Submit samples in accordance with Section 01330 - Submittal Procedures.

.2 Submit full size sample of each type, and size pavers.

1.7 Mock-ups

.1 Construct mock-up in accordance with Section 01450 - Quality Control.

.2 Install 3 m x 3 m area mock-up. Mock-up area will be used to determine surcharge of bedding layer, joint sizes, lines, laying patterns, colours and texture.

.3 Acceptance of work will be determined by Contract Administrator from standard mock-up area.

.4 Protect mock-up for inclusion in work.

1.8 Waste Management and Disposal

.1 Separate and recycle waste materials.

Part 2 Products

2.1 Pre-cast Concrete Pavers

.1 Pre-cast concrete pavers:

.1 Shape: Barkman Concrete Ltd. Roman Series Pavers

.2 Colour: Desert Buff

.1 Sizes for main paving areas:

210mm x 314mm x 60mm height.
210mm x 262mm x 60mm
210mm x 157mm x 60mm
210mm x 105mm x 60mm

.3 Colour: Antique Brown

.1 Size for borders only:

210mm x 105mm x 60mm

.4 Shape: Detectable Pavers

.5 Colour:

.6 Roman Series pavers available from Barkman Concrete Ltd., Telephone: 667.3310.

.2 Manufactured in moulds, with spacers, suitable for installation and delivered on site in cubes of laying panels, in protective wrapping.

2.2 Detectable Warning Systems

.1 Detectable Warning Tiles: Curb Ramps

.1 Armor-Tile Tactile Systems high strength modular pavers

.2 Material: vitrified polymer composite (VPC) MANUFACTURED BY Engineered Plastics Inc.

.3 Size: 610 mm x 610 mm (24” x 24”)

.4 Colour: Dark Grey 36118

.2 Detectable Directional Tile

.1 Armor-Tile Tactile Systems Detectable Directional Tile (tactile pathway)

.2 Size:

.1 Pathway: 152 mm x 122 mm (6” x 48”)

.2 Directional Change: 305 mm x 305 mm (12” x 12”)

.3 Colour: Dark Grey 36118

.4 Detectable warning tiles and directional tile available from Engineered Plastics Inc., T: 1.800.682.2525.

.1 Contact; www.armor-tile.com

2.3 Bedding and Joint Material

.1 Bedding and joint sand: clean, non-plastic, free from deleterious or foreign matter, natural or manufactured from crushed rock or gravel. Do not use limestone screenings or stone dust.

.2 Gradation: to CAN/CSA-A23.1, Table I - Grading Limits for Fine Aggregate, and CSA A179 as follows:

Table I

Sieve Designation	% Passing for Bedding Sand	Joint Sand
10 mm	100	
5 mm	95-100	100
2.5 mm	80-100	95-100
1.25 mm	50-90	60-100
630 microns	25-65	
600 microns		35-80
315 microns	10-35	
300 microns		15-20
160 microns	2-10	
150 microns		2-15

2.4 Edge Restraints

.1 Structural curb:

.1 Cast-in-place concrete curb as per Construction Drawings and Section 02770

.2 Snap Edge, or equal, PVC or medium density polyethylene, industrial and flexible type edging, manufactured for use in paver installation, complete with connectors and pre-manufactured anchoring locations for spikes. Snap Edge available from Barkman Concrete Ltd., Telephone: 667.3310.

.1 Anchoring: to manufacturer's instructions.

2.5 Cleaning Compound

.1 Clear, organic solvent designed and recommended by manufacturer for cleaning concrete pavers of contamination encountered.

2.6 Sealing Compound

.1 Clear urethane, exterior type, specially formulated for application on pre-cast concrete pavers.

Part 3 Execution

3.1 Structural Surface

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

.2 Verify that top of structural surface does not exceed plus or minus 10 mm of grade over 3 m straightedge.

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

3.2 Structural Curbs

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

3.3 Installation of Edge Restraints

.1 Install restraints true to grade, in accordance with manufacturer's recommendations.

3.4 Placing of Bedding Material

.1 Place bedding material in accordance with the construction drawings and CW 3330.

3.5 Installation of Pre-cast Concrete Pavers

.1 Lay pavers to patterns indicated on the Construction Drawings and in accordance with CW 3330.

.2 Pavers designated as having lean concrete base lay in accordance with CW 3335.

.3 Joints between pavers: 2 to 3 mm wide, or as recommended by manufacturer.

.4 Use appropriate end, edge and corner stones. Saw cut pavers to fit around obstructions and at abutting structures.

.5 Inspect, remove, and replace chipped, broken and damaged pavers.

.6 Sweep dry joint sand material into joints.

.7 Settle sand by vibrating pavers with plate compactor.

.8 Complete installation to within 1 m of laying face, with sand-filled joints, at completion of each work day.

.9 Final surface elevations not to exceed plus or minus 10 mm under 3 m long straight edge

.10 Surface elevation of pavers: 3 to 4 mm above adjacent drainage inlets, concrete collars or channels.

.11 Ensure conformance of final elevations.

3.6 Installation of Armor-Tile Tactile Systems

.1 Install detectable paving in locations as indicated on the Construction Drawings.

.2 Dry lay detectable paving on compacted granular base

3.7 Cleaning

.1 Carry out cleaning at times and conditions recommended by manufacturer of cleaning compound, immediately prior to sealing and as directed by Contract Administrator.

.2 Remove and dispose of loose, extraneous materials from surfaces to be cleaned.

.3 Apply cleaning compounds appropriate for removal of various contaminants encountered in accordance with manufacturer's recommendations.

.4 Final surface to be free of contamination

3.8 Inspection and Acceptance

.1 Inspection and acceptance of pavers will be in accordance with CW 3330.

END OF SECTION

Part 1 General

1.1 Related Work

.1 Section 02722 - Pavement Surface Cleaning and Removal of Pavement Markings

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.

Part 2 Products

2.1 Materials

.1 Paint:

- .1 To CGSB1-GP-74M, alkyd traffic paint.
- .2 Colour: to CGSB1-GP-12C, yellow 505-308.
- .3 Upon request, Contract Administrator will supply a qualified product list of paints applicable to work. Qualified paints may be used but Contract Administrator reserves right to perform further tests.

.2 Thinner: to CAN/CGSB-1.5.

Part 3 Execution

3.1 Equipment Requirements

.1 Paint applicator to be an approved pressure type 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 standing water, frost, ice, dust, oil, grease and other foreign materials.

3.3 Application

.1 Lay out pavement markings.

.2 Unless otherwise approved by Contract Administrator, apply paint only when air temperature is above 10 C, wind speed is less than 60 km/h and no rain is forecast within next 6 h.

.3 Apply traffic paint evenly at rate of $3m^2/L$.

.4 Do not thin paint unless approved by Contract Administrator.

.5 Symbols and letters to conform to dimensions indicated or standard Universal Access symbol dimensions.

.6 Paint lines to be of uniform colour and density with sharp edges.

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

3.4 Tolerance

.1 Paint markings to be within plus or minus 12mm of dimensions indicated.

.2 Remove incorrect markings in accordance with Section 02722 - Pavement Surface Cleaning and Removal of Pavement Markings.

3.5 Protection of Completed Work

.1 Protect pavement markings until dry.

END OF SECTION

Part 1 General

1.1 Related Sections

.1 Section 02315 - Excavating, Trenching and Backfilling

.2 Section 02743 - Asphalt Concrete Paving – Short Form

.3 Section 03100 - Concrete Forms and Accessories

.4 Section 03200 - Concrete Reinforcement

.5 Section 03300 - Cast-in-Place Concrete

1.2 References

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.2-98, Boiled Linseed Oil.

.2 CAN/CGSB-3.3-99, Kerosene.

.2 Canadian Standards Association (CSA)

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

1.3 Waste Management and Disposal

.1 Separate and recycle waste materials.

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

.3 Ensure emptied containers are secured and stored in a safe place.

Part 2 Products

2.1 Materials

.1 Concrete mixes and materials: to Section 03300 - Cast-in-Place Concrete.

.2 Reinforcing steel: to Section 03200 - Concrete Reinforcement.

.3 Joint filler curing compound: to Section 03300 - Cast-in-Place Concrete.

.4 Granular base: to Section 02721 – Granular Base

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

.6 Fill material: to Section 02315 - Excavating, Trenching and Backfilling, Type 3 fill

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

.8 Kerosene: to CAN/CGSB-3.3.

Part 3 Execution

3.1 Granular Base

.1 Obtain Contract Administrator approval of sub-grade before placing granular base.

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

.3 Compact granular base to at least 95% of maximum density to ASTM D698.

3.2 Concrete

.1 Obtain Contract Administrator approval of granular base and reinforcing steel prior to placing concrete.

.2 Do concrete work in accordance with Section 03300 - Cast-in-Place Concrete.

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

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

3.3 Tolerances

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

3.4 Expansion and Contraction Joints

.1 Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals of 3 m.

.2 Install expansion joints at intervals of 6 m.

3.5 Isolation Joints

.1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins or permanent structure.

.2 Install joint filler in isolation joints in accordance with Section 03300 - Cast-in-Place Concrete.

.3 Seal isolation joints with sealant approved by Contract Administrator.

3.6 Curing

.1 Cure concrete by adding moisture continuously in accordance with CAN/CSA-A23.1 to exposed finished surfaces for at least 1 day after placing, or sealing moisture in by curing compound approved by Contract Administrator.

.2 Where burlap is used for moist curing, place two pre-wetted layers on concrete surface and keep continuously wet during curing period.

.3 Apply curing compound evenly to form continuous film in accordance with manufacturer's requirements.

3.7 Backfill

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

.2 Backfill to designated elevations with material approved by Contract Administrator Compact and shape to required contours as indicated or as directed by Contract Administrator.

3.8 Linseed Oil Treatment

.1 After concrete has cured for specified curing time and when surface of concrete is clean and dry, apply two coats of linseed oil mixture uniformly to surfaces of curbs.

.2 Linseed oil mixture to consist of 50% boiled linseed oil and 50% mineral spirits by volume.

.3 Apply treatment when air temperature above 10°C.

.4 Apply first coat at 135 mL/m^2.

.5 Apply second coat at 90 mL/$m^2$when first coat has dried.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation of standard manufactured catalogue items such as waste containers, benches and bike racks, and library drop-box.

1.2 RELATED SECTIONS

.1 Section 01330 - Submittal Procedures.

.2 Section 01780 - Closeout Submittals.

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01330 - Submittal Procedures.

.2 Indicate dimensions, sizes, assembly, anchorage and installation details for each furnishing specified.

.3 Provide maintenance data for care and cleaning of site furnishings for incorporation into manual specified in Section 01780 - Closeout Submittals.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling.

Part 2 Products

2.1 **LIBRARY DROP-BOX** (to be provided by Library Services)

.1 Acceptable Product: Large Capacity Curbside Book Return

- .1 Curbside Book Return
- .2 Capacity – 400 books
- .3 Complete with removable receiving cart on 150mm (6”) wheels that can be pulled into library
- .4 Fire retardant chute and slopping roof

.2 Dimensions**:**

- **.**1 Height: 1194 mm (47”)
- .2 Width: 1092 mm (43”)
- .3 Depth: 1321 mm (52”)

.3 Weight: 57.6 kg (127 lbs)

.4 Material: 18 gauge, rust resistant, zinc-plated steel

.5 Finish: Stainless Steel

.6 Mounting: Bolted to concrete

.7 Contact:

.1 Rick Walker, Manager of Library Services
T: 986.6472
rwalker@winnipeg.ca

2.2 BENCH

.1 Acceptable Product: Landscape Forms Manistee Bench

.1 Backed
.2 Without arms
.3 Surface mount

.2 Dimensions:

.1 Height: 794 mm (31.25”)
.2 Length: 1829 mm (72”)
.3 Depth: 660 mm (26”)

.3 Finish: Panguard II ® powdercoat finish, HAPS free with low VOCs

.1 Colour: Ocean (powdercoat colour)

.4 Material: 86% or greater recycled material

.5 Contact: www.landscapeforms.com/products

.1 **Martin Petersen**
T: 604-987-7461
F: 866.269.9191
martinp@landscapeforms.com

.2 **Lee Day**
T: 416.968.6655
F: 416.968.1944
leed@landscapeforms.com

2.3 TRASH CONTAINER

.1 Acceptable Product: Landscape Forms Plexus Group Litter Receptacle.

.1 Top opening, 30-gallon receptacle
.2 Wire grid body
.3 Liner: polyethylene coordinated with body colour
.4 Lid: spun metal
.5 Surface mount

.2 Dimensions:

.1 Height: 914 mm (36”)
.2 Diameter: 508 mm (20”)

.3 Finish: Panguard II ® powdercoat finish, HAPS free with low VOCs

.1 Colour: Ocean (powdercoat)

.4 Contact: www.landscapeforms.com/products

.1 **Martin Petersen**
T: 604-987-7461
F: 866.269.9191
martinp@landscapeforms.com

.2 **Lee Day**
T: 416.968.6655
F: 416.968.1944
leed@landscapeforms.com

2.4 BICYCLE RACK

.1 Acceptable Product: GameTime: GT Site: Loop Bike Rack

.1 Model: 7700: in-ground, 9 bikes

.2 Frame: 60 mm (2.375") O.D. galvanized steel pipe

.2 Finish: powdercoat

.1 Colour: Metallic

.3 Contact: www.gametime.com

.1 **Crozier Agencies**
Unit 8, 1865 Sargent Ave.
Winnipeg, Manitoba R3H 0E4
T: 204-774-6084
Toll Free: 800-665-3821
F: 204-774-6099
crozier@mts.net

Part 3 Execution

3.1 INSTALLATION

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

.2 Install furnishing true, plumb, anchored firmly supported, as indicated.

.3 Library drop box to be bolted to paving surface as instructed by City of Winnipeg Library staff.

.4 Touch-up damaged finishes to approval of Contract Administrator.

END OF SECTION

Part 1 General

1.1 Section Includes

.1 Materials and installation for fertilizing and preserving root systems of plants affected by changing grades or excavation.

1.2 Related Sections

.1 Section 01330 - Submittal Procedures

.2 Section 02232 - Tree Pruning

.3 Section 02933 - Sodding

1.3 References

.1 Canadian Standards Association (CSA International)

.1 CSA G30.5-M1983(R1998), Welded Steel Wire Fabric for Concrete Reinforcement.

.2 Health Canada - Pest Management Regulatory Agency (PMRA)

.1 National Standard for Pesticide Education, Training and Certification in Canada (1995)

.3 Department of Justice Canada

.1 Fertilizers Act (R.S. 1985, c. F-10)

.2 Fertilizers Regulations (C.R.C., c. 666)

1.4 Submittals

.1 Submittals in accordance with Section 01330 - Submittal Procedures

.2 Submit monthly written reports on maintenance during warranty period, to Contract Administrator identifying:

.1 Maintenance work carried out

.2 Development and condition of plant material

.3 Preventative or corrective measures required, which are outside Contractor's responsibility

1.5 Waste Management and Disposal

.1 Separate waste materials for reuse and recycling.

.2 Dispose of unused fertilizer material at official hazardous material collections site.

.3 Do not dispose of unused fertilizer material into sewer system, into streams, lakes, onto ground or in any other location where they will pose health or environmental hazard.

1.6 Scheduling

.1 Obtain approval from Contract Administrator of schedule indicating beginning of Work.

1.7 Maintenance during Warranty Period

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

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

.2 Apply pesticides in accordance with National Standard for Pesticide Education, Training and Certification in Canada, Federal, Provincial and Municipal regulations as and when required to control insects, fungus and disease. Obtain product approval from Contract Administrator prior to application.

.3 Apply fertilizer in early spring at rate of 0.025 kg of nitrogen/m^2.

.4 Remove dead, broken or hazardous branches from plant material. Dispose of debris through mulching.

Part 2 Products

2.1 Materials

.1 Fill:

.1 Type (A): clean, natural river sand and gravel material, free from silt, clay, loam, friable or soluble materials and organic matter.

.2 Type (B): excavated pervious soil, free from roots, rocks larger than 75 mm, building debris, and toxic ingredients (salt, oil, etc).

.2 Coarse washed stones: 35-75 mm diameter clean round hard stone.

.3 Drain-tile: 100 mm diameter corrugated plastic perforated tubing complete with snap couplings. Fill vents with 20 mm clear stone.

.4 Peatmoss:

.1 Derived from partially decomposed species of Sphagnum Mosses.

.2 Elastic and homogeneous.

.3 Free of wood and deleterious material which could prohibit growth.

.4 Shredded minimum particle size: 5 mm.

.5 Fertilizer:

.1 To Canada Fertilizer Act and Fertilizers Regulations.

.2 Complete, commercial, slow release with 35 % of nitrogen content in water-insoluble form.

.6 Anti-desiccant: commercial, wax-like emulsion.

.7 Filter Cloth:

.1 Type 1: 100 % non-woven needle punched polyester, 2.75 mm thick, 240 g/m^2 mass.

.2 Type 2: biodegradable burlap.

.8 Wood posts 38 x 89 x 2400 mm length, untreated wood.

.9 Welded wire fabric (WWF): 100 x 100 mm, to CSA G30.5.

Part 3 Execution

3.1 Identification and Protection

.1 Identify plants and limits of root systems to be preserved as approved by Contract Administrator.

.2 Protect plant and root systems from damage, compaction and contamination resulting from construction as approved by Contract Administrator.

.3 Ensure no pruning is done inside drip line. If pruning inside drip line is required consult an aborist or Canadian Certified Horticultural Technician (CCHT) as approved by Cotract Administrator.

3.2 Root Curtain System

.1 Identify limits for required construction excavation as approved by Contract Administrator.

.2 Prior to construction excavation, dig trench minimum 500 mm wide x 1500 mm deep, along perimeter of excavation limits.

.3 Prune exposed roots cleanly at side of trench nearest plants to be preserved. Pruned ends to point obliquely downwards.

.4 Install wooden posts or recycled composite plastic posts and welded wire fabric against construction edge of trench.

.5 Securely attach Type 2 filter fabric on plant side of wire mesh.

.6 Prepare homogeneous mixture of fertilizer, parent material and organic matter.

.1 Add organic matter to mixture to achieve 7-9 % organic matter content by weight.

.2 Incorporate with mixture grade 2:12:8 ratio fertilizer (dry) at rate of 1.5 kg/m^3.

.7 Backfill with homogeneous mixture between curtain wall and plants to be preserved in layers not exceeding 150 mm in depth. Compact each layer to 85 % Standard Proctor Density.

.8 Protect root curtain from damage during construction operations.

.9 Water plants and root curtain sufficiently during construction to maintain optimum soil moisture condition until backfill operations are complete.

.10 Remove root curtain before backfill operations. Ensure root curtain is cut down to 300 mm below finished grade and remove cut material.

3.3 Air Layering System

.1 Using manual methods, carefully remove turf, plants, leaves and organic matter in area of root system, dispose of plant matter through compost site and slightly loosen topsoil surface. Avoid damage to root system.

.2 Lay horizontal system of perforated drain pipe on surface of existing grade.

.1 Slope drain tile minimum 3% for drainage away from trunk of tree.

.2 Connect system with general site drainage system or drain to low point on site.

.3 Install plastic "vent" pipes vertically over joints in horizontal pipe system or where indicated. Top of vent pipe to be 20 mm above finished grade of fill. Keep top of vent pipe covered during construction.

.4 Cover joints with Type 1 filter fabric and place coarse washed stone around joints and vertical pipes to secure their position.

.5 Construct drywell around trunk of tree.

.1 Ensure vertical vent pipes are left exposed for air circulation to root system.

.2 Protect openings from blockage during construction.

.3 Install protective caps on exposed horizontal openings.

.6 Place 200 mm depth of coarse washed stone on surface of original ground and horizontal pipe system to limits.

.7 Place Type 1 filter fabric over surface of granular layer.

.8 Place Type A fill over filter fabric to required depth without disturbing or damaging drain pipe system. Avoid damage to filter fabric.

.9 Complete topsoil and sodding or finished paving over area of sub-surface system within one week of placing fill.

.10 Remove temporary protective covering from vent pipe openings. Install protective caps flush with finished grade.

3.4 Trenching and Tunnelling for Underground Services

.1 Centre line location and limits of trench/tunnel excavation to be approved by Contract Administrator prior to excavation. Tunnel excavation to extend 2000 mm from edge of trunk on either side.

.2 Excavate manually within zone of root system. Do not sever roots greater than 40 mm diameter except at greater than 500 mm below existing grade. Protect roots, and cut roots cleanly with sharp disinfected tools.

.3 Excavate tunnel under centre of tree trunk using methods and equipment approved by Contract Administrator.

.4 Minimum acceptable depth to top of tunnel: 1000 mm.

.5 Backfill for tunnel and trench to 85 % Standard Proctor Density. Avoid damage to trunk and roots of tree.

.6 Complete tunnelling and backfilling at tree within 2 weeks of beginning Work.

3.5 Pruning

.1 Prune in accordance with Section 02232 - Tree Pruning.

.2 Prune crown to compensate for root loss while maintaining general form and character of plant. Dispose of debris through mulching.

3.6 Anti-Desiccant

.1 Apply anti-desiccant to foliage where applicable.

END OF SECTION

Part 1 General

1.1 Related Sections

.1 Section 01330 - Submittal Procedures

.2 Section 02311 - Site Grading

.3 Section 02911 - Topsoil and Finish Grading

1.2 Method of Measurement and Basis of Payment

.1 Two-year maintenance of plant material will be measured on a separate price lump sum basis.

.2 Two-year maintenance of plant material will be paid for at the Contract Price for "Plant Material Maintenance", which price shall be payment in full for supplying all labour and equipment and performing all operations herein specified acceptable to the Contract Administrator.

1.3 References

.1 Agriculture and Agri-Food Canada (AAFC)

.1 Plant Hardiness Zones in Canada-2000

.2 Canadian Nursery Landscape Association (CNLA)

.1 Canadian Standards for Nursery Stock- latest edition.

1.4 Product Data

.1 Submit product data in accordance with Section 01330 - Submittal Procedures.

.2 Provide product data for:

.1 Fertilizer

.2 Anti-desiccant

.3 Guying assembly including clamps, collar, guying wire, anchors and wire-tightener

1.5 Samples

.1 Submit samples in accordance with Section 01330 - Submittal Procedures.

1.6 Storage and Protection

.1 Protect plant material from frost, excessive heat, wind and sun during delivery.

.2 Immediately store and protect plant material which will not be installed within 1 hour after arrival at site in storage location approved by Contract Administrator

.3 Protect plant material from damage during transportation:

.1 Protect foliage and root balls using anti-desiccants and tarpaulins, where use of enclosed vehicle is impractical due to size and weight of plant material.

.4 Protect stored plant material from frost, wind and sun and as follows:

.1 For bare root plant material, preserve moisture around roots by heeling-in or burying roots in peat moss and watering to full depth of root zone.

.2 For pots and containers, maintain moisture level in containers. Heel-in fibre pots.

.3

.4 For balled and burlap, and wire basket root balls, place to protect branches from damage. Maintain moisture level in root zones.

1.7 Waste Management and Disposal

.1 Separate and recycle waste materials.

.2 Dispose of unused fertilizer at official hazardous material collection site.

.3 Dispose of unused anti-desiccant at official hazardous material collections site.

1.8 Scheduling

.1 Obtain approval from Contract Administrator of schedule 7 days in advance of shipment of plant material.

.2 Schedule to include:

.1 Quantity and type of plant material (species and sizes)

.2 Shipping dates

.3 Arrival dates on site

.4 Planting dates

1.9 Warranty

.1 The Contractor hereby warrants that plant material as itemized on plant list will remain free of defects for 2 full growing seasons.

.2 End-of-warranty inspection will be conducted by Contract Administrator.

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

Part 2 Products

2.1 Plant Material

.1 All plant material shall be containerized and/or ball and burlap nursery stock.

.2 Type of root preparation, sizing, grading and quality: comply with “Guide Specification for Nursery Stock” produced by Landscape Canada (CNTA).

.1 Source of plant material: nursery grown in the Oak-Aspen Forest Eco-region, in Zone 3A or 2B, in accordance with Plant Hardiness Zones in Canada.

.2 Install plant material in locations appropriate to species.

.3 All plant material: No. 1 Nursery Stock, free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.

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

2.2 Water

.1 Free of impurities that would inhibit plant growth.

2.3 Stakes and Guys

.1 Stakes: T-bar, steel, 40 x 40 x 5 x 2440 mm

.2 Wire Tightener: Type 2: turnbuckle, galvanized steel, 9.5 mm diameter with 270 mm open length

.3 Guying Wire: Type 2: 1.5 mm diameter multi-wire steel cable

.4 Clamps: U-bolt: galvanized, 13 mm diameter, c/w curved retaining bar and hex nuts

.5 Anchors: Wood, 38 x 38 x 460 mm

.6 Guying Collar: Plastic tube, 13 mm diameter, nylon reinforced

2.4 Trunk Protection

.1 Plastic: perforated spiralled strip

2.5 Fertilizer

.1 Synthetic commercial type as recommended by soil test report

2.6 Anti-desiccant

.1 Wax-like emulsion

2.7 Flagging Tape

.1 Fluorescent, orange colour

2.8 Source Quality Control

.1 Imported plant material must be accompanied with necessary permits and import licenses. Conform to federal and provincial regulations.

.1 Imported material obtained from a milder climate zone: only acceptable when moved to the site prior to the breaking of buds in their original location, and

heeled in a protected area or placed in cold storage until conditions are suitable for planting.

Part 3 Execution

3.1 Pre-planting Preparation

.1 Ensure plant material acceptable to Contract Administrator

.2 Remove damaged roots and branches from plant material.

.3 Apply anti-desiccant to deciduous trees in leaf in accordance with manufacturer's instructions.

3.2 Planting Beds

.1 Establishment of sub-grade for planting beds is specified in Section 02311 - Site Grading.

.2 Preparation of planting beds is specified in Section 02911 - Topsoil and Finish Grading.

.3 For individual planting holes:

.1 Stake out location and obtain approval from Contract Administrator prior to excavating.

.2 Excavate to depth and width as indicated.

.3 Remove subsoil, rocks, roots, debris and toxic material from excavated material that will be used as planting soil for trees and individual shrubs. Dispose of excess material.

.4 Scarify sides of planting hole.

.5 Remove water which enters excavations prior to planting. Notify Contract Administrator if water source is ground water.

3.3 Planting

.1 Coordinate planting operations with the installation of drip irrigation system.

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

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

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

.5 For trees and shrubs:

.1 Backfill soil in 150 mm lifts. Tamp each lift to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has soaked into soil, backfill to finish grade.

.2 Form watering saucer as indicated.

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

.7 Water the plant material thoroughly.

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

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

3.4 Trunk Protection

.1 Install trunk protection on deciduous trees.

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

3.5 Tree Supports

.1 Install tree supports as indicated on the Construction Drawings.

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

3.6 Mulching

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

.2 Spread mulch as indicated.

3.7 Maintenance during Establishment Period

.1 Perform following maintenance operations from time of planting to acceptance by Contract Administrator.

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

.2 Remove weeds monthly.

.3 Replace or re-spread damaged, missing or disturbed mulch.

.4 For non-mulched areas, cultivate as required to keep top layer of soil friable.

.5 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Contract Administrator prior to application.

.6 Remove dead or broken branches from plant material.

.7 Keep trunk protection and guy wires in proper repair and adjustment.

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

3.8 Maintenance during Warranty Period

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

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

.2 Reform damaged watering saucers.

.3 Remove weeds monthly.

.4 Replace or re-spread damaged, missing or disturbed mulch.

.5 For non-mulched areas, cultivate monthly to keep top layer of soil friable.

.6 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Contract Administrator prior to application.

.7 Apply fertilizer in early spring as indicated by soil test.

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

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

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

.11 Remove and replace dead plants and plants not in healthy growing condition.

.12 Make replacements in same manner as specified for original plantings.

.13 Submit monthly written reports to Contract Administrator identifying:

.1 Maintenance work carried out

.2 Development and condition of plant material

.3 Preventative or corrective measures required, which are outside Contractor's responsibility

END OF SECTION

Part 1 General

1.1 Related Sections

.1 Section 01293 - Payment Procedures: Testing Laboratory Services

.2 Section 02311 - Site Grading

1.4 Reference

.1 City of Winnipeg Standard Construction Specifications CW 3540 "Topsoil and Finish Grading for Establishment of Turf Areas"

1.5 Definition

.1 COMPOST: A mixture of soil and decomposing organic matter used as a fertilizer, mulch, or soil conditioner. Compost is processed organic matter containing 40% or more organic matter as determined by the Walkley-Black or LOI test. Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below 50), and contain no toxic or growth inhibiting contaminates.

1.6 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.

1.7 Waste Management and Disposal

.1 Separate and recycle waste materials.

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

Part 2 Products

2.1 Topsoil

.1 Site topsoil and imported topsoil shall conform to CW 3540.

2.2 Soil Amendments

.1 Fertilizer:

Chemical fertilizers shall have N-P-K compositions as recommended by an agricultural soil-testing laboratory approved by the Contract Administrator provided for each of the following:

.1 Lawn turf (City Specification) with imported topsoil
.2 Horticultural trees and shrubs with planting soil mix

Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation. Ph value: 6.5 to 8.0.

.2 Peatmoss:

.1 Derived from partially decomposed species of Sphagnum Mosses
.2 Elastic and homogeneous, brown in colour
.3 Free of wood and deleterious material which could prohibit growth
.4 Shredded particle minimum size: 5mm

.3 Sand: washed coarse silica sand, medium to course textured.

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

2.3 Mulch

.1 Wood chip: varying in size from 50 mm to 100 mm and 5 to 20 mm thick, free of bark, small branches and leaves.

.2 Shale: red shale mineral mulch with pieces varying in size from 50 to 100 mm by 5 to 20 mm thick, free of clay and organic materials.

2.4 Source Quality Control

.1 Contractor is responsible for amendments to stockpiled and imported topsoil as specified.

.2 Have soil testing performed by recognized testing facility for pH, N, P and K, and organic matter.

.3 Contractor will pay for cost of soil tests.

Part 3 Execution

3.1 Stripping of Topsoil

.1 Commence topsoil stripping of areas as indicated and as directed by Contract Administrator after sod has been removed.

.2 Strip topsoil to depths as directed by Contract Administrator. Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Stockpile in locations as directed by Contract Administrator. Stockpile height not to exceed 2 m.

.4 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill.

.5 Protect stockpiles from contamination and compaction.

3.2 Preparation of Existing Grade

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

.2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

.3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes above surface. Dispose of removed material off site.

.4 Cultivate entire area which is to receive topsoil to minimum depth of 100mm. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 Placing and Spreading of Topsoil and Planting Soil Mixture

.1 Place topsoil after Contract Administrator has accepted sub-grade.

.2 Spread topsoil in uniform layers not exceeding 150mm.

.3 For sod areas:

.1 Keep topsoil 15mm below finished grade.
.2 Spread topsoil 100mm minimum depth after settlement.
.3 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

.4 For planting beds: thoroughly mix topsoil and soil amendments into full specified depth of planting soil mixture at following rates:

.1 2 m^3 of compressed peatmoss per 10 m^3 of topsoil (20%)

.2 1 tonne of sand per 10 m^3 of topsoil (5%)

.3 Bone meal at 30 Kg per 10 m^3 of topsoil

3.4 Finish Grading

.1 Construct finish grades in accordance with the Construction Drawings and CW 3540.

.2 Grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.

.3 Consolidate topsoil to required bulk density. Leave surfaces smooth, uniform and firm against deep foot-printing.

3.5 Acceptance

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

3.6 Surplus Material

.1 Legally dispose of materials, except topsoil not required, off site.

.2 Surplus topsoil shall be removed and reused.

3.7 Cleaning

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01330 - Submittal Procedures

.2 Section 02911 - Topsoil and Finish Grading

1.2 REFERENCES

.1 City of Winnipeg Standard Construction Specifications CW 3510 “Sodding”

1.3 QUALITY ASSURANCE

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

- .1 Sod – mineral content
- .2 Fertilizer

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

1.4 SCHEDULING

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

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

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials.

.2 Dispose of unused fertilizer in hazardous waste collection site.

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

Part 2 Products

2.1 MATERIALS

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

- .1 Turf grass sod shall conform to City of Winnipeg Standard Construction Specifications CW 3510.

.1 Sod shall be a mixture of ninety-five (95%) percent Kentucky bluegrass, using equal proportions of any three Class 2 cultivars, and five (5%) percent Creeping Red fescue.

.2 Turf Grass Nursery Sod quality:

.1 Conform to City of Winnipeg Standard Construction Specifications CW 3510.

.2 Mowing height limit: 75 mm

.2 Sod establishment support:

.1 Geotextile fabric: biodegradable

.2 Wooden pegs: 17 x 8 x 200 mm

.3 Water:

.1 Supplied by Contractor

.4 Fertilizer:

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

.2 Use complete, synthetic, slow release fertilizer with 65 % of nitrogen content, water insoluble.

2.2 SOURCE QUALITY CONTROL

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

Part 3 Execution

3.1 PREPARATION

.1 Verify that grades are correct and prepared in accordance with Section 02911 - Topsoil and Finish Grading. If discrepancies occur, notify Contract Administrator and do not commence work until instructed by 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, to tolerance of plus or minus 8 mm for Turf Grass Nursery Sod, surface to drain naturally.

3.2 SOD PLACEMENT

.1 Install sod in accordance with the Construction Drawings and CW 3510.

3.3 SOD PLACEMENT ON SLOPES AND PEGGING

.1 In accordance with CW 3540

3.4 FERTILIZING PROGRAM

.1 Fertilize during establishment and warranty periods as required for healthy sod development and in conformance with CW3510. .

3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Maintain sod areas during the establishment period in accordance with CW 3510.

.2 Cut grass and remove clippings that will smother grass to height as follows:

.1 Turf Grass Nursery Sod:

.1 Cut 75 mm height during normal growing conditions.

.2 Cut grass at 2 week intervals or as directed by Contract Administrator, but at intervals so that approximately one third of growth is removed in single cut.

3.6 ACCEPTANCE

.1 Acceptance conditions as per CW 3510.

3.7 MAINTENANCE DURING WARRANTY PERIOD

.1 Conduct warranty maintenance in accordance with CW 3510.

.2 Cut grass and remove clippings that will smother grass to height as follows:

.1 Turf Grass Nursery Sod:

.1 Cut 75 mm height during normal growing conditions.

.2 Cut grass at 2 week intervals or as directed by Contract Administrator, but at intervals so that approximately one third of growth is removed in single cut.

.3 Eliminate weeds by mechanical or chemical means to extent acceptable to Contract Administrator.

.1 If chemical means are used, comply with Section 02361 - Chemical Control of Vegetation.

3.8 CLEANING

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

END OF SECTION