

**NATIONAL CAPITAL COMMISSION
CAPITAL PLANNING AND REAL ASSET MANAGEMENT BRANCH**

**Garden of the Provinces and Territories
Planting Rehabilitation**

Reference Number: DC 4075-04-10

Date: January 2015

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END OF SECTION

BASIS OF PAYMENTS

- .1 Payment at the price per item listed in the Tender Form shall be full compensation for all labour, services and equipment as well as the supply, delivery and installation of all materials required for the proper execution of this contract.

ITEM NO. 1 - MOBILIZATION AND GENERAL REQUIREMENTS

- .1 This item includes all general requirements to complete the project including general instructions, shop drawings, safety measures, environmental protection, protection of existing vegetation to remain, temporary facilities, traffic control, cleaning and reinstatement at completion of the project. All turf reinstatement to be sodding.
- .2 Included in this lump sum price are all the general requirements identified on the drawings and specifications and all those required to complete the work of this contract not covered under specific items.
- .3 Included in this lump sum price are the completion of record drawings at the end of the Contract for provision to the Contract Administrator
- .4 This item will not be measured but will be paid on a lump sum basis upon the following schedule.
 - .1 70% for substantial completion of this item
 - .2 30% for completion and supply of Contract record drawings

ITEM NO. 2 - HANDLING AND DISPOSAL OF CONTAMINATED SOIL

- .1 This item also includes the hauling, handling and off-site disposal of all excavated contaminated soil from the site, as per Section 31 23 10 – Excavation and Backfilling.
- .2 This item includes the supply of weigh bills to confirm the disposal of contaminated soil at designated facilities.
- .3 This item will not be measured but will be paid on a lump sum basis upon successful completion of work, including the provision of weigh bills.

ITEM NO. 3 - CLEARING AND GRUBBING

- .1 This item consists of the clearing and grubbing of all plant material within the ground level planting beds. Most of the above ground parts were removed in the spring of 2015.
- .2 This item includes the removal of turf in the woodland areas.
- .3 This item also includes the pruning of any woody plant material designated to remain that is damaged during the execution of the work.
- .4 This item will not be measured but will be paid on a lump sum basis.

ITEM NO. 4 - REMOVE PART OF EXISTING IRRIGATION SYTEM

- .1 This item consists of the removal and disposal of part of the existing irrigation within planting beds as indicated.
- .2 This item will not be measured but will be paid on a lump sum basis.

ITEM NO. 5 - 120 VOLT POWER SUPPLY TO CONTROLLER

- .1 This item consists of extending and relocating the existing 120 volt power supply to the new irrigation controller as indicated.
- .2 This item will not be measured but will be paid on a lump sum basis.

ITEM NO. 6 - IRRIGATION SYSTEM

- .1 This item consists of the supply, installation and set-up of an irrigation system inclusive of earth excavation, trenching, bedding of pipes, backfilling landscape repairs, piping, irrigation equipment, water connections, work in confined spaces, electrical connections, repair of existing irrigation components where indicated and cleanup.
- .2 This item will not be measured but will be paid on a lump sum based upon the following progress schedule:
 - 1. 80% at the completion the supply, installation, set-up and repair of an irrigation system;
 - 2. 10% at the completion of all fall 2015 maintenance and warranty conditions as determined by the Contract Administrator;
 - 3. 5% at the completion of all fall 2016 maintenance and warranty conditions as determined by the Contract Administrator;
 - 4. 5% at the end of the maintenance and warranty period provided that all conditions have been met as determined by the Contract Administrator.

ITEM NO. 7 - MONITORING AND ADJUSTMENT OF IRRIGATION SYSTEMS

- .1 This item consists of monthly monitoring, during the growing season, of installed irrigation system functionality and optimum moisture levels for plantings.
- .2 This item will not be measured but will be paid on a lump sum basis upon the following schedule.
 - .1 40% for completion of monitoring and adjustments in 2015
 - .2 30% for completion of monitoring and adjustments in 2016
 - .3 30% for completion of monitoring and adjustments in 2017

ITEM NO. 8 - SOIL CULTIVATION

- .1 This item consists of the cultivation of underlying soils and the mixing of soil amendments within the various proposed soil profiles as indicated.
- .2 This item will not be measured but will be paid on a lump sum basis.

ITEM NO. 9 - STANDARD TOPSOIL

- .1 This item consists of supply and installation of imported topsoil to the extent indicated and specified in the contract documents.
- .2 This item will not be measured but will be paid on a lump sum basis.

ITEM NO. 10 - SHREDDED LEAF COMPOST

- .1 This item consists of supply and installation of shredded leaf compost as a soil amendment to the extent indicated and specified in the contract documents.
- .2 This item will not be measured but will be paid on a lump sum basis.

ITEM NO. 11 - UNAMENDED SPHAGNUM PEAT MOSS

- .1 This item consists of supply and installation of unamended sphagnum peat moss as a soil amendment to the extent indicated and specified in the contract documents.
- .2 This item will not be measured but will be paid on a lump sum basis.

ITEM NO. 12 - SULPHUR

- .1 This item consists of supply and installation of sulphur as a soil amendment to the extent indicated and specified in the contract documents.
- .2 This item will not be measured but will be paid on a lump sum basis.

ITEM NO. 13 - RESET COBBLESTONE EDGING

- .1 This item consists of lifting, stockpiling, and re- installation of existing cobblestone edging to provide a smooth, level alignment in their present location.
- .2 This item includes the supply and installation of additional stonedust fines as required to meet the edging detail.
- .3 This item will not be measured but will be paid on a lump sum basis.

ITEM NO. 14 - FINISH GRADING

- .1 This item consists of the fine grading and rolling of imported topsoil and soil amendments to the extent indicated and specified in the contract documents.
- .2 This item will not be measured but will be paid on a lump sum basis.

ITEM NO. 15 - NATURAL SHREDDED CEDAR MULCH

- .1 This item consists of supply and installation of natural shredded cedar mulch to the extent indicated and specified in the contract documents.
- .2 This item will not be measured but will be paid on a lump sum basis.

ITEM NO. 16 - LEAF MULCH

- .1 This item consists of supply and installation of leaf mulch to the extent indicated and specified in the contract documents.
- .2 This item will not be measured but will be paid on a lump sum basis.

ITEM NO. 17 - ANGULAR GRANITE MULCH

- .1 This item consists of supply and installation of angular granite mulch for construction of maintenance paths and surface mulching to the extent indicated and specified in the contract documents.
- .2 This item will not be measured but will be paid on a lump sum basis.

ITEM NOS. 18 TO 74 - NURSERY GROWN PLANT MATERIAL

- .1 These items consist of the supply and installation of nursery grown plant material as indicated in the Contract documents.
- .2 These items include all works associated with planting including mulching.
- .3 These items will be measured for payment by the number of plants supplied and planted.

ITEM NO. 75 TO 79 - FALL BULBS

- .1 These items consist of the supply and installation of nursery grown fall bulbs as indicated in the Contract documents.
- .2 These items include all works associated with planting including reinstatement of mulching.
- .3 These items will be measured for payment by the number of bulbs supplied and planted.

ITEM NO. 80 - PLANT MATERIAL MAINTENANCE AND WARRANTY 2015

- .1 This item consists of the maintenance and warranty of all plant material in 2015 in accordance with the Contract documents to ensure healthy plant material.
- .2 This item will not be measured but will be paid on a lump sum based upon the following progress schedule:
 - 1. 40% at the completion of all spring maintenance and warranty conditions as determined by the Contract Administrator;
 - 2. 20% at the completion of all summer ~~2013~~ maintenance and warranty conditions as determined by the Contract Administrator;
 - 3. 40% at the completion of all fall maintenance and warranty conditions as determined by the Contract Administrator.

ITEM NO. 81 - PLANT MATERIAL MAINTENANCE AND WARRANTY 2016

- .1 This item consists of the maintenance and warranty of all plant material in 2016 in accordance with the Contract documents to ensure healthy plant material.
- .2 This item will not be measured but will be paid on a lump sum based upon the following progress schedule:
 1. 40% at the completion of all spring maintenance and warranty conditions as determined by the Contract Administrator;
 2. 20% at the completion of all summer maintenance and warranty conditions as determined by the Contract Administrator;
 3. 40% at the completion of all fall maintenance and warranty conditions as determined by the Contract Administrator.

ITEM NO. 82 - PLANT MATERIAL MAINTENANCE AND WARRANTY 2017

- .1 This item consists of the maintenance and warranty of all plant material in 2017 in accordance with the Contract documents to ensure healthy plant material.
- .2 This item includes the expectation for an enhanced level of maintenance during the 2017 growing season, commensurate with increased visitation to Ottawa in celebration of the 150th anniversary of Canada.
- .3 This item will not be measured but will be paid on a lump sum based upon the following progress schedule:
 1. 40% at the completion of all spring maintenance and warranty conditions as determined by the Contract Administrator;
 2. 20% at the completion of all summer maintenance and warranty conditions as determined by the Contract Administrator;
 3. 40% at the end of the maintenance and warranty period provided that call conditions have been met as determined by the Contract Administrator.

END OF SECTION

PART 1 - GENERAL

1.1 TIME OF COMPLETION

- .1 Unless otherwise indicated, the work of this Contract shall be substantially completed by June 30th, 2015 (maintenance excepted).
- .2 On-site work shall be limited from Monday to Friday, unless approved by the Contract Administrator.

1.2 SCOPE OF WORK

- .1 Work under this contract covers the work involved in the rehabilitation of plantings at the Garden of the Provinces and Territories at the corner of Wellington Street and Bay Street, Ottawa, Ontario and includes, but is not limited to, the supply and installation of the following:
 - .1 Selective removal of old irrigation systems.
 - .2 Resetting of existing cobblestone edging.
 - .3 Supply, installation and ongoing monitoring of several types of new irrigation systems.
 - .4 Planting bed preparation and soil amendments.
 - .5 Planting of small trees, shrubs and non-standard perennials, ornamental grasses and bulb species.
 - .6 Plant material maintenance and warranty to October 31st 2017.

1.3 PRE-CONTRACT AWARD CONDITIONS

- .1 **Prior to award of the Contract, the Contractor must submit a detailed Work Methodology Plan acceptable to the Contract Administrator no later than 10 business days of receipt of the letter of notification.**
 - .1 **A Work Methodology Plan shall at a minimum identify the Contractors plans for sourcing the large amount of native plant species and specific cultivars and the qualifications of proposed staff to undertake the handling, planting and multi-year maintenance of the plant material.**
 - .2 **The Work Methodology Plan shall also outline the Contractors plans for pathway closure, advance signage for pathway closure and detouring.**
 - .3 **If acceptable Plans are not received within 10 business days, the NCC reserves the right to proceed on to the next lowest compliant bidder.**
 - .4 **The Contractor may be considered in default of the Contract if execution of the accepted Work Methodology Plan is not being executed as approved and/or the work methods being used are determined by the Contract Administrator to not be in conformance with accepted horticultural practices.**

1.4 SPECIAL CONSTRUCTION REQUIREMENTS

- .1 The Contractor will be responsible to protect the subgrade at all times during construction and in particular following moderate to heavy rainfall. Construction traffic on exposed subgrade should be prohibited or limited to equipment which will not damage subgrade.
- .2 The Contractor will be responsible to ensure that the equipment utilized in the site preparation, excavation and construction minimizes any damage or disturbance to the park surface.
- .3 Any damaged areas caused as a result of construction traffic or construction techniques must be repaired to the original or better condition by the Contractor as part of this contract and at no additional cost to the National Capital Commission.
- .4 The Contractor shall be responsible as part of the tender price for the removal from the site of all excavated non reusable or excess material as well as the supply and placement of all required imported fill material required to execute the work of this contract.
- .5 The Contractor will not be compensated for any additional excavation and/or additional earth or granular backfill materials required as a result of over-excavations not approved and authorized by the Contract Administrator prior to undertaking work.

1.4 CODES, PERMITS AND STANDARDS

- .1 Standards referred to in this Specification (CGSB, CSA, ASTM, OPSD, CHBDC etc.) may be examined at the following location:
 - Public Works and Government Services Canada
 - Standards and Specifications Branch
 - Place du Portage - Phase 3, 11 Laurier Street
 - Gatineau, Quebec
 - K1A 0S5
- .2 Perform work in accordance with the National Building Code of Canada 1995 and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .3 Work to meet or exceed requirements of:
 - .1 contract documents
 - .2 specified standards, codes and referenced documents

1.5 DEFINITIONS

- .1 Wherever the term "Contract Administrator" appears throughout this specification, it shall be construed to mean an Inspector representing the National Capital Commission and including a duly named consultant on their behalf.
- .2 Wherever the terms "or equal", "or approved equal" appear after specific types of materials and items throughout this specification, they shall be construed to mean as being equal in the opinion of the Contract Administrator, in material content, workmanship and quality to that designated as being the minimum acceptable standard, and that the Contract Administrator's written approval must be obtained prior to submitting an alternative, 7 days before close of tender.

1.6 TAXES

- .1 Include in the tender amount, all sales and other taxes levied by the Federal, Provincial and Municipal government or other authority. There will be no refunds made by the National Capital Commission to the Contractor for taxes paid by the Contractor.

1.7 PROTECTION

- .1 The Contractor will be held fully responsible by the Owner for any damage to utilities, services, properties, buildings, or structures adjacent to or in the general area of the work, through settlement of ground, vibration or shock resulting from any cause relating to the work carried out under this Contract. Make good and repair all such damage at his own expense.
- .2 The contractor shall supply and install the support system at his own judgment and at his own cost to protect the existing utilities, services, buildings and structures from damage for the duration of the construction. The cost for this item shall be included in the tender price and the contractor shall not make any claim against the Owner for extra work on this item.
- .3 Provide and maintain guardrails, fences, barricades, lights and other devices required for protection of workmen and public in accordance with the requirements of Provincial and Local by-laws and the Canadian Construction Safety Code.
- .4 Protect existing structures against damage until completion of work.
- .5 Take all precautions to protect vegetated areas and specimen trees from any damage.

1.8 DAMAGES

- .1 Damages caused to existing plant material, landscaping, lawns, roadways, pathways, structures, finishes and public utilities due to work of this contract, will be restored to their original condition, replaced or adequate compensation made to affected parties by the Contractor at his own expense.
- .2 It is understood that restored or replaced work includes, labour, equipment and material costs.
- .3 The restored or replaced work shall be completed within 7 days of notification by the Contract Administrator.

1.9 CUTTING, FITTING AND PATCHING

- .1 Execute cutting, fitting and patching of work that may be a requirement to make work fit properly together, to receive or be received by other work.
- .2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.
- .3 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

1.10 SITE VISIT

- .1 Parties intending to submit tenders on the work must visit the site and obtain for themselves all information pertaining to existing conditions affecting the proper execution and completion of the work. The submission of a tender shall be deemed as proof that the tenderer and his sub-trades have complied with this requirement. After claims for additional compensation will not be entertained for any items of labour, equipment or materials required to complete the work that could have been reasonably ascertained by a Site Examination.

1.11 WORKMANSHIP

- .1 It is a requirement of this contract that qualified tradesmen execute each type of work specified.
- .2 Example: Landscape contractor for landscape work, irrigation specialist for irrigation system, carpenter for carpentry work, etc.
- .3 Work unsatisfactorily completed by unqualified tradesmen will be redone and paid for by the Contractor.

1.12 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each of following:
 - .1 Contract drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change orders.
 - .5 Other modifications to Contract.
 - .6 Field test reports.
 - .7 Manufacturer's installation and application instructions.
 - .8 Copy of current and approved work schedule.
 - .9 Copy of Site Health and Safety Plan approved by Contract Administrator

1.13 WORK SCHEDULE

- .1 Provide within 10 working days after Contract award, in form acceptable to Contract Administrator, detailed schedule showing anticipated progress stages and final completion of work within time period specified in Contract documents.
- .2 Interim reviews of work progress based on work schedule will be conducted as decided by Contract Administrator and schedule updated by Contractor in conjunction with and to approval of Contract Administrator.

1.14 CONTRACTOR'S USE OF SITE

- .1 Limited to area immediately surrounding work and areas designated by the Contract Administrator for material stockpiling and work equipment parking.
- .2 Do not trespass onto private property - specifically the properties adjacent to the northern edge of park.
- .3 Do not unreasonably encumber site with materials or equipment during construction.
- .4 Move stored products or equipment interfering with operations of NCC other contractors or agencies and the general public.
- .5 Obtain and pay for use of additional storage or work areas needed for operations.
- .6 Where security is reduced by work, provide temporary means to maintain security of area at all times.

1.15 SETTING-OUT OF WORK

- .1 The Commission shall furnish the Contractor with the reference co-ordinates necessary for laying out the work of this contract. The Contractor shall employ survey personnel with experience in the use of coordinates to physically lay out work utilizing a total station survey system.
- .2 Contractor shall assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .3 Provide devices needed to lay out and construct work. Supply such devices as required to facilitate Contract Administrator's inspection of work.
- .4 Supply stakes and other survey markers required for laying out work.
- .5 Contractor must obtain Contract Administrator's approval of planting beds limits, specimen tree location, and lookout plaza layout prior to commencing work.

1.16 PROJECT MEETINGS

- .1 Contract Administrator will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

1.17 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of work and notify Contract Administrator of findings.
- .2 Where unknown services are encountered, immediately advise Contract Administrator and confirm findings in writing.
- .3 Where work involves adjusting of existing services, carry out work as directed by the Contract Administrator.
- .4 Make good and pay for damage to existing utility lines resulting from work.

1.18 TRAFFIC CONTROL

- .1 Do not infringe on adjacent roads, sidewalks, ramps, loading zones or interfere with normal traffic flow in carrying out the work. If it is necessary to disrupt traffic or occupy those thoroughfares for purposes of unloading materials, etc., obtain permission from the Contract Administrator and abide by his instructions regarding the manner, time and delays necessary to carry out these operations. Incidental costs (e.g. for permits, signage, public notification of lane closures, etc) conforming to these requirements will be paid by Contractor.
- .2 Provide a suitable system of protective barricades, lane markings, signs, lights and other such devices to warn and channel traffic and wherever necessary, the services of a flagman to direct and control traffic. Carry out protection in accordance with the requirements of the Provincial and Local by-laws having jurisdiction over this type of work.
- .3 Printed signage must be provided in both English and French
- .4 The proposed methods and systems of traffic control and maintenance provisions together with supporting sketches must be submitted to the Contract Administrator upon request following tender closing.

1.19 ADDENDA

- .1 Answers to questions directed to the Contract Administrator, and any amendments to the

drawings and specifications during the tender period will be communicated in the form of addenda to all general contractors tendering. Such addenda to be considered as and read as part of the specifications and thereby included in the contract documents.

1.20 ADDITIONAL DRAWINGS

- .1 The Commission may furnish additional drawings to the Contractor to assist in the proper execution of the work. These additional drawings will be issued for clarification purposes only. Such drawings shall have the same meaning and intent as if they were included with the plans referred to in Contract Documents.

1.21 CONTRACT DOCUMENTS

- .1 Drawings and specifications are complementary. Items shown or mentioned in one and not in the other are deemed to be included in the contract work.
- .2 If the drawings and specifications differ, the Contract Administrator shall give preference to the Contract document thereof, that best insures the attainment of this contract's objectives.

1.22 PAYMENT

- .1 This is a unit price contract. Any minor or miscellaneous items indicated on the drawings as being part of the work of this contract must be included by the Contractor in his overhead and indirect charges and incorporated into the unit price bid.
- .2 No separate payment will be made for work performed in respect to any of the special provisions where there is no specific pay item on the schedule of prices. The cost of these works must be appropriated among, and included in, the lump sum bid price.

1.23 ADVERTISING

- .1 No advertising will be permitted on this project.

1.24 COMPACTION AND TESTING OF MATERIALS AND CONCRETE

1. The thickness of fill materials and concrete such as granulars, select fill and topsoil, shown on the drawings shall be the real thickness after the materials have been compacted as specified.
2. Compaction and testing of material and concrete will be carefully monitored by Contract Administrator throughout contract.

1.25 TEMPORARY UTILITIES

- .1 The Contractor shall make an arrangement for power and water connections and shall bear the costs of all electricity, fuel, water and sanitary facilities required for, or at the site of, the works up to the date of substantial performance as established by the Certificate of Substantial Performance.

1.26 DUST CONTROL

- .1 Apply calcium chloride and/or water with equipment for dust control for the duration of the construction under the direction of the Contractor Administrator.
- .2 Apply water and/or aqueous calcium chloride with distributors equipped with means of shut-off and with spray system to ensure uniform application.
- .3 Deliver calcium chloride to site in moisture-proof bags. Indicate name of manufacturer, name of product, net weight or mass, and percentage of calcium chloride guaranteed by manufacturer.

- .4 Store bags of calcium chloride in weather-proof enclosures
- .5 Place materials defined as hazardous or toxic in designated containers.
- .6 Separate and recycle waste materials in accordance with Section 01 35 43 and 01 74 21.

1.27 RECORD DRAWINGS

- .1 As work progress, maintain, accurate record to show deviations from contract documents.
- .2 Just prior to Contract Administrator's inspection for issuance of final certificate of completion, supply one (1) set of white prints with all major and minor deviations neatly inked in. The Contract Administrator will provide two (2) sets of clean white prints for this purpose.

1.28 GUARANTEES AND WARRANTIES

- .1 Before completion of work, collect all manufacturer's guarantees and warranties, and deposit to Contract Administrator.

PART 2 - PRODUCTS

- 2.1 Not used

PART 3 - EXECUTION

- 3.1 Not used

END OF SECTION

PART 1 - GENERAL

- 1.1 Submit to Contract Administrator for review, shop drawings, product data and samples specified.
- 1.2 Until submission is reviewed, work involving relevant product may not proceed.
- 1.3 Shop Drawings
 - .1 Drawings to be originals supplied by contractor, subcontractor, supplier or distributor, illustrating appropriate portion of work:
 - .1 Showing fabrication, layout, setting or erection details as specified in appropriate sections.
 - .2 Identify details by reference to sheet or detail number shown on contract documents.
 - .3 Maximum sheet size 610 x 915 mm.
 - .4 Reproductions for submissions opaque diazo prints.
- 1.4 Product Data
 - .1 Manufacturer's standard schematic drawings, catalogue sheets, diagrams schedules, performance charts, illustrations and other standard descriptive data may be accepted in lieu of shop drawings.
 - .2 Above will only be accepted if they conform to following:
 - .1 Delete information not applicable to project;
 - .2 Supplement standard information to provide additional information applicable to project;
 - .3 Show dimensions and clearances required;
 - .4 Show performances characteristics and capacities.
- 1.5 Samples and Mock-ups
 - .1 Submit samples in sizes and quantities specified.
 - .2 Where colour, pattern or texture is criterion, submit full range of samples.
 - .3 Reviewed samples will become standards of workmanship and material against which installed work will be checked on project.
- 1.6 Co-ordination of Submissions
 - .1 Review shop drawings, product data and samples prior to submission.
 - .2 Verify:
 - .1 Field measurements;
 - .2 Field construction;
 - .3 Catalogue numbers and similar data.
 - .4 Co-ordinate each submission with requirements of work and contract documents. Individual shop drawings will not be reviewed until all related drawings are available.
 - .5 Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.
 - .6 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Contract Administrator's review of submission, unless Contract Administrator gives written acceptance of specified deviations.
 - .7 Notify Contract Administrator in writing at time of submission, of deviations from requirements of Contract documents.
 - .8 After Contract Administrator's review, distribute copies.
- 1.7 Submission Requirements
 - .1 Schedule submissions at least 10 days before dates reviewed submissions will be needed.
 - .2 Submit the number of paper or electronic copies of shop drawings and product data Contractor requires for distribution, plus 2 copies to be retained by Contract Administrator.

- .3 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date;
 - .2 Project title and number;
 - .3 Contractor's name and address;
 - .4 Number of each shop drawings, product data and sample submitted;
 - .5 Other pertinent data.

- 1.8 Submissions shall include:
 - .1 Date and revisions dates;
 - .2 Project title and number;
 - .3 Name of:
 - .1 Contractor;
 - .2 Subcontractor;
 - .3 Supplier;
 - .4 Manufacturer;
 - .5 Separate detailer when pertinent.
 - .4 Identification of product or material;
 - .5 Relation to adjacent structure or materials;
 - .6 Field dimensions, clearly identified as such;
 - .7 Specification Section number;
 - .8 Applicable standards, such as CSA or CGSB numbers;
 - .9 Contractor's stamp, initialed or signed, verifying review of sub-mission, verification of field measurements and compliance with Contract documents.

END OF SECTION

PART 1 - GENERAL

- 1.1 Related Requirements Specified Elsewhere .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Contract Administrator are specified under various sections.
- 1.2 Appointment and Payment .1 Contract Administrator will appoint and pay for services of testing laboratory except for the following:
.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
.2 Inspection and testing performed exclusively for Contractor's convenience.
.3 Mill tests and certificates of compliance.
.4 Tests specified to be carried out by Contractor under the supervision of Contract Administrator.
.2 Where tests or inspections by designated testing laboratory reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as Contract Administrator may require to verify acceptability of corrected work.
- 1.3 Contractor's Responsibilities .1 Furnish labour and facilities to:
.1 Provide access to work to be inspected and tested.
.2 Facilitate inspections and tests.
.3 Make good work disturbed by inspection and test.
.4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
.2 Notify Contract Administrator sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
.4 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Contract Administrator.

END OF SECTION

PART 1 - GENERAL

1.1 References

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Province of Ontario Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. [1990 as amended 213/91].

1.2 Related Work

- .1 Section 01 74 21 – Management and Disposal of Excess Material
- .2 Section 31 23 10 – Excavation and Backfilling

1.3 Submittals

- .1 Submit site-specific Health and Safety Plan prior to award of contract. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in the scope of work.
 - .3 Decontamination procedures for both personnel and equipment.
- .2 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .3 Submit copies of incident and accident reports.
- .4 Submit Material Safety Data Sheets (MSDS) to Contract Administrator.
- .5 Names of personnel and alternates responsible for site safety and health, hazards present on site, and use of personal protective equipment.

1.4 Safety Assessment

- .1 Perform site specific safety hazard assessment related to project.

1.5 General Requirements

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Contract Administrator may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.6 Responsibility

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.7 Compliance Requirements

- .1 Comply with Ontario Health and Safety Act and Regulations for Construction Projects.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

- 1.8 Unforeseen Hazards
- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, and follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province of Ontario having jurisdiction. Advise Contract Administrator verbally and in writing.
- 1.9 Posting of Documents
- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario having jurisdiction, and in consultation with Contract Administrator.
- 1.10 Correction of Non-Compliance
- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Contract Administrator.
- .2 Provide Contract Administrator with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Contract Administrator may stop Work if non-compliance of health and safety regulations is not corrected.
- 1.11 Work Stoppage
- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- 1.12 Personnel Health, Safety, And Hygiene
- .1 Training: Ensure personnel entering site are trained in accordance with specified personnel training requirements.
- .2 Personal Protective Equipment:
- .1 Workers in direct contact with the existing contaminated soil within park shall at a minimum wear gloves, long sleeves and long pants.
- .2 Personal shall not eat or smoke near areas of excavation and grubbing due to the presence of contaminated soils. Wash hands of contaminated soil prior to eating or smoking.
- 1.13 Excavating
- .1 The Contractor shall ensure no person enters an excavation unless another worker is working above ground close to the excavation or to the means of access to it.
- .2 The Contractor shall arrange the locating and marking of gas, electrical and other services prior to commencing an excavation.
- .3 The Contractor shall obtain approval from Consultant before arranging the shut off and disconnection of a service that may pose a hazard.
- .4 The Contractor shall comply with the requirements of Section 230 to 242, O. Reg. 213/91, OHSAA..
- 1.14 Chemicals
- .1 The Contractor must provide a list of all chemicals to be used on site and a copy of the Material Safety Data Sheet (MSDS) for each chemical to the Consultant prior to being brought onto the job site.
- .2 The Contractor must ensure each chemical container brought on site is clearly labelled with the identity of the chemical, information for the safe handling of the chemical and the

location of the MSDS.

- .3 The Contractor must ensure adequate measures are taken to control the distribution, within the application area or throughout the building, of fumes/vapours before applying flammable, noxious or volatile materials.
- .4 The Contractor may be required to schedule the application of hazardous materials which might affect the well-being of any workers or disrupt work of other Contractors and cannot be adequately controlled to prevent such occurrences to evening or weekend periods.
- .5 The Contractor must ensure workers wear the required personal protective equipment (respiratory protection, protective clothing, hand protection, eye/face protection, etc.) when working with chemicals.
- .6 The Contractor must ensure the safe use and disposal of all chemicals that they are using. No chemicals and/or chemical waste product shall be disposed of on site without prior approval of Consultant.
- .7 The Contractor may not store chemicals and compressed gas cylinders on site without approval of the Consultant. If approved, the Contractor must ensure incompatible chemicals are stored separately.

PART 2 - PRODUCTS

2.1 Not Used

PART 3 - EXECUTION

3.1 Not Used

END OF SECTION

PART 1 - GENERAL

1.1 Related Work

- .1 Management and Disposal of Excess Material Section 01 74 21
- .2 Planting Section 32 93 10

1.2 Fires

- .1 Fires and burning of rubbish on site not permitted.

1.3 Disposal of Wastes

- .1 Burying of rubbish and waste materials on site is not permitted.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
- .3 Waste materials to be as per Section 01 74 21 - Management and Disposal of Excess Material.

1.4 Site Clearing and Plant Protection

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .3 Minimize stripping of soil.
- .4 Restrict tree removal to areas indicated or designated by Contract Administrator.

1.5 Protection of Bird Nesting Sites

- .1 No clearing or close cut clearing shall take place during the avoidance time period for nesting habitat removal from April 15 to August 15.
- .2 In the event such clearing is unavoidable during this time period, vegetation to be removed shall be inspected by an avian biologist to determine whether there are any active nesting sites. If clearance is received from the avian biologist, clearing may proceed.
- .3 The NCC will be responsible for retaining the avian biologist. The Contractor shall provide at least 1 week advanced notice of the need for such an inspection.

1.6 Drainage

- .1 Provide temporary drainage and pumping as necessary to keep excavation and site free from water.
- .2 Do not pump water containing suspended materials into adjacent waterway.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with the requirements of applicable authorities.

1.7 Work Adjacent to Waterways

- .1 Do not operate construction equipment in watercourses.
- .2 Do not dump excavated fill, waste material or debris in watercourses.

1.8 Pollution Control

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.9 Watercourse Protection

- .1 The Contractor shall ensure that no contamination, waste or other substances which may be detrimental to aquatic life or quality of water shall enter the watercourse as either direct or indirect result of construction and the Contractor shall meet all requirements of Government authorities or agencies with respect to environmental protection.
- .2 The Contractor shall be prepared to immediately clean up any spills of contamination, waste or other substances which may be either detrimental to marine life or quality of water. In the event of a spill, the Contractor shall immediately commence a clean-up operation. The Contractor shall be liable for all damages and/or charges laid which result, either directly or indirectly, from the spill, or contamination of any kind which results from their construction operations.
- .3 The Contractor shall not make any claim for extra compensation for the cost of fulfilling the obligations set out herein.

1.10 Erosion and Sediment Control Plan

- .1 Within 2 weeks of award of Contract, the Contractor shall submit an Erosion and Sediment Control Plan. The plan shall indicate how the Contractor intends to provide for securing the site against erosion and siltation problems for the full duration of the construction period, i.e. from start of construction to final completion. The Contractor shall not proceed with excavation in or near waterways, drainage channels or wetland areas until approval of the erosion and sediment control plan is received from the Contract Administrator.
- .2 A copy of the Erosion and Sediment Control Plan shall be present on-site at all times. The Contractor shall ensure that all workers, including sub-contractors, are aware of the importance of the erosion and sediment control measures and are informed of the consequences of the failure to comply with the requirements of all Regulatory Agencies.
- .3 The Contractor shall exercise reasonable care to ensure that sediment run-off does not enter the watercourse. Berms, silt fences and other best management practices, as determined by the Contractors site work methods, shall be constructed at appropriate locations to ensure that turbidity shall be kept to a minimum as determined by the Government authorities and agencies.
- .4 The minimum erosion and sediment controls shall be:
 - .1 Limit the extent of exposed soils at any given time.
 - .2 Re-vegetate exposed areas as soon as possible.
 - .3 Provide temporary protection of exposed slopes 3H:1V or steeper and more than 3 meters height with plastic or mulch material approved by Contract Administrator.
 - .4 Install filter cloth between frame and cover on all catchbasins and manholes that may be affected by run-off from the site.
 - .5 A silt fence shall be installed around the perimeter of all stockpiles of any soil to be used or removed from the site. Stockpiles shall be located outside of the floodplain and in locations approved by Contract Administrator.

- .6 Erosion and sediment control measures shall be inspected, maintained and repaired weekly and after every rainfall event.
- .7 All water from trench excavations shall be pumped into an approved sedimentation pond for settlement or approved treatment system prior to discharge into the river.
- .5 Erosion and sediment control will be reviewed as an item during the weekly site meeting. The status of the work will be recorded by the Contract Administrator in the meeting minutes.
- .6 If soil and debris from site accumulate in low areas, storm sewers, roadways, gutters, ditches or any other areas where the Contract Administrator determines it is undesirable, remove accumulation and restore area to its original condition. In the event the Contractor causes sediment to accumulate in a water course, he will have to obtain approval from DFO and the Commission prior to removing accumulation and restoring area to its original condition.
- .7 Unless indicated or directed otherwise by the Contract Administrator, remove temporary erosion and sediment control devices upon completion of work.

1.11 Review Agencies

- .1 Various concerned Government agencies may be on site during construction and the Contractor shall provide easy access and meet the requirements of those agencies without delay.

1.12 Equipment Fuelling

- .1 Designate an area within the working limits to be used exclusively for fuelling construction equipment. Equipment fueling shall be at least 5 m away from the watercourse.
- .2 Submit for review a plan for the interception and rapid clean-up of fuel spills should they occur. Maintain the apparatus for cleaning up fuel spills on site.

PART 2 - PRODUCTS

- 2.1 Not Used

PART 3 - EXECUTION

- 3.1 Not Used

END OF SECTION

PART 1 - GENERAL

1.1 Access

- .1 With Contract Administrator present, prepare photographic inventory of the original condition of all locations where temporary facilities are to be built by the Contractor. Submit a bound record copy of the photographic inventory with locations, labels and descriptions of existing features to the Contract Administrator prior to commencing any work on the temporary facilities.
- .2 Provide and maintain adequate access to the project site.
- .3 Build and maintain temporary roads and temporary watercourse crossings where required or indicated subject to approval of the Contract Administrator. Remove temporary access roads and reinstate site following completion of work.
- .4 If authorized to use existing roads or pathways for access to project site, maintain such roads for duration of contract and make good damages resulting from the Contractor's use of roads or pathways.

1.2 Sanitary Facilities

- .1 Provide sanitary facilities for work force in accordance with governing regulations and by-laws.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.3 Water Supply

- .1 Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.

1.4 Removal of Temporary Facilities

- .1 Remove temporary facilities from site unless directed otherwise by Contract Administrator.
- .2 All areas disturbed shall be reinstated by the Contractor to its original condition at the Contractor's expense and to the Contract Administrator's satisfaction.

END OF SECTION

PART 1 - GENERAL

1.1 General

- .1 Use new material and equipment unless otherwise specified.
- .2 Within 7 days of written request by Contract Administrator, submit following information for materials and equipment proposed for supply:
 - .1 Name and address of manufacturer.
 - .2 Trade name, model and catalogue number.
 - .3 Performance, descriptive and test data.
 - .4 Manufacturer's installation or application instructions.
 - .5 Evidence of arrangements to procure.
- .3 Use products of one manufacturer for material and equipment of same type or classification unless otherwise specified.

1.2 Manufacturers Instructions

- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .2 Notify Contract Administrator in writing of any conflict between these specifications and manufacturers instructions. Contract Administrator will designate which document is to be followed.

1.3 Delivery and Storage

- .1 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.
- .2 Prevent damage, adulteration and soiling of material and equipment during delivery, handling and storage. Immediately remove rejected material and equipment from site.
- .3 Store material and equipment in accordance with suppliers instructions.
- .4 Touch-up damaged factory finished surfaces to Contract Administrator's satisfaction. Use primer or enamel to match original. Do not paint over name plates.

1.4 Contractor's Options for Selection of Materials for Tendering

- .1 Materials specified by referenced standard, select any material that meets or exceeds the specified standard.
- .2 Where materials are required to be listed on the "Canadian General Standards Board, Qualified Products List" select any manufacturer so listed.
- .3 Materials specified by "Prescriptive" or "Performance" specification, select any material meeting or exceeding specification.
- .4 Materials specified by naming one or more materials, select any material named. For the purpose of these specifications, the term "Acceptable Material" is deemed to be a complete and working commodity as described by a manufacturer's name, catalogue number, trade name or any combination thereof.
- .5 When materials are specified by a Standard, Prescriptive or Performance specification, upon request of the Contract Administrator, obtain from manufacturer an independent testing laboratory report, showing that the material or equipment meets or exceeds the specified requirements.

1.5 Substitution

- .1 No substitutions will be permitted without prior written approval of Contract Administrator.
- .2 Proposals for substitutions to be made in accordance with Instructions to Bidders. Such requests must include statements of respective costs of items originally specified and the proposed substitution.

- .3 Proposals will be considered by Contract Administrator if:
 - .1 Materials selected by tenderer from those specified, are not available.
 - .2 Delivery date of materials selected from those materials specified would unduly delay completion of contract, or
 - .3 Alternative material to those specified, which are brought to the attention of and considered by Contract Administrator as equivalent to the material specified and will result in a credit to the Contract amount.
- .4 Should proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on project. Pay for design or drawing changes required as result of substitution.
- .5 Amounts of all credits arising from approval of substitutions will be determined by Contract Administrator and Contract Price will be reduced accordingly.

PART 2 - PRODUCTS

2.1 Not Used

PART 3 - EXECUTION

3.1 Not Used

END OF SECTION

PART 1 - GENERAL

1.1 Related Work

.1 Health and Safety

Section 01 35 30

PART 2 - PRODUCTS

2.1 Not Used

PART 3 - EXECUTION

- 3.1 Conduct cleaning and disposal operations to comply with local ordinances and anti pollution laws.
- 3.2 Disposal of mineral spirits, oil or paint and varnish solvents in storm or sanitary drainage systems is prohibited.
- 3.3 Prevent accumulation of wastes which create hazardous conditions.
- 3.4 Cleaning During Construction
- .1 Maintain project grounds and public properties free from accumulations of waste materials and rubbish on a daily basis.
 - .2 Remove waste materials and rubbish from site and haul to an approved dump site.
 - .3 Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not interfere with operation of roads and pathways.
- 3.5 Final Cleaning
- .1 Remove grease, dirt, dust, stains and other foreign materials from finished surfaces.
 - .2 Broom clean paved surfaces; rake clean other surfaces of grounds, to satisfaction of Contract Administrator.
 - .3 Clean project site in preparation for substantial completion inspection and final inspection.

END OF SECTION

PART 1 – GENERAL

1.1 General Conditions

- .1 The requirements of this specification take precedence over the requirements of any other specification for the management and disposal of excess material.

1.2 Related Work

- .1 Planting Section 32 93 10

1.3 Definitions

- .1 Bituminous pavement: any combination of asphaltic material and aggregate, excluding asbestos modified asphaltic material.
- .2 Concrete: concrete mixtures produced with Portland cement, which may include blended hydraulic cement, supplementary cement materials, spent debris and silica sand abrasive blasting media from abrasive cleaning of concrete and reinforcing steel, concrete brick, block and associated mortar. Can include embedded steel, and excludes asbestos modified Portland cement concrete mixtures.
- .3 Disposable fill: excess material, other than that disposed of at a certified disposal site that is managed in berms and mounds, and as fill, other than in road embankments.
- .4 Earth: all soils except those defined as rock, and excludes stone masonry, concrete and other manufactured materials.
- .5 Excess material: Material removed as a result of Work outlined in the Contract, for which management is not specified. Includes surplus and unsuitable materials.
- .6 Fabricated metal and plastic products: metal and plastic products such as culverts, fence materials, and guide rails. Does not include containers, other packing materials, storage tanks, septic tanks, and ancillary equipment associated with sanitary sewage systems, septic systems, and fuel/lubricant dispensing and storage systems.
- .7 Groundwater: subsurface water and water that occurs beneath the water table in soils and rock formations that are fully saturated.
- .8 Masonry: clay brick, stone and associated mortar.
- .9 Natural wood: plant material, stumps, trunks, branches, and debris, from tree and shrub removal, and wood products that are not treated, coated or glued. Note that all natural wood sourced from the construction site is to be assumed to be contaminated waste.
- .10 Re-use: utilization, processing, re-processing or recycling of excess material into a construction material or other useful product, and management by these means for the Contract and other work.
- .11 Rock: natural beds or massive fragments, of the hard, stable, cemented part of the earth's crust, igneous, metamorphic, or sedimentary in origin, which may or may not be weathered, and includes boulders having a volume of 1 m or greater.
- .12 Waste: excess material managed by re-use or as disposable fill.
- .13 Water body: any body of water or watercourse or wetland, or a portion thereof, and excludes

ditches other than those functioning as natural watercourses.

1.4 Submittals

- .1 Prior to the commencement of excavation work, the Contractor shall submit for the Contract Administrator's review and approval:
 1. A list of debris disposal sites or recycling facilities and all applicable Certificates of Approval, as issued by the Ministry of the Environment under Part V of the Environmental Protection Act.
 2. A list of waste haulers and all applicable Certificates of Approval, as issued by the Ministry of the Environment under Part V of the Environmental Protection Act.
- .2 Weigh bills from the soil, natural wood and other materials disposed of at designated facilities must be submitted to the Contract Administrator.

PART 2 - PRODUCTS

- 2.1 Not Used

PART 3 - EXECUTION

3.1 Construction

- .1 Management of excess material shall be as described below:
 - .1 Earth, aggregate and rock: Manage by disposal off-site at an approved disposal facility (e.g. Trail Road landfill).
 - .2 Bituminous pavement: Manage by disposal off-site.
 - .3 Concrete, masonry, fabricated metal and plastic products: Manage by disposal off site.
 - .4 Where excess materials are suspected of being contaminated or if types of materials are encountered which are not addressed in this specification, direction on management shall be obtained from Contract Administrator.
 - .5 Excess material that is a mixture of materials shall be disposed of according to most stringent conditions associated with any one of individual constituents.
 - .6 Excess materials shall be managed using methods which prevent their entry into water bodies and other sensitive areas. These may be identified in Contract. Exceptions may be made when materials are re-used in accordance with requirements specified elsewhere in Contract.
 - .7 Notification requirements shall be complied with and approvals, releases, and agreements shall be obtained that are necessary for management of excess material.
- .2 Management of disposable fill, within Commission's property and on other property designated in Contract, shall be as specified.
- .3 Management by open burning is not permitted.

END OF SECTION

PART 1 - GENERAL

- 1.1 Related Work Specified Elsewhere
- .1 Environmental Protection Section 01 35 43
 - .2 Management and Disposal of Excess Material Section 01 74 21
 - .3 Clearing and Grubbing Section 31 11 00
- 1.2 Protect existing items designated to remain and materials designated for salvage and relocation. In event of damage, immediately replace such items or make repairs to approval of Contract Administrator and at no additional cost to the Commission.
- 1.3 Site Conditions
- .1 Contractor to contact appropriate utilities to verify presence and location of all overhead and underground services and establish location for all such services in the field before commencing work. Report any discrepancies to Contract Administrator.

PART 2 - PRODUCTS - Not applicable

PART 3 - EXECUTION

- 3.1 Preparation
- .1 Inspect site and verify with Contract Administrator items designated for removal and items to be preserved.
 - .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
 - .3 Notify utility companies before starting any work involving relocation, dismantling or demolition.
- 3.2 Removal
- .1 Remove items indicated on drawings.
 - .2 Do not disturb adjacent items designated to remain in place.
- 3.3 Removal of Existing Irrigation
- .1 Remove and dispose of all parts of existing irrigation systems within planting beds, were indicated. This includes the removal of pipes, spray heads, electric solenoid valves and valve boxes.
 - .2 All remaining open pipes are to be plugged at the edges of the planting areas in a manner that does not intrude into the growing area.
- 3.4 Removal of Pavements:
- .1 Square up adjacent surfaces to remain in place by saw cutting or other approved method.
 - .2 Protect underlying granular materials where shown.
- 3.5 Salvage and Relocation
- .1 Carefully dismantle items indicated for salvage or relocation. Stockpile salvaged materials at locations as directed by Contract Administrator.
 - .2 Items to be salvaged include forest litter.
- 3.6 Disposal of Material
- .1 Dispose of materials not designated for salvage or re-use in work, off-site.

3.7 Restoration

- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.
- .2 Reinstate areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.

END OF SECTION

PARTIE 1 - GENERAL

- 1.1 Related Work Specified Elsewhere
.1 Management and Disposal of Excess Material Section 01 74 21
- 1.2 Definitions
.1 Clearing consists of cutting off trees and shrub growth to not more than a specified height above ground and disposing of felled trees and surface debris.
.2 Grubbing consists of excavation and disposal of stumps and roots to not less than a specified depth below original ground surface.
- 1.3 Emerald Ash borer treatment:
.1 EAB refers to Emerald Ash Borer
.2 Ministerial Order refers to the Emerald Ash Borer infested Place Order for the City of Gatineau, in the Province of Quebec and the City of Ottawa, in the Province of Ontario by the Minister of Agriculture and Agri-Food, pursuant to subsection 15(3) of the Plant Protection Act, April 27, 2009.
.3 Wood Chips in the context of the Ministerial Order shall consist of untreated, raw bark and wood fragments broken or shredded from logs or branches. Chips must be less than 2.5cm in at least any two dimensions.
.4 Firewood in the context of the Ministerial Order shall consist of non-manufactured, solid wood material, with or without bark, cut into sizes less than 1.2 metres long and less than 25 cm in diameter which may be handled manually.
.5 Logs in the context of the Ministerial Order shall consist of untreated, raw wood greater than 1.2 metres in length and greater than 25 cm diameter.
.6 Enclosed vehicle shall be any vehicle transporting regulated wood material that is equipped to preclude the loss of materials, or the escape of EAB, while en route.
- 1.4 Protection
.1 Prevent damage to existing trees, natural features, bench marks, existing buildings, existing pavement, utility lines, site appurtenances and furnishings that are to remain. Make good damage.

PARTIE 2 - PRODUCTS

Not applicable

PARTIE 3 - EXECUTION

- 3.1 Preparation
.1 Inspect site and verify with Contract Administrator all items designated to remain.
.2 Locate and protect existing utilities and preserve in operating condition during the course of the work.
.3 Notify all utility authorities before starting clearing and grubbing.
- 3.2 Clearing
.1 Clear all plant material designated for removal within the limit of work.
- 3.3 Grubbing
.1 Grub out all stumps and roots to not less than 300 mm below existing grade.
- 3.4 Removal and Disposal
.1 All cut woody debris shall be removed from the site, unless otherwise indicated.

- .2 Separate waste materials in accordance with Section 01 74 21 – Management and Disposal of Excess Material.
 - .3 Any ash wood materials which is removed from the site shall be transported in an enclosed vehicle and disposed of at the Trail Road disposal facility in accordance with the Ministerial Order. When ash wood is mixed with the wood of other species, all woody material shall be treated as ash wood material.
 - .4 The Contractor is responsible for ensuring that all ash wood is closely monitored until it is transported from the site.
- 3.5 Pruning
- .1 Any woody plant material designated to remain that is damaged during the execution of the Contract shall be pruned under the direct supervision of the Contract Administrator.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 General Instructions Section 01 11 00
- .2 Management and Disposal of Excess Material Section 01 74 21

1.2 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock: any solid material in excess of 0.25 m³ and which cannot be removed by means of heavy duty mechanical excavating equipment. Frozen material not classified as rock.
 - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.
- .3 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .6 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: Sieve sizes to 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.

1.3 CONTAMINATED SOILS

- .1 All existing soil outside of planting beds is contaminated. Contractor shall limit any excavations and grubbing to the least feasible. Dispose of any excavated soil, turf and surface materials (wood mulch, etc.) according to the letter to be provided by the Owner from an environmental consultant.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Contaminated soil shall only be transported off-site by a waste hauler licensed by the Ontario Ministry of Environment as per Section 01 74 21 – Management and Disposal of Excess Material.

1.5 SUBMITTALS

- .1 Prior to the commencement of excavation work, the Contractor shall submit for the Contract Administrator's review and approval:
 - .1 Copies of all clearance certificates from utility and service companies.
 - .2 A proposed haulage route from the construction site to the disposal facility.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 – Management and Disposal of Excess Material.

1.7 PROTECTION OF EXISTING FEATURES

- .1 Protect existing features in accordance with 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 re-routing.
 - .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.

1.8 EQUIPMENT

- .1 Excavation equipment shall be suited for the intended work, sized to effectively perform the work and minimize excessive mixing of soils, over-excavation into contaminated soils, dust emissions and working around trees.
- .2 Shovels to be equipped with smooth toothless buckets when excavating in soils.

- .3 Haulage vehicles are to be equipped with appropriate tarpaulins of suitable size and design to comply with Section 01 74 11 – Cleaning.
- .4 Haulage vehicles required to access public roadways shall operate by authorization of a Certificates of Approval (Waste Management System), as issued by the Ministry of the Environment under Part V of the Environmental Protection Act.

Part 2 Products

2.1 EQUIPMENT

- .1 In order to avoid spreading of contaminated soil around the site, the following precautions will be observed:
 - .1 Heavy machinery will be driven over the hard surfaces only unless impossible.
 - .2 When circulating over grass areas, machinery shall not be of a size or type to that will sink or tear into turf and soil, exposing the contaminated soil underneath. Grass surfaces will not be driven over when wet (after rain) or soft (early spring).
 - .3 Right after excavation of contaminated soil, tools, machinery and labourers in contact with contaminated soil shall use brooms and brushes to remove soil. Cleaning shall occur either directly over the excavated exposed contaminated soil areas or over tarps. Contaminated material on tarps to be transferred immediately to drums or bins.
 - .4 Do not wash off contaminated soil due to risk of contaminated runoff moving toward the river or storm sewers.
 - .5 Haulage vehicles are to be equipped with appropriate tarpaulins of suitable size and design for containment of contaminated soil.
 - .6 Haulage vehicles required to access public roadways shall operate by authorization of a Certificates of Approval (Waste Management System), as issued by the Ontario Ministry of the Environment under Part V of the Environmental Protection Act.

Part 3 Execution

3.1 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Protect existing site features from damage while work is in progress. In the event of damage, immediately make repairs to the satisfaction of the Contract Administrator.

3.2 STRIPPING OF TOPSOIL AND TURF

- .1 Do not strip or disturb soil within planting beds and turf, except as follows.
 - .1 Any existing soil contaminated with concrete slurry, oil or other substances detrimental to plant growth.
 - .2 Skim off existing turf in designated woodland garden areas.
- .2 Any excavated soil from site to be disposed of as per Section 01 74 21 - Management and Disposal of Excess Material.

3.3 STOCKPILING

- .1 Stockpile imported fill materials in designated areas. Stockpile granular materials in manner to prevent segregation.

- .2 Do not stockpile contaminated material on site.
- .3 All excavated contaminated material shall be placed directly in drums or bins provided by a licensed Ministry of Environment waste hauler for transport off-site.

3.4 DEWATERING

- .1 Protect open excavations against flooding and damage due to surface run-off.
- .2 Provide approved treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

3.5 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
- .2 Remove concrete, masonry, paving and rubble encountered during excavation in accordance with Section 01 74 21 – Management and Disposal of Excess Material.
- .3 Do not disturb soil within branch spread of trees that are to remain.
- .4 Excavation in proximity to trees:
 - .1 Excavate by hand and cut roots with sharp axe or saw.
- .5 Dispose of unsuitable excavated material off site as per Section 01 74 21 – Management and Disposal of Excess Material.
- .6 Dispose of surplus excavated material in approved location on site or off site as per Section 01 74 21 – Management and Disposal of Excess Material.
- .7 Do not obstruct flow of surface drainage or natural watercourses.
- .8 Notify Contract Administrator when bottom of excavation is reached.
- .9 Obtain Contract Administrator approval of completed excavation.
- .10 Correct unauthorized over-excavation by placing Select Cover Material compacted to not less than 95% of corrected maximum dry density.
- .11 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.

3.6 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.

3.7 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Management and Disposal of Excess Materials, trim slopes, and correct defects as directed by Contract Administrator.

- .2 Reinstall damaged turf with imported topsoil and sod to elevation which existed before excavation as directed by Contract Administrator.
- .3 Reinstall pavements disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .4 Clean and reinstall areas affected by Work as directed by Contract Administrator.

3.8 INSPECTION AND TESTING

- .1 The Contractor shall provide proper and sufficient samples, ample opportunity and access at all times for the Contract Administrator to inspect materials, operations and completed works carried out under this Section.
- .2 Other requirements shall be in accordance with Section 01 11 00 – General Instructions.

END OF SECTION

PART 1- GENERAL

- 1.1 Related Works 10 .1 Excavation and Backfilling Section 31 23
- 1.2 Protection .1 Prevent damage to buildings, landscaping, curbs, sidewalks, trees, fences, roads and adjacent property. Make good any damage.

PART 2- PRODUCTS

- 2.1 Materials .1 Cobblestones: as available on site as planting bed edging.
- .2 Granular laying course shall be stonedust.
.1 This material shall be crushed rock screenings.
.2 Gradation Requirements:

<u>Sieve</u>	<u>% Passing</u>
9.5 mm (3/8")	100
4.75 mm (No. 4)	50-100
1.18mm (No. 16)	20-55
300 um (No. 50)	10-30
75 um (No. 200)	0-12

PART 3- EXECUTION

- 3.1 Site Preparation .1 Remove and stockpile existing cobbles on site.
- .2 Remove weeds and other debris as required. Remove from site.
- 3.2 Laying Course .1 Place stonedust laying course to compacted thickness as indicated on drawings. Provide additional stonedust as required to achieve desired thickness.
- .2 Ensure laying course is dry (4-8% moisture content) prior to placement of unit pavers.
- 3.3 Surface Course .1 Install unit paving true to grade, in existing locations, layout and pattern.
- .2 Joints not to exceed 3 mm.
- .3 Where required, cut unit pavers accurately without damaging edges.
- .4 Tamp down and level pavers with mechanical plate vibrator on minimum 19 mm thick plywood until pavers are true to grade and free of movement.
- .5 Fill spaces between pavers by sweeping in stonedust. Completely fill joints by watering down paving surface.
- .6 Surface of finished pavement: free from depressions exceeding 3 mm as measured with 3 m straight edge.

.7 Sweep surface course clean.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- | | | |
|----|-----------------------------------|------------------|
| .1 | Planting Soil and Soil Amendments | Section 32 91 21 |
| .2 | Planting | Section 32 93 20 |

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
- .2 American National Standards Institute/American Society of Safety Engineers (ASSE)
 - .1 ANSI/ASSE 1015-2005 (sanitary) 'Double Check Valve Backflow Prevention Assembly'.

1.3 QUALITY ASSURANCE

- .1 Provide a foreman with a minimum of two years experience, competent and skilled in the work of this section, to direct all work and be present at all times during the performance of work.
- .2 Comply with all local codes relative to the installation of the work of this section. Additionally, comply with the regulations of the electrical safety authority, and Ottawa Hydro for all electrical work and materials for all mechanical work and materials.
- .3 Contractor is to be a Certified Irrigation Contractor (CIC) in good standing as determined by the Irrigation Association.
- .4 The Foreman responsible for the site shall have a minimum of two years experience managing projects of this nature.

1.4 WORK IN CONFINED SPACES

- .1 The Contractor must comply with all safety standards established by law.
- .2 The Contractor shall provide approved equipment and trained personnel to enter confined spaces as required on this project. Refer to Special Provision.
- .3 Special Provision
 - .1 The Contractor shall provide their detailed written Confined Space Entry Policy and site specific procedures for each confined space at the work site. All work associated with these confined spaces shall be conducted in accordance with the site-specific procedures and the requirements of the Occupational Health and Safety Act and any regulations that may affect the performance of the work.
 - .2 Site-specific procedures shall contain a hazard assessment and hazard control method for all work performed within or around the confined space. The assessment will include, but is not necessarily limited to, the proposed work within, material use, and equipment use. They shall also include the rescue procedures from the confined space(s) to be followed in the event of worker injury or if evacuation of all personnel from an unsafe condition is required.
 - .3 The Contractor shall have personnel trained in Confined Space Entry and rescue procedure readily available on site and shall take all other precautions necessary to meet its obligations under the Occupational Health and Safety Act.
 - .4 The Confined Space Policy and site-specific procedures shall be kept on site and made available to all workers on request. Submittal of Policy and site-specific

procedures shall be made to the Contract Administrator, prior to the commencement of the work.

1.5 PERMITS AND FEES

- .1 The Contractor will fully acquaint himself with all relevant provincial and municipal by-laws relating to the work of this contract, as he will be required to comply with such bylaws without extra compensation.
- .2 The Contractor will obtain and pay for all permits, approvals, and inspections relating to work of this section.

1.6 APPROVAL AND SUBMITTALS

- .1 Submit shop drawings and product data, including catalogue cuts and manufacturer's data pertaining to standard component parts.
- .2 Prior to commencing the work of this section, submit a plan of all irrigation materials to be used including manufacturers' number, technical data and recommended method of installation of materials, submit these for the approval of the Contract Administrator.
- .3 Receive Contract Administrator's approval of the material and methods in writing before commencing the work of this section.
 - .1 Any substitutions will be equivalent or better than the originally specified product.
 - .2 Prior to connecting the irrigation water system to water source, receive in writing the approval from the Owner.
 - .3 Record and submit to the Contract Administrator, the available static pressure downstream of the irrigation water shut-off valve.

1.7 PRODUCT HANDLING

- .1 Protect all irrigation system materials before, during, and after installation, and protect installed materials and work of other trades.
- .2 In the event of damage, make all necessary repairs to the approval of the Contract Administrator, and at no additional cost to the Owner.

1.8 WARRANTY AND MAINTENANCE

- .1 The Contractor will guarantee all parts, materials, and workmanship for a period of three year from the date of final acceptance. The Contractor will repair or replace any defective materials, parts or work appearing during the three-year warranty period. Where the manufacturer's warranty extends beyond the three-year warranty period, such warranties will become effective at the expiry of the three-year warranty period. The Contractor will furnish a written warranty, in a form acceptable to the Owner, at the completion of the work. Also, he will furnish copies of all manufacturers' warranties to the Owner.
- .2 The Contractor will maintain the entire system for a period of three years, including all equipment adjustment, seasonal shut down and start-up operation. Turn over a proper and fully operating system at the end of the three-year maintenance period from date of Final Acceptance.
- .3 The maintenance and warranty period will run concurrently beginning upon acceptance of the system installation.

1.9 AS-BUILT DRAWINGS AND MANUALS

- .1 On completion of work, prepare an accurate 'as-built' drawing of the irrigation system as installed indicating depth and location of conduits/sleeves, piping, sprinkler heads, control valves, controller(s) field wiring, complete with dimensions and reference points.
- .2 Submit one print of the 'as-built' drawings to the Contract Administrator.
- .3 Submit three copies of operating manuals and maintenance guidelines to the Contract Administrator.
- .4 Submit one copy of all manufacturers warranties to the Contract Administrator.
- .5 Submit one copy of a written guarantee to the Contract Administrator.

1.10 CO-ORDINATION AND SUBDIVISION OF WORK

- .1 This section may consist of the work of more than one trade, supplier, or Subcontractor.
- .2 The responsibility for determining which Subcontractor will provide labour, material, equipment and service to complete the work, will rest solely with the Contractor.

1.11 LOCATION OF ITEMS NOT DIMENSIONED

- .1 The location of piping, valves, field wires, controller's conduit/sleeve, and all items shown or specified but not dimensioned will be considered schematic and approximate.
- .2 Consult with the Contract Administrator to determine actual location of items not dimensioned.

1.12 INSPECTION OF SITE

- .1 The Contractor will acquaint himself with all site conditions, and will notify the Contract Administrator of any discrepancies or conditions that will result in poor workmanship.

1.13 FINAL ACCEPTANCE

- .1 The Contract Administrator will issue final acceptance upon the satisfactory completion of all work of this section.

1.14 GUARANTEE

- .1 The Contractor will guarantee all work of this section for a period of three years from date of final acceptance, against all defects in material, equipment, and workmanship.
- .2 The Contractor will promptly repair and/or replace any defective material, equipment, or workmanship during the guarantee period.
- .3 The Contractor will repair or compensate for any damage to any part of the premises resulting from leaks or other defects in material, equipment, and workmanship, to the satisfaction of the Owner.
- .4 An inspection will be conducted after the three year guarantee period.

Part 2 Products

2.1 MATERIALS

- .1 Pipe:
 - .1 PVC Plastic Pipe: Class 160, rated to CSA specification.
 - .2 Copper Pipe: type K copper tubing rated to CSA specification.
 - .3 Polyethylene Pipe: All polyethylene pipes will have a minimum pressure rating of 100 psi. A CSA rating is not required for polyethylene pipe used for irrigation.
- .2 Fittings:
 - .1 All metal fittings will be type K copper, compatible to pipe and bonded as per manufacturers' recommendations.
 - .2 All plastic fittings will be compatible to the pipe and bonded as per manufacturers' recommendations.
- .3 Controller: Pedestal Mount – Stainless Steel
 - .1 The pre-assembled controller enclosure shall be 17.38" W x 36.25" H x 12.63" D (440 mm W x 920 mm H x 320 mm D).
 - .2 The pedestal enclosure shall be a NEMA type 3R rainproof enclosure manufactured entirely of 16-gauge 304-grade stainless steel, and compatible with the pre-assembled controller enclosure. The main housing shall be louvered for cross flow ventilation. Filter screens shall cover all louvers to help protect internal components from water spray, insects, and dust. A stainless steel backboard shall be provided for the purpose of mounting electronics and other types of equipment. The backboard shall be mounted on 4 stainless steel bolts that will allow for removal of the backboard.
 - .3 A stainless steel cam-style lock shall be mounted in the door for security.
 - .4 The pedestal shall come complete with lightning and surge protection and all terminals shall be factory labeled. The pre-assembled enclosure shall come with an on/off switch to isolate the controller along with a GFI receptacle.
 - .5 The pedestal shall be mounted to a concrete pad as per manufacturer's instructions. Refer to the Irrigation Controller Detail drawing on IR-3.
 - .6 The controller shall be able to operate:
 - .1 Up to 50 zones along a two-wire path and/or a conventional wire path
 - .2 Up to 10 moisture sensors
 - .3 Up to 3 normally open or normally closed event device inputs
 - .4 Up to 3 normally open or normally closed master valves and/or pump starts for the entire system
 - .5 1 water source and 1 associated flow sensor or meter
 - .6 Up to 20 completely independent programs
 - .7 Programming
 - .1 The controller shall be capable of managing 20 programs, including up to 8 start times per program.
 - .2 The controller shall automatically stack up to 10 overlapping programs. The system can run up to 10 programs concurrently if permitted by the concurrent zone settings.
 - .3 The controller shall allow run times for zones from 5 seconds to 24 hours.
 - .4 The controller shall be able to adjust seasonal water budget from 10% to 200% by program.
 - .5 The controller shall allow an operator to enable or disable each zone.

- .6 The controller shall allow an operator to set a “water window” by program on a per hour basis for each day of the week, which suspends watering beyond a set time and resumes watering when another window opens.
- .7 The program shall be capable of using the following schedules:
 - .1 Day intervals in even days
 - .2 Odd days
 - .3 Odd days excluding the 31st
 - .4 User defined interval
 - .5 Custom 7-day calendar
 - .6 Smart interval calendar with customizable half-months
- .8 The controller shall be able to irrigate in the following modes:
 - .1 Timed (standard time-based watering)
 - .2 Soil moisture based
 - .3 Event based
- .9 Flow Monitoring and Management
 - .1 The controller shall support 1 water source and 1 associated flow sensor or meter.
 - .2 The operator shall be able to manually enter a design flow for each zone, with or without an installed flow meter.
 - .3 The controller shall be able to learn flow rates by turning each zone on, one at a time, allowing the flow rate to stabilize, and then recording the flow of each zone back to the controller.
 - .4 The operator shall be able to configure pipe fill time for a water source.
 - .5 The controller shall display real-time flow updated every 60 seconds when watering.
 - .6 The controller shall intelligently schedule watering based on target flow to maximize concurrent valve operation and minimize total water time by mainline.
 - .7 The controller shall allow a program to be assigned to a water source.
 - .8 The controller shall be able to limit the number of concurrent zones using the design flow.
 - .9 The controller shall allow flow variance to be set from 10 to 200%.
 - .10 In an “overflow event,” the controller shall close the master valve and halt all irrigation by water source.
- .4 Valves:
 - .1 Remote control valves: 150 psi rated, electrically activated (24 VAC), plastic solenoid control valves (size as required).
 - .2 Master control valve: 50mm (2”), 200 psi rated, electrically activated (24 VAC), brass solenoid control valve.
 - .3 Master shut-off valve.
 - .4 Drain valve for winterization.
 - .5 25mm (1”) Low Flow Control Zone Kit: The control zone kit shall consist of a 25mm (1”) low flow plastic solenoid valve, a 25mm (1”) 120 micron filter, a 40psi pressure regulator and fittings to connect the components.
 - .6 40mm (1-1/2”) Low Flow Control Zone Kit: The control zone kit shall consist of a 40mm (1-1/2”) plastic solenoid valve, two 25mm (1”) 120 micron filters, two 40psi pressure regulators and fittings to connect the components.

- .5 Quick Coupling Valves: Use types as indicated or specified on drawings. The contractor is to provide four compatible Quick Coupler keys and Hose Swivels.
- .6 Backflow Preventer: 50mm (2") brass double-check valve assembly, CSA approved, ANSI/ASSE 1015 with replaceable seats.
- .7 Sleeving: PVC rigid pipe conduit required as shown on drawings.
- .8 Control Wires: All 24 volt control wire between the solenoid valves and the controller shall be CSA approved, #14 gauge TWU-10 solid conductor, white jacket for the common wire, and coloured for the control wire.
- .9 Sprinkler Heads & Nozzles: Use types as indicated or specified on drawings to guarantee 100% coverage, while allowing for water differential of turf areas from shrub/flower areas.
- .10 Drip Irrigation:
 - .1 Subsurface Drip Irrigation: The subsurface drip irrigation shall be pre-assembled and constructed of a sheet of polypropylene fleece matting with two rows of fleece-wrapped, pressure-compensating, non-draining inline emitter tubing. The wrapped emitter tubing shall be joined to the top of the fleece mat in regular intervals so as to provide uniform spacing of the lines at 350mm distance and to facilitate uniform installation. The wrapped emitter tubing shall have a nominal outside diameter of 16mm and shall have 2.3 L/hr (0.6 gph) emitters uniformly spaced at 300mm intervals. This tubing shall be made of landscape grade tubing with a nominal wall thickness not less than 1.1mm. The rolls shall be delivered with solid caps inserted to protect the tubing from debris during installation.
 - .2 Surface Drip Irrigation: The drip line shall have pressure compensating emitters located every 300mm (12") along the pipe that deliver 2.3 L/hr (0.6 gph) of water. The drip line shall be 16mm diameter polyethylene pipe. The drip line shall be connected using insert fittings and adapters.
 - .3 Air Relief Valve: The air relief valve shall have a 25mm (1") FPT inlet. The air relief valve shall prevent clogging of the drip line emitters.
 - .4 Flush Ball Valve: The flush ball valve shall have a 20mm (3/4") MPT inlet and outlet. The valve shall be made of PVC or ABS plastic. The valve shall be capable of moving between the on and off position with a quarter turn of the handle.
 - .5 Pop-Up Indicator: The pop-up indicator shall rise 300mm (6") when the zone has a minimum pressure of 20psi.
- .11 PVC Flow Sensor:
 - .1 The 50mm (2") Flow Sensor shall be two-wire ready.
 - .2 Fully sealed and submersion proof that shall effectively seal moisture from electronics when installed per manufacturer's specifications, and as specified herein.
 - .3 The flow sensor shall have a tested working pressure of 150 psi @ 90°F (32°C).
- .12 Soil Sensors:
 - .1 The soil moisture sensor shall be fully sealed, submersion proof, and direct bury that shall effectively seal moisture from electronics and shall be installed as specified herein.

- .2 The soil moisture sensor shall be a TDT (time domain transmissibility) technology sensor that accurately measures soil moisture.
 - .3 The soil moisture sensor shall be installed per the installation details provided. The soil moisture sensor shall be buried with no air pockets around the sensor.
 - .4 The soil moisture sensor shall be marked to avoid damage during landscape maintenance.
 - .5 All splices shall be made inside the valve box with a DBR/Y or equivalent direct-burial waterproof connection.
- .13 **Wireless Rain Sensor:**
- .1 The rain sensor shall be capable of interrupting the power from the irrigation controller to the valves when rainfall exceeds a pre-selected amount.
 - .2 The rain sensor shall be of a two-piece configuration with a transmitting unit and a receiving unit. The receiving unit shall be wired directly to the irrigation controller and mounted in close proximity to the controller. The transmitter unit may be mounted up to 305 metres (1000 feet) away from the receiver. The receiver unit shall also have a built-in bypass switch to allow for overriding of the sensor. The unit shall be available in a 315 MHz model (North America), and a 433 MHz model (Europe, Australia, and other markets) to meet local codes.
 - .3 The rain sensor circuitry shall be housed in an UV and corrosion resistant plastic casing and shall utilize hygroscopic disks to activate switches in the unit.
 - .4 The sensor shall have an adjustable airflow opening that varies the rate of evaporation from the hygroscopic disks.
 - .5 The sensor shall have an integral, adjustable, aluminum, mounting bracket that allows installation on angled, as well as perpendicular surfaces. The sensor shall have a mounting option that allows for installation on a rain gutter.

2.2 OTHER MATERIALS

- .1 All incidental materials, tools, and equipment not specifically described herein, but are required to complete the work of this section, in accordance with the manufacturer's recommendation.

Part 3 Execution

3.1 SITE EXAMINATION

- .1 Examine areas where the system is to be installed. Conditions that will result in a poor installation will be reported to the Contract Administrator prior to commencement of work.

3.2 INSTALLATION

- .1 Perform all necessary excavation, trenching, and backfilling for the installation of the system. Lateral lines will be at a minimum 300 mm depth and main lines at a 450 mm minimum depth. Backfilling will be completed with soft fill material, and compacted to 100% of original density. All main lines will be located in one trench when running together and as close as practically possible to ensure that they are at the edge of the planting beds or as directed by Contract Administrator.

- .2 PVC pipe fittings will be solvent welded using solvents and methods as recommended by the pipe manufacturer. Make all connections between plastic pipe and metal valves or pipe with threaded fittings using plastic male adaptors. For Polyethylene pipe, all insert fittings shall be constructed of PVC Type 1 cell classification 12454-B adhering to ASTM standard D 2609. The insert fittings will be secured with all stainless construction gear drive clamps. Stainless steel squeeze clamps may also be used. Any piping under continuous pressure will be double clamped.
- .3 Position and install spray heads on risers, with flexible swing joints.
- .4 Position and install pop-up shrub spray heads, with flexible swing joints. Set body plumb and firmly anchored in the ground.
- .5 Wire the control valves to the controller, as per manufacturer's specifications. Connect each control valve to one station. All visible low voltage wires will be enclosed in P.V.C. electrical conduit. Direct burial wire may be trenched or placed in a common trench beneath plastic irrigation pipes, or lain with a vibratory plough (but not pulled), and must have a minimum cover of 300mm (12"). Provision must be made for expansion and contraction of all direct burial wire, including protection from foreign objects. All electrical wire connections to remote control electric valve and splices in the field will be completed with a DBY weatherproof wire connector.
- .6 The connection of the irrigation system must be co-ordinated with the electrical services existing on site.
- .7 Flush all lines of dirt or debris prior to installation of heads.
- .8 Program the controller into a logical sequence as directed by the Contract Administrator.

3.3 WORKMANSHIP

- .1 The Contractor will be responsible for full and complete coverage of all irrigated areas and will make any necessary minor adjustments at no additional cost.
- .2 Any major revisions to the system must be submitted and answered in written form, along with any change in contract price.

3.4 EXCAVATING AND TRENCHING

- .1 Perform all excavations as required for the work under this section.
- .2 Restore all surfaces, existing underground utilities, damaged or cut, to their original condition and in a manner approved by the Contract Administrator.
- .3 Trenches for pipelines will be made of sufficient depths to provide the minimum cover from finish grade as follows:
 - .1 450 mm minimum cover over main lines.
 - .2 300 mm minimum cover over lateral lines to heads.

3.5 PIPELINE ASSEMBLY

- .1 Plastic pipe and fittings will be solvent welded, using solvents and methods as recommended by manufacturer of the pipe, except where screwed connections are required. Pipe and fittings will be thoroughly cleaned of dirt, dust, and moisture before applying solvent with a non-synthetic bristle brush.

- .2 Pipe may be assembled and welded on the surface. Snake pipe from side to side of trench bottom to allow for expansion and contraction.
- .3 Make all connections between plastic pipe and metal valves or pipe with threaded fittings using plastic male adapters.

3.6 SPRINKLER INSTALLATION

- .1 Install all sprinklers as indicated on drawings and/or specified plumb and anchor firmly in the ground.
- .2 Adjust the sprinkler top flush with finish grade.

3.7 CLOSING OF PIPE AND FLUSHING OF LINES

- .1 Cap or plug all openings as soon as lines have been installed to prevent entrance of materials that would obstruct pipe. Leave in place until removal is necessary for completion of installation.
- .2 Flush out all water lines thoroughly before installing heads and valves.
- .3 Test in accordance with Hydrostatic Test.
- .4 Upon completion of the testing the Contractor will complete assembly and adjust sprinkler heads for proper distribution.

3.8 HYDROSTATIC TESTING

- .1 Notify the Contract Administrator at least 48 hours in advance of testing.
- .2 Testing will be done in the presence of the Contract Administrator.
- .3 Apply a continuous and static water pressure of 345 kPa (50 psi), after the welded plastic joints have cured for at least for twenty-four (24) hours. Risers should be capped as follows:
 - .1 Water mainlines and sub-mains to be tested for 12 hours.
 - .2 Lateral lines are to be tested for two hours.
 - .3 Repair leaks resulting from tests.

3.9 AUTOMATIC CONTROL VALVES AND CONTROLLER INSTALLATION

- .1 Install automatic control valves per manufacturers' specifications, in location(s) indicated or specified on drawings.
- .2 Install automatic controller(s) per manufacturer's recommendations in location(s) indicated or specified on drawings.
- .3 Wire the control valves to the controller as per manufacturer's specifications, and program them in a logical sequence to be approved by the Contract Administrator.

3.10 BACKFILL AND COMPACTION

- .1 Backfill excavations and trenches with clean soil, free of debris and large stones after the system is operating and the required tests and inspections have been made. Compact the soil to the minimum density of 85% SPD.

- .2 Dress off all areas to required grade, and remove from site any debris resulting from work of this section.

3.11 INSPECTION AND DEMONSTRATION

- .1 Prior to backfilling, pressure-test the system at 345 kPa (50 psi) water pressure for four hours during which a zero pressure drop is required. Report all leaks and retest to Contract Administrator's approval.
- .2 Upon completion of installation the Contractor will set controller and fully demonstrate the system to the Contract Administrator and the Owner or representative or maintenance staff, showing that the system functions in accordance with the original design intent and manufacturer's specifications.
- .3 Inspections will occur first, prior to backfilling, second upon completion of the installation of the system and finally at the end of the one year maintenance period. Acceptance of the installation of the system will occur at the second inspection.
- .4 Operate each zone to determine the precipitation rate performance of the system. The method and recording will be set up by the Owner or representative and mutually agreed by Owner, Contract Administrator, and Contractor.

3.12 AS-BUILTS AND MANUAL

- .1 The Contractor will furnish three copies of the as-built irrigation system upon completion to the Owner.
- .2 The Contractor will furnish three copies of the operating manuals and maintenance guidelines for the system to the Owner upon completion.

END OF SECTION

PART 1 - GENERAL

- | | | | |
|-----------------------------|----|---|------------------|
| 1.1 Related Works | .1 | Clearing and Grubbing | Section 31 11 00 |
| | .2 | Excavation and Backfilling | Section 31 23 10 |
| | .3 | Irrigation System | Section 32 84 10 |
| | .4 | Planting | Section 32 93 10 |
| | | | |
| 1.2 Testing | .1 | Submit 5.0 kg sample of proposed standard topsoil and leaf compost to approved testing laboratory. Submit copy of topsoil and compost analysis and recommendations for corrections to the Contract Administrator a minimum of 2 weeks prior to scheduled delivery of materials to site. | |
| | .2 | Test topsoil for N, P, K, Mg, total salts, pH value, and percent organic matter, silt, sand, and clay content. | |
| | .3 | Test leaf compost for pH, total carbon, and total nitrogen. | |
| | | | |
| 1.3 Operational Constraints | .1 | Protect all stone surfaces from direct contact with topsoil and other soil amendments. | |
| | .2 | The Contractor is responsible for cleaning of stone after completion of landscape works. | |
| | .1 | If surface contamination is deemed to be surficial in nature, clean all affected stone surfaces using a standard hose. | |
| | .2 | If surface contamination is deemed to be impregnated in stone, all affected stone surfaces shall be cleaned using a method approved by the Owner and as directed by the Contract Administrator. | |

PART 2 - PRODUCTS

- | | | | |
|---------------|----|---|--|
| 2.1 Materials | .1 | Standard topsoil: friable loam, neither clay nor light sand in nature, containing 5 to 7% organic matter by volume. Free from subsoil, roots, grass, weeds, toxic materials, stones, foreign objects and an acidity range (pH) of 6.2 to 6.5. Topsoil containing crabgrass, couch grass or other noxious weeds, not acceptable. | |
| | .2 | Soil Amendments: | |
| | .1 | Shredded Leaf Compost: shall be fully cured, commercial source of leaf compost with a carbon: nitrogen ratio no greater than 33:1. No odor or steam shall emanate from the compost. Compost shall be capable of passing screen size of 10 mm or less. | |
| | .2 | Unamended Sphagnum Peat Moss: shall be coarsely shredded sphagnum peat moss, brown in colour, with a pH of 5.0-5.5 and suitable for horticultural purposes. | |

Shredded particles shall not exceed 16 mm in size. It shall be baled and free of decomposed colloidal residue, wood, sulphur, iron, containing minimum 60% organic matter by weight and moisture content not exceeding 15%. Sphagnum peat moss to have a natural pH and is not to be amended with lime.

- .3 Sulphur: granular horticultural grade sulphur, 0-0-0-90, TIGER 90CR sulphur or approved equal.

PART 3 – EXECUTION

3.1 General Requirements

- .1 Inspect base on which the work of this section is installed. Report any defects that will result in a poor installation.
- .2 Ensure topsoil contains adequate moisture content during spreading operation. Do not spread during dry weather or excessively wet or windy weather.
- .3 Manually spread topsoil around obstacles in planting areas.

3.2 Prairie Meadow Areas

- .1 Remove 200 mm of existing soil and stockpile during installation of irrigation system. Keep soil removed from each area stockpiled separately.
- .2 Prior to installation of subsurface irrigation, cultivate existing soil below irrigation to 150 mm depth.
- .3 Once irrigation system has been installed, spread a mix of stockpiled soil and 100 mm of new standard topsoil for a total of 300 mm soil cover over subsurface irrigation.
- .4 Blend grades to meet flush with cobblestone edging.
- .5 Do not apply any additional nutrients.
- .6 Apply a surface application of sulphur over all prairie meadow planting areas to bring the pH to 6.5. Rake sulphur into the top 25 mm of soil.
- .7 Apply an additional application of sulphur over the zone containing *Lilium philadelphicum* to bring the pH to 5.0. Rake additional sulphur into the top 25 mm of soil.

3.3 Tundra/ Rock Garden Areas

- .1 Remove existing soil as required to meet proposed contouring. Keep soil removed from each area stockpiled separately.
- .2 Apply a mix of 100 mm stockpiled soil, 100 mm of shredded sphagnum peat moss and 100 mm of new standard topsoil for a total of 300 mm soil. Adjust position of subsurface irrigation in soil mix below proposed surface:
- .1 200 mm for perennials and small shrubs (*Vaccinium*)

.2 300 mm for shrubs (*Rosa* and *Betula*)

.3 Blend grades to meet flush with cobblestone edging.

.4 Do not apply any additional nutrients.

.5 Apply a surface application of sulphur over all tundra/ rock garden planting areas to bring the pH to 6.5. Rake sulphur into the top 25 mm of soil.

.6 Apply an additional application of sulphur over the zones containing *Vaccinium angustifolium* to bring the pH to 5.0. Rake additional sulphur into the top 25 mm of soil.

3.4 Woodland Areas

.1 Remove existing turf cover to 25mm depth.

.2 Spread 100 mm of shredded leaf compost over all woodland areas.

.3 Do not apply any additional nutrients..

.4 Apply sulphur to all woodland areas to achieve a target pH level of 6.0.

.5 Mix by cultivating soil amendments to a depth of 100 mm into existing soil, taking care to minimize root disturbance. Do not disturb soil within 2 metres diameter around existing trees. Do not damage major tree roots.

3.5 Canadian Horticultural Pioneer Areas

.1 Planters:

.1 Remove and dispose of the top 450 mm of existing soil within the four raised planters.

.2 Cultivate underlying existing soil to 150 mm depth.

.3 Replace the removed soil with the standard soil mix amended with minimum 20% shredded sphagnum peat moss by volume.

.4 Fill to within 50 mm of the top of the planter coping.

.2 Wellington/Bay Bed:

.1 Remove 200 mm of existing soil and stockpile during installation of irrigation system. Keep soil removed from each area stockpiled separately.

.2 Prior to installation of irrigation, cultivate underlying existing soil to 150 mm depth.

.3 Once irrigation system has been installed, spread a mix of stockpiled soil and 100 mm of new standard topsoil for a total of 300 mm.

.4 Do not apply any additional nutrients.

.5 Apply a surface application of sulphur over entire planting bed to bring the pH to 6.5. Rake sulphur into the top 25 mm of soil.

.6 Blend grades to meet flush with cobblestone edging.

- .3 Bay Street Bed:
 - .1 Grub out root systems of all dead or heavily damaged shrubs.
 - .2 Amend soil in gaps only, in locations of missing or dead plant material. Mix 50 mm of new standard soil with 150 mm of existing soil.
 - .3 Weed entire planting bed.
 - .4 Do not apply any additional nutrients.
 - .5 Apply a surface application of sulphur over entire planting bed to bring the pH to 6.5. Rake sulphur into the top 25 mm of soil.
 - .6 Repair or replace existing pop up irrigation heads as required.
 - .7 Blend grades to meet flush with cobblestone edging.

- 3.6 Finished Grading
 - .1 Fine grade entire soil area to contours and elevations as indicated on drawings or as directed. Unless otherwise indicated, eliminate rough spots and low areas to ensure positive surface drainage.
 - .2 Roll topsoil with 50 kg roller, minimum 900 mm wide, to compact and retain surface and ensure a stable planting medium for plant material.

- 3.7 Surplus Material
 - .1 Dispose of surplus soil and amendments not required off-site.

END OF SECTION

PART 1- General

1.1 RELATED WORK

- .1 Planting Soil and Soil Amendments Section 32 91 21

1.2 SCHEDULING

- .1 Schedule sod laying to coincide with preparation of soil surface.
.2 Schedule sod installation when frost is not present in ground.

PART 2- Products

2.1 MATERIALS

- .1 Number One Turfgrass Nursery Sod: Sod that has been especially sown and cultivated in nursery fields as turfgrass crop.
.1 Turfgrass Nursery Sod types:
.1 Number One Kentucky Bluegrass Sod: Nursery Sod grown solely from seed of cultivars of Kentucky Bluegrass, containing not less than 50% Kentucky Bluegrass cultivars.
.2 Turfgrass Nursery Sod quality:
.1 Not more than 2 broadleaf weeds or 10 other weeds per 40 m².
.2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 40 mm.
.3 Mowing height limit: 35 to 65 mm.
.4 Soil portion of sod: 9 to 15 mm in thickness.
.2 Water:
.1 Potable.
.3 Fertilizer:
.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
.2 Complete, synthetic, slow release with 65% of nitrogen content in water-insoluble form.

PART 3- Execution

3.1 PREPARATION

- .1 Verify that grades are correct and prepared in accordance with Section 32 91 21 – Planting Soil and Soil Amendments. 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 or dry soil or soil covered with snow, ice, or standing water.
.3 Fine grade surface free of humps and hollows to smooth, even grade, elevations indicated, surface to drain naturally.

- .4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site.
- .5 Cultivate fine grade approved by Contract Administrator to 25 mm depth immediately prior to sodding.

3.2 SOD PLACEMENT

- .1 Lay sod within 24 h of being lifted.
- .2 Lay sod sections in rows, longitudinally, along contours of slopes, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .3 Roll sod as directed by Contract Administrator. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.3 FERTILIZING PROGRAM

- .1 Fertilize during establishment and warranty periods to following program:
One (1) month after sodding apply 2:1:1 at a rate of 0.5kg/100m².

3.4 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of installation until acceptance.
- .2 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
- .3 Cut grass to 50 mm when it reaches height of 75 mm. Remove clippings which will smother grassed areas as directed by Contract Administrator.
- .4 Maintain sodded areas weed free 95%.
- .5 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles.

3.5 ACCEPTANCE

- .1 Turfgrass Nursery Sod areas will be accepted by Contract Administrator provided that:
 - .1 Sodded areas are properly established.
 - .2 Sod is free of bare and dead spots and without weeds.
 - .3 No surface soil is visible from height of 1200 mm when grass has been cut to height of 50 mm.
 - .4 Sodded areas have been cut minimum 2 times, and within 24 h prior to acceptance.
- .2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

END OF SECTION

PART 1 - GENERAL

1.1 Related Works

- | | | |
|----|---|------------------|
| .1 | Irrigation System | Section 32 84 10 |
| .2 | Planting Soil and Soil Amendments | Section 32 91 21 |
| .3 | Plant Material Maintenance and Warranty | Section 32 93 20 |

1.2 Source Quality Control

- .1 The Contractor shall commence sourcing the specified material immediately upon award of the Contract.
- .2 Species and cultivars have been selected for their specific floral characteristics. The Contractor shall arrange for the production of difficult to source plant material that are not immediately available in the plant nursery industry.
- .3 No substitutions will be considered unless the Contractor can demonstrate to the Contract Administrator's satisfaction that a prolonged and widespread search for the specified species has been undertaken. The approval of a substitution will be an exceptional circumstance.
- .4 The Contractor must obtain the written approval of the Contract Administrator for any accepted changes to the species, cultivar or size of specified plant material.
- .5 Obtain approval of source of plant material. Acceptance of plant at its source does not prevent rejection on site prior to or after planting operations.

1.3 Shipment and Pre-planting Care

- .1 Protect plant material against abrasion, exposure and extreme temperature change during transit.
- .2 Keep roots moist and protected from sun and wind.

1.4 Scheduling

- .1 The majority of specified plant material shall be installed in the spring of 2015, by June 15th.
- .2 Interplanted bulbs and difficult to source plant material shall be planted in the fall of 2015, by October 1st.
- .3 The remaining difficult to source plant material shall be planted at the latest in the spring of 2016, by June 15th.

PART 2 - PRODUCTS

2.1 Plant Materials

- .1 General Requirements:
 - .1 All plants to be specimen quality.

- .2 Written documentation of delivery of the specified species and cultivars to be provided by Contractor.
- .2 Woody Plant Material (Shrubs):
 - .1 Comply with Guide Specification for Nursery Stock, latest edition, of Canadian Nursery Trades Association referring to size and development of plant material and root ball.
 - .2 Use plants with strong fibrous root systems free of disease, insects, defects or injuries and structurally sound. Plants must have been root pruned regularly, but not later than one growing season prior to arrival on site.
 - .3 Size indicated are the minimum allowable after pruning.
- .3 Herbaceous Plant Material (Perennials):
 - .1 All plants of same variety shall be consistent in form and size.
 - .2 Minimum two year old plants with well developed root systems.
 - .3 Minimum 3 to 5 shoots per 1 gal. potted plant.
- .4 Bonemeal: raw bonemeal, finely ground with a minimum analysis of 4% nitrogen and 20% phosphoric acid.
- .5 Mulch Materials:
 - .1 Natural shredded cedar mulch (sample to be provided for approval).
 - .2 Leaf mulch: coarse shredded leaves, primarily from oak and maple species (sample to be provided for approval).
 - .3 Angular granite mulch: crushed, washed Madawaska granite stone, 6 to 16 mm diameter (sample to be provided for approval).

PART 3 - EXECUTION

3.1 Maintenance Pathways

- .1 Clearly mark centerline of maintenance pathways with string or paint and have layout approved by the Contract Administrator.
- .2 Coordinate the installation of maintenance pathways with installation of irrigation systems. Ensure no damage to irrigation systems.
- .3 Maintenance Paths:
 - .1 600 mm wide, using angular granite mulch material:
 - .1 100 mm deep for prairie and tundra garden areas
 - .2 75 mm deep for woodland areas
 - .2 Apply granular material in smooth continuous lines as indicated. Compact granular to 85% SPD.
 - .3 Cover paths in woodland areas with 75 mm leaf mulch.

3.2 Planting Time

- .1 Spring planting shall occur from May 15 to June 15, unless otherwise approved by the Contract Administrator.
- .2 Plants sourced from protected greenhouse conditions shall not be planted until after May 24th.
- .3 Fall planting shall occur from August 15 to October 1, unless otherwise approved by the Contract Administrator.

3.3 Bonemeal (for shrubs only)

- .1 Place one generous handful of bonemeal in the bottom of each shrub planting hole, two handfuls for each *Amelanchier*. Mix bonemeal thoroughly with soil.

3.4 Spacing and Layout

- .1 The Contract Administrator shall be present on site during the layout of all plant material. No plant material is to be planted without the approval of the Contract Administrator of the proposed layout and spacing.
- .2 The spacing between plants is as indicated on the Contract drawings. Ensure a relatively uniform spacing is achieved.
- .3 Where a mix of plants are indicated, refer to the plant list on Contract drawings for the relative percentages of species/cultivars within a mix and for specific directions on the placement and grouping of species/cultivars within the designated zones.
- .4 Unless otherwise indicated, ensure a good, relatively even mix is achieved within a designated zone.
- .5 Ensure a clean line of plants is established around the outer edges of designated zones.

3.5 Removal of Containers

- .1 Ensure all containers are removed from plant material prior to planting.
- .2 Cut and remove burlap from top 1/3 of rootballs without damaging roots.

3.6 Soil Compaction

- .1 Install plant material in a manner which minimizes foot traffic in planting beds.
- .2 Where excessive soil compaction is deemed by the Contract Administrator to have occurred, the Contractor shall be responsible for aeration and/or cultivation of the soil to rectify the growing conditions.

3.7 Planting – Shrubs and Perennials

- .1 Excavate planting holes to width and depth as indicated on drawings.
- .2 Adjust placement of plants in woodland areas when large roots are encountered.

- .3 Place plant material to depth equal to depth they were originally growing in nursery. Take into account the mulch depth when planting in cedar or leaf mulch. Adjust height accordingly. Do not adjust height in granular mulch.
 - .4 Tamp planting soil around root system in layers of 150 mm, eliminating air voids.
 - .5 Remove dead and injured branches.
 - .6 Minimize excessive trampling and compaction of soil during planting operations.
- 3.8 Planting – Bulbs
- .1 See Section 32 93 20 – Plant Material Maintenance and Warranty for planting of fall bulbs.
- 3.9 Mulch
- .1 After planting, spread the following type and depth of mulch over bare soil within the different planting areas.
 - .1 Prairie garden areas: natural shredded cedar mulch to a depth of 75 mm.
 - .2 Tundra/rock garden areas: angular granite mulch to a depth of 50 mm.
 - .3 Woodland areas: leaf mulch to a depth of 75 mm.
 - .2 Covering of plant material with mulch is unacceptable.
 - .3 Mulch heavily contaminated with soil is unacceptable.
- 3.10 Watering
- .1 See Section 32 93 20 – Plant Material Maintenance and Warranty for watering.
- 3.11 Final Inspection
- .1 At final inspection, plant material shall be acceptable when it is properly installed, unbroken, shows adequate formation of buds and is free from blight of any description. All planting areas shall be free of weeds, litter and in good order.

END OF SECTION

PART 1 - GENERAL

- 1.1 Related Works
- .1 Irrigation System Section 32 84 10
 - .2 Planting Soil and Soil Amendments Section 32 91 21
 - .3 Planting Section 32 93 10
- 1.2 Warranty
- .1 All plant material shall be warranted from the date of substantial performance until October 31, 2017.
 - .2 The warranty shall cover any defects in materials and workmanship.
 - .3 A warranty inspection will be carried out at the end of the warranty period.
 - .4 The warranty will be extended for an additional year on replacement plant material.
- 1.3 Duration
- .1 Plant material maintenance shall begin immediately after each portion of planting has been completed and shall continue throughout the maintenance and warranty period to the satisfaction of the Contract Administrator.

PART 2 - PRODUCTS

- 2.1 Materials
- .1 Bulbs: shall be very high quality and top size for each bulb species. All discoloured, damaged, diseased and insect infested bulbs shall be discarded.
 - .2 Bulb fungicide: shall be Maestro 80 DF. The Contractor shall obtain all federal and provincial licences and permits necessary for this application.
 - .3 Sulphur: shall be in conformance with Section 32 91 21.
 - .4 Lime: shall be ground agricultural limestone containing minimum 85% of total carbonates, 90% passing 1.0 mm sieve, 50% passing 125 mm sieve by weight.
 - .5 Mulch: shall be in conformance with Section 32 93 10.
 - .6 Pruning Tools: shall be designed specifically for horticultural purposes and shall be clean, sharp and in proper, safe, working order. Pruning equipment shall be capable of producing clean, flush cuts without tearing or fraying the bark.
 - .7 Water: shall be free from any contaminants which could adversely affect plant growth.

PART 3 - EXECUTION

- 3.1 Operational Constraints
- .1 Do each maintenance operation continuously and complete within a reasonable time period.
 - .2 No maintenance equipment, materials or other miscellaneous items may be stored on site unless approved by the Contract Administrator.

- .3 All debris, waste and other extraneous material resulting from the maintenance operation shall be removed from the site daily upon completion of maintenance, unless otherwise directed or approved by the Contract Administrator.
- .4 The Contractor shall be fully acquainted with all relevant Provincial and Municipal By-laws and Regulatory Codes relating to the work of this contract, and will be required to comply with such by-laws and codes without extra compensation.
- .5 Notify the Contract Administrator immediately of damage incurred by pest, disease, mechanical or vandalism.
- .6 Minimize excessive trampling and compaction of soil during maintenance operations.

3.2 Interim Replacement of Plant Material

- .1 Throughout the maintenance and warranty period, units of plant material that are found to be unacceptable will be replaced by the Contractor. Replace material within one month of notification of the need for replacement unless otherwise directed by the Contract Administrator. Ensure sources of difficult to obtain species or cultivars are identified for replacement within the specified time period.
- .2 At the discretion of the Contract Administrator, plant material that is identified as dead or in a poor or diseased condition shall be immediately removed from the site.

3.3 Watering

- .1 The Contractor is responsible for back up watering of all plant material, from time of planting until the irrigation systems are fully functional.
- .2 Once the irrigation systems are functional, the Contractor is responsible to water plant material as follows:
 - .1 Manual watering using quick coupler connections throughout the site.
 - .1 During the first two years of the warranty, manually water all areas where subsurface irrigation has been installed until the Contract Administrator agrees that the rooting is deep enough to benefit from the subsurface irrigation.
 - .2 Continue supplementary watering for specific species or zones during the entire three year warranty as directed by the Contract Administrator.
 - .3 Connect a hose to irrigation systems in the four planters and the woodland areas to provide a water source. Disconnect between watering operations.
 - .4 Ensure hoses do not create a tripping hazard.
 - .2 Automatic irrigation systems.
 - .1 Pop up irrigation systems connected to a water source can be used immediately.
 - .2 Subsurface irrigation systems are to be considered secondary until such time as root systems reach with 50 mm of the distribution mat as determined by the Contract Administrator.
- .3 Water all plant material immediately after installation. Thereafter,
 - .1 Water daily for the first week after planting;
 - .2 Water every second day for the next 3 weeks;
 - .3 Water weekly from June 1 to August 31st of the first warranty year;
 - .4 For the remainder of the warranty period, thoroughly water whenever natural precipitation falls below 20 mm per week (Sunday to Saturday) for 2 consecutive

weeks. Precipitation data shall be as per Environment Canada from the Macdonald-Cartier Airport weather station.

- .4 Ensure the root zone is thoroughly saturated during each watering operation.
- .5 Repair any damage caused by watering operations.

3.4 Weeding

- .1 All weeds, dead plants, leaves, branches and paper within planting beds shall be removed by hand and disposed of off the Contract site.
- .2 Weeds shall not exceed 5 cm in height between weedings.
- .3 Ensure the entire root system of weeds is removed and not just the above ground growth.
- .4 At a minimum, weeding shall occur:
 - .1 Weekly from June 1 to August 15;
 - .2 Every two weeks from May 1 to May 31, and from August 16 to October 31.
 - .3 A final weeding shall be completed immediately prior to the final warranty inspection.
- .5 The application of herbicides or mechanical weed removers is prohibited.
- .6 Ensure planting beds are weed free prior to the application of mulch material.
- .7 The scope of work also includes weeding of joints between cobbles in stone edging.

3.5 Pruning and Deadheading

- .1 Prune off dead and injured branches in accordance with accepted arboricultural practices.
- .2 Deadhead faded flowers of *Veronicastrum virginicum*, *Liatris spicata* and *Gaillardia aristata* by pinching, snipping or shearing as appropriate for species.
- .3 Remove damaged leaves and faded flowers unless otherwise directed. Retain spent flowers of plants with attractive seedheads.

3.6 Garbage Removal

- .1 On a bi-weekly basis, keep planting beds free of garbage, paper and other foreign debris. Remove garbage off-site.

3.7 Pest Management

- .1 Monitor plant material throughout the warranty period for any sign of disease or insect problems. Practice integrated pest management.
- .2 The use of pesticides shall not be permitted.

3.8 Planting – Interplanted Bulbs

- .1 In the fall of 2015, between September 15th and October 15th, the Contractor shall be responsible for the installation of fall bulbs as indicated on the drawings. Do not damage perennials to remain over winter during installation of bulbs.

- .2 Prior to planting, dip all bulbs in fungicide in a controlled indoor environment in accordance with the manufacturer's instructions.
 - .3 For bulb mixes, place all bulbs in a container and gently mix bulbs to achieve a random blend of different bulbs.
 - .4 Plant bulbs based on spacings indicated on drawings. Have layout approved by the Contract Administrator prior to planting bulbs.
 - .5 Plant bulbs at a depth of two and one-half times the height of any bulb.
 - .6 Tamp planting soil over bulbs to eliminate air voids.
- 3.9 Winter Preparation
- .1 In the fall, the Contractor is responsible for completion of the following:
 - .1 Ensure all plant material is well watered before freeze-up.
 - .2 The following species are to be cut back to 100 mm above ground once plants turn yellow or are damaged by frost. All other perennials are to be left in place over the winter, including their seed heads.
 - .1 *Adiantum pedatum*
 - .2 *Allium cernuum*
 - .3 *Anaphalis margaritacea*
 - .4 *Asarum canadense*
 - .5 *Carex pensylvanica*
 - .6 *Carex plantaginea*
 - .7 *Eragrostis spectabilis*
 - .8 *Eriophorum vaginatum*
 - .9 *Gaillardia spp.*
 - .10 *Gentiana andrewsii*
 - .11 *Geum triflorum*
 - .12 *Iris sibirica*
 - .13 *Iris vericolor*
 - .14 *Iris x versata*
 - .15 *Lilium philadelphicum*
 - .16 *Nepeta x faassenii*
 - .17 *Podophyllum peltatum*
 - .18 *Rudbeckia fulgida*
 - .19 *Rudbeckia subtomentosa*
 - .20 *Tiarella cordifolia*
 - .21 *Verbena hastate*
 - .22 *Viola labradorica*
 - .23 *Zizia aurea*
 - .3 *Cornus canadensis* is an evergreen species. Only dead or damaged parts are to be removed.
 - .4 Species to be cut in the fall or retained until spring will be reassessed in the spring of 2016.
- 3.10 Spring Preparation
- .1 In the spring, the Contractor is responsible for completion of the following:

- .1 Between March 20 and April 15 of each warranty year, cut all remaining dead growth on perennials and ornamental grasses to 100 mm above ground. Ensure new shoots of early spring bulbs are not damaged during trimming operations. This work may be completed when up to 100 mm of snow is covering planting beds. Species to be left over winter:
 - .1 *Bouteloua curtipendula*
 - .2 *Deschampsia cepitosa*
 - .3 *Echinacea spp.*
 - .4 *Liatris spicata*
 - .5 *Panicum virgatum*
 - .6 *Ratibida coumifera*
 - .7 *Schizachyrium scoparium*
 - .8 *Verbena stricta*
 - .9 *Veronicastrum virginicum*
 - .2 Cut flower stalks of all bulbs immediately after completion of flowering to help prolong the longevity of the bulbs.
 - .3 Cut rest of bulb foliage when the majority (90%) has wilted or died back. If wilted foliage becomes quickly hidden by new foliage, delay clean up until covering foliage dies back.
 - .4 The following plants shall be cut back in late spring or early summer, after they have finished flowering:
 - .1 *Dodecatheon media*
 - .2 *Mertensia virginica*
 - .3 *Pulsatilla patens*
 - .4 *Trillium grandiflorum*
 - .5 In the spring of 2017, take a mixed soil sample from each of the four different planting area and each of the zones with specialized pH requirements. Have each individual sample tested to determine pH and nutrient levels (N, P, K, and trace elements). Consult with the Contract Administrator to determine the required nutrient amendments for each area or zone.
 - .6 In late spring of each warranty year, after the soil has thawed and dried up, re-apply the different mulch types over all thin or bare areas to ensure good weed suppression. Mulch thicknesses shall be in accordance with Section 32 93 10, Planting. Ensure new growth is not suppressed by the application of mulch material. Ensure mulch is neat and tidy with clean edges.
- 3.11 Incidental Maintenance
- .1 The Contractor shall in general be responsible for any incidental maintenance to ensure healthy plant growth and a satisfactory appearance of plant material.
- 3.12 Reinstatement
- .1 Any damage to vegetation, hard surfaces, structures or services caused as a result of the Contractor's work methods and practices for plant material maintenance shall be reinstated or repaired to the satisfaction of the Contract Administrator. The cost of such reinstatement or repair shall be solely at the Contractor's expense.
- 3.13 Final Warranty Inspection
- .1 A one-time inspection of all plant material shall be carried out by the Contract Administrator upon completion of the maintenance and warranty period.

Plant material shall be **acceptable** when it is undamaged, shows adequate growth and formation of buds, and is free from blight of any description. All planting beds and tree pits shall be free of weeds, litter and in good order, including the removal of all tree supports.

Plant material shall be **unacceptable** when it does not meet this quality standard.

Units of plant material that are found to be unacceptable will be replaced by the Contractor at the earliest opportunity. The Contract Administrator reserves the right to extend the Contractor's maintenance and warranty responsibilities for an additional one-year for replacement plant material.

In the event that this inspection is satisfactory to the Contract Administrator, and that there are no outstanding commitments to the contracted works, the Contractor will be given final approval of the maintenance and warranty requirements.

- .2 Where, in the opinion of the Contract Administrator, the Contractor has failed to complete obligations as detailed in this Specification; and further, fails to rectify said deficiency within two days of written notification from the Contract Administrator, the Contract Administrator reserves the right to retain others to complete the work and deduct incurred expenses from monies owing to the Contractor.

END OF SECTION