THE CORPORATION OF THE TOWN OF

GANANOQUE

Canadian Gateway to the 1000 Islands

Construction Services for Baseball Diamond Field Construction

Specifications

1 GENERAL

1.1 **SECTION INCLUDES**

.1 Shop drawings and product data.

.2 Certificates and transcripts.

.3 Fees and permits.

1.2 **ADMINISTATIVE**

.1 Submit to Project Manager submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Project Manager. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Project Manager, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are coordinated.

.8 Contractor’s responsibility for errors and omissions in submissions is not relieved by Project Manager’s review of submittals.

.9 Contractor’s responsibility for deviations in submission from requirements of Contract Documents is not relieved by Project Manager’s review.

.10 Keep one reviewed copy of each submission on site.

.11 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as Adobe Acrobat files. Forward files on CD or through email.

1.3 **SHOP DRAWING AND PRODUCT DATA**

.1 The term ‘Shop Drawings’ means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario Canada.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow five days for Project Manager's review of each submission.

.5 Adjustments made on shop drawings by Project Manager are not indicated to change Contract Price. If adjustments affect value of Work, state such in writing to Project Manager prior to proceeding with Work.

.6 Make changes in shop drawings as Project Manager may require, consistent with Contract Documents. When resubmitting, notify Project Manager in writing of any revisions other than those requested.

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

.8 Submissions shall include:
- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.
    - .9 Single line and schematic diagrams.
    - .10 Relationship to adjacent work.

.9 After Project Manager's review, distribute copies.

.10 Submit one electronic copy of shop drawings for each requirement requested in specification Sections and as Project Manager may reasonably request.

.11 Submit one electronic copy of product data sheets or brochures for

requirements requested in specification Sections and as requested by Project Manager where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit one electronic copy of test reports for requirements requested in specification Sections and as requested by Project Manager.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
.2 Testing must have been within three years of date of contract award for project.

.13 Submit one electronic copy of certificates for requirements requested in specification Sections and as requested by Project Manager.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
.2 Certificates must be dated after of project contract complete with project name.

.14 Submit one electronic copy of manufacturer's instructions for requirements requested in specification Sections and as requested by Project Manager.

.1 Preprinted material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedance, hazards and safety precautions.

.15 If upon review by Project Manager, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If Shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.16 The review of shop drawings by the Landscape Architect is for sole purpose of ascertaining conformance with general concept. This review shall not mean that Landscape Architect approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting the generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 **SAMPLES**

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Project Manager's business address.

.3 Notify Project Manager in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Project Manager are not intented to change Contract Price. If adjustments affect value of Work, state such in writing to Project Manager prior to proceeding with Work.

.6 Make changes in samples which Project Manager may require, consistent with Contractor Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 **CERIFICATES AND TRANSCRIPTS**

.1 Immediately after award of Contract, submit WSIB- Workplace Safety and Insurance Board Experience Report.

1.6 **FEES, PERMITS AND CERIFICATES**

.1 Provide authorities having jurisdiction with information requested.

.2 Pay fees and obtain certificates and permits required.

.3 Furnish certificates and permits.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 – Submittal Procedures.

1.2 REFERENCES

.1 .1 Definitions:
- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by CONTRACT ADMINISTRATOR.

.3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.4 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.5 Include in Environmental Protection Plan:
- .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
- .2 Names and qualifications of persons responsible for training site personnel.
- .3 Descriptions of environmental protection personnel training program.
- .4 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .5 Drawings indicating locations of proposed material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .6 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
  - a. Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
- .7 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
  - b. Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .8 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.9 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.10 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.11 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

1.4 FIRES

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

1.5 DRAINAGE

.1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.2 Provide temporary drainage and pumping required to keep excavations and site free from water.

.3 Do not pump water into waterways, sewer or drainage systems.

1.6 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties as indicated.

.2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes with protection fencing.

.3 Protect roots of designated trees to1.5m from the dripline during excavation and site grading to prevent damage.

.1 Avoid parked vehicles, dumping and/or storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas indicated on the plan or by the PROJECT MANAGER.

1.7 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this Contract.

.2 Control emissions from equipment in accordance with local authorities' emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.8 NOTIFICATION

.1 PROJECT MANAGER will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform PROJECT MANAGER of proposed corrective action and take such action for approval by CONTRACT ADMINISTRATOR.

.1 Take action only after receipt of written approval by CONTRACT ADMINISTRATOR.

.3 PROJECT MANAGER will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

2 EXECUTIONS

2.1 CLEANING

.1 Leave Work area clean at end of each day.

.2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

.3 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused other Contractors.

.4 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by PROJECT MANAGER. Do not burn waste materials on site.

.5 Dispose of waste materials and debris off site.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Provide on-site containers for collection of waste materials and debris.

.8 Provide and use marked separate bins for recycling.

.9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

2.2 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction

machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Remove stains, spots, marks and dirt from concrete and asphalt work, and furniture fitments.

.4 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.5 Sweep and wash clean paved areas; rake clean other surfaces of grounds.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The CONTRACTOR shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.2 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the CONTRACTOR for correction prior to commencing the work of this section.

.3 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 APPOINTMENT AND PAYMENT

.1 The CONTRACTOR will retain and co-ordinate the services of an independent testing laboratory for testing as approved by The Town of Gananoque.

.2 The costs of testing shall be expressly the responsibility of the CONTRACTOR including:
.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.

.3 Costs for Inspection and testing performed exclusively for CONTRACTOR'S convenience is the responsibility of the CONTRACTOR.

.4 Co-ordination and administration of the testing shall form part of the CONTRACTOR'S work.

.5 Where tests or inspections by designated testing laboratory reveal work not in accordance with Contract requirements, the CONTRACTOR shall pay costs for additional tests or inspection as required by the PROJECT MANAGER to verify the acceptability of corrected work.

1.3 CONTRACTOR'S RESPONSIBLITIES

.1 The CONTRACTOR and each of his Subcontractors, suppliers and manufacturers whose material and work is subject to inspection and testing, whether so specified or not, shall supply material, labour and facilities as required and necessary for the Inspection and Testing Agency to perform its work. Provide full access to the site and/or manufacturing plant. Give all required notices for inspection and testing and provide full co-operation.

.2 Notify the PROJECT MANAGER well in advance of testing.

.3 Inspection and testing specified or directed for any part of the work, material and manufactured items shall in no instance mitigate the CONTRACTOR'S , Subcontractor's, supplier's, or manufacturer's responsibility for his own supervision and conformance of work and materials to the Contract Documents.

.4 Materials which do not meet the requirements of the Contract Documents are to be rejected.
.1 The CONTRACTOR shall be responsible for the removal and replacement of

defective materials and shall bear all costs of remedial work or additional tests as required by the PROJECT MANAGER.

.5 If the CONTRACTOR covers or permits to be covered any work that is subject to inspection, or before any special tests and approvals are completed without the approval of the PROJECT MANAGER, the CONTRACTOR shall uncover the work to enable the inspections to be satisfactorily completed, and then make good the Work at his own expense.

1.4 REPORTS

.1 Include the following information as a minimum on report forms:

.1 Dates and time of inspection or test.

.2 Weather conditions and ambient air temperatures during the inspection/test.

.3 Mix proportions and methods, rate and method of application.

.4 Testing method employed by proper standard reference and specific paragraphs or other detailed identification as applicable.

.5 Inspection description and details and other relevant information.

.6 Test results in detail complete with applicable graphs and other clarifying documents and information.

.7 Printed name and signature of person having conducted inspection or test and name, title and signature of supervisor having verified the report.

1.5 DISTRIBUTION OF REPORTS

.1 Submittal Procedures.

.2 Provide electronic copies of inspection/testing reports via email or by USB drive to the following:

.1 Representative for The Town of Gananoque.
.2 The PROJECT MANAGER.
.3 Submit reports within 3 days of the testing when work to be tested is in progress.
.4 Testing Agency is not authorized to amend or release any requirements of the Contract Documents, nor to approve any portion of the work.
.5 Submit inspection/testing reports in accordance with Section 01 33 00 –

END OF SECTION 01 33 19

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 Excavating, Trenching and Backfilling.

.2 Section 32 01 90.33 Tree and Shrub Preservation.

.3 Section 32 91 19.13 Topsoil Placement and Grading.

1.2 **PROTECTION**

.1 Prevent movement, settlement or damage of adjacent parts of existing structure to remain. Make good damage and be liable for injury caused by demolition and removal.

1.3 **MEASUREMENT PROCEDURES**

.1 Demolition, removals and disposal as indicated on Drawings or required to complete the work will not be measured for payment and is considered incidental to Work.

1.4 **SAFETY CODE**

.1 Unless otherwise specified, carry out demolition work in accordance with Municipal Construction / Demolition Waste Management Guidelines and Disposal and CSA S350-M1980 (R2003).

1.5 **WASTE MANAGEMENT AND DISPOSAL**

.1 Separate waste materials for reuse, and recycling in accordance with Municipal Construction / Demolition Waste Management and Disposal Guidelines.

1.6 **DELIVERY, STORAGE AND HANDLING**

.1 Storage and Protection

.1 Protect in accordance with Section 31 23 33.01 – Excavating, Trenching and Backfilling and Section 32 01 90.33 – Tree and Shrub Preservation.

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

.3 Remove and store materials to be salvaged, in manner to prevent damage and as specified on the drawings. Store and protect in accordance with requirements for maximum preservation of material.

.4 Handle salvaged materials as new materials.

.5 Protect municipal sidewalks from heavy vehicular damage and keep all roadways, lanes and sidewalks clean and clear of dirt, debris, etc. resulting from the work.

.6 Erect warning signs and protective barriers in accordance with all applicable regulations. Post danger signs in conspicuous locations to warn persons that demolition is in progress.

.2 Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling in accordance with Municipal regulations.

.2 Divert excess material from landfill to site approved by Project Manager.

.3 Separate for reuse and recycling and place in designated containers Steel Metal Plastic waste in accordance with Waste Management Plan.

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

.5 Handle and dispose of hazardous materials in accordance with CEPA, Regional, and Municipal regulations.

.6 Label locations of salvaged materials storage areas and provide barriers and security devices.

.7 Ensure emptied containers are sealed and stored safely.

.8 Source separate for recycling materials that cannot be salvaged for reuse including wood, metal, concrete, and asphalt.

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

1.7 **SITE CONDITIONS**

.1 Site Environmental Requirements:

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

.2 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
.1 Ensure proper disposal procedures are maintained throughout the project.

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

.4 Control disposal or runoff water containing suspended materials or other harmful substances in accordance with local authorities and as directed by Project Manager.

.5 Protect trees, plants and foliage on site and adjacent properties where indicated on the drawings and in accordance with Section 32 01 90.33 – Tree and Shrub Preservation.

2 PRODUCTS

2.1 **EQUIPMENT**

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

3 EXECUTION

3.1 **PREPARATION**

.1 Inspect site prior to demolition with Project Manager and verify extent and locations of items designated for removal, disposal, recycling, salvage and items to remain.

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

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

3.2 **REMOVAL OPERATIONS**

.1 Prepare schedule of removals to indicate timing of activities and obtain Project Manager approval prior to proceeding.

.2 Remove items as indicated on the drawings.

.3 Do not disturb items designated to remain in place as indicated on the drawings.

.4 Removal of Pavements, Curbs, Walkways:
.1 Square up adjacent surfaces to remain in place by saw cutting to full depth.
.2 Protect adjacent joints and load transfer devices.
.3 Protect underlying and adjacent granular materials.

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

.6 Remove designated trees during demolition.
.1 Grind, chip or shed other vegetation for mulching and composting, or use as mill pulp.

.7 Dispose of materials not designated for salvage or ruse on site as indicated by Project Manager at authorized facilities in Waste Reduction Plan.

.8 Backfill in areas as indicated and in accordance with Section 31 23 33.01 – Excavating, Trenching and Backfilling.

.9 No additional compensation for various depths.

3.3 **DEMOLITION AND REMOVAL**

.1 Sort materials into appropriate piles for reuse, recycling and disposal.

.2 Remove stockpiled material as directed by Project Manager when it interferes with operations of the project.

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

.4 Dispose of removed materials, to appropriate recycling facilities, reuse facilities or disposal facility except where specified otherwise, in accordance with authority having jurisdictions.

.5 All material not to be reused and recycled shall be disposed offsite in a legal manner.

3.4 **RESTORATION**

.1 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of work to match condition of adjacent, undisturbed areas.

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

3.5 **CLEANING**

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

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

END OF SECTION

1 GENERAL

1.1 **RELATED REQUIREMENTS**

.1 Section 32 91 19.13 Topsoil Placement & Grading.

.2 Section 32 01 90.33 – Tree and Shrub Preservation.

.3 Section 32 92 23 – Sodding.

1.2 **REFERENCES**

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D 698-91(1998), Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.

1.3 **EXISTING CONDITIONS**

.1 Known underground and surface utility lines and buried objects are as indicated on site plan. Contractor responsible for obtaining service locates.

.2 The Contractor shall be held responsible for all damages to utilities and structures resulting from his work.

1.4 **PROTECTION**

.1 Protect fencing, trees, landscaping, natural features, buildings, pavement, surface or underground utility lines which are to remain as directed by Project Manager. If damaged, restore to original or better condition unless directed otherwise.

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

.3 Erect warning signs and protective barriers in accordance with all applicable regulations.

.4 Do not disturb soil within the branch spread of existing trees or shrubs that are designated for preservation or on adjacent property. Where excavation necessitates root or branch cutting, do so only in accordance with Section 02104 - Shrub and Tree Preservation.

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

.6 Protect work to remain against damage. Repair or replace damaged work at no additional cost to the owner.

.7 Where excavation necessitates root or branch cutting, do so only in accordance with Section 02104 - Shrub and Tree Preservation.

2 PRODUCTS

2.1 **MATERIALS**

.1 Excavated or graded material existing on site may be suitable to use as fill for grading work if approved by consultant and/or Project Manager.

.2 All material shall be free from frozen lumps, cinders, ashes, refuse, vegetable or organic matter, rocks and boulders over 75 mm in any dimension, and other deleterious material.

3 EXECUTION

3.1 **GRADING**

.1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.

.2 Rough grade to following depths below finish grades, unless otherwise indicated by Project Manager:

.1 150 mm for General sodded lawn areas.

.2 200 mm for Infield sodded lawn area.

.3 150 mm for Infield Clay Mix

.3 Grade to meet elevations set on Grading Plan.

.4 Grade swale to elevations as indicated on drawings.

.5 Prior to placing fill over existing ground, scarify surface to depth of 100 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

.6 Compact filled and disturbed areas to ASTM D 698, as follows:

.1 85 % under landscaped areas.
.2 95 % under paved and walk areas.
.3 As otherwise specified in the soils report or indicated on drawings.

.7 Place fill material in maximum 150 mm lifts.

.8 Do not disturb soil within branch spread of trees to remain.

.9 Grade slopes for landscape areas to a maximum of 4:1 unless otherwise specified on drawings.

.10 Remove surplus material and material unsuitable for fill, grading or landscaping off site at Contractor’s expense, or refer to drawings for notes that would supercede this removal.

3.2 **TESTING**

.1 Inspection and testing of soil compaction will be carried out by testing laboratory designated by ULC. Costs of tests will be paid by Owner.

3.3 **SITE TOLERANCES**

.1 Grade surfaces to be within +/- 25 mm from specified elevation but not uniformly high or low.

3.4 **PROTECTION**

.1 Maintain finished surface in condition conforming to this section until succeeding layer/surface treatment is applied.

3.5 **CLEAN UP**

.1 Do final cleaning upon completion of work in this Section

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 02 41 13 – Selective Site Demolition.

.2 Section 31 22 13 – Rough Grading.

.3 Section 32 91 19.13 – Topsoil Placement and Grading.

1.2 REFERENCES

.1 Ontario Provincial Standard Specifications (OPSS)/Ontario Ministry of Transportation

.1 OPSS.PROV 1004 November 2012, Ontario Provincial Standard Specification, Material Specification for Aggregates - Miscellaneous.
.2 OPSS.PROV 1010 April 2013, Ontario Provincial Standard Specification, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM C117-04, Standard Test Method for Material Finer Than 0.075 MM (No.200) Sieve in Mineral Aggregates by Washing.
.2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.3 ASTM D422-63 (2007), Standard Test Method for Particle Size Analysis of Soils.
.4 ASTM D698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600kN-m/m^3)
.5 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
.6 ASTM D 1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ü) (2,700 kN-m/m ü).

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.4 Canadian Green Building Council (CaGBC)

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

.5 Canadian Standards Association (CSA International)

.1 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
.1 CSA-A3001-03, Cementitious Materials for Use in Concrete.

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

.6 U.S. Environmental Protection Agency (EPA) / Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.

.1 Rock : any solid material in excess of 0.25m³ and which cannot be removed by means of heavy duty mechanical excavating equipment having a 1.2m wide bucket. 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 sodding.
.1 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters 1 inch in any dimension and meets testing requirements stated within Section 32 91 19.13 – Topsoil Placement and Grading.

.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 ASTMD 4318-00, and gradation within limits specified when tested to ASTM D 422-63(2002) and ASTM C 136-01: Sieve sizes to CAN/CGSB-8.1-88.

.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.

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

.8 Recycled Fill Material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

1.4 PROTECTION OF EXISTING FEATURES

.1 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 the The Town of Gananoque and/or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Utilities to be clearly marked 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 as indicated.

.5 Where unidentified utility lines or structures exist in area of excavation, obtain direction of Project Manager before removing or re-routing.

.6 Record location of maintained, re-routed and abandoned underground lines on as-built drawings.

.7 Remove obsolete buried services within 2m of foundations: cap cut-offs.

.8 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

.9 Before commencing work verify establish location of buried services on and adjacent to site.

.2 Existing buildings and surface features:

.1 Conduct, with Project Manager, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, 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 Project Manager.

1.5 ACTION AND INFORMATION SUBMITTALS

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

.2 Quality Control:

.1 Submit for review by Project Manager proposed dewatering and heave prevention methods.

.2 Submit to Project Manager written notice when bottom of excavation is reached.

2 PRODUCTS

2.1 MATERIALS

.1 Type 1 fill: OPSS Granular A – clean, hard, durable crushed gravel or stone, free from shale, clay, friable materials, organic matter and other deleterious substances with physical properties and gradation to conform to OPSS 1010, max. size 19 mm.

.2 Type 2 fill: OPSS Granular B, Type 1 - clean, hard, durable crushed gravel or stone, free from shale, clay, friable materials, organic matter and other deleterious substances with physical properties and gradation to conform to OPSS 1010, max. size 65 mm.

.3 Type 3 fill: selected backfill material from excavation or other sources, approved by Project Manager for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials to conform to OPSS 1010.

.4 Type 4 fill: OPSS Granular B, Type 2 - clean, hard, durable crushed gravel or stone, free from shale, clay, friable materials, organic matter and other deleterious substances with physical properties and gradation to conform to OPSS 1010. When used for granular backfill for pipe sub-drains, 100% of the material shall pass the 37.5 mm sieve.

.5 Clean Sand: clean sand, free of stone larger than 3mm, debris and vegetation.

.6 Unshrinkable fill: proportioned and mixed to provide:
- .1 Maximum compressive strength of 0.4MPa at 28 days.
- .2 Maximum Portland cement content of 25kg/m^3 .
- .3 Minimum strength of 0.07 MPa at 24 h.
- .4 Concrete aggregates: to CAN/CSA-A23.1-00.
- .5 Portland cement: Type 10.
- .6 Slump: 160 to 200 mm.
- .7 Shearmat: honeycomb type bio-degradable cardboard 100 mm thick, treated to provide sufficient structural support for poured concrete until concrete cured.

3 EXECUTION

3.1 SITE PREPARATION

.1 Temporary Erosion Control and Sedimentation Control:
- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

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

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

3.2 STOCKPILING

.1 Stockpile fill materials in areas designated by Project Manager Stockpile granular materials in manner to prevent segregation.

.2 Protect stockpiled materials from contamination.

3.3 PREPARATION / PROTECTION

.1 Protect existing features in accordance with local regulations.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.4 Protect buried services that are required to remain undisturbed.

3.4 DEWATERING AND HEAVE PREVENTION

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

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

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

.4 Disposal of water shall be done in accordance with local regulations and in manner not detrimental to public and private property, or any portion of work completed or under construction.

.5 Provide settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

.6 Contractor to provide to Project Manager, for review, details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.

3.5 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Health and Safety Act for the Province of Ontario and Authorities having Jurisdiction.

.2 Obtain permit from authority having jurisdiction for temporary diversion of water course.

.3 During backfill operation:

.1 Unless otherwise indicated or directed by Project Manager, remove sheeting and shoring from excavations.

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

3.6 EXCAVATION

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

.2 Remove all items noted within the construction documents and rubble and other obstructions encountered during excavation in accordance with Section 02 41 13 – Selective Site Demolition. Blasting will not be Permitted.

.3 Excavation must not interfere with normal 45° splay of bearing from bottom of any footing.

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

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

.6 Dispose of unsuitable excavated material off site at an approved disposal facility.

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

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

.9 Notify Project Manager when bottom of excavation is reached.

.10 Obtain Project Manager’s approval of completed excavation.

.11 Remove unsuitable material from trench bottom to extent and depth as directed by Project Manager.

.12 Correct unauthorized over-excavation as follows:
- .1 Fill under bearing surfaces and footings with concrete specified for footings.
- .2 Fill under other areas with Type 2 fill compacted to not less than 95 % of corrected maximum dry density.
- .3 No payment will be made for over excavation works.

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

3.7 FILL TYPES AND COMPACTION

.1 Use fill of types as indicated or specified below. If not specified under Section, refer to Construction Drawings. Compaction densities are percentages of maximum densities obtained from standard Proctor maximum dry density.
- .1 Type 1 – Granular A: to be used as base under areas to be paved, and to be backfill unstable areas in existing sub-grade, or as a base for built structures, subject to the Consultant’s approval. Compaction 98% in 50 mm lifts.

.2 Type 2 – Granular B, Type 1 and 2: to be used as sub-base under areas to be paved, and to backfill unstable areas in existing sub-grade, subject to the Consultant's approval. Compaction 98% in 100 mm lift.

.3 Native and Imported Material: to be used under areas intended for sodding, seeding and other "soft" landscaping, subject to Project Managers approval.

.4 Stockpiled fill materials in areas approved by Project Manager. Stockpile granular materials in manner to prevent contamination.

3.8 BACKFILLING

.1 Vibratory compaction equipment: use vibratory equipment suitable for installation and of size to achieve compaction.

.2 Do not proceed with backfilling operations until Project Manager has inspected and approved installations.
- .1 Project Manager has inspected and approved of construction below finished grade.
- .2 Inspection, testing, approval and recording location of underground utilities.
- .3 Removal of concrete formwork.
- .4 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.

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

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

.5 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.6 Backfill around installations:
- .1 Place bedding and surround material as specified elsewhere.
- .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
- .3 Place layers simultaneously on both sides of installed work to equalize loading.
- .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
  - .1 Permit concrete to cure for minimum 14days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Project Manager.

.7 Place unshrinkable fill in areas as indicated Consolidate and level unshrinkable fill with internal vibrators.

.8 Install drainage system in backfilled as indicated.

3.9 RESTORATION

.1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by Project Manager.

.2 Replace topsoil as indicated.

.3 Reinstate pavement and sidewalks, lawns and other soft landscaping to elevations which existed before excavation.

.4 Clean and reinstate areas affected by work as directed by Project Manager.

.5 Protect newly graded areas from traffic and erosion and maintain free of trash and debris.

END OF SECTION

1 GENERAL

1.1 SUMMARY

.1 Section Includes:

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

.2 Related Requirements

.1 Section 31 22 13 - Rough Grading.

1.2 REFERENCES

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

.2 Department of Justice Canada (Jus).
.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
.2 Fertilizers Act (R.S. 1985, c. F-10).
.3 Fertilizers Regulations (C.R.C., c. 666).
.4 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
.1 Material Safety Data Sheets (MSDS).

1.3 DEFINITIONS

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

1.4 SUBMITTALS

.1 Submit monthly written reports on maintenance during warranty period, to Project Manager identifying:

.1 Maintenance work carried out.
.2 Development and condition of plant material.
.3 Preventative or corrective measures required which are outside Contractor's responsibility.

1.5 QUALITY ASSURANCE

.1 Health and Safety:
.1 Do construction occupational health and safety in accordance with Ministry Standards.

1.6 MAINTENANCE DURING WARRANTY PERIOD

.1 From the time of acceptance by Project Manager to end of warranty period, perform the following maintenance operations.

.2 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
.3 Apply fertilizer in early spring at a rate of 0.025 kg of nitrogen/m²
.4 Remove dead, broken or hazardous branches from plant material. Dispose of debris through alternative disposal composting or mulching.

2 PRODUCTS

2.1 MATERIALS

.1 Fill: Do not use materials which will affect pH levels of soil.

.1 Type A: excavated soil, free from roots, rocks larger than 75 mm, building debris, and toxic ingredients (salt, oil, etc). Excavated material shall be approved by Project Manager before use as fill.

.2 Peatmoss:

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

.3 Fertilizer:

.1 To Canada Fertilizer Act and Fertilizers Regulations.
.2 Complete, commercial, slow release with 35 % of nitrogen content in water-insoluble form.

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

.5 Filter Cloth:
.1 Type 1: 100 % non-woven needle punched polyester, 2.75 mm thick, 240 g/m² mass.
.2 Type 2: biodegradable burlap.

.6 Steel T-bar, 40 x 40 x 2440 mm long

3 EXECUTION

3.1 IDENTIFICATION AND PROTECTION

.1 Do construction occupational health and safety in accordance with Ministry Standards.

.2 Identify plants and limits of root systems to be preserved as approved by Project Manager.

.3 Protect plant and root systems from damage, compaction and contamination resulting from construction as approved by Project Manager.

.4 Ensure no pruning is done inside drip line. If pruning inside drip line is required consult an arbourist or Canadian Certified Horticultural Technician (CCHT) as approved by Project

Manager.

3.2 ROOT CURTAIN SYSTEM

.1 Identify limits for required construction excavation as approved by Project Manager.

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

3.3 AIR LAYERING SYSTEM

.1 Construct drywell around trunk of tree.

.1 Ensure open ends of vertical vent pipes are left exposed for air circulation to root system.
.2 Protect openings from blockage during construction.
.3 Install protective caps on exposed horizontal openings.

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

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

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

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

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

3.4 TRENCHING AND TUNNELING FOR UNDERGROUND SERVICES

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

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

.3 Excavate tunnel under centre of tree trunk using methods and equipment approved by Project Manager.

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

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

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

3.5 LOWERING GRADE AROUND EXISTING TREE

.1 Begin Work in accordance with schedule approved by Project Manager and or Owner.

.2 Cut slope not less than 500 mm from tree trunk to new grade level.

.3 Excavate to depths as indicated. Protect from damage root zone which is to remain.

.4 When severing roots at excavation level, cut roots with sharp tools.

.5 Cultivate excavated surface manually to 15 mm depth.

.6 Prepare homogeneous soil mixture consisting by volume of:

.1 60 % excavated soil cleaned of roots, plant matter, stones, debris.
.2 25 % coarse, clean sterile sand.
.3 15 % organic matter.
.4 Grade 2:12:8 fertilizer at rate of 1.5 kg/m³.

.7 Place soil mixture over area of excavation to finished grade level. Compact to 85% Standard Proctor Density.

.8 Water entire root zone to optimum soil moisture level.

.9 Install surface cover of sodding in accordance with Section 32 92 23 - Sodding.

3.6 ANTI-DESICCANT

.1 Apply anti-desiccant to foliage where applicable and as directed by Landscape Architect.

3.7 GUARANTEE

.1 All existing trees will have a guarantee from start of construction to 120-days beyond substantial completion. If an existing tree is damaged or suffers external shock and declines through improper protection measures, it shall be replaced at the contractor expense with equally valued materials based on the council of Tree and Landscape Appraisers Valuing methods.

END OF SECTION

1 GENERAL

1.1 **SUMMARY**

.1 Section Includes: Labour, Products, equipment and services necessary to complete the work of this Section.

.2 Hardware and attachment accessories

1.2 **RELATED REQUIREMENTS**

.1 Section 32 13 13 - Concrete Paving.

1.3 **REEFERENCES**

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C117-04, Standard Test Method for Material Finer Than 0.075 MM (No.200) Sieve in Mineral Aggregates by Washing.
.2 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.3 ASTM D422-63 (2007), Standard Test Method for Particle Size Analysis of Soils.
.4 ASTM D698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600kN-m/m^3)
.5 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
.6 ASTM D4791-05e1, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
.7 ASTM C131-06, Standard Test Method for Resistance to Degradation of Small Size Course Aggregate by Abrasion and Impact in the Los Angeles Machine.
.8 ASTM D1883-07e2, Standard Test Method of CBR (California Bearing Ratio) of Laboratory Compacted Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.4 **SOURCE QUALITY CONTROL**

.1 Submit samples in accordance with Section, Shop Drawings, Product Data, Samples and Mark-Ups.

.2 At least 4 weeks prior to commencing works, inform Consultant and/or Project Manager of proposed source of aggregates and provide access for sampling

1.5 **CERTIFICATES**

.1 Minimum 4 weeks prior to starting concrete work submit to Consultant and/or Project Manager Manufacturer’s test data.

.2 Provide certification that plant, equipment and materials to be used in concrete comply with the requirements of CAN/CSA-A23.1 and that mix design is adjusted to prevent alkali aggregate reactivity problems.

1.6 **CONSTRUCTION QUALITY CONTROL**

.1 Submit proposed quality control procedures for Consultant's Project Manager's approval.

1.7 **DELIVERY, STORAGE AND HANDLING**

.1 Deliver and stockpile aggregates minimum 50% of total aggregate required prior to beginning operation.

1.8 **WASTE MANAGEMENT AND DISPOSAL**

.1 Separate and recycle waste materials in accordance with Municipal Construction / Demolition Waste Management and Disposal procedures.

.2 Divert unused granular material from landfill to local approved facility.

1.9 **PROTECTION**

.1 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below 38 degree C. Do not permit stationary loads on pavement until 24 hours after placement.

2 PRODUCTS

2.1 **MATERIALS**

.1 Granular sub-base: OPSS 1010, Granular A, hard, durable, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.

.2 Granular base: OPSS 1010, Granular B, Type 1 and 2, hard, durable, free from clay lumps, cementation, organic material, frozen material and other deleterious materials. When using Granular B – Type 2 for backfill for pipe sub-drains, 100% of the material shall pass the 37.5 mm sieve.

3 EXECUTION

3.1 **INSPECTION**

.1 Verify grades of subgrade drains and other items set in paving area for conformity with elevations and sections before placing granular base and sub-base material.

3.2 **PLACING**

.1 Place granular base after sub-grade surface is inspected and approved by Project Manager.

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

.3 Ensure no frozen material is placed.

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

.5 Place material to full width in uniform layers not exceeding 200 mm compacted thickness, unless indicated on Construction drawings.

.6 Shape each layer to smooth contour and compacted to specified density before succeeding layer is placed.

.7 Remove and replace that portion of layer in which material becomes segregated during spreading.

3.3 COMPACTION EQUIPMENT

.1 Compaction requirement to be capable of obtaining required material densities.

.2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from Project Manager before use.

.3 Equipped with device that records hours of actual work, not motor running hours.

.4 Compact to 98% maximum dry density in accordance with ASTM D698.

.5 Shape and roll alternately to obtain smooth, even and uniformly compacted base.

.6 Apply water as necessary during compaction to obtain specified density.

.7 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Project Manager.

.8 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 PROOF ROLLING

.1 Obtain approval from Project Manager to us non-standard proof rolling equipment.

.2 Proof roll at level in granular base as indicated. If use of non-standard proof rolling equipment is approved, Project Manager to determine level of proof rolling.

.3 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.

.4 Where proof rolling reveals areas of defective subgrade:

- .1 Remove base, sub base and subgrade material to depth and extent as directed by Project Manager.
- .2 Backfill excavated subgrade with material approved by Project Manager and compact in accordance with Section 31 23 33.01 Excavating, Trenching and Backfilling.
- .3 Replace sub base material and compact.
- .4 Replace base material and compact in accordance with this Section.

3.5 QUALITY CONTROL TESTING

.1 Inspection and testing of granular base compaction shall be carried out by a testing firm designated by Project Manager. Cost of testing to be borne by the Contractor.
.1 Minimum testing frequency: 1 test per 2,00 m²/lift.

.2 Compaction test results shall be submitted to Consultant and/or Project Manager for review and approval as they become available.

.3 Any test with failing results will be rectified and retested at the Contractor's expense.

3.6 **SITE TOLERANCES**

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

3.7 **PROTECTION**

.1 Maintain finished base in condition conforming to this Section until succeeding material is applied.

END OF SECTION

1 GENERAL

1.1 REFERENCE STANDARDS

.1 Install chain-link fencing in accordance with CAN2-138.3-M80.

2 PRODUCTS

2.1 MATERIALS

.1 Concrete mix designed to produce 32 MPa minimum compressive strength at 28 days and containing 20 mm maximum size and 5 mm minimum size coarse aggregate, with water/cement ratio to CAN3-A23.1-M77 Table 7 for Class A exposure and 60 mm slump at time and point of deposit. Air entrainment to CAN3-A23.1M77 Table 8.

.2 Fence Components:
Refer to specific construction drawings and details for fencing layout and location.

2.2 FINISHES

.1 Galvanizing:
.1 For pipe: 550 g/s.m. minimum to ASTM A90-81.

.2 For other fittings: to CSA G164-M1981.

3 EXECUTION

3.1 GRADING

.1 Remove debris and correct ground undulations along fence line to obtain smooth, uniform gradient between posts. Provide clearance between bottom of fence and ground surface neither less than 30 mm or more than 50 mm.

3.2 ERECTION OF FENCE

.1 Erect fence along lines indicated in accordance with CAN 2-138.3-M80.

.2 Excavate post holes 1200 mm deep x specified width by methods approved by the Consultant. Bulb bottom of holes for corner and end posts and for intermediate posts at every 18.2 m along fence line.

.3 Space line posts at intervals as indicated on drawings and details, measured parallel to ground surface.

.4 Install corner post where change in alignment exceeds 10 degrees.

.5 Install end posts at end of fence.

.6 Place concrete in holes, then embed posts in concrete to minimum 1200 mm deep. Slope concrete away from post and ensure no potentially hazardous edges are exposed. Brace to hold posts in plumb position and true to alignment and elevation until concrete has set.

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

.8 Install top rail between fence posts and fasten securely to terminal posts and secure waterproof caps.

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

.10 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end and corner posts with tension bar secured to post bands at 300 mm intervals.

.11 Secure fabric to top rails, line posts, and bottom tension wire with tie wires at 457 mm intervals. Give tie wires minimum two twists.

3.3 TOUCH-UP

.1 Repair damaged galvanized surfaces. Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of approved zinc pigmented paint to damaged areas.

3.4 CLEANING

.1 Clean and trim areas disturbed by operations. Dispose of surplus excavated material and replace damaged sod as directed.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 32 22 13 - Rough Grading.

.2 Section 32 92 23 – Sodding.

.3 Section 32 01 11.01– Tree and Shrub Preservation.

1.2 TESTING

.1 Inspection and testing of topsoil will be carried out by a testing laboratory immediately after the Contractor receives notification of Contract award. Owner will pay for cost of tests.

.2 All testing shall only be performed by an OMAFRA accredited commercial lab.

.3 Carefully communicate to the testing laboratory the intended use to which the topsoil is to be put.

.4 Test samples shall be an amalgamation of at least three (3) samples randomly taken from the source. Samples shall be carefully mixed, recorded, labelled and otherwise documented prior to delivery to the testing laboratory.

.5 Submit two (2) copies of the test results to the Consultant. Unless otherwise indicated in the Special Requirements, test results shall include P, K, trace elements, soluble salt content, organic matter content, sand and silt content, and pH.

.6 In the event test results indicate that the topsoil does not meet the mentioned quality criteria, the Consultant shall direct the Contractor to take the necessary remedial action. The cost of such remedial action shall be borne by the Owner.

.7 Make topsoil available for inspection at source by Consultant. All topsoil shall be subject to Consultant's approval before use on job site, but subject to receipt and analysis of soil testing report. Advise Owner of sources of topsoil and manufactured topsoil to be utilized with sufficient lead time for testing.

1.3 REFERENCES

.1 Agriculture and Agri-Food Canada
  .1 The Canadian System of Soil Classification, Third Edition, 1998.

.2 Canadian Council of Ministers of the Environment
  .1 PN1340-2005, Guidelines for Compost Quality.

.3 U.S. Environmental Protection Agency (EPA)/Office of Water
  .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.4 DEFINITIONS

.1 Compost: Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner. Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test. Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below 25), and contain no toxic or growth inhibiting contaminates. Composed bio-solids to: CCME Guidelines for Compost Quality.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Quality control submittals:

.1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 1.2 - TESTING.

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

1.6 QUALITY ASSURANCE

.1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse, and recycling in accordance with Section 01 74 00 – Cleaning and Waste Management.

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

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

2 PRODUCTS

2.1 TOPSOIL

.1 Topsoil for seeded areas, sodded areas and planting beds: mixture of particulates, microorganisms and organic matter which provides suitable medium for supporting intended plant growth.
.1 Soil texture based on The Canadian System of Soil Classification, to consist of 50 to 70 % sand, maximum 20 % clay, 25-35% silt and contain 5 to 10 % organic matter by weight. Clay and silt combined not exceed 45%.

.2 Contain no toxic elements or growth inhibiting materials.

.3 Finished surface free from:
.1 Debris and stones over 10 mm diameter.
.2 Course vegetative material, 10 mm diameter and 50 mm length, occupying more than 2% of soil volume.

.4 Consistence: friable when moist.

2.2 SOIL AMENDMENTS

.1 Fertilizer:
- .1 Fertility: major soil nutrients present in following amounts:
- .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
- .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
- .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
- .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
- .6 pH value: 6.5 to 8.0.

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

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

.4 Organic matter: compost Category A in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.

.5 Use composts meeting Category B requirements for land fill reclamation and large scale industrial applications.

.6 Limestone:
- .1 Ground agricultural limestone.
- .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

.7 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

.8 Topsoil and soil amendments should meet the mechanical analysis noted in the table below;

Mechanical Analysis of Topsoil and Amendments

Topsoil	Passing Percent (%)	Retained Percent (%)
1 inch screen	100	0
0.5 inch screen	97-100	0-3
#100 mesh sleeve	40-60	40-60

Soil Amendment Mix

2 inch screen	100	0
1 inch screen	90-100	0-10
0.5 inch screen	50-80	20-50
#100 mesh sleeve	0-15	85-100

3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION OF EXISTING GRADE

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

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

.3 Remove debris, roots, branches, stones in excess of 25 mm diameter and other deleterious materials.
- .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
- .2 Remove debris which protrudes more than 50 mm above surface.
- .3 Dispose of removed material off site.

.4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.

- .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING AND SPREADING OF TOPSOIL/ROOT ZONE GROWING MIXTURE

.1 Place topsoil after Owner has accepted subgrade.

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

.3 For sodded areas keep topsoil 15 mm below finished grade.

.4 Spread topsoil as indicated to following minimum depths after settlement.
- .1 150 mm for Sodded areas.

.5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.4 SOIL AMENDMENTS

.1 Commercial processing and thorough mixing of the growing medium components shall be done thoroughly by a mechanized screening process. No hand mixing shall occur. The resulting product shall be homogeneous mixture having the required properties throughout. Product shall not be stored for excessive periods if a fertilizer component has

been mixed.

.2 Contaminations of components or finished media shall be avoided by keeping amendments in closed bags or by covering outdoor piles.

.3 Mixes containing a significant amount of peat moss shall not be permitted to dry out. The moisture content of the peat moss at the time of mixing shall not be less than 60% to 75%.

.4 Growing medium shall be moist (25% to 75% of field capacity) but not wet, muddy or frozen when placed.

3.5 FINISH GRADING

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

.2 Consolidate topsoil to required bulk density using equipment approved by Owner.
.1 Leave surfaces smooth, uniform and firm against deep foot printing.

3.6 ACCEPTANCE

.1 Owner and Consultant will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading, prior to sodding, seeding and planting operations.

3.7 CLEANING

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

END OF SECTION

1 GENERAL

1.1 RELATED WORK

.1 Section 32 91 19.13 – Topsoil Placement and Grading

1.2 SOURCE QUALITY CONTROL

.1 Obtain approval from landscape architect.

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

1.3 SCHEDULING

.1 Schedule sod laying to coincide with topsoil operations.

2 PRODUCTS

2.1 MATERIALS

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

.1 Turf Grass Nursery Sod types:
- .1 No. One Bluegrass Sod

.2 Turf Grass Nursery Sod quality:
- .1 Not more than 1 broadleaf weeds or 10 other weeds per 40 square metres and up to 1% native grasses.
- .2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.
- .3 Mowing height limit: 35 to 65 mm.
- .4 Soil portion of sod: 6 to 15 mm in thickness.

.2 The sod shall consist of live, growing, mature TWCA® Qualified Water Star Turfgrass obtained from a Green Certified Turf Producer, or approved equivalent. The sod shall have a healthy, virile root system of dense, thickly matted roots throughout.

.3 The sod shall be free of disease and harmful insects, obnoxious weeds or other grasses and shall not contain any other matter deleterious to its growth or which might affect its subsistence or hardiness when transplanted.

.4 Thickness of Cut: Turfgrass sod shall be machine cut at uniform soil thickness of 0.60 inch (15 mm), plus or minus 0.25 inch (6 mm), at the time of cutting. Measurement for thickness shall exclude top growth and thatch.

.5 Pad Size: Individual pieces of turfgrass sod shall be cut to the supplier's standard width and length. Maximum allowable deviation from standard widths and lengths shall be plus of minus 0.5 inch (15 mm) on width and plus or minus

five percent on length. Broken pads and torn or uneven ends will not be acceptable.

.6 Strength of Turf Sod Sections: Standard size sections of turfgrass sod shall be strong enough that it can be picked up and handled without damage.

.7 Moisture Content: Turfgrass sod shall not be harvested or transplanted when its moisture content (excessively dry or wet) may adversely affect its survival.

.8 Wooden Pegs: 17 x 17 x 200 mm or approved 200 mm long steel staples.

.9 Water: potable.

.10 Fertilizer: complete synthetic slow release fertilizer with maximum 35% water soluble nitrogen. Final composition ratio to be determined upon the soil testing results.

3 EXECUTION

3.1 LAYING OF SOD

.1 Prior to sodding, obtain approval from landscape architect that finished grade and depth of topsoil are satisfactory.

.2 Lay sod within 24 hours of being lifted.

.3 Sodding during excessively wet conditions, at freezing temperatures, or over frozen soil is not acceptable.

.4 Lay sod in rows, perpendicular to slope, and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.

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

.6 Water sod immediately after laying to obtain moisture penetration into top 100 mm of topsoil.

3.3 MAINTENANCE

.1 Maintain sodded area from start of installation until Substantial CompletioN. Maintenance during this establishment period shall consist of the following:

- .1 cutting of the turf to a height of 2.5”, removing no more than 1/3 of the turf blade
- .2 bagging of clipping IF they are excessive and will compromise the integrity and health of the turf
- .3 applying Gro-In granular fertilizer monthly from four weeks after completion until Substantial Completion
- .4 monitoring of the irrigation system to ensure full coverage and optimum watering evels are achieved

.2 Monitor the irrigation system sodded areas to ensure full coverage and optimum and uniform watering levels are achieved to a depth of 100 mm sufficient.

.3 Maintain grass at height of 50 mm. Mow in pattern appropriate to distribute clippings. Remove clippings which will smother grassed areas.

.4 Maintain sodded areas weed free.

.5 Fertilize sodded areas one month after sodding with a Gro-In 2:1:1 ratio fertilizer. Spread evenly at manufacturer's rate and water in well.

3.4 ACCEPTANCE

.1 Sodded areas will be accepted at final inspection 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 when grass has been cut to height of 50 mm

.2 Lawns sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 32 01 90.33 - Tree and Shrub Preservation.

1.2 MEASURE PROCEDURES

.1 Measure tree pruning for payment on Lump Sum basis according to project needs.

1.3 REFERENCES

The ANSI/A300 standard has been drafted to address pruning specifications across all geographic areas. Knowledge of the growth habits of certain tree species within a given environment may alter how the recommendations of A300 are interpreted.

.1 American National Standard Institute (ANSI)

.1 ANSI A300 (Part 1)-[2001], Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices (revision and re-designation of ANSI A300-1995) (includes supplements).
.2 ANSI A300 (Part 2)-[1998], Tree Care Operations - Tree, Shrub, and Other Woody Plant Maintenance - Standard Practices - Part 2 - Fertilization.
.3 ANSI A300 (Part 3)-[2000], Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance: Standard Practices - Part 3 - Tree Support Systems (a. Cabling, Bracing, and Guying) (supplement to ANSI A300-1995).

.2 Canadian Nursery Landscape Association (CNLA)

.3 International Society of Arboriculture (ISA)

.4 Ontario Ministry of Agriculture, Food and Rural Affairs
.1 Publication 483-[2004], Pruning Ornamentals.

1.4 DEFINITIONS

.1 Crown Cleaning: consists of selective removal of one or more of following items: dead, dying or diseased branches, weak branches and water sprouts.

.2 Crown Thinning: consists of selective removal of branches to increase light penetration, air movement and reduce weight.

.3 Crown Raising: consists of removal of lower tree branches to provide clearance.

.4 Crown Reduction or Crown Shaping: decreases tree height and/or spread.

.5 Vista Pruning: is selective thinning of framework limbs or specific crown areas to improve views.

.6 Crown Restoration: improves structure, form and appearance of trees that have been severely headed or vandalized.

1.5 QUALITY ASSURANCE

.1 Certification: provide International Society of Arboriculture or Canadian Nursery Landscape Association certification.

.2 Regulatory requirements: provide safety certificate as approved by local hydro utility.

.3 Field Samples: do sample pruning in manner to enable Project Manager to identify:
- .1 Knowledge of target areas including branch bark ridge and branch collars.
- .2 Technique for selection process and pruning used to establish desired form and shape for each species.

.4 Acceptance of Work will be determined by Project Manager from field sample.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and/or recycling in accordance with municipal guidelines.

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

.3 Dispose of unused disinfectant at official hazardous material collections site approved by City's Representative.

.4 Ensure emptied containers are sealed and stored safely.

.5 Divert wood materials from landfill to acceptable facility for recycling or composting as directed by City's Representative and/or Project Manager.

1.7 TOOL MAINTENANCE

.1 Ensure that tools are clean and sharp throughout pruning operation: do not use tools that crush or tear bark.

.2 Disinfect tools before each tree is pruned.

.3 On diseased plant material disinfect tools before each cut.

2 PRODUCTS

2.1 DISINFECTANT

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

3 EXECUTION

3.1 APPLICATION

.1 Manufacturer's instructions: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 GENERAL

.1 Prune in accordance with Pruning Ornamentals ANSI A300, and as directed by Project Manager. Where discrepancies occur between standard and specifications, specifications govern.

.2 Notify immediately Project Manager, conditions detrimental to health of plant material or operations.

.3 Prune during plant dormant period or after leaves have matured. Avoid pruning during leaf formation, at time of leaf fall.

.4 Retain natural form and shape of plant species.

.5 Do not:
- .1 Flush cut branches.
- .2 Crush or tear bark.
- .3 Cut behind branch bark ridge.
- .4 Damage branch collars.
- .5 Damage branches to remain.

3.3 PRUNNING

.1 Remove dead, dying, diseased and weak growth from plant material to provide crown cleaning, crown raising or crown reduction as required for work, and as designated by Project Manager in order to promote healthy growth.

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

.3 Remove live branches to re-establish natural species form including:
- .1 One or more developing leaders.
- .2 Multiple growth due to previous topping.
- .3 Branches extending outward from natural form.
- .4 Undesirable sucker growth.

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

.5 Remove vines.

.6 For branches under 50 mm in diameter:
- .1 Locate branch bark ridge and make cuts smooth and flush with outer edge of branch collar to ensure retention of branch collar. Cut target area to bottom of branch collar at angle equal to that formed by line opposite to branch bark ridge.
- .2 Make cuts on dead branches smooth and flush with swollen callus collar. Do not injure or remove callus collar.
- .3 Do not cut lead branches unless directed by Project Manager.

.7 For branches greater than 50 mm in diameter:

.1 Make first cut on lower side of branch 300 mm from trunk, one third diameter of branch.
.2 Make second cut on upper side of branch 500 mm from trunk until branch falls off.
.3 Make final cut adjacent to and outside branch collar.

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

.9 Remove additional growth designated by Project Manager.

3.4 ROOT GIRDLING

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

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

3.5 CARE OF WOUNDS

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

.2 Do not paint wound

3.6 CLEAN UP

.1 Collect pruned material daily and remove from site, and compost/recycle whenever applicable.

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

END OF SECTION

1 GENERAL

1.1 WORK INCLUDED

.1 The following specification is prepared for the Town Hall Baseball Field Construction for the drainage layout as shown on the Grading Plan. Contractor for this work shall be equipped and experienced in this work.

2 PRODUCTS

2.1 MATERIALS

.1 Plastic Drainage Tubing: Quality must meet or exceed CGSB 412GB-29M.

.2 Backfill: 19 mm diameter clear limestone granular.

.3 Geotextile: Non-woven geotextile filterfabric, Typar 3341 or approved equivalent, in 600 mm wide strips.

3 EXECUTION

3.1 WORKMANSHIP AND INSTALLATION

.1 Supply and install Header Pipe of 150 mm diameter perforated corrugated plastic tubing with factory wrapped fabric envelope material. Backfill with 19 mm diameter clear granular backfill to 200 mm from finished grade. Install drainage line at the specified slope, minimum 0.15%, minimum 0.4 meters cover.

.2 Supply and install drainage lines from 100 mm diameter perforated corrugated plastic tubing with factory wrapped fabric envelope material. Backfill with 19 mm diameter clear granular backfill to 200 mm from finished grade. Install drainage line at the specified slope, minimum 0.15% slope, minimum 0.4 meters cover.

.3 Installation of the drainage lines must be performed with a laser guided trencher.

.4 Do not place drainage lines on loose soil. The lines must be placed on compacted soil or clear to prevent settlement and lose of slope along the length of the drain lines.

END OF SECTION